

This is the official bulletin of The Pennsylvania State University. Graduate program and Graduate Council requirements are those in effect at the time of admission to a graduate degree program.

The University reserves the right to change the requirements and regulations listed here and to determine whether a student has satisfactorily met requirements for admission or graduation, and to reject any applicant for any reason the University determines to be material to the applicant's qualifications to pursue higher education. Nothing in this material should be considered a guarantee that completion of a program and graduation from the University will result in employment.

The Graduate Council has responsibility for and authority over all academic information contained in the Graduate Degree Programs Bulletin.

## **History of Graduate Education at Penn State**

For information, see [www.gradsch.psu.edu/aboutus/history.html](http://www.gradsch.psu.edu/aboutus/history.html).

## **The Graduate Faculty**

For information, see <http://www.gradsch.psu.edu/facstaff/faculty.cfm>.

## **The Graduate Council**

For information, see  
[www.gradsch.psu.edu/council](http://www.gradsch.psu.edu/council)

## **Administration**

For information, see  
[www.gradsch.psu.edu/aboutus](http://www.gradsch.psu.edu/aboutus)

## Program Locations

Programs of graduate study are offered at five locations in Pennsylvania:

- **Penn State Erie-** - [pennstatebehrend.psu.edu](http://pennstatebehrend.psu.edu)
- **Penn State Harrisburg-** - [www.hbg.psu.edu](http://www.hbg.psu.edu)
- **College of Medicine-** - <http://www.pennstatehershey.org/web/guest/education>
- **Penn State Great Valley-** - [www.gv.psu.edu](http://www.gv.psu.edu)
- **University Park Campus-** - [www.gradsch.psu.edu](http://www.gradsch.psu.edu)

**Off-site courses**--Graduate degree programs based at any of the five administrative centers of the Graduate School listed previously, but offered at locations away from those centers, may be discontinued at any time. Degree candidates will be eligible to continue the program, but this may require attendance at courses offered only at the center where the program is based. The University will provide notice of the discontinuance of any program offered at an off-center site at least one semester in advance and furnish information concerning available options for continuance in the program.

## GRADUATE LIFE

Current graduate enrollment at University Park campus is about 6,790 students, of whom 78 percent are engaged in graduate study full time, 47 percent are women, and 35 percent are residents of Pennsylvania. (Undergraduate enrollment at University Park campus exceeds 40,000.) International students make up about 35 percent of the graduate student population, and about 8 percent of enrolling graduate students report themselves as members of recognized U.S. ethnic minority groups.

University Park campus is one of the most naturally beautiful American campuses. On any given day of the semester, about 50,000 people will be on the campus: 38,000 students, 12,000 employees, and several hundred visitors. Although the size of the campus can be intimidating, graduate students soon find that its size and diversity afford a variety of stimulating activities. This variety reflects the University's view that a person's graduate experience should include, in addition to course work and research, living in a scholarly atmosphere, profiting from the perspectives of visiting scholars and artists, and engaging in informal discussions with faculty and fellow students. It also should mean participating in student affairs and University governance, and allowing time to reflect, to explore fields related to one's specialty, and to enjoy leisure activities.

Although the mailing address of the largest campus is University Park, PA 16802, this name ordinarily does not appear on maps. The University Park campus is located in State College, Pennsylvania, an area with a population of more than 67,000. State College is located on U.S. Highway 322, near Interstates 80 and 99, and can be reached directly by bus or airline service. The town retains a collegiate atmosphere enhanced by many small shops, restaurants, cinemas, and bookstores.

## GRADUATE STUDENT ASSOCIATION

For information, see  
[www.clubs.psu.edu/up/gsa](http://www.clubs.psu.edu/up/gsa)

## GRADUATE SCHOOL ALUMNI SOCIETY

For information, see  
[www.gradsch.psu.edu/av](http://www.gradsch.psu.edu/av)

## RECREATIONAL AND ATHLETIC FACILITIES

For information, see  
[www.psu.edu/ur/athrec.html](http://www.psu.edu/ur/athrec.html)

## THE ARTS

For information, see  
[www.psu.edu/ur/arts.html](http://www.psu.edu/ur/arts.html)

## REGULATIONS AND CONDUCT STANDARDS FOR STUDENTS ENROLLED IN THE GRADUATE SCHOOL

It is the responsibility of students to be cognizant of the rules, regulations, and procedures of the University. This information is contained in the graduate school policies at [www.gradsch.psu.edu/policies](http://www.gradsch.psu.edu/policies) ([Opens New Window](#)).

### MOTOR VEHICLE REGULATIONS

For information, see [guru.psu.edu/policies/BS04.html](http://guru.psu.edu/policies/BS04.html) ([Opens New Window](#)).

### BICYCLE REGULATIONS

For information, see [guru.psu.edu/policies/SY16.html](http://guru.psu.edu/policies/SY16.html) ([Opens New Window](#)).

### STANDARDS OF CONDUCT

By virtue of their maturity and experience, graduate students are expected to have learned the meaning and value of personal honesty and professional integrity before entering the Graduate School. Every student is expected to exhibit and promote the highest ethical and moral standards. A violation of such standards is regarded as a serious offense, raising grave doubt that the student is worthy of continued membership in the Graduate School community. The University Code of Conduct is found in [Appendix I](#) in this Bulletin. Violation of the Code may result in suspension or dismissal from the academic program and/or from the Graduate School. For additional information, please go to [www.sa.psu.edu/ja](http://www.sa.psu.edu/ja).

*Research Integrity*--Graduate students are expected to adhere to the highest standards of research integrity in the conduct of their research and other educational activities. They are subject to University policy AD-47, "General Standards of Professional Ethics," and RA-10 "Handling Inquiries/Investigations into Questions of Ethics in Research and in Other Scholarly Activities," which apply to all University personnel engaged in research activities. This policy may be accessed electronically through the University's General University Reference Utility (GURU). For information on Research Integrity, please go to [guru.psu.edu/policies/RA10.html](http://guru.psu.edu/policies/RA10.html). For more information on general standards of professional ethics, please go to [guru.psu.edu/policies/AD47.html](http://guru.psu.edu/policies/AD47.html).

### RESOLUTION OF PROBLEMS

For information regarding procedures for resolving or appealing problems in the classroom and outside, see [Appendix II](#) in this bulletin.

### OWNERSHIP OF INTELLECTUAL PROPERTY

For information, see [www.research.psu.edu/ipo](http://www.research.psu.edu/ipo) ([Opens New Window](#)) and [guru.psu.edu/policies/RA11.html](http://guru.psu.edu/policies/RA11.html) ([Opens New Window](#)).

### RESEARCH PROTECTIONS

To ensure compliance with applicable federal and state laws, certain University activities require review and approval by appointed institutional review committees. Projects involving any of the following concerns must be reviewed and approved through the Office for Research Protections (ORP) before the project is initiated.

For information, see [www.research.psu.edu/orp](http://www.research.psu.edu/orp) ([Opens New Window](#)).

Conflict of Interest--See [guru.psu.edu/policies/RA20.html](http://guru.psu.edu/policies/RA20.html) ([Opens New Window](#)).

For policy statements on these issues, see [guru.psu.edu/policies/RA14.html](http://guru.psu.edu/policies/RA14.html) and [guru.psu.edu/policies/RA15.html](http://guru.psu.edu/policies/RA15.html). See also policies on safety issues at [guru.psu.edu/policies/SY24.html](http://guru.psu.edu/policies/SY24.html) ([Opens New Window](#)).

NOTE: The College of Medicine at the Penn State Milton S. Hershey Medical Center is a unique Penn State campus in that it maintains a separate IRB, IACUC, UBC, and UIC. Students conducting projects at Hershey should contact their local committees for approval of research.

Date last reviewed: 10/11/11



## **STUDENT SERVICES**

### **CAREER SERVICES**

For information, see  
[www.sa.psu.edu/career](http://www.sa.psu.edu/career)

### **CENTER FOR COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS)**

For information, see  
[www.sa.psu.edu/caps](http://www.sa.psu.edu/caps)

### **OFFICE FOR DISABILITY SERVICES**

For information, see  
[www.equity.psu.edu/ods](http://www.equity.psu.edu/ods)

### **OFFICE OF GRADUATE EDUCATIONAL EQUITY**

For information, see  
<http://www.gradsch.psu.edu/diversity/>

### **HEALTH INSURANCE**

For information, see  
[www.sa.psu.edu/uhs/basics/insurance.cfm](http://www.sa.psu.edu/uhs/basics/insurance.cfm)

### **UNIVERSITY HEALTH SERVICES (UHS)**

For information, see  
[www.sa.psu.edu/uhs](http://www.sa.psu.edu/uhs)

**Penn State Erie-#See**  
[pennstatebehrend.psu.edu/student/health](http://pennstatebehrend.psu.edu/student/health)

**Penn State Harrisburg-#See**  
<http://php.scripts.psu.edu/dept/iit/hbg/studentaffairs/health.php>

### **HOUSING AND FOOD SERVICES**

For information about housing, see  
[www.hfs.psu.edu/housing](http://www.hfs.psu.edu/housing)

For information about food services, see  
<http://www.foodservices.psu.edu/>

### **INTERNATIONAL STUDENT SERVICES**

For information, see  
[www.international.psu.edu](http://www.international.psu.edu)

### **VETERANS OUTREACH OFFICE**

For information, see  
[www.equity.psu.edu/veterans](http://www.equity.psu.edu/veterans)

DATE LAST REVISED: 05/18/07



## Application and Admission Procedures

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualification to pursue higher education.

An applicant for admission to the Graduate School should understand that graduate work is not a simple extension of an undergraduate program but, rather, demands scholarship of a higher order, and emphasizes research, creativity, and professional competence with a minimum of formal requirements and a maximum of student initiative and responsibility.

**Objective--**The objective of the admission process of the Graduate School is to identify and admit a qualified graduate student body up to the limit of the University's resources to provide outstanding graduate programs. In most programs, a student may begin graduate work in the fall or spring semester or in the summer session.

As at all universities, Penn State's staff, facilities, and other resources are limited, so that not all qualified persons can be admitted. The number accepted will vary by program and from semester to semester. In some graduate programs all vacancies will have been filled long before the deadline for submitting applications, so that even outstanding students cannot be accepted.

**Degree Admission--**Applicants interested in applying to a graduate program at Penn State should obtain information on individual program requirements via the website at [www.gradsch.psu.edu/prospective/program.cfm](http://www.gradsch.psu.edu/prospective/program.cfm).

. Applicants may apply for admission to only one program at a time.

**Qualifications--**For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Ordinarily, an entering student must have completed in a satisfactory manner a minimum of course work in designated areas, the specific courses and amount of work depending upon the intended field of advanced study. Scores on the Graduate Record Examinations (GRE) General Test are required by most programs. Individual program requirements for admission are included under the specific program descriptions. Information about GRE publications can be obtained by calling the Educational Testing Service in Princeton, New Jersey, USA at 1-866-473-4373 or writing to GRE, Educational Testing Service, P.O. Box 6000, Princeton, NJ USA 08541-6000. If you prefer, you may send an e-mail to [gre-info@ets.org](mailto:gre-info@ets.org) or order publications through the website at

[www.gre.org](http://www.gre.org)

Provisional admission may be granted to applicants whose credentials are not complete at the time of application because the baccalaureate degree has not yet been conferred, grades for the current semester are not yet available, etc. Such admission is subject to cancellation if the complete credentials, on arrival, do not meet the requirements for admission. In the interim, certification of any earned credits will be withheld. If admission is canceled for any reason, the student is dropped automatically from the Graduate School. Completion of admission in such cases is dependent upon receipt of the missing credentials. (See Provisional Admission under [Classification of Students](#).)

Admission is granted jointly by the Graduate School and the department or graduate program in which the student plans to study. The establishment of standards by which applicants are admitted is a departmental or program responsibility. Although the Graduate School has no fixed minimum grade-point requirement for admission, an applicant is generally expected to maintain a junior-senior grade-point average of at least 2.50 on Penn State's grading scale of A (4.00) to D (1.00). Individual programs often establish higher grade-point average requirements and use other criteria to judge candidates for admission. In exceptional cases, departments or major programs may also approve admission by reason of special backgrounds, abilities, and interests. Departmental or program requirements are given in the descriptive statements appearing under the graduate programs listed in the latter part of this publication.

A student who has been admitted to a program in which the doctorate is offered may begin working toward that degree but has no official status as a doctoral student and no assurance of acceptance as a doctoral candidate until a candidacy examination administered by the major department or committee has been passed. (See Candidacy Examination under [Degree Requirements](#).)

**Deadlines--**Applicants should obtain application deadlines by contacting the individual graduate program. Because the admission process is time consuming, applications should be submitted as early as possible.

**Pennsylvania Act 34 Clearance--**Applicants should note that some programs may require clearance of students participating in internships/practicums in Pennsylvania school districts. Pennsylvania Act 34 of 1985 (Criminal History Record Information) specifies that employees of Pennsylvania public and private schools must undergo background checks. School districts accepting graduate students for internships/practicums increasingly require Act 34 clearance before permitting students to begin their practicums in the district, even though they are not employees. In addition, non-Pennsylvania residents are expected to present evidence of an FBI background information check. Applicants are encouraged to contact the program to which they are applying if they have questions as to this requirement and how it may affect them.

**Nondegree Admission--**If you do not intend to pursue a graduate degree, but want to take graduate-level courses for personal enrichment, professional development, permanent certification, or to apply for degree status at a later date, you can seek admission as a nondegree graduate student. Information on applying for nondegree graduate status may be obtained via the website at

[www.gradsch.psu.edu/prospective/apply](http://www.gradsch.psu.edu/prospective/apply)

Changing from graduate nondegree status to regular status requires a new admission application. No more than 15 graduate credits of course work taken prior to admission to a graduate degree program may be applicable to a graduate program. (See "Nondegree Student" under [Classification of Students](#).) However, admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships and preference for courses is given to degree students. Programs control access to some courses.

Applicants for nondegree admission must have received from a regionally accredited institution a baccalaureate degree under residence and credit conditions substantially equivalent to those required by Penn State.

**Minority Students**--Minority students are encouraged to apply for admission to any of the programs offered in the Graduate School. Information concerning programs and financial aid can be obtained from the chair of the graduate program, the dean of the college of the student's major interest, or from the Office of Graduate Educational Equity, 304 Kern Building.

**International Students**--International applicants must hold the equivalent of an American **four**-year baccalaureate degree. They must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.

**English Proficiency**--The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5. Graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Please note that specific graduate programs may require all international applicants to submit a TOEFL or IELTS score, regardless of their academic background and country of origin.

Information about the TOEFL can be obtained by writing to the Educational Testing Service, Box 6155, Princeton, NJ 08541-6155 or visiting its website at [www.toefl.org](http://www.toefl.org). Local administration at University Park campus of the TOEFL is handled by the IECF. Information about the IELTS can be obtained by contacting IELTS International, 100 East Corson Street, Suite 200, Pasadena, CA 91103 or visiting its website at [www.ielts.org](http://www.ielts.org).

**Undergraduate Students**--Any senior with a 3.50 grade-point average may be admitted to 500- or 800-level courses with the consent of the instructor; other seniors with a B average or better may be admitted to graduate courses with the consent of the instructor, the student's academic adviser, and the director of Graduate Enrollment Services. Forms to request permission to take 500- or 800-level courses are available in the Office of Graduate Enrollment Services, 114 Kern Building.

Undergraduate students in The Schreyer Honors College who undertake integrated undergraduate--graduate study (IUG) can pursue concurrent bachelor's and master's degrees. Information on IUG study can be obtained at the office of the dean of The Schreyer Honors College, 10 Schreyer Honors College.

In certain cases undergraduate students may subsequently apply credits they have earned in 400, 500, and 800 series courses toward an advanced degree at Penn State. After admission to the Graduate School, and with the approval of the major field, a maximum of 9 credits relevant to the graduate program of study that were not used to satisfy undergraduate requirements may be applied toward an advanced degree. The time limitation on the completion of a master's degree program applies to these as well as to other credits.

**Postdoctoral Fellows, Scholars, and Guests of the University**--Postdoctoral Fellow appointments are financed under a Postdoctoral Fellow Program of a granting agency outside the University. A Postdoctoral Scholar is the usual designation for all other postdoctoral appointments that meet the standards enumerated by the National Research Council. Postdoctoral appointments are considered appointments of a temporary nature that are intended to offer an opportunity for continued experience in research or teaching, usually, though not necessarily, under the supervision of a senior mentor.

Individuals holding the highest degree in their fields from Penn State or other accredited colleges and universities are invited to apply to the dean of the Graduate School for guest privileges for purposes of noncredit study. Guests may attend seminars and courses with the privileges of faculty members and, if space and facilities are available, carry on research. Individuals may also be appointed to temporary positions in all University ranks. All guests are expected to affiliate formally or informally with one of the departments, institutes, or other subdivisions of the University engaged in scholarly pursuits.

**Policy on Second Doctorates**--The Graduate School does not admit applicants to concurrent double Ph.D. degree programs, D.Ed. degree programs, or D.M.A. degree programs, or to concurrent doctoral degree programs in any combination (Ph.D., D.Ed., and/or D.M.A.). In general, the Graduate School discourages the pursuit of a second Ph.D., D.Ed., or D.M.A. degree. However, if an applicant who holds one of these degrees requests admission to a second doctoral degree program (either Ph.D., D.Ed., or D.M.A.), the applicant is asked to give the Graduate School the reason why the second doctorate is necessary (as opposed to taking course work or obtaining a master's degree in the second field or working in a postdoctoral appointment in the second field). The Graduate School then may solicit responses concerning

the necessity of the second doctorate from representatives of the field at Penn State or elsewhere. This information is then given to the Dean of the Graduate School for the final decision. If approved, all Graduate School requirements for the second doctorate must be ~~met~~ *met* *nov*o.

**Student Pennsylvania Resident Status**--When it appears that an applicant for admission is not a resident of Pennsylvania for tuition purposes, a non-Pennsylvanian classification is assigned. If the student who is thus admitted believes that circumstances do not justify classification as a non-Pennsylvanian, a petition may be addressed to the Fee Assessor, The Pennsylvania State University, 108 Shields Building, University Park, PA 16802 for reclassification. Penn State Harrisburg students may petition the Penn State Harrisburg financial officer.

A copy of the Policy for Determination of Eligibility for Reclassification as a Pennsylvania Resident for Tuition Purposes can be obtained in the office mentioned above or [online](#) and should be reviewed before requesting reclassification. Any reclassification resulting from a student's petition shall be effective for tuition purposes as of the date such petition was filed. A student who changes residency from Pennsylvania to another state must promptly give written notice to the University. See also [Appendix V](#) to this bulletin.

Updated: 4/6/12

## TRANSFER CREDIT

Subject to the limitations given below, a maximum of 10 credits of high-quality graduate work (credits must be equivalent to 400-level or higher at Penn State) transferred from a regionally accredited U.S. institution or a recognized degree-granting international institution may be applied toward the requirements for a graduate degree. However, credits earned to complete a previous degree, whether at Penn State or elsewhere, may not be applied to a graduate degree program at Penn State, except for those students who are approved to double-count credits as part of an approved concurrent or integrated undergraduate-graduate degree or those students approved by the Graduate School to receive a master's degree along the way to a doctorate.

The student should distinguish carefully between the transferability of credit and its applicability in a particular degree program. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official transcript of a regionally accredited U.S. institution or recognized degree-granting international institution.

Pass-fail grades are not transferable to a graduate degree program unless the "Pass" can be substantiated by the former institution as having at least B quality.

Forms for transfer of credit can be obtained from each graduate program. (See [www.gradsch.psu.edu/prospective/program.cfm](http://www.gradsch.psu.edu/prospective/program.cfm) for graduate program contact information.)

Updated: 4/3/12

## Classification of Students

A graduate student may be admitted as a degree student, a certificate student, or a nondegree student, depending upon the student's objectives. A student who has held only nondegree status and who later wants to apply for degree status should contact his or her intended program of study. Admission as a nondegree student neither guarantees nor implies subsequent admission to a degree program. Any other change in classification must be arranged through the Office of Graduate Enrollment Services, 114 Kern Building.

**Degree Student**--A degree student is one who plans to become a candidate for an advanced degree at Penn State and who has been formally admitted for advanced studies in a particular program. The program of study is developed under the guidance of an adviser appointed by the head of the student's major program. A degree student who has passed a candidacy examination is classified as a doctoral candidate.

**Provisional Admission**--Provisional admission is a temporary classification in which an applicant may remain for a period of either one or two semesters (depending on the provisional type) following admission. If the conditions of provisional admission are not met within that time, the student may be dropped from the program. In addition, all provisional conditions must be met before a student reaches an academic benchmark. Benchmarks include completion of a master's program, the doctoral candidacy, comprehensive, and the final oral examinations. A student will not be permitted to graduate who has not met the conditions of his or her provisional admission.

**Nondegree Student**--If you do not intend to pursue a graduate degree, but want to take graduate-level courses for personal enrichment, professional development, permanent certification, or to apply for degree status at a later date, you can seek admission as a nondegree graduate student. Information on applying for nondegree graduate status may be obtained via the Web site at [www.gradsch.psu.edu/prospective/apply](http://www.gradsch.psu.edu/prospective/apply).

A maximum of 15 graduate credits taken as a nondegree student prior to admission to a graduate degree program may be applied to a graduate program, with departmental approval. The credits must have been earned within five years preceding entry into the degree program. For additional information, see Transfer of Nondegree Graduate Credits, under [Transfer Credits](#). Forms for transfer of nondegree credits may be obtained from the graduate program.

Applicants for nondegree admission must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State.

**Certificate Student**--A certificate student is one who is engaged in a program of study leading to a certificate or equivalent recognition of accomplishment rather than a graduate degree program at Penn State. Certification students, i.e., candidates for Instructional, Supervisory, Educational Specialist, and Administrative certificates, have the same University privileges and responsibilities as graduate degree students. ( See additional information under Pennsylvania Department of Education Certificate Candidates.)

**Undergraduate Student**--Such a student is not a graduate student because a baccalaureate degree has not been attained. The student may not register for graduate courses (500 or 800 series) unless he or she is a senior with at least a 3.50 cumulative GPA or with at least a 3.0 GPA and special permission from the Office of Graduate Enrollment Services. Forms to request permission to take 500- or 800-level courses are available in the Office of Graduate Enrollment Services, 114 Kern Building.

## **CREDIT BY EXAMINATION**

Examinations to establish credit for work done in absentia or without formal class work may be used to remove undergraduate deficiencies, but not to earn credits toward an advanced degree. Arrangements are made by the student directly with the major department head or program chair.





## **Student Aid**

For general information regarding available sources of student aid, see [www.psu.edu/studentaid](http://www.psu.edu/studentaid) and click on the link for Graduate Students.

## **Assistantships**

For information, see [www.gradsch.psu.edu/prospective/assistantships.html](http://www.gradsch.psu.edu/prospective/assistantships.html).

## **Fellowships and Traineeships**

For information, see <http://gradsch.psu.edu/fellowships>.

For information about specific funding programs, see [www.gradsch.psu.edu/fellowships/programs](http://www.gradsch.psu.edu/fellowships/programs).

## **Veterans' Benefits**

For information, see [www.equity.psu.edu/veterans/outreach.asp](http://www.equity.psu.edu/veterans/outreach.asp).



## THE UNIVERSITY LIBRARIES

The University Libraries constitute a major resource for students and researchers in all fields of study. The Libraries are ranked among the top ten research libraries in North America by the Association of Research Libraries and contain more than 53 million volumes, 6.9 million microforms, 88,668 serial subscriptions, plus more than 536 databases and 45,906 online full-text journals, and 100,000 e-books.

The University Libraries include a central facility and five other libraries at University Park campus, plus libraries at 23 Penn State locations throughout the state, including the Dickinson School of Law and the Milton S. Hershey Center and the Penn State affiliated Pennsylvania College of Technology. At University Park, the Arts and Humanities, Business, Education and Behavioral Sciences, Gateway Commons, Social Sciences, Maps, Life Sciences, Special Collections, and News and Microforms libraries are maintained in Pattee Library and Paterno Library. Other Libraries at University Park include the Architecture and Landscape Architecture, Earth and Mineral Sciences, Engineering, Law, and Physical and Mathematical Sciences libraries.

In addition Pattee Library houses Course Reserves Services, the Extended Hours Study Area, (now offering 24-hour service), and Library Services for Persons with Disabilities. The Special Collections Library in Paterno Library includes Historical Collections and Labor Archives, Rare Books and Manuscripts, and the Penn State University Archives. Additional library services include assigned carrels, photocopiers, a student lounge with vending machines, change machines, and MacKinnon's Cafe.

Among special collections of national importance are those on Arnold Bennett, Kenneth Burke, Jean Giraudoux, John O'Hara, Vance Packard, Joseph Priestley, Conrad Richter; the Allison-Shelley collection of Anglo-Americana-Germanica; and materials on Utopian literature and on Australia. The Historical Collections and Labor Archives contain a wide variety of documentary sources, including the papers of Pennsylvania leaders and businesses and records of labor unions. The most notable of these documents are those of Richard Schweiker, William Scranton, the United Steelworkers of America, and the United Mine Workers of America. The Penn State University Archives house an extensive collection of materials about the University and the surrounding community.

Faculty members may recommend books and other library material purchases by contacting a subject specialist at [www.libraries.psu.edu/psul/cataloging/services\\_policies/specialists.html](http://www.libraries.psu.edu/psul/cataloging/services_policies/specialists.html)

. Faculty at locations other than University Park can also contact their head librarian.

Access to holdings is obtained through The CAT, a computerized catalog, part of the Library Information Access System (LIAS), available on the Web at

[www.libraries.psu.edu](http://www.libraries.psu.edu)

. LIAS is a dynamic, integrated information system that provides electronic access to a great variety of materials in many subject areas.

The Libraries maintain a comprehensive program of general and specialized reference and instructional services. The Libraries' faculty teach credit courses as part of the Library Studies Program and offer a variety of topical seminars. Introductory sessions, offered by Library Learning Services, are scheduled on a regular basis to familiarize faculty, students, and other library users with LIAS. Class sessions designed for specific courses can be arranged in the library to help students learn how to find, use, and evaluate relevant books, articles, Web sites, and other information resources. Assistance is available to help design assignments that use library resources to enhance student research skills and critical thinking. Library instruction rooms (hands-on labs or traditional classrooms) can be reserved for on-site instruction in the use of library resources. For information, go to:

[www.libraries.psu.edu/psul/lis.html](http://www.libraries.psu.edu/psul/lis.html)

Penn State holds membership in the Association of Research Libraries, the Consortium for Institutional Cooperation, and the Online Computer Library Center (OCLC). Participation in these organizations provides faculty and students with access to the collections of more than 2,500 libraries across the United States and internationally, including major research libraries. It is the largest research library in Pennsylvania and one of four resource libraries that provide service and collections to all other libraries and citizens of the Commonwealth.

The publication Guide to the University Libraries offers additional information on services and programs and is available at Libraries service desks and by calling 814-863-4240. More information is also available at

[www.libraries.psu.edu/psul/pram/publications.html](http://www.libraries.psu.edu/psul/pram/publications.html)

. An Open House is held each fall semester.

Media and Technology Support Services (MediaTech),

[www.libraries.psu.edu/mtss/](http://www.libraries.psu.edu/mtss/)

, a division of the University Libraries, has a collection of more than 24,000 films and videotapes and more than 5,000 pieces of technology and audio-visual equipment available to faculty, staff, and students. Titles in the Media Tech collection are listed in The CAT, the Libraries' online catalog and in the MediaTech database at

<http://extranet.libraries.psu.edu/mtss/media/searchMedianet.html>

Services include:

- Consultation for purchase of technology or audiovisual equipment: 814-863-0665
- Consultation for purchase of technology or audiovisual equipment: 814-863-0665
- Equipment scheduling: 814-865-5400, or 26 Willard Building; e-mail to [mtsseq@psulias.psu.edu](mailto:mtsseq@psulias.psu.edu)
- Media Duplication: Call 814-863-8144 or e-mail [mjs149@psu.edu](mailto:mjs149@psu.edu). Downloadable duplication order form (PDF) at [www.libraries.psu.edu/mtss/services/duplication.html](http://www.libraries.psu.edu/mtss/services/duplication.html)

- Media Site Live: [www.libraries.psu.edu/mtss/mediasitelive/mediasitelive.html](http://www.libraries.psu.edu/mtss/mediasitelive/mediasitelive.html)
- Preview facilities: 814-863-3202 and 814-865-5400, Wagner Annex
- Program scheduling: 814-865-5400; e-mail to [mtssmed@psulias.psu.edu](mailto:mtssmed@psulias.psu.edu)
- Repair and Installation Services: 814-863-4389
- Video/Photo Production Studios: Students and faculty may reserve time and space in the studios to produce, edit, and export their video/audio projects. Green Screen is also available for use, with on-site staff available to answer questions and conduct demonstrations. Call 814-865-5400.
- Video Taping Class Presentations: Schedule taping at least thirty-eight hours before the presentation by contacting MTSS Equipment at 814-865-5400 or [mtsseq@psulias.psu.edu](mailto:mtsseq@psulias.psu.edu). Indicate desired format when scheduling--mini-DV tape or DVD (digital).
- MediaTech Info Line: 814-863-1234 (touch-tone phones only). Includes current weather forecasts as provided by the Campus Weather Service, the University Calendar of Events, information on town and campus movies, JOBS-Penn State's employment information service, open house schedules for the Department of Astronomy, and construction barriers on or around the University Park campus.

For more information about services available from MediaTech, e-mail [mtssmed@psulias.psu.edu](mailto:mtssmed@psulias.psu.edu) or visit [www.libraries.psu.edu/mtss](http://www.libraries.psu.edu/mtss)

## **THE PENN STATE PRESS**

The Penn State Press is a publisher of books and journals that contribute to the advancement of scholarship. It publishes in most areas of the humanities and social sciences, giving emphasis to art and architectural history, literature and literary criticism, philosophy, religious studies, history, political science, women's studies, sociology, Latin American studies, and East European and Russian studies. Its journals include the Chaucer Review, Journal of Nietzsche Studies, the Good Society, Philosophy and Rhetoric, Journal of General Education, Journal of Speculative Philosophy, Comparative Literature Studies, Journal of Policy History, Pennsylvania History, Book History, and Shaw: The Annual of Bernard Shaw Studies. The Press publishes eight series: Issues in Policy History (Editor: Donald T. Critchlow); Literature and Philosophy (Editor: Anthony J. Cascardi); Penn State Series in the History of the Book (Editor: James L. W. West III); Re-reading the Canon (Editor: Nancy Tuana); Studies of the Greater Philadelphia Philosophy Consortium (Editor: Michael Krausz); Rural Studies Series (Editor: Clare Hinrichs); Penn State Library of Jewish Literature (Editors: Baruch Halpern and Aminadav Dykman); American and European Philosophy Series (Editors: Charles Scott and John Stuhr); Buildings, Landscapes, and Societies; and Refiguring Modernism.

## **INFORMATION TECHNOLOGY SERVICES**

Information Technology Services (ITS) ensures that faculty, students, and staff have the information technology tools and infrastructure necessary to carry out the University's mission. ITS is working to achieve five broad goals: help faculty improve the way education is delivered; provide students with resources to enrich their educational experience; create and sustain an environment that enables leading-edge research; help to improve productivity; and establish the information technology infrastructure necessary to maintain Penn State's preeminence in integrating high-quality programs in teaching, research, and outreach. For additional information, see [its.psu.edu](http://its.psu.edu) on the Web.

## SPECIALIZED COMPUTING FACILITIES

Penn State also provides distributed computing and information systems. Many academic computing facilities exist to support the specialized research and instructional requirements of the colleges and the intercollege research programs. Some of these facilities are described below.

### Colleges

#### College of Arts and Architecture

The School of Architecture and Landscape Architecture operates dedicated student computer labs and has integrated desktop computers into the studio environment. Students have access to high-performance networks via either wired or wireless connections. The school's computer labs, including the Stuckeman Center for Design Computing, are primarily used for teaching and research in such areas as computer graphics, computer-assisted drawing, design, GIS, and digital imaging, as well as exploration into computer visualization, virtual reality, and digital fabrication. A wide variety of available input and output equipment, such as large-format printers, color printers, scanners, a CNC laser cutter, site survey, and video imaging and capturing equipment, provides faculty and students with opportunities to explore and master a variety of technologies and presentation techniques.

The Immersive Environments Lab (IEL) is a joint venture between Penn State's Information Technology Services (ITS) and the School of Architecture and Landscape Architecture (SALA). The IEL is a stereo visualization system consisting of a three-screen panorama display and a cluster of graphics workstations. Students have the capability of displaying a range of 2D and 3D presentations or they may launch 3D to a full three-screen stereo panorama for a group walk-through. Using virtual reality to visualize interior and exterior spaces allows students to follow the design process from conception to construction to completion.

The School of Music provides students and faculty in all disciplines within the school with a Macintosh-based electronic music laboratory and two computerized music rooms. These facilities afford faculty and students opportunities to create, analyze, and perform music as well as develop innovative music teaching materials.

The School of Theatre maintains lab facilities to support its technical theatre program, including set design, lighting, sound, and costume design. Interaction with common and professional applications affords students the opportunity to gain familiarity and experience with tools being used in the field. In addition, computers are regularly used in performance to control lighting and sound systems and to facilitate such complex tasks as moving scenery.

The School of Visual Arts computer facilities are customized for the advanced technological needs of students and faculty in the School of Visual Arts and the Department of Integrative Arts. Located in 302, 304, and 401 Patterson Building and maintained by Information Technology Services (ITS), the Patterson computer laboratories are specialized for design, animation, and high-end multimedia production. Within close proximity, the Graphic Design computer laboratory, 208 Visual Arts Building, is designed to meet the specific needs of students enrolled in the Graphic Design program. The Digital Photography computer laboratory, customized for students enrolled in the Photography program, is located in 209 Visual Arts Building. All five labs are Macintosh environments and are used as both teaching and study facilities. Most labs are open twenty-four hours a day, seven days a week.

#### College of Earth and Mineral Sciences

The College of Earth and Mineral Sciences has installed a high-speed communications network that provides computer-to-computer communications within the college, as well as with external networks and computers via University facilities. Wireless access to this network is provided throughout the college. Computing facilities are distributed throughout the departments and institutes of the college, and include extensive local PC, UNIX/LINUX, and Macintosh computer laboratories accessible to undergraduate and graduate students. Many graduate students have a PC or UNIX computer supplied to their desktop. In addition to these distributed facilities, high-performance computing is available on high-end Linux clusters operated by the ITS GeARS group in concert with the college's departments and institutes.

#### College of Education

In the College of Education, the Education Technology Center, located in 201 Chambers Building, provides technical support services, multimedia and graphic design services, Web design and development services, and computer application training for College of Education faculty and staff. The Education Technology Center also maintains the Education Technology Demonstration Classroom and video conferencing services. The Demonstration Classroom is used by College of Education faculty for implementing technology into teaching and learning for undergraduate and graduate College of Education courses. It also provides a computer facility equipped to instruct College of Education students how to use technology in their teaching and learning experiences.

The IBM Personal Computer Lab, located in 202 Chambers Building and the Macintosh Computer Lab located in 205 Chambers provide microcomputer access to the University community. Thirty networked IBM and twenty-eight Macintosh computers are available for student and faculty use. (The labs are restricted during certain hours; check schedule outside each room.)

#### College of Engineering

The College of Engineering has a number of general and special purpose computational resources and services to support



the College's educational and research endeavors. Each department maintains multiple laboratories that include various servers and workstations. These laboratories employ a number of Sun, PC, and Macintosh workstations running under the latest Sun, Microsoft, LINUX, or UNIX operating system. In addition to these general purpose facilities, several departments have faculty who maintain High-Performance Parallel Computing facilities with multiprocessor computing nodes for research initiatives. These facilities typically use PC-based systems running LINUX or Macintosh OSX servers running Open BSD in Beowulf clustering configurations. The University's Information Technology Services also maintains a multinode High-Performance Parallel Computing facility for faculty and graduate student research. The College of Engineering also operates and maintains a multimode High-Performance Computing cluster to support undergraduate and graduate education. The College system is available during non-peak usage times to support graduate research.

The Department of Computer Science and Engineering at Penn State uses a network of Solaris, Linux, OS X, and Windows workstations and servers to support academic computing needs. Instruction is supported by pairs of Sun V240 and V880 servers. These servers act as application, Web, e-mail, and license servers for over 400 workstations in labs, graduate student offices, and faculty offices. Funded research efforts utilize any one of the departments nine High Performance Computing Clusters, totaling nearly 400 multi-processor compute nodes sharing IBA, DolpinNet, Myrinet, and GigE interconnection. Researchers currently share approximately 15TB of BlueArc NAS storage. Additionally, the department is constructing a cognition and perception lab with cutting edge computer vision technology. NSF CISE/Instrumentation, Infrastructure, and IGERT grants have funded much of CSE's research equipment. Computing resources are connected via a fail-safe pair of 3Com 7700 Switching Routers. The routers provide GigE service to all backbone-connected devices, including all edge switching devices. CSE's GigE connection to the campus backbone (including I and I2) is hosted with a resilient pair of interfaces through an HSRP enabled firewall. All of this equipment is housed in the Information Sciences and Technology building, Penn State's new technology showcase building.

The Institute for Computational Science is a University-wide initiative conceived and chaired by a faculty member in the College of Engineering. The institute addresses the need for resources and computing power required for fields such as computational fluid dynamics, computational chemistry, computational meteorology, computational physics, artificial intelligence, computational materials science, business computing, etc. Annual conferences focus on collaboration among researchers in the aforementioned computation intensive programs.

Electronic and Computer Services (ECS) within the College of Engineering provides faculty and graduate students with engineering expertise and support in the areas of hardware and software system design, prototyping, and complete systems integration. ECS resources include high-performance workstations and design tools (ViewLogic, H-Spice, Cadence, LabView, AutoCAD, etc.). Also available are tools for embedded system development. Prototyping facilities consist of Xilinx and Altera systems for FPGA design. Distributed access to College, departmental, and ECS resources is through the College's maintained high-speed secure data network. ECS maintains the College's High-Performance computing cluster and network throughout 26 buildings; ECS also maintains and operates core College e-mail, Web and departmental servers, providing nightly backup services to these critical systems. Virtual Private Networking and secure wireless services throughout the College enables mobile computing and data access from anywhere Internet connectivity is available.

## College of Health and Human Development

The Department of Kinesiology maintains several specialized computer systems dedicated to automated motion analyses, musculoskeletal modeling, medical imaging, physiological testing, and the generation of virtual reality environments for experimental purposes.

## Eberly College of Science

Within the Eberly College of Science, each department has an array of computer facilities.

- The Department of Astronomy and Astrophysics computing resources include a large and ever-expanding network of workstations and personal computers. The current census includes 50 Sun workstations, 12 Power Macs, and 70 PCs. Many of the workstations are configured for maximum processing power so that data sets from various ground- and space-based observing platforms from around the world can be intensively analyzed by faculty and graduate students. The Department has a 100-MB intranet with a fiber optic 100-MB connection to the University backbone. Ten terabytes of online disk space serves data to Department research teams.
- The Department of Biochemistry and Molecular Biology maintains a 100-Mbps Ethernet with ~500 IP addresses currently in use. Most of these serve desktop computers in individual research groups. Twelve desktop computers are maintained in one room for general or instructional use, and eight workstations are dedicated to special equipment for phosphorimaging, laser densitometry, analytical ultracentrifugation, surface plasmon resonance measurements, and X-ray crystallography. Laptops and projectors also are available for general use.
- The Department of Biology maintains two 100-MB fiber backbones that support nearly 500 PC and Macintosh machines. Most of these computers are used to run research machinery and for individual research label workstations. The department also houses thirteen servers, including a state-of-the-art firewall, two domain controllers, automated Windows patch management, automated antivirus system management, and an advanced Web application cluster. Licensed software within the department includes a wide array of Microsoft and Macintosh products.
- The Department of Chemistry provides network access for approximately 1,024 nodes comprising numerous PCs, workstations, and servers of varying operation systems, supported by 10/100/1000 MB Fast Ethernet. Chemistry also Penn State Wireless 2.0 access, VPN service and Web space for courses and research as well as computer an instrumentation repair services for Penn State-funded equipment. Several individual research groups within Chemistry boast their own PC clusters. Some of the computer-intensive research groups participate in the shared resources of the Graduate Educational and Research Services (GEaRs) and the Institute for High-Performance Computing Applications.
- The Department of Mathematics maintains a high-speed switched network of UNIX-based workstations and servers for use by faculty, students, and staff. Most workstations are for use by individuals or small groups. A lab is

maintained for use by undergraduates, graduates, faculty, and visitors. Supported operating systems are Solaris and OSX. Supported software includes Mathematica, Matlab, TeX, and LaTeX. Supported programming languages include C, C++, Java, Fortran, and Perl. Some research groups maintain their own computing equipment including a Beowulf cluster and computers used to control high-speed cameras.

- The Department of Physics maintains a high-speed switched network that provides several connections to each office and supports a wide variety of computing environments. In addition to this wired networking, the department provides wireless internet access in several areas. Many research groups have their own computing systems, which range from simple PCs to Beowulf clusters. At the departmental level, a group of UNIX and MAC servers supports mail, Web, printing, backup, etc. All department members are entitled to accounts on general access Windows XP, Linux, and Sun system with a variety of appropriate software. A computer lab, available to all department members, has workstations, printers, and scanners. The department hosts a Reconfigurable Advance Visualization Environment (RAVE) for stereoscopic visualization of simulation results.
- The Department of Statistics maintains computer systems and laboratories to provide facilities for both research and instruction. Equipment includes thirty Sun UNIX workstations, sixty PCs (operating Windows and LINUX), high-quality laser printers, color printers, a color scanner, and video-capture facilities. Faculty and students have computers in their offices. Software packages include BMDP, MINITAB, SAS, Splus, R, ArcInfo, Mathematica, FORTRAN, C, Java, LaTeX, and TeX. The department has two full-time system administrators to maintain a high-quality computer infrastructure.

Many colleges operate computing laboratories that provide students and faculty with microcomputing capabilities and/or batch and interactive access to the University's principal computers through Information Technology Services (ITS).

Interdisciplinary—The Applied Research Laboratory (ARL) uses more than 2,000 computers in multiple networks of Microsoft Windows, LINUX, Solaris, and VAX workstations, with software supporting data acquisition and processing, process control, modeling and simulation, visualization, data fusion, interactive problem solving, and business applications. MATLAB is used extensively. A synthetic environment lab is available for 3-D visualization.

High-performance computer resources include multiple Linux clusters and grids, and access to U.S. government HPC resources. Mechanical and printed circuit CAD software is used for design, and computer-aided manufacturing software is used extensively to run the shop's multi-axis CNC machines. Student access is dependant upon their relationship with ARL.

The Materials Research Institute (MRI, at [www.mri.psu.edu](http://www.mri.psu.edu)

), together with more than a dozen academic departments/units, offers students access to professionally staffed materials processing, characterization, and computer simulation facilities. MRI enables new opportunities for multidisciplinary education and research within the materials-related disciplines.

### **Materials Simulation Center (MSC)**

A group of faculty and professional staff develop state-of-the-art atomic-scale materials modeling for design of high-performance alloys, evaluation of precursors for epitaxial growth, calculation of electronic and structural properties of nanoscale materials, and simulations for materials processing.

### **Center for Computational Materials Design (CCMD)**

An NSF I/UCRC Center based on needs identified by CCMD members, which initially includes 13 organizations representing both large and small businesses and DOE and DOD laboratories. Faculty from Penn State and Georgia Tech will carry out short and long term research in innovative materials design. The proposed research will be at the interface of industrial relevance and scientific knowledge and will include interdisciplinary groups of materials science and engineering faculty and graduate students, as well as engineering systems design faculty, computer scientists, and applied mathematicians.

### **Institute for Computational Science**

Computational science refers to the use of computers, networks, storage devices, software, and algorithms to solve problems, do simulations, build things, or create new knowledge.

The Penn State Institutes of Energy and the Environment (PSIE) at the Land and Water Research Building provide computing and network infrastructure to support the research of affiliated faculty, researchers, and graduate students. Resources include a firewalled local network as well as web servers and infrastructure for public presentation of research, applications, and data. Additionally, PSIE maintains a 25-person capacity videoconferencing facility for faculty and research use.



## Academic Information and Procedures

It is each student's responsibility to know or seek out as needed the regulations and pertinent procedures of the Graduate School as set forth in the Graduate Degree Programs Bulletin and in the Thesis Guide and to meet the standards and requirements expressed by these regulations. The Graduate Bulletin is available online at [www.psu.edu/bulletins/whitebook](http://www.psu.edu/bulletins/whitebook); the Thesis Guide is on the Thesis Office Web site at: [forms.gradsch.psu.edu/thesis/thesisguide.pdf](http://forms.gradsch.psu.edu/thesis/thesisguide.pdf)

Graduate students are encouraged to contact the Office of Graduate Enrollment Services, 114 Kern Building (814-865-1795), for guidance if they have any questions, uncertainties, or difficulties concerning any procedure or regulation of the Graduate School or any procedure or regulation of the University as it may affect them.

In addition, all programs should have a graduate handbook, which provides students with information on specific program requirements and procedures from admission to degree completion (i.e., arrangement of courses in accordance with degree requirements including required courses and typical elective courses; appointment of advisors and/or committees; responsibilities of the student, advisor and committee; scheduling of exams; assistantship duties; etc.).

### UNSATISFACTORY SCHOLARSHIP

A graduate student who fails to maintain satisfactory scholarship or to make acceptable progress in a degree program may be dropped from the University. One or more failing grades or a cumulative grade-point average below 3.00 for any semester or session or combination of semesters and/or sessions may be considered as evidence of failure to maintain satisfactory scholarship. Action may be initiated by the department or committee in charge of the graduate major or by the chair of the student's doctoral committee. The procedures to be followed in such action are found in [Appendix III](#) in this bulletin.

### CONFIDENTIALITY OF STUDENTS' RECORDS

The Pennsylvania State University collects and retains data and information about students for designa-<sup>ted</sup> periods of time for the express purpose of facilitating the students' educational development. The University recognizes the privacy rights of individuals in exerting control over what information about themselves may be disclosed and, at the same time, attempts to balance that right with the institution's need for information relevant to the fulfillment of its educational missions.

The University further recognizes its obligation to inform the students of their rights under the Family Educational Rights and Privacy Act of 1978 (FERPA); to inform students of the existence and location of records as well as to define the purposes for which such information is obtained; to provide security for such material; to permit students access to, disclosure of, and challenge to this information as here- in described; and to discontinue such information when compelling reasons for its retention no longer exist.

**Student Record Policy**--No information from records, files and data directly related to a student shall be disclosed by any means (including telephone) to individuals or agencies outside the University without the written consent of the student, except pursuant to lawful subpoena or court order, or in the case of specifically designated educational and governmental officials as required by FERPA. Information contained in such records may be shared within the University by University officials with "legitimate educational interest" in such information.

A more complete description of the University's policy on confidentiality of student records, including educational records and alumni records; disclosures to students, third parties, agencies and parents of dependent students; and challenges to entries, is contained in *Policies and Rules*, which is available at departmental and deans' offices.

## Programs and Advanced Degrees

### PROGRAMS

**Graduate Major Program**--A student's major program is the field of primary interest and the one in which the greater portion of graduate work is taken. Programs are designed to prepare students to assume positions of informed and responsible authority in their fields and to contribute creatively to them. They promote not only specialization, but also breadth of scholarship, the ability to study and think independently, and familiarity with the principal techniques and important literature in the field. The research undertaken by the candidate should deal with a problem that can yield a significant contribution to knowledge.

In general, departments of the University are identified with specific major programs. Thus, Aerospace Engineering is a graduate major program that is offered by the Department of Aerospace Engineering. In some cases, a single department offers work in more than one degree program. Occasionally, two or more departments within a college or across colleges collaborate in offering an interdisciplinary program.

**Intercollege Graduate Degree Programs**--When faculty members from departments in two or more colleges collaborate in offering a graduate major, the program is designated as an intercollege graduate degree program. A committee of graduate faculty members approved by the Graduate School is responsible for administering the program under a program chair. The University currently offers more than a dozen such programs, primarily at the doctoral level.

### ADVANCED DEGREES OFFERED

The degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Musical Arts are conferred by the University. The Ph.D. places a strong emphasis on research. The D.Ed. emphasizes professional competence in a field of education. The D.M.A. recognizes professional-level performance and scholarly knowledge of the instrument and the discipline of music. All require high attainment and productive scholarship.

The Master of Arts (M.A.) and the Master of Science (M.S.) degrees are academic in nature, the programs placing emphasis on basic knowledge and research. Various professional master's degrees also are conferred.

Graduate degree programs are offered at five campuses of the University: University Park (State College); Penn State Erie, The Behrend College (Erie); Penn State Harrisburg (Harrisburg); the Penn State Milton S. Hershey Medical Center (Hershey); and Penn State Great Valley School of Graduate Professional Studies (Malvern). Some graduate programs also are offered online through Penn State's World Campus at [www.worldcampus.psu.edu](http://www.worldcampus.psu.edu).

### CHANGE OF DEGREE OR PROGRAM

A graduate student who has been admitted for work in one major program but who wants to transfer to another should complete a "Resume Study/Change of Degree or Major" form and submit the request to the Office of Graduate Enrollment Services. The student's credentials will be reviewed and the proposed new graduate program head or committee chair consulted. If the change is approved but the student is inadequately prepared for the new major, the student may be required to make up certain deficiencies.

A graduate student admitted for either an academic/research degree (M.A., M.S., or Ph.D.) or a professional degree who wants to change from one type of degree program to another must complete a "Resume Study/Change of Degree or Major" form and submit the request to the Office of Graduate Enrollment Services. Similarly, a student who has earned a master's degree at Penn State but who wants to earn a doctoral degree in a different field must complete a "Resume Study/Change of Degree or Major" form and submit the request to the Office of Graduate Enrollment Services, 114 Kern Graduate Building. A student may be required to make up certain deficiencies if inadequately prepared for the new program.

### CONCURRENT GRADUATE DEGREE PROGRAMS

In general, graduate students are best advised to focus on one degree objective at a time. However, a candidate for a master's degree in one major field who wishes to begin work for either a master's or a doctoral degree in a second field; or a candidate for a doctoral degree who wishes to begin work on a master's degree in a second field while concurrently completing the doctoral program can petition to do so (approval will not be granted for any combination of concurrent doctorates, including the Ph.D., D.Ed., or D.M.A. degrees). The department heads of both fields and the director of Graduate Enrollment Services must approve any such plan. Guidelines for preparation of a proposal for concurrent graduate degrees have been established by Graduate Council and are available in the Office of Graduate Enrollment Services, 114 Kern Graduate Building.

### DUAL-TITLE GRADUATE DEGREE PROGRAMS

Students may apply for dual-title degrees in one of the dual-title graduate degree programs approved by Graduate Council. Students wishing to follow this course of action must already be enrolled in an existing graduate program; it is this primary program in which the greater portion of the work will be conducted. The primary program will be supplemented by a secondary program in which substantial work is carried out under the supervision of a faculty adviser from the secondary program, and in which a thesis or culminating/capstone experience integrating both fields is completed. Guidelines and information are available from the Dean of the Graduate School.

## **INTEGRATED UNDERGRADUATE-GRADUATE (IUG) DEGREE PROGRAMS**

**Programmatic Integrated Undergraduate-Graduate Degree Programs**--Graduate Council-approved Integrated Undergraduate-Graduate (IUG) degree programs are available. These programs allow students to work on a baccalaureate and a master's degree at the same time and are intended for exceptional students who can perform their academic studies at an accelerated pace and take on the challenges of graduate courses and research while still enrolled as undergraduates. Typically, up to 12 of the credits required for the master's degree may be applied to both degrees (excluding the graduate thesis or other graduate culminating/capstone experience, including any associated credits and/or deliverables, which may not be double-counted toward any other degree; if the thesis or culminating/capstone experience is recognized as meeting requirements for the undergraduate degree, it will not be recognized and cannot be used to meet requirements for the graduate degree), and the total time for completing both degrees is less than if the degrees were earned separately. These programs include those within a single department and those that are interdepartmental or intercollege programs. Guidelines and information are available at [www.gradsch.psu.edu/policies/faculty/iugguidelines.html](http://www.gradsch.psu.edu/policies/faculty/iugguidelines.html).

**Schreyer Honors College Integrated Undergraduate-Graduate Degree Programs**--The Graduate School, by special exception from the Dean of the Graduate School, offers Schreyer Scholars the opportunity to integrate any existing Penn State baccalaureate degree program with any existing Penn State master's degree program in a continuous program of study culminating in both a baccalaureate and a master's degree.

A Schreyer Scholar who is granted IUG status will have dual enrollment in an undergraduate program and in a master's program. Some credits earned as an undergraduate may be applied to both degree programs; however, the graduate thesis or other graduate culminating/capstone experience (including associated credits and/or deliverables) may not be double-counted toward any other degree. If the thesis or culminating/capstone experience is recognized as meeting requirements for the undergraduate degree, it will not be recognized and cannot be used to meet requirements for the graduate degree. Schreyer Scholars must adhere to the Graduate Council guidelines for establishing IUG programs that may be found at [www.gradsch.psu.edu/policies/faculty/iugguidelines.html](http://www.gradsch.psu.edu/policies/faculty/iugguidelines.html) when constructing their individual IUG programs, including those related to timing of admission. In addition, the Schreyer Honors College has established procedures for Schreyer Scholars who wish to explore this opportunity (see [www.shc.psu.edu/students/iug/program/IUGguidelines.pdf](http://www.shc.psu.edu/students/iug/program/IUGguidelines.pdf)).

Updated: 12/20/12

## Registration

A graduate student who is in residence at the University is expected to be properly registered. In residence means that the student (whether full- or part-time, whether commuting to campus or other instructional site or living nearby or on campus) is pursuing graduate credits and/or an advanced degree by (a) attending classes or seminars for credit or audit; (b) doing a thesis, term project, independent study, or similar research or scholarly work in a University laboratory or other research facility; (c) consulting in person or by other means of communication with one or more faculty members on scholarly matters, research projects, or dissertation; (d) using the library, Computation Center, or other University information resources; or (e) using other University facilities provided for graduate study.

The responsibility for being properly registered rests first with the student and secondarily with the student's adviser if the student has one (nondegree students may not). A student may register for course work or research or a combination of the two. In the case of research the number of credits shall be determined by the amount of time devoted to the investigation, with 1 credit representing approximately the equivalent of one week of full-time work. In the later stages of the program, the situation will determine the requirements for the student's registration. (See Registration Near the Completion of a Program.)

**International Students**--Because international students on an F1 or J1 visa are required by the Department of Homeland Security regulation to be in residence, all international students need to be registered for full-time status (fall and spring semester), unless an exception to full-time enrollment has been approved by the University Office of Global Programs Directorate of International Student Advising (DISA). Students who fail to register may jeopardize their status.

**Advisers**--Advising is an important factor in enhancing the quality of a student's program. To assist the student in planning a coherent program and meeting all degree requirements, the head of the major department or program chair will designate a member of the faculty to serve as adviser. It is the student's responsibility to secure an adviser from the department or program and to seek a conference before each registration.

**Time of Registration**--Registration days are indicated in the calendar at the beginning of this bulletin. A student is expected to complete registration during the officially designated period and to attend the first meeting of all classes. If this is impossible because of some emergency or unusual circumstance, the student may be granted permission by the instructor to miss a few class meetings, it being understood that work missed will be made up subsequently. Under these conditions permission may be granted through the Office of Graduate Enrollment Services for the student to register late. In general, a student who receives permission to register late will be required to reduce the course load in proportion to the length of absence.

A student who fails to complete the process of registration within the officially designated registration period will be liable for the late registration charge, regardless of when the student begins attending classes.

**Continuity of Registration**--A student who is a degree candidate at any of the five graduate campuses of the University and who registers there without interruption for each fall and spring semester is considered to have maintained a normal continuity of registration. A student who has been admitted as a "summers only" D.Ed. candidate (see D.Ed. Residence Requirements) can maintain continuity by registering each summer for a six-week summer session.

Anyone who has interrupted such a normal sequence and now plans to return and register for course work is required to submit a request to the appropriate campus graduate admissions office using the form found at the corresponding links below:

- [Penn State Great Valley School of Professional Studies](#)
- [Penn State Harrisburg](#)
- [All other campuses](#)

The policy may be summarized for any specific semester or session as follows:

- *Summer Session*--Resume Study/Change of Degree or Major form required unless the student was registered for the preceding spring semester or the preceding summer session (if "summers only" student).
- *Fall Semester*--Resume Study/Change of Degree or Major form required unless the student was registered for the preceding summer session or the preceding spring semester.
- *Spring Semester*--Resume Study/Change of Degree or Major form required unless the student was registered for the preceding fall semester.

**Withdrawal**--The dropping of all academic work for which a student is registered in any semester constitutes withdrawal from the University, and changes the student's status to nondegree. A "Resume Study/Change of Degree or Major" form must then be submitted and approved if the student wants to enroll for further work toward a degree.

**Procedure**--For each registration, it is expected that the student, in consultation with the adviser, will prepare a schedule of courses and research designed to fit individual needs and meeting the pertinent credit limits. The registration process is completed in the manner specified for all students at the University.

Under certain conditions credit may be earned for work done away from the campus. A student contemplating such work should first consult with his or her adviser and then inquire at the Office of Graduate Enrollment Services about the procedures and conditions. The student must assume responsibility for the registration process, by accessing the Registrar's Web site at [www.registrar.psu.edu](http://www.registrar.psu.edu)

. Registration must be completed before the close of central registration at University Park campus.

A student must register for courses audited as well as those taken for credit.

**REGISTRATION NEAR THE COMPLETION OF A PROGRAM**

A candidate for the Ph.D. degree is required to register continuously for each semester from the time the comprehensive examination is passed and the two-semester residence requirement is met until the thesis is accepted by the doctoral committee, regardless of whether work is being done on the thesis during this interval. (See Registration and Continuous Registration.)

Although there is no general continuous registration requirement for D.Ed. degree candidates and master's students, individual programs may require it. It should be noted, moreover, that (a) proper registration (see Registration) is expected of all graduate students; (b) graduate assistants must carry the prescribed credit loads (see Credit Loads and Academic Status); and (c) because of visa considerations, international students typically will register every semester, no matter what their degree objectives.

A master's candidate is not required to register for the final semester in order to graduate or in order to make minor revisions to the thesis and/or to take a final examination for the degree, unless required to do so by the program.

4/16/12



## Graduate Credits

Typically, a candidate for an advanced degree is required to earn a certain minimum number of credits at Penn State. Consequently, there is a limit to the number of credits that may be earned at another approved institution to meet the minimum requirements of the degree. Moreover, the department or committee in charge of a major program may require a student to do more of the work at the University than specified by the limitations set by the Graduate Faculty.

Full-time participation in graduate study involves a wide range of activities. The nature of these activities varies because of the diversity of programs throughout the University. The graduate student is responsible for ascertaining, through the adviser and/or program office, the range of total activity of his or her individual program that constitutes normal progress toward the degree.

A self-supported or fellowship student who is registered for at least 9 credits is considered to be engaged in full-time academic work for that semester. If such a student wishes to register for more than 15 credits, an exception to the normal maximum load must be granted through petition (with adviser's approval) to the Office of Graduate Enrollment Services.

Credit limits and full-time status for assistants and University employees are described under Assistantships and Credit Loads and Academic Status.

Graduate courses carry numbers from 500 to 599 and 800 to 899.

--A 500-level graduate course builds on advanced undergraduate and/or graduate courses, dealing with the frontiers of knowledge in the field. It is grounded in theories, hypotheses, and methodologies as expounded in current and/or primary literature sources. Synthesis of knowledge and independent analytical work by the student must be demonstrated. Significant interaction among students and with the instructor(s) is expected.

--An 800-level graduate course pertains to the most recently established knowledge and methodologies in a field of study, as applied to practice. It emphasizes analytical thinking and application of knowledge by the student in the context of providing pragmatic solutions for professionals. Significant interaction among students and with the instructor(s) is expected.

Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. Language courses used to meet foreign language requirements are exceptions, as are the ESL courses for international students.

No student is permitted to count audited credits toward the minimum credit load for full-time or part-time status.

**Course-Numbering System**--Courses in the series 1–399 are not listed in this bulletin because they are strictly undergraduate courses and yield no graduate credit. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Courses in the series 400–499 are for upperclass students with at least a junior standing and for graduate students. Only a limited number of credits earned in these courses may be counted toward the requirements for an advanced degree. Detailed regulations concerning the restrictions are given under the specific requirements for the various master's degrees.

Courses in the series 500–599 and 800-899 are restricted to students registered in the Graduate School, senior undergraduate students with an average of at least 3.50, and certain other students with averages of at least 3.00 who have been granted special permission to enroll through the Office of Graduate Enrollment Services. (See the introduction to Graduate Programs, Faculty, and Courses for a more detailed description of these courses.)

The numbers 600 (on campus) and 610 (off campus) are available for credit in thesis research in all graduate major programs. The numbers 601 and 611 do not denote conventional courses but are used for noncredit special registration for thesis preparation by a Ph.D. candidate. (Note that 596 course numbers may not be used for thesis research work.) Registration under these numbers will maintain status as a full-time (601) or part-time (611) student during the interval that begins at the time the student passes the comprehensive examination and meets the two-semester residence requirement and ends at the time the doctoral committee accepts the thesis. The student may register for 601 if engaged full-time in the preparation of a thesis or for 611 if engaged only part-time in thesis preparation. Candidates for the Ph.D. degree do not receive grades for noncredit registrations (601 and 611). [See also Ph.D.—Additional Specific Requirements and the common course descriptions in the introduction to Graduate Programs, Faculty, and Courses.]

**Schedule of Courses**--The most current information on courses that will be offered in any specific semester is at <http://soc.our.psu.edu/soc>

. It gives the number of the class, the hours at which the class will meet, the location of the class, and in some cases the instructor's name.

**Visiting and Auditing Classes**--A graduate student registered for a given semester who wants to attend classes without receiving credit may secure permission either to visit or to audit courses during that semester.

As a visitor, a student may attend classes with the approval of the instructor but may not claim the usual privileges of class membership, such as participating in discussion, doing practicum work, or taking examinations. Registration is not required for the privilege of visiting, and no record appears on the student's transcript.

As an auditor, a student may participate in class discussion, do practicum work, take examinations, and generally enjoy the privileges of a class member. Registration procedures and fee payment are the same as for taking the course for credit. Attendance is required. No credit is given, either on completion of the course or at a later time; however, the number of credits assigned to the course appears on the grade report and on the student's transcript. Thus, when a student receives an audit grade, the number of credits audited is shown. The symbol AU shall be used if attendance has

been regular, the symbol W if attendance has been unsatisfactory.

*A graduate assistant or Fellow who is required to register for a certain minimum number of credits is not permitted to count audited course credits toward the minimum credits needed. Undergraduate courses taken to meet foreign language or English requirements do count in the total credit load. The student may register for credit or audit beyond the required minimum but may not exceed the normal maximum without special permission.*

## Credit Loads and Academic Status

**Graduate Assistants**--Graduate assistants must be enrolled at Penn State as graduate students. More specifically, since assistantships are provided as aids to completion of advanced degrees, assistants must be degree-seeking and enrolled in residence for credit loads each semester that fall within the limits indicated in the table below. Maximum limits on permissible credit loads are indicated in order to assure that the student can give appropriate attention both to academic progress and assistantship responsibilities. These considerations give rise to the table of permissible credit loads below.

Level of Assistantship	Credits Per Semester		Credits per 6-Week Summer Session	
	Minimum	Maximum	Minimum	Maximum
Quarter-time	9	14	5	7
Half-time	9	12	4	6
Three-quarter-time	6	8	3	4

\*Credits taken during the Maymester and over both six-week summer sessions must total a minimum of 9 (for 1/4- and 1/2-time assistantships) or 6 (for 3/4-time assistantships) and cannot exceed a maximum of 8 (for 3/4-time assistantships), 12 (for 1/2-time assistantships), or 14 (for 1/4-time assistantships).

To provide for some flexibility, moderate exceptions to the specified limits may be made in particular cases. The credit limits specified above may only be increased or decreased in exceptional cases for a specific semester or summer session by permission of the assistantship supervisor, the student's academic adviser, and the dean of the Graduate School (requests should be submitted for the dean's approval via the Office of Graduate Enrollment Services). The Graduate School expects that an exception made in one semester or summer session will be compensated for by a suitably modified credit load in the subsequent semester or summer session, so that, on the average, normal progress is maintained at a rate falling within the limits above. Failure to do so may jeopardize the student's academic status. Maintenance of the established credit loads and responsibility for consequences of a graduate student's change of course load rest with the student and adviser. The course load is a factor in determining whether a graduate student is classified as a full-time or part-time student; has met residence requirements; and is eligible to hold a fellowship, traineeship, assistantship, or departmental or program appointment.

**Full-Time Academic Status**--Students holding fellowships, traineeships, or other awards based on academic excellence are required to carry 9 or more credits each semester (fall and spring). For awards that require full-time summer registration, students should register for a minimum cumulative total of 9 credits (over all summer sessions), or SUBJ 601 (in the case of post-comprehensive doctoral candidates). A graduate assistant whose semester or summer session credit load meets or exceeds the minima in the above credit table and whose assistantship duties are directly related to his or her degree objectives is considered by the Graduate School to be engaged in full-time academic work for that semester or summer. A post-comprehensive doctoral candidate who is registered for SUBJ 601 also is so considered.

**Part-Time Academic Status**--A student who in any semester or summer session is registered for study but who does not meet the criteria for full-time status is considered to be engaged in part-time academic work for that semester. This includes students registered for SUBJ 611.

**Credit Loads for Internationals**--The Department of Homeland Security requires that international students proceed in a timely fashion toward completion of their degrees, as established by the academic department and (usually) stated on their initial immigration document. Failure to maintain normal progress toward completion of the degree during this period will jeopardize the student's ability to continue academic study, adjust status, or seek future employment in the United States. Because of this, students should not be enrolled less than full-time during fall or spring semester without prior approval of the University Office of Global Programs Directorate of International Student Advising (DISA).

The U.S. Department of Homeland Security requires the DISA to report violations of status, including failure to maintain full-time enrollment. The following is intended to provide guidance for international graduate students and for DISA in determining full-time status:

- A graduate student is considered full-time if registered for a minimum of 9 credits, excluding courses taken for audit, or if a Ph.D. candidate who has successfully completed the comprehensive examination and is registered for SUBJ 601.
- On rare occasions, and under exceptional circumstances, international students in master's degree programs who have completed all required course work and, if applicable, research for their degree, may be granted an exception to the need to maintain full-time status as defined above, for a limited period (in no case to exceed two semesters), by special petition to DISA in advance of the semester in which the exception is needed. This request must be initiated by the student using the DISA eForm system. The academic adviser will be asked through this eForm system to justify the reduced course load.
- Under all circumstances, international students must be enrolled--either full-time or approved by DISA for a reduced course load. (See Academic Information and Procedures/Registration/International Students.)

**Employment**--Many students depend upon part-time employment to help meet their expenses. A student who is thus employed, whether on or off campus, must recognize the time demands of a work schedule in planning an academic program. A student holding a fellowship or scholarship may not accept employment of any kind for service beyond that specifically permitted by the appointment. A graduate assistant may assist in classroom or laboratory instruction, in

research or in other work. The tasks assigned to a graduate assistant often are identical in nature to those required for the advanced degree sought. Additional compensation is paid to a graduate assistant by the University for additional hours of work only with special, advance approval of the administrative head of the academic unit in which the assistantship is held, and of the chair of the student's graduate academic program, and provided that such compensation is not for additional hours of work on the assigned assistantship duties. A graduate assistant may not hold a concurrent appointment with the University other than a Fellowship Supplement.

For international students, guidelines for assistantships or employment are the same as for domestic students, with the following distinctions: (a) I-9 and W-4 forms must be processed through DISA; (b) vacation period employment may be up to forty hours per week; and (c) since Department of Homeland Security regulations on employment are subject to change, all employment off campus for international students must be cleared through DISA.

**Full-Time Employment Off Campus**--A candidate for the Ph.D. degree at a particular campus of the University may not count the work of any semester toward the residence requirement for this degree while engaged in full-time employment off campus or at a different campus of the University.

**Staff Employee Credit Status**--A full-time staff employee of the University may schedule up to 16 credits per academic year, either for credit or audit.

Full-time University employees may meet Ph.D. degree residence requirements by registering for 6 credits per semester or 4 credits per eight-week summer session and by obtaining certification from the department head as being principally engaged in activities directly relating to their degree objectives. A post-comprehensive full-time University employee may not register for SUBJ 601 (i.e., full-time thesis preparation), but may register for SUBJ 611 (part-time thesis preparation).

No academic employee above the rank of instructor or research assistant or equivalent may receive from the University a master's degree or doctoral degree in any graduate program where the faculty member has membership, teaches courses, serves on master's or doctoral committees, or has other supervisory responsibilities that might give rise to conflicts of interest. The faculty member should inform his/her department head of his/her intention to pursue an advanced degree. University staff employees who want to take graduate degree work must first be admitted to the Graduate School.

Updated: 4/15/12

## Grading System

A grade is given solely on the basis of the instructor's judgment as to the student's scholarly attainment. The following grading system applies to graduate students: A (EXCELLENT) indicates exceptional achievement; B (GOOD) indicates substantial achievement; C (SATISFACTORY) indicates acceptable but substandard achievement; D (POOR) indicates inadequate achievement and is a failing grade for a graduate student—a course in which a D has been obtained cannot be used to meet graduate degree requirements and will not count toward total credits earned; and F (FAILURE) indicates work unworthy of any credit, and suggests that the student may not be capable of succeeding in graduate study. The grade-point equivalents for the above marks are: A, 4.00; B, 3.00; C, 2.00; D, 1.00; F, 0. A minimum grade-point average of 3.00 for work done at the University is required for all graduate degrees. In Fall 1995 a +/- grading system went into effect that includes A-, B+, B-, and C+. The grade-point equivalents are A-, 3.67; B+, 3.33; B-, 2.67; and C+, 2.33.

In addition to the quality grades listed above, three additional grade designations, DF (deferred), NG (no grade), and R, may appear on a student's transcript. If work is incomplete at the end of a semester because of extenuating circumstances, the instructor may report DF in place of a grade, which will appear temporarily on the student's record. It is not appropriate to use the DF either casually or routinely to extend a course beyond the end of the semester or to extend a course for a student who has failed so that the individual can do extra work to improve the grade. Required work should be completed and the DF resolved as soon as possible once assigned, but must be resolved (i.e., the course must be completed) no later than twenty-five weeks after the course end date as noted on the Registrar's Schedule of Courses. A deferred grade that is not resolved before the end of this period automatically converts to an F, unless an extension to a specified date is agreed upon by the instructor and student that allows for a completion deadline longer than 25 weeks. A memo with a justifying statement and the agreed-upon date must be submitted by the instructor to the Office of Graduate Enrollment Services in order to request an extension.

If an instructor does not submit a grade (including a quality grade, DF, or R) for a graduate student by the grade-reporting deadline, the designation NG (no grade) appears on the transcript. An NG that is not reconciled within twenty-five weeks following the posting of the NG automatically becomes an F.

A DF or NG that has converted to an F may not be changed without approval from the Office of Graduate Enrollment Services. Requests for approval must be submitted by the instructor and include a justification for the change.

It is to be emphasized that no deferred (DF), missing(\*), or no grades (NG) may remain on the record at those times when a student reaches an academic benchmark. Benchmarks include completion of a degree program (e.g., master's completed for a student continuing through for a doctoral degree) and the doctoral candidacy, comprehensive, and final oral examinations. Graduate programs may add additional benchmarks.

It is further noted that there are only three circumstances under which a course grade, once assigned, can be changed: (1) if there was a calculational or recording error on the instructor's part in the original grade assignment (Senate Policy 48-30); (2) if it is a course for which an R grade has been approved and in which an initial R can be assigned and changed later to a quality grade; (3) if, as discussed above, a DF was assigned and the deadline for course completion has not yet passed.

Grade changes are governed by Senate Policy 48-30, found in Policies and Rules.

In the case of thesis work, either in progress or completed, and in certain courses (e.g., 590, 594, 595, 596, 597, 598, 599, 894, 895, 896, 897, 899, and a few others) approved by the Graduate Council, the instructor may report the symbol R in place of a grade. An R does not influence the grade-point average. It indicates that the student has devoted adequate effort to the work scheduled but gives no indication of its quality. The symbol may be used, for instance, in courses that are officially designed to extend over more than one semester or in courses for which a quality grade is not appropriate. An R in an approved graduate course need not be changed later to a quality grade. Graduate courses approved for R grading may be credited toward fulfilling graduation requirements. However, if the instructor deems it appropriate, the R grade may be changed to a quality grade when the course work has been completed. Normally, if a quality grade is to be assigned, the grade must be reported no later than the end of the following semester.

When reported for thesis work, an R will not influence the grade-point average and remains on the student's transcript if not converted to a quality grade within one semester of its recording. *The Graduate Council has established upper limits of 6 credits of quality grades for master's thesis research and 12 credits for doctoral dissertation research. The remaining credits must be assigned Rs except in the case of academic or disciplinary sanctions, in which case an F or XF grade may be assigned, as appropriate, up to the total number of thesis research credits (600 or 610) on record. (See Senate Policy 49-20 and Procedures G-9, as well as [Appendix II](#) of this bulletin).*

Pass-Fail (P/F) grading is used exclusively in certain graduate courses where it has been requested by the program and approved by the graduate dean following guidelines established by the Graduate Council. A grade of P does not influence the GPA, but an F does.

Revised by Graduate Council, April 2011

6/6/13

## Thesis

**Thesis Research**--To register for thesis/dissertation research in all graduate major programs, a student uses the appropriate course number (600 for on campus, 610 for off campus) preceded by the abbreviation designating the major field. The Bursar's office assesses charges for these courses at the current rate of tuition according to the student's status at the time of registration.

Students registering for 600 or 610 should be aware that Graduate Council has established limits on the total number of research credits that can be assigned letter grades in a student's program (i.e., other than R): 6 credits for master's candidates and 12 credits for doctoral candidates.

**Ph.D. Dissertation Preparation**--The numbers 601 and 611 are available to Ph.D. degree candidates only and are used for special noncredit registration for dissertation preparation work. Such candidates must have passed the comprehensive examination and must have met the two-semester residence requirement. A candidate registered for SUBJ 601 is classified as a full-time student, while one registered for SUBJ 611 is classified as a part-time student.

The numbers 600, 601, 610, and 611 may not always appear in the Schedule of Courses for each semester, but they are available for registration each semester.

**Thesis/Dissertation Submission**--When a student completes a thesis or a dissertation, an archival copy must be submitted to the Graduate School. After acceptance by the Graduate School, the document is available through the University Libraries.

## Graduation

Students who plan to graduate at the end of the current semester/session are responsible for indicating an intent to graduate. A student must initiate an intent to graduate via eLion during the designated period for that semester. Any changes to a student's graduation status after this time period must be made by contacting Graduate Enrollment Services at 814-865-1795.

Students who have been removed from the graduation list will need to initiate their intent to graduate again for the semester in which they plan to graduate.

A preliminary graduation list is prepared and reviewed by Graduate Enrollment Services soon after the deadline for each semester or summer session. Accepted theses, master's papers, and project reports are noted as may be relevant. The records of candidates who appear to have met requirements are forwarded to major and minor department heads or program chairs for review and recommendation. The final list of approved candidates appears in the fall, spring, or summer commencement program.

Only those transfer credits that have been accepted by the Graduate School and entered upon the student's transcript before the graduation deadline will be considered in evaluating a student for graduation at the end of that particular semester or summer session.

The University holds commencement exercises for graduate students three times a year: at the end of the fall and spring semesters and at the end of the summer session. Attendance at commencement exercises is expected. Diplomas are mailed to all students unable to participate in the commencement exercises. Information is available at the Office of the University Registrar, 112 Shields Building, or by accessing the Registrar's Web site at [www.registrar.psu.edu](http://www.registrar.psu.edu).

Even though the student's name may appear in the commencement program, no degrees are conferred until final grade reports have been received and all requirements fulfilled. A student's transcript or diploma, or both, may be withheld until any outstanding financial obligations to the University have been paid.





## DOCTORAL DEGREES

The Doctor of Philosophy, an academic degree; the Doctor of Education and Doctor of Musical Arts, both professional degrees, are conferred by the University. Recognized as different in purpose, the three programs consequently have different requirements in certain respects.

### ADMISSION

A student who has been admitted to the Graduate School and has been accepted by the department or committee in charge of a major program in which the doctorate is offered may begin working toward a doctoral degree. However, the student has no official status as a doctoral student and no assurance of acceptance as a doctoral candidate until the candidacy examination has been passed. This examination is administered by the major department or graduate program and is given early in the student's program.

It is the policy of the Graduate School not to encourage applicants to work for a second doctoral degree. (See [Policy on Second Doctorates](#)). However, the President, on recommendation of the dean of the Graduate School, will welcome, as guests, holders of earned doctoral degrees who may be visiting the University Park campus for purposes of noncredit study. Guest privileges apply to persons holding the degree from Penn State or other accredited colleges and universities. Guests may attend seminars and courses and, if space and facilities are available, carry on research. There will be no charge except for laboratory expenses. Arrangements should be made in advance with the dean of the Graduate School.

### GENERAL REQUIREMENTS

No specified number of courses completed or credits earned will assure attainment of the doctorate. The general requirements are based upon a period of residence, the writing of a satisfactory dissertation acceptance by the doctoral committee and the Graduate School, and the passing of a comprehensive and a final oral examination. A doctoral program consists of such a combination of course seminars and individual study and research as meets the minimum requirements of the Graduate School and is approved by the doctoral committee for each individual student.

A master's degree is not a prerequisite for the doctorate in some major programs. However, the first year of graduate study leading to the Ph.D. may be substantially the same as that provided for the M.A. or M.S. degree. Similarly, the first year of the D.Ed. program may be essentially the same as that provided for the M.Ed. degree.

### SATISFACTORY SCHOLARSHIP

A graduate student who fails to maintain satisfactory scholarship or to make acceptable progress in a degree program may be dropped from the University. One or more failing grades or a cumulative grade-point average below 3.00 for any semester or session or combination of semesters and/or sessions may be considered as evidence of failure to maintain satisfactory scholarship. Action may be initiated by the department or committee in charge of the graduate major or by the chair of the student's doctoral committee. The procedures to be followed in such action are found in [Appendix III](#) in this bulletin.

### GRADE-POINT AVERAGE

A minimum grade-point average of 3.00 for work done at the University is required for admission to the candidacy examination, the comprehensive examination, and the final oral examination, and for graduation.

### TIME LIMITATION

A doctoral student is required to complete the program, including acceptance of the doctoral thesis, within eight years from the date of successful completion of the candidacy examination. Individual programs may set shorter time limits. Extensions may be granted by the Director of Graduate Enrollment Services in appropriate circumstances.

### OFF-CAMPUS AND TRANSFER CREDIT

A maximum of 30 credits beyond the baccalaureate at a regionally accredited school not granting the doctorate in the student's major program may be accepted by the Graduate School in partial fulfillment of the requirement for a D.Ed. degree at Penn State. A maximum of two full academic years of work (60 credits) beyond the baccalaureate at a regionally accredited graduate school that grants the doctorate in the candidate's major program may be accepted here to apply toward D.Ed. degree requirements. A completed master's degree may be transferred to a D.Ed. program with no intervening time limitation. Because there is no total-credit requirement for the Ph.D. degree program, advanced standing is not awarded for a master's degree. Advanced standing is awarded for only one master's degree.

Subject to the approval of the adviser and the head of the major department or program chair, a student may register for research to be done away from the University Park campus.

Academic work to be so transferred must meet the following criteria:

1. It must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State (see below);
2. It must appear on an official graduate transcript of an accredited or recognized degree-granting institution;
3. It must be equivalent to "B" quality or higher (grades of B- are not transferrable) on Penn State's grading system;
4. It must be deemed applicable to the student's program by the current academic adviser, approved in writing, and submitted to the Graduate School for approval and action.

Credits earned toward a previously completed postbaccalaureate professional degree program (law, medicine, etc.) are not transferrable. However, up to 10 credits can be transferred from a professional degree program if the degree has not been conferred. All transfer credit must be substantiated by the former institution as having at least B quality whatever grading system is in place (e.g., this includes P/F grading).

## ADVISERS AND DOCTORAL COMMITTEES

Following admittance to a degree program, the student should confer with the head of that major program concerning procedures and the appointment of an academic adviser. Consultation or arrangement of the details of the student's semester-by-semester schedule is the function of the academic adviser. This person may be a member of the doctoral committee or someone else designated by the head of the major program for this specific duty. The academic adviser may be different from the dissertation adviser.

**Doctoral Committee**--General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed. In most cases, the same individual (e.g., dissertation adviser) is a member of the Graduate Faculty in both the major and dual-title fields, and in such cases may serve as sole chair.

At least one regular member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the "Outside Field Member." In cases where the candidate is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser's primary appointment is held (i.e., the adviser's administrative home; in the case of tenure-line faculty, this is the individual's tenure home). This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student's dissertation adviser and also represent a field outside the student's major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

If the candidate has a minor, that field must be represented on the committee by a "Minor Field Member." (For additional information related to minors for D.Ed. students, see "Major Program and Minor Field" under "D.Ed.—Additional Specific Requirements" in this *Bulletin*.)

The doctoral committee is appointed by the Graduate School dean through the Office of Graduate Enrollment Services, upon recommendation of the head of the major program, soon after the student is admitted to candidacy. The dean may on occasion appoint one or more members of the committee in addition to those recommended by the head of the program.

A person who is not a member of the Graduate Faculty (and may not be affiliated with Penn State) who is otherwise qualified and has particular expertise in the candidate's research area may be added as a "Special Member," upon recommendation by the head of the program and approval of the dean of the Graduate School (via the Office of Graduate Enrollment Services). A Special Member is expected to participate fully in the functions of the doctoral committee. If the Special Member is asked only to read and approve the doctoral dissertation, that person is designated a Special Signatory. Occasionally, Special Signatories may be drawn from within the Penn State faculty in particular situations.

Graduate Faculty officially appointed by the Graduate School to a doctoral committee who then leave Penn State may maintain that committee appointment for up to one year if the student's graduate program and the Graduate School dean, through the Office of Graduate Enrollment Services, approve the request for this exception. A retired or emeritus faculty member may serve as a doctoral committee chair if, and only if, he/she was officially appointed and began chairing the committee prior to retirement and has the continuing approval of the program head and the Graduate School dean, through the Office of Graduate Enrollment Services. Otherwise, the committee must be revised to either remove the faculty member from the committee or change the individual's appointment to a Special Member.

The membership of doctoral committees should be periodically reviewed by the head of the program to ensure that all members continue to qualify for service on the committee in their designated roles. For example, if type of appointments, employment at the University, etc., have changed since initial appointment to the committee, changes to the committee membership may be necessary. If changes are warranted, they should be made as soon as possible to prevent future problems that may delay academic progress for the student (e.g., ability to conduct the comprehensive or final examinations).

The graduate program head must also periodically review the Graduate Faculty listing for his/her program on both the [Graduate School's website](#) and the graduate program's listing in this *Bulletin* to ensure that those listings are accurate.

**Chair**--The chair or at least one co-chair must be a member of the graduate faculty of the specific doctoral program in which the candidate is enrolled. A retired or emeritus faculty member may chair a doctoral committee if he/she was officially appointed and began chairing the committee prior to retirement and has the continuing approval of the head of the graduate program. The primary duties of the chair are to: (1) maintain the academic standards of the doctoral program and the Graduate School and assure that all procedures are carried out fairly, (2) ensure that the comprehensive and final examinations are conducted in a timely fashion, (3) arrange and conduct all meetings, and (4) ensure that requirements set forth by the committee are implemented in the final version of the dissertation.

**Responsibilities of Doctoral Committees**--The doctoral committee is responsible for approving the broad outline of the

student's program and should review the program as soon as possible after the student's admission to candidacy. Moreover, continuing communication among the student, the committee chair, the research supervisor, and the members of the committee is strongly recommended, to preclude misunderstandings and to develop a collegial relation between the candidate and the committee.

**Doctoral Examination--**The (entire) committee will prepare and administer the examination, and evaluate the candidate's performance on the examination. If a committee member is unable to attend the final oral defense, the member may sign as a special signatory. A revised committee appointment form will need to be sent to the Office of Graduate Enrollment Services, 114 Kern Graduate Building, removing the faculty member as a regular committee member and if it is desired to designate that individual as a special signatory, a memo must accompany the revised committee form, requesting that the faculty member be moved to a special signatory. If there are then not enough members serving on the committee (i.e., four or more active members of the Graduate Faculty), another Penn State faculty member will need to replace that member to constitute a legitimate doctoral committee. (Substitutes are not permitted.) These changes and approvals shall occur before the actual examination takes place. The department or program head will notify the Office of Graduate Enrollment Services, providing two weeks' notice, when the candidate is ready to schedule the comprehensive and the final oral examinations and will report the results of these examinations to that office.

The dissertation adviser, as well as the chair of the doctoral committee (if not the same individual as the dissertation adviser), along with additional members of the committee to total a minimum of three (3), must be physically present at the final oral examination. The graduate student must also be physically present at the exam. (Thus for a five-person committee, two could participate via distance.) No more than one member may participate via telephone; a second member could participate via interactive videoconferencing. Requests for exceptions must accompany the Examination Request Form, and must be submitted to the director of Graduate Enrollment Services for approval at least two weeks prior to the date of the exam. Special arrangements, i.e., requirements for meeting participation via distance, must be communicated to the student and the doctoral committee members well in advance of the examination.

A favorable vote of at least two-thirds of the members of the committee is required for passing a comprehensive or a final oral examination. If a candidate fails an examination, it is the responsibility of the doctoral committee to determine whether another examination may be taken.

The committee examines the dissertation, administers the final oral examination, and signs the approval page of the dissertation. At least two-thirds of the committee must approve the dissertation.

## **ENGLISH COMPETENCE**

A candidate for the degree of Doctor of Philosophy is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the Ph.D. Programs are expected to establish mechanisms for assessing and improving competence of both domestic and international students. Assessments should include pieces of original writing. Programs and advisers should identify any deficiencies before or at the candidacy examination and direct students into appropriate remedial activities. Competence must be formally attested by the program before the doctoral comprehensive examination is scheduled. (International students should note that passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.)

## **COMMUNICATION AND FOREIGN LANGUAGE COMPETENCE**

In addition to demonstrating competence in English as described above, each candidate for the Ph.D. must meet communication and foreign language requirements that have been established within the major program. The candidate should ascertain specific language requirements by contacting the professor in charge of the program, whose name appears with the program description under Graduate Programs, Faculty, and Courses.

Candidates for the Doctor of Education degree may be required to demonstrate competence in foreign languages.

## **CANDIDACY EXAMINATION**

Every student who wishes to pursue a doctorate must take a candidacy examination administered by the Graduate Faculty in the graduate major program. The purpose of the candidacy examination should be to assess whether the student is capable of conducting doctoral research based on evidence of critical thinking or other measures that the Graduate Faculty of the program view as important to a successful doctoral student. It should be taken early in the student's program. The nature of the examination varies with the program and may be the master's examination if so prescribed by the program and understood by the student. The decision to admit or not to admit a student to candidacy must be made by the graduate faculty or a designated committee of graduate faculty in the program. All graduate students are required to have a minimum grade-point average of 3.00 for work done at the University at the time the candidacy examination is given, and may not have deferred or missing grades.

The graduate student must be in good academic standing and must be registered as a full-time or part-time graduate degree student for the semester (excluding summer session) in which the candidacy examination is taken.

If the student is seeking dual candidacy in an approved dual-title program, the dual-title field must be integrated into the student's candidacy examination. The results of all candidacy examinations, pass or fail, must be reported to Graduate Enrollment Services via the Candidacy Reporting Form.

For the Ph.D. student, the examination may be given after at least 18 credits have been earned in graduate courses beyond the baccalaureate. The examination must be taken within three semesters (summer sessions do not count) of entry into the doctoral program.

For the D.Ed. student, the examination should be given when the student has earned a total of at least 30 credits toward the graduate degree, including the master's program and graduate work done elsewhere. A student transferring from

another graduate school with 30 or more credits earned toward a graduate degree must take the candidacy examination prior to earning more than 25 credits toward the graduate degree at Penn State.

For the D.M.A. student, the examination should be given when the student has completed two semesters in residence.

## COMPREHENSIVE EXAMINATION

When a candidate for the Ph.D., D.Ed., or D.M.A. degree has substantially completed all course work, a comprehensive examination is given. The examination is intended to evaluate the candidate's mastery of the major, and if appropriate, the minor field. Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishing the doctoral committee and prior to scheduling the comprehensive examination. For more information regarding minors, please see the following web pages.

---For Ph.D. candidates:

[http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm?section=degreeReq2](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq2)

---For D.Ed. candidates:

[http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm?section=degreeReq3](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq3)

---For general information regarding minors:

<http://bulletins.psu.edu/bulletins/whitebook/minors.cfm>

(Note: Some programs require students to pass various "area" examinations, "cumulative" examinations, and the like, or require presentation of a thesis proposal, prior to the comprehensive. These are matters of departmental or program policy, distinct from the general policies of Graduate Council described here.)

A candidate for the Ph.D. must have satisfied the English competence and the communication and foreign language requirement before taking the comprehensive examination.

All candidates are required to have a minimum grade-point average of 3.00 for work done at the University at the time the comprehensive examination is given, and may not have deferred or missing grades.

The graduate student must be in good academic standing and must be registered as a full-time or part-time graduate degree student for the semester in which the comprehensive examination is taken.

The examination is scheduled and announced officially by the Office of Graduate Enrollment Services upon recommendation of the department or program head, and must not be held without the official paperwork from the Graduate School. It is expected that the examination will take place at the campus location of the graduate center offering the program. Two weeks' notice is required by the Office of Graduate Enrollment Services for scheduling this examination, which may be open to the University community and the public at the department's discretion. It is given and evaluated by the entire doctoral committee. The format for the comprehensive examination may be entirely oral, or it may have both a written and an oral component. A favorable vote of at least two-thirds of the members of the committee is required for passing. In case of failure, it is the responsibility of the doctoral committee to determine whether the candidate may take another examination. The results are reported to the Office of Graduate Enrollment Services.

The dissertation adviser, as well as the chair of the doctoral committee (if not the same individual as the dissertation adviser), along with additional members of the committee to total a minimum of three (3), must be physically present at the comprehensive examination. The graduate student must also be physically present at the exam. (Thus for a five-person committee, two could participate via distance.) No more than one member may participate via telephone; a second member could participate via interactive videoconferencing. Requests for exceptions must accompany the Examination Request Form, and must be submitted to the director of Graduate Enrollment Services for approval at least two weeks prior to the date of the exam. Special arrangements, i.e., requirements for meeting participation via distance, must be communicated to the student and the doctoral committee members well in advance of the examination.

When a period of more than six years has elapsed between the passing of the comprehensive examination and the completion of the program, the student is required to pass a second comprehensive examination before the final oral examination will be scheduled.

## FINAL ORAL EXAMINATION

The doctoral candidate who has satisfied all other requirements for the degree will be scheduled by the Office of Graduate Enrollment Services, on the recommendation of the head of the program, to take a final examination. Two weeks' notice is required by the Office of Graduate Enrollment Services for scheduling this examination. Typically, the final oral examination may not be scheduled until at least three months have elapsed after the comprehensive examination was passed, although the director of Graduate Enrollment Services may grant a waiver in appropriate cases. It is the responsibility of the doctoral candidate and chair to provide a copy of the dissertation to each member of the doctoral committee at least two weeks before the date of the scheduled examination.

Both the dissertation adviser and the student are responsible for ensuring the completion of a draft of the dissertation and for adequate consultation with members of the dissertation committee well in advance of the oral examination. Major revisions to the dissertation should be completed before this examination. The dissertation should be in its final draft, with appropriate notes, bibliography, tables, etc., at the time of the oral examination; both the content and style should be correct and polished by the time this final draft of the dissertation is in the hands of the committee.

The final examination of the doctoral candidate is an oral examination administered and evaluated by the entire doctoral committee. It consists of an oral presentation of the dissertation by the candidate and a period of questions and responses. These will relate in large part to the dissertation, but may cover the candidate's entire program of study, because a major purpose of the examination is also to assess the general scholarly attainments of the candidate. The portion of the examination in which the dissertation is presented is open to the University community and the public; therefore, it is expected that the examination will take place at the campus location of the academic unit offering the

program.

The dissertation adviser, as well as the chair of the doctoral committee (if not the same individual as the dissertation adviser), along with additional members of the committee to total a minimum of three (3), must be physically present at the final oral examination. The graduate student must also be physically present at the exam. (Thus for a five-person committee, two could participate via distance.) No more than one member may participate via telephone; a second member could participate via interactive videoconferencing. Requests for exceptions must accompany the Examination Request Form, and must be submitted to the director of Graduate Enrollment Services for approval at least two weeks prior to the date of the exam. Special arrangements, i.e., requirements for meeting participation via distance, must be communicated to the student and the doctoral committee members well in advance of the examination.

All candidates are required to have a minimum grade-point average of 3.00 for work done at the University at the time the examination is given, and may not have deferred or missing grades.

The graduate student must be in good academic standing and must be registered as a full-time or part-time graduate degree student for the semester in which the final oral examination is taken.

A favorable vote of at least two-thirds of the members of the committee is required for passing. The results of the examination are reported to the Office of Graduate Enrollment Services. If a candidate fails, it is the responsibility of the doctoral committee to determine whether another examination may be taken.

## **DISSERTATION ACCEPTANCE**

Completion of the requirements of a doctoral degree program entails acceptance of the dissertation, as indicated by the signatures of at least two-thirds of the doctoral committee, including the dissertation adviser, committee chair, and the program chair or department head on its approval page, and by its acceptance as meeting the editorial standards of the Graduate School, so that it constitutes a suitable archival document for inclusion in the University Libraries. Thus it is to be noted that passage of the final oral examination is necessary but not sufficient for award of the degree; the dissertation must be accepted, as the ultimate step.

Updated: 6/11/13

## Ph.D.--ADDITIONAL SPECIFIC REQUIREMENTS

The degree of Doctor of Philosophy is conferred in recognition of high attainment and productive scholarship in some special field of learning as evidenced by:

1. The satisfactory completion of a prescribed period of study and investigation;
2. The preparation and formal acceptance of a dissertation involving independent research;
3. The successful passing of examinations covering both the special subject and the general field of learning of which this subject forms a part.

**Residence Requirements**--There is no required minimum number of credits or semesters of study, but over some twelve-month period during the interval between admission to the Ph.D. program and completion of the Ph.D. program, the candidate must spend at least two semesters (summer sessions are not included) as a registered full-time student engaged in academic work at the University Park campus, the Penn State Milton S. Hershey Medical Center, or Penn State Harrisburg. Full-time University employees must be certified by the department as devoting half-time or more to graduate studies and/or thesis research to meet the degree requirements. Students should note that 601 cannot be used to meet the full-time residence requirement. (See Credit Loads and Academic Status.)

**Continuous Registration**--It is expected that all graduate students will be properly registered at a credit level appropriate to their degree of activity. (See Registration.) After a Ph.D. candidate has passed the comprehensive examination, the student must register continuously for each fall and spring semester until the final oral examination is passed. (Students who are in residence during summers must also register for summer sessions if they are using University facilities and/or faculty resources, except for Graduate Lecturers/Researchers, who are not required to enroll for any credits unless they are first-semester graduate students, or are required to be enrolled by their graduate program.)

Post-comprehensive Ph.D. students can maintain registration by registering for credits in the usual way, or by registering for noncredit 601 or 611, depending upon whether they are devoting full time or part time to thesis preparation. Students may take 601 plus up to 3 additional credits of course work for audit by paying only the dissertation fee. Students wishing to take up to 3 additional credits of course work for credit, i.e., 590, 602, etc., with 601 may do so by paying the dissertation fee and an additional flat fee. Enrolling for either 3 credits for audit or credit will be the maximum a student may take with SUBJ 601 without special approval by the Graduate School. NOTE: Registration for additional credits above this will incur an additional charge at the appropriate tuition per-credit rate (in state or out of state). Students wishing to take more than 3 additional credits of course work must register for 600 or 611 (i.e., not for 601, which is full-time thesis preparation).

Note that the least expensive way for a student to maintain full-time status while working on research and thesis preparation is to register for 601. This clearly is the procedure of choice for international students who need to maintain status as full-time students for visa purposes.

If a Ph.D. student will not be in residence for an extended period for compelling reasons, the director of Graduate Enrollment Services will consider a petition for a waiver of the continuous registration requirement. The petition must come from the doctoral committee chair and carry the endorsement of the department or program chair.

**Minor Field**--A Ph.D. candidate is not required by the Graduate Council to have a minor field of study. However, a department or a committee in charge of a major field may require a candidate to offer work in a minor field, or a student may elect such a program with the permission of the doctoral committee.

A doctoral minor consists of no fewer than 15 graduate credits of integrated or articulated work in one field related to, but different from, that of the major. Programs should consider that a doctoral minor should represent curriculum and study that reflect graduate-level concepts and scholarship, with a preponderance of courses at the 500-level, however, at a minimum, 6 credits must be at the 500-level. A minor may be taken in one of the approved graduate degree programs offered at Penn State, or in a formal graduate minor program that has been approved by the Graduate Council, such as those listed in this Bulletin on the following web page: <http://bulletins.psu.edu/bulletins/whitebook/minors.cfm>. The minor field chosen must have the approval of the departments or committees responsible for both the major program and the minor field. If more than one minor is being proposed, a separate group of courses must be taken for each (i.e., none of the courses may be used concurrently). If the student received a master's minor in the same field as is being proposed for a doctoral minor, the 15 credits taken must be above and beyond those used for the master's minor. However, credits earned in the master's program over and above those applied to either the master's minor or major may be applied to a minor in the Ph.D. program.

At least one faculty member from the minor field must be on the candidate's doctoral committee.

**Dissertation** --The ability to do independent research and competence in scholarly exposition must be demonstrated by the preparation of a dissertation on some topic related to the major subject. It should represent a significant contribution to knowledge, be presented in a scholarly manner, reveal an ability on the part of the candidate to do independent research of high quality, and indicate considerable experience in using a variety of research techniques. The contents and conclusions of the dissertation must be defended at the time of the final oral examination.

When a complete draft of the dissertation has been compiled, the student must submit it to the Thesis Office for format review. Submission for format review must be made by the announced deadline for the semester/session in which the degree will be conferred. After a successful defense and after signed approval by the advisers and/or committee members and the department head or graduate program chair, the final archival copy of the dissertation (incorporating any format changes requested by the Thesis Office), must be uploaded as an eTD (electronic dissertation) by the announced deadline for the semester/session in which the degree will be conferred. It is also expected that the student will provide a final archival copy of the dissertation to the office of the department or program head.

A Thesis Guide, which gives details concerning format and other requirements, can be accessed at:

Updated: 12/14/11

## D.Ed.--Additional Specific Requirements

The D.Ed. degree is conferred in recognition of advanced preparation of a high order for work in the profession of education as evidenced by:

1. Satisfactory completion of a prescribed period of study;
2. Ability to apply scientific principles to practitioner problems in a variety of education endeavors;
3. Preparation of dissertation demonstrating ability to undertake an educational problem with originality and independent thought;
4. Successful performance on major and minor examinations, showing a satisfactory grasp of the field of specialization and its relation to allied education areas.

**Residence Requirement**--A minimum of 90 credits, of which at least 30 credits must be earned in residence at University Park campus, or Penn State Harrisburg if the degree is offered at that location, is required for the D.Ed. degree. The D.Ed. candidate may meet the requirements by attending summer sessions unless the major department requires a period of registration during the regular academic year. A candidate may register for a maximum of 30 credits of research in absentia, but none of these may count toward the minimum of 30 credits that must be earned at the University Park campus or Penn State Harrisburg if the degree is offered at that location. It is expected that students will register for a minimum of 15 credits of thesis research.

**Major Program and Minor Field**--The program of study includes a major and either a minor or a group of general studies. A majority of the courses offered in fulfillment of the requirements must be in the major program of study.

A candidate choosing to minor in a major outside the fields of professional education (such as history) shall have a minor consisting of no fewer than 15 graduate credits in professional education, as recommended to the director of Graduate Enrollment Services early in the major program with the approval of a faculty adviser from the major and minor areas.

A candidate choosing a major in one of the approved programs in professional education must also choose either a minor or a group of general studies with the approval of the major program chair. In this case, a minor consists of no fewer than 15 graduate credits in a field considered by the major program committee to provide valuable intellectual and/or professional depth and breadth for the candidate.

There must be at least one faculty member from the minor field on the candidate's doctoral committee. The minor may include courses taken as part of a previous master's degree program, if the minor is in an area different from the master's, and if the courses were not a required part of the program, e.g., used to meet a total credit requirement.

An acceptable general studies group consists of at least 15 graduate credits, including those taken as part of a previous master's degree (up to 6 credits), considered by the major program committee to provide valuable intellectual breadth for the candidate. (Note that a general studies group is not a minor and is not entered as such on the student's transcript.)

A candidate entering with a master's degree in a field that would normally be regarded as appropriate for a minor may petition the major program committee for a waiver of the minor requirement. If the program chair then approves, a request for a waiver may be submitted by the chair to the director of Graduate Enrollment Services. Waiving the minor requirement does not reduce the residence or total credit requirements for the D.Ed. degree.

**Comprehensive Examination**--In addition to demonstrating a high level of competence in the subject matter in the major program and minor field, each candidate must show, by a comprehensive examination, an understanding of current theories of education and the ability to apply the techniques and findings of educational research so far as they bear upon the teaching of the subject matter. The candidate must also be able to understand and contribute to the technical and professional literature in the field, and to criticize learned procedures in the light of historical trends and practices in this and other countries. Command of the tools for a thorough study of the problems of education is necessary and must include competence in the use of statistical methods. For certain students the requirements may include a reading knowledge of one or more foreign languages.

All candidates are required to have a minimum grade-point average of 3.00 for academic work done at the University at the time the comprehensive examination is given, and may not have deferred or missing grades. The student must be in good academic standing and must be registered as a full-time or part-time student for the semester in which the examination is taken.

**Dissertation**--Evidence of a high degree of scholarship, competence in scholarly exposition, and ability to select, organize, and apply knowledge must be presented by the candidate in the form of a written dissertation. The candidate must demonstrate a capacity for independent thought, as well as ability and originality in the application of educational principles or in the development of a new generalization under scientific controls. A dissertation may be based upon a product or project of a professional nature, provided scholarly research is involved. For example, it may be based upon the solution of a professional problem concerned with the development of a curriculum, or a product of creative effort related to education. However, in order to be acceptable as a dissertation, professional project must be accompanied by a written discourse demonstrating the nature of the research and including such theories, experiments, and other rational processes as were used in effecting the final result. The topic and outline of the proposed dissertation must have the approval of the doctoral committee.

When a complete draft of the dissertation has been compiled, the student must submit it to the Thesis Office for format review. Submission for format review must be made by the announced deadline for the semester/session in which the degree will be conferred. After a successful defense and after signed approval by the advisers and/or committee members and the department head or graduate program chair, the final archival copy of the dissertation (incorporating any format changes requested by the Thesis Office), must be uploaded as an eTD (electronic dissertation) by the announced deadline for the semester/session in which the degree will be conferred. It is also expected that the student will provide a final archival copy of the dissertation to the office of the department or program head.

A Thesis Guide, which gives details concerning format and other requirements, can be accessed at:



Updated: 10/23/12

## **D.M.A.--Additional Specific Requirements**

The Doctor of Musical Arts requires four semesters in residence. The degree is designed to provide students with a thorough background of preparation and experience in professional-level performance and in the literature of the instrument, while becoming sufficiently knowledgeable about the discipline of music as a whole, in order to teach at the collegiate or university level. This background knowledge would include, but not be limited to, music theory, analysis, and history. Sixty credits are required beyond the Master of Music; if an exceptional student is admitted before completion of a prior Master of Music degree, the student will complete a total of 30 credits in categories equivalent to those required for the M.Mus., in addition to the 60 required for the D.M.A. A candidacy examination will follow upon two semesters completed in residence. The comprehensive examination will occur upon the completion of course work, before the final recital. The culminating experience of the D.M.A. degree is a public performance: three memorized solo recitals are required (the final recital is prepared independently), and two recitals of chamber music. Although no written thesis is required, a lecture-recital is required, with a pre-approved monograph text.

## **Pennsylvania Department of Education Certificate Candidates**

For information, see  
[www.ed.psu.edu/certification](http://www.ed.psu.edu/certification)

### **PROFESSIONAL DEVELOPMENT CERTIFICATES**

Postbaccalaureate candidates who want to pursue course work simply for their professional development and/or a permanent Level II certificate should apply to the Graduate School as special nondegree graduate students.



## M.A. and M.S.--Additional Specific Requirements

The Master of Arts and the Master of Science degrees have similar requirements, the general major area determining which degree is conferred. Programs for both degrees are strongly oriented toward research.

A minimum of 30 graduate credits is required, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. Some graduate programs require additional credits; the exact number can be determined by consulting the specific program description in the subsequent section, Graduate Programs, Faculty, and Courses. A minor is not required of all candidates for the M.A. or M.S. degree. A department or committee in charge of a major program may require a candidate to offer work in a minor field, or the minor may be elected with the permission of the student's committee.

Any member of the Penn State faculty with at least assistant professor rank may participate in the guidance and examination of master's candidates and sign master's thesis signatory pages. Special signatories occasionally are requested and approved for master's thesis. The supervisor of the master's work must be a member of the Graduate Faculty.

A master's minor consists of no fewer than 6 credits of integrated or articulated work in one field related to, but different from, that of the major. Programs should consider that a minor at the graduate level should represent curriculum and study that reflect graduate-level concepts and scholarship, with a preponderance of courses at the 500-level, however, at a minimum, 3 credits must be at the 500-level. A minor program must be in one of the approved graduate degree programs offered at Penn State and must have the approval of the departments or committees responsible for both the major program and the minor field. For more information regarding minors, please see <http://bulletins.psu.edu/bulletins/whitebook/minors.cfm> in this Bulletin.

The major department or the committee in charge of the major program is the judge as to the suitability of a field for the minor and of its relevance to the major. The minor field department has the responsibility of accepting or rejecting students, advising on courses to be taken by the candidate in the field, examining the candidate in the area of studies undertaken in the field, and certifying that the minor requirements have been met.

At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program, with a minimum number of 800-level credits as appropriate to the degree and as approved by the graduate program to be applied to degree requirements. A thesis is required of many candidates for these degrees. Details are given in the introductory paragraphs under the major program headings in the latter part of this bulletin. If a student is required to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If no thesis is required, at least 18 credits must be in 500-level courses.

A thesis is prepared under the direction of the department or program in which the candidate's major work is taken. Under certain conditions a student may complete the thesis off campus. To do so, satisfactory arrangements must be made in advance with the adviser and the head of the major department or program.

When a complete draft of the thesis has been compiled, the student must submit it to the Thesis Office for format review. Submission for format review must be made by the announced deadline for the semester/session in which the degree will be conferred. After a successful defense and after signed approval by the advisers and/or committee members and the department head or graduate program chair, the final archival copy of the thesis (incorporating any format changes requested by the Thesis Office), must be deposited with the Thesis Office or uploaded to the eTD Web site by the announced deadline for the semester/session in which the degree will be conferred. It is also expected that the student will provide a final archival copy of the thesis to the office of the department or program head.

A Thesis Guide, which gives details concerning format and other requirements, can be accessed at: [www.gradsch.psu.edu/current/thesis.html](http://www.gradsch.psu.edu/current/thesis.html)

Candidates who are not required to write a thesis must present a suitable essay or paper. Its nature and extent shall be determined by the major program. The department head or program chair shall report to the Office of Graduate Enrollment Services that the student has met the approved requirement. The department or program is responsible for ensuring that the work is finalized by the published deadline for the semester/session. The program head may require one or more copies of the essay for the program's library or files.

Some programs in the field of education offer the M.S. degree but prefer to admit students into the M.Ed. degree program. Other programs that emphasize research prefer to admit only students interested in pursuing the Ph.D. degree.

Requirements for the M.A. degree at Penn State Harrisburg differ somewhat from the above and are outlined under the major programs in American Studies, Humanities, Community Psychology and Social Change, and Applied Psychology. These programs are available only at Penn State Harrisburg.

Updated: 12/14/11

## **Master of Accounting (M.Acc.)**

The Master of Accounting is designed to prepare students to enter careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement. The program is designed to allow students to complete the educational requirements for becoming a certified public accountant in Pennsylvania as well as most other states. A minimum of 30 graduate credits is required, with a least 18 credits earned in courses at the 500- or 800-level of which at least 6 credits must be earned in 500-level courses. A capstone course (with a final project) integrating material learned in the other program courses is required.

## **M.Agr.--Additional Specific Requirements**

The Master of Agriculture is a professional degree with an industrial orientation. A student, according to individual objectives, may obtain intensive training encompassing a wide spectrum of subject matter area or intensive training in a specialized area. The program emphasizes the development of professional skills in the communication of technical knowledge and its application to the solution of current and future technical, economic, and social problems of individuals and groups.

The head of the department or program chair appoints a three-member committee to guide and monitor the candidate's professional development. Members of this committee must represent at least two departments. The chair of the appointed committee serves as the candidate's adviser. The candidate will inform the committee of personal aspirations and background early in the program. The committee will suggest to the student how best to achieve these goals and the standard of professional competence required for the Master of Agriculture degree.

A minimum of 30 graduate credits is required, of which 18 credits must be at the 500 level or above. A maximum of 10 credits may be earned in special problem-type courses.

Students in the Master of Agriculture degree program can major in Agricultural Economics, Agronomy, Animal Science, Forest Resources, Horticulture, Plant Pathology, Rural Sociology, Soil Science, or Wildlife and Fisheries Science.

The candidate must present an acceptable paper on a selected professional problem or a report of internship training. Up to 3 graduate credits will be given for an acceptable paper. The candidate may be required to provide one or more copies of the paper for the University.

The candidate's committee shall report, through the department head or program chair, to the Office of Graduate Enrollment Services the title of the paper and that a draft of the work has been submitted by the published draft deadline for the semester. The department or program is responsible for ensuring that the work is finalized by the published deadline for the semester.

## **M.Arch.--Additional Specific Requirements**

The Master of Architecture degree is a postprofessional degree intended for persons already holding an accredited Bachelor of Architecture degree. (Postprofessional architecture degrees are not eligible for NAAB accreditation.) The M.Arch. is a 30-credit program that requires 24 credits of course work and 6 credits of thesis or thesis project. At least 18 credits must be at the 500 or 600 levels, and at least 24 credits must be taken in residence at University Park. The core courses consist of a total of 12 credits. The capstone of the M.Arch. degree program is a master's thesis or thesis (design) project, requiring the student to identify and formulate an area of inquiry within which to do original research and then to complete a project or a written thesis.



## **M.A.S.--Additional Specific Requirements**

The professional Master of Applied Statistics degree requires a minimum of 30 graduate credits of which 24 must be courses from the Department of Statistics. Twenty-one credits must be at the 500 level. The program has been approved for both in residence at University Park campus and online via the World Campus.

## M.B.A.--Additional Specific Requirements

Master of Business Administration degree programs are offered at the University Park campus, Penn State Great Valley, Penn State Harrisburg, and Penn State Erie.

**University Park Campus**--The purpose of the MBA program at the University Park campus is to develop professional managerial knowledge and skills as these are applied to decisions in complex organizations. The curriculum was developed by the graduate business faculty to blend technical rigor, managerial theory, and integrative learning experiences through case studies and other teaching methods.

A minimum of 48 graduate credits is required, with a minimum of 42 credits at the 500 level. Twenty-six credits must be in specific core courses. Also required are 22 credits in portfolio and breadth electives. Work for this degree may be started in the fall semester only. Applications for this AACSB-accredited M.B.A program must include the results of the Graduate Management Admission Test.

**Penn State Harrisburg**--The goals of the Harrisburg MBA program are to provide graduates with a foundation for personal and professional growth and lifelong learning; a firm grounding in the academic disciplines underlying the field of business; participative strengths; and decision making, problem solving, and critical thinking skills. Major emphasis is placed on the social, legal, and ethical context of business—particularly ethical values needed in the conduct of business. Program faculty place high value on teaching and currency of curriculum, an emphasis on oral and written communication, collaborative learning, and cross-functional integration of concepts. The students served by the MBA program are, primarily, employees of area business, government, and not-for-profit organizations who reside within the Capital Region and study on a part-time basis. However, either full- or part-time study is possible. The M.B.A. is also offered as a concurrent MBA/Ph.D. program with the College of Medicine at the Penn State Milton S. Hershey Medical Center Department of Pharmacology, and concurrent MBA/J.D. degree program with The Dickinson School of Law.

The M.B.A. requires a minimum of 30 graduate credits, and is offered at the college's Middletown campus and in Lancaster, Pennsylvania. Eighteen of these credits are in prescribed areas of business, including accounting, finance, management, marketing, and information systems. An additional 12 credits are elective, permitting students to select courses in such areas as e-business, human resource managements, financial analysis, or general business to meet their personal and professional goals. Depending on their level of preparation, some students may need to take additional course work beyond the baccalaureate to permit them to begin their advanced business studies with a common conceptual foundation and adequate understanding of the integrated nature of the business enterprise. Applications to this AACSB-accredited program must include results of the Graduate Management Admission Test and two letters of recommendation. In addition, applicants whose first language is not English or who have not received a prior degree from an institution in which the language of instruction was English must provide scores on the Test of English as a Foreign Language (TOEFL).

**Penn State Erie**--The Penn State Erie M.B.A. is a general degree emphasizing development of the planning and problem-solving skills crucial in middle and upper management. Course work emphasizes the integration of business functions and the practical application of theory in the business world, using simulated problems and actual situations students are experiencing at work. Many students are fully employed professionals who bring a wealth of knowledge and experience to the classroom. Both full- and part-time study is possible and the program can be completed by attending evening classes. The Master of Business Administration degree program consists of three parts:

1. **Foundation Core Courses (18 credits):** The courses introduce students to the ethical, legal, social, political, technological, and societal environment of business, accounting, economics, finance, management, marketing, operations management, and the application of quantitative methods to the analysis of business problems. The foundation core is required of all applicants who have not completed an undergraduate degree in business or previous undergraduate or graduate course work relevant to the foundation core requirements.
2. **Advanced Required Courses (15 credits):** These courses build on the knowledge base established in the foundation core and provide greater depth of knowledge in the subject areas included. This component of the MBA program consists of five 3-credit courses that cover advanced topics in cost management, information systems management, managing a diverse workforce, global operations and supply chain management, and strategic management and business policy.
3. **Elective Courses (15 credits):** All students are required to take 15 credits of elective courses covering advanced topics of their choice. Electives must include at least 3 credits of community outreach-oriented and 3 credits of internationally focused course work from the program-approved list of courses.

**Penn State Great Valley**--The M.B.A. at Great Valley's School of Graduate Professional Studies is designed to meet the needs of the working professional desiring to advance her or his career. The M.B.A. requires 45 credits for degree completion. Courses are categorized into four groups: core, advanced, elective, and capstone. Students may be exempt from up to 15 credits from the core courses based on academic preparation and test scores. Students entering the program are expected to meet preprogram requirements that build a foundation for effective communication skills and quantitative analysis.

In addition to the general M.B.A. program, options are available in Biotechnology and Health Industry Management, and New Ventures and Entrepreneurial Studies. Classes are offered evenings and Saturdays in seven-week sessions, and the program may be completed in as little as 18 months. M.B.A. students are admitted year-round at the beginning of each of the seven-week sessions. Applications must include the results of a Graduate Management Admissions Test. For more information, refer to the Web at

<http://www.gv.psu.edu>

## **M.Ed.--Additional Specific Requirements**

The programs leading to the degree of Master of Education provide preparation for increased professional competence in education. They should be distinguished carefully from the research-oriented programs that lead to the academic degrees of Master of Arts or Master of Science. In most major programs the requirements for admission include 18 credits in education and related fields.

A minimum of 30 graduate credits is required for the degree, of which at least 20 must be earned at the campus/center where the degree program is offered; at least 24 must be in course work. This degree is also offered in certain programs at Penn State Harrisburg and Penn State Great Valley.

**Major Programs in the Fields of Education--**A student can major in one of the approved programs in professional education and proceed under the guidance of a graduate faculty member of the appropriate major. At least 18 credits at the 500 level or above (with at least 6 credits in 500 level) must be included in the program. Most programs of this type require at least 6 credits to be earned outside the major as providing valuable breadth for the candidate. However, this policy differs among programs. Specific information about such requirements is found under the individual program listings in this bulletin or from the program's coordinator. It is important for potential students to obtain the degree requirements of the programs in which they are interested, because many programs specify degree requirements in excess of 30 credits and the manner in which credits are to be earned: required, elective, in or out of the major.

**Major Programs Outside the Fields of Education--**A student who wants to earn an M.Ed. in a specific subject-matter field, such as economics, mathematics, German, or a broader area, can choose such a program as a major and take a majority of work in it under the guidance of the department offering that major. The candidate is required to earn 6 credits in education as directed by the faculty of one of the approved graduate programs in professional education.

**Culminating Experience--**All M.Ed. programs require a significant culminating or "capstone" experience. Each program has established the specific manner for meeting the requirement, which may take the form of a thesis, production, paper, exhibition, comprehensive examination or other similar experience serving to demonstrate comprehensive and in-depth knowledge of the field of study. The nature and extent of this work and when it is to be undertaken within the program of study shall be determined by the major program and reported to the Office of Graduate Enrollment Services of the Graduate School.

**Thesis or Paper--**The thesis or paper must be of considerable proportion and must be clearly and definitively indicative of the capacity to describe a serious intellectual investigation, study, critical analysis, or evaluation; to acquire, integrate, and analyze information; to draw conclusions logically; and to present the experience adequately and professionally in writing. The requirements of the Graduate School regarding a thesis must be met. Programs may impose other requirements regarding the master's paper, including submission of more than one copy for disposition at the program level.

**Exhibition or Production--**The capstone experience must be of comparable rigor as that required for a thesis or master's paper. While the format of the experience will differ among programs, all such capstone experiences must result in definitive evidence of satisfaction of the above noted qualities. Some tangible written report is required, although the length and nature of this report are to be left to the department or program.

**Other Capstone Experience--**If the program wishes to use some other mechanism to demonstrate culminating evidence of analytical ability and synthesis of material, it may do so upon approval by the Graduate Council. The program or department must report to Graduate Enrollment Services evidence that the student has met the approved requirement.

## **M.E.M. -- Additional Specific Requirements**

The Master of Engineering Management is developed for students with a background in engineering or science. Applicants with a four-year undergraduate degree in engineering, mathematics, physics, computer science, or a related discipline will be considered. All students in the Master of Engineering Management program must complete a minimum of 33 credits, including 18 credits in core courses at the 500 level and completion of the capstone course.

## **M.Eng.--Additional Specific Requirements**

The Master of Engineering degree programs provide training for advanced professional competence in several fields of engineering. This professional master's degree emphasizes practical application of knowledge for solving problems and should be distinguished carefully from the research-oriented programs that lead to the academic degree of Master of Science. A minimum of 30 graduate credits is required, of which 20 must be earned at the campus/center where the degree program is offered. At least 18 credits must be earned in graduate courses (500 series).

**Culminating Experience**--All M.Eng. Programs require a significant culminating or "capstone" experience. Each program has established the specific manner for meeting the requirement, which may take the form of a paper, writing portfolio, or other similar experience serving to demonstrate comprehensive and in-depth knowledge of the field of study. The nature and extent of this work and when it is to be undertaken within the program of study shall be determined by the major program and reported to the Office of Graduate Enrollment Services of the Graduate School.

Work for this degree is not required to be done specifically at the University Park campus. A complete program of study can be pursued at Penn State Harrisburg or Penn State Great Valley.

## **M.E.P.C.--Additional Specific Requirements**

The Master of Environmental Pollution Control (M.E.P.C.) is an intercollege professional degree program designed to improve competence in various fields of the control, management, and prevention of environmental pollution. The degree should be distinguished from the research-oriented program that leads to the academic degree of master of science, since the M.E.P.C. emphasizes application, analysis, and synthesis of knowledge rather than creating new information through traditional research.

A minimum of 30 graduate credits is required, of which 20 must be earned at the campus where the degree program is offered. Special requirements include 1112 credits of core courses covering air pollution, water quality, solid/hazardous waste management, and policy/risk assessment. At least 18 credits at the 500 level or above (with at least 6 credits in 500 level) must be included in the program, which includes 1 credit of E P C 590 and up to 3 paper-writing (596) credits offered through the student's department of affiliation.

A scholarly master's paper must be completed by all M.E.P.C. candidates. It must be of considerable proportion and must demonstrate the ability to formulate objectives, acquire and document relevant information, critically analyze, draw logical conclusions, and relate findings to professional problems and practices.

## **M.F.A.--Additional Specific Requirements**

The programs leading to the Master of Fine Arts degree provide professional training in art, creative writing, and theatre. The M.F.A. is one of two terminal degrees in the arts. (The other is the research-oriented Ph.D.) The M.F.A. is a 48- to 60-credit degree and usually requires two to three years to complete.

The greater number of credits in the major should be at the 500 level, but the needs of the student will be considered in arranging the best combination of courses and research for preparing the candidate in a particular field.

A professional creative project is required. This project will include a monograph (an artist's statement for the M.F.A. in studio art) in support of the creative or interpretative aspect of the program. Continuance in the program is dependent upon the student's academic and artistic progress as evaluated at the end of each semester.

## **M.Fin. -- Additional Specific Requirements**

The Master of Finance (M.Fin.) degree is intended to provide an advanced and specialized graduate education in finance for individuals who have career interests in financial management, financial analysis, or financial consulting with a focused, intensive curriculum that will develop and expand their quantitative, analytical, and technical expertise.

The M.Fin. degree requires 30 graduate credits-18 in prescribed core courses, 9 in electives, and 3 for a capstone course, including a research paper, which provides a culminating experience for students to develop their analytical abilities to identify strategies that enhance value creation, building upon knowledge acquired from the core courses.



## **M.F.R.--Additional Specific Requirements**

The Master of Forest Resources (M.F.R.) is a professional degree designed for students who want to specialize in fields of wood products marketing or industries, forest management, silviculture, urban forestry, watershed management, or wildlife and fisheries management. This degree differs from the research-oriented Master of Science degree programs in the School of Forest Resources, because the M.F.R. emphasizes applications, analysis, and synthesis of knowledge rather than creating new information through more traditional types of research. This program is especially attractive to returning students interested in gaining state-of-the-art information rather than thesis research in their specialized field.

Students who have baccalaureate degrees in forestry, wood products, or wildlife and fisheries may complete the M.F.R. degree requirements in one year, whereas those with degrees in related fields generally require longer because of deficiencies in prerequisite undergraduate courses.

A minimum of 30 graduate credits (400- to 500-level courses) is required, of which 20 credits must be earned at an established graduate campus of the University, with at least 18 credits as formal courses (excluding paper writing, colloquia, and independent studies) related to forest resources, wood products, and wildlife and fisheries. At least 18 credits at the 500 level or above (with at least 6 credits in 500 level) must be included in the program, including 6 credits of formal courses. A paper (3 to 6 credits of FOR/W P/W F S 596) and formal oral presentation (1 credit of FOR/W P/WFS 596) are required as part of the 30 credits that demonstrate ability to apply the knowledge gained during the program to the specialized field of interest. The program must also include 3 credits of statistics at the graduate level.

## **M.G.I.S.--Additional Specific Requirements**

The Master of Geographic Information Systems (M.G.I.S.) degree program is for adult professionals who aspire to leadership in the GIS profession but who are able to study only part-time and at a distance.

MGIS is a 35-credit program. Six to 9 credits are earned through an independent project that culminates in a formal public presentation attended by the student's academic adviser. The independent project demonstrates students' ability to apply advanced knowledge and skills in a way that makes a substantial contribution to their professional work.

Designed in consultation with an advisory board of experienced professionals in industry, government, and private practice, the MGIS curriculum nurtures not only technical competence but also the articulacy, analytical skills, and professionalism required for leadership in any organization.

Throughout the program students create and maintain personal e-portfolios that chronicle their achievements, outline long-term professional development strategies, and foster meaningful interactions among fellow students and faculty members.

## **M.H.A.--Additional Specific Requirements**

Penn State's Department of Health Policy and Administration helps students prepare for positions in health care organizations, the nation's second-largest and fastest-growing industry. Master of Health Administration (MHA) graduates become executives in hospitals, health systems, skilled nursing facilities, insurance companies, consulting firms, home health agencies, federal regulating agencies, medical group practices, health maintenance organizations, public health agencies, mental health agencies, and clinics. The curriculum emphasizes strategic thinking, management, communication, and a broad understanding of the U.S. health care system. Areas of study include health law, epidemiology management, payment mechanisms, ethics, managed care, long-term care, health care technology, marketing, and strategic planning.

Satisfactory scores on either the Graduate Management Test (GMAT) or the Graduate Record Examinations (GRE) are required for admission. In addition, a junior/senior grade-point average of 3.00 or better, a relevant personal statement, and two letters of recommendation are necessary. Some work experience in health care is preferred, but not required.

The MHA program is designed to be completed in twenty-one months of full-time study, although it may be completed on a part-time basis. A minimum of 49 credits is required for completion of the degree. Students take 46 preselected Health Policy and Administration credits and 3 credits of electives selected in consultation with an adviser. Students are required to complete a ten-week residency in a health care practice setting. For full-time students, this is completed during the summer between the first and second years of academic study.

Penn State Harrisburg--Based on eight prescribed core courses defined as the foundation of administration in health care, the degree program is designed for part-time professional students already engaged in, or interested in, health administration careers. Three years of relevant experience is an admission requirement. If the applicant's GPA is less than 3.0, GRE or GMAT scores are required.

## **M.H.S.--Additional Specific Requirements**

The M.H.S. is designed to provide students with broad training in issues surrounding homeland security. The target audience may include federal, state, and local public health officials, public affairs administrators, emergency management professionals, health care professionals, first responders, criminal justice and law enforcement personnel, military staff, and members of corporate security.

The Master of Homeland Security requires a minimum of 30 graduate credit hours, of which at least 18 must be in 500-level courses. Each candidate must complete a project report on a topic related to homeland security. The department head or program chair shall report, to the Office of Graduate Enrollment Services, the successful completion of the report and is responsible for ensuring that the work is finalized by the deadline for the semester in which the student intends to graduate.

## **M.I.A. -- Additional Specific Requirements**

Students admitted to the Master of International Affairs program must take a total of 30 graduate credits, including 18 credits of required core courses with the remaining credits chosen from elective courses that will cluster around areas of concentration designed by the program faculty. A minimum of 18 credits must be at the 500 level or above. In addition to the core curriculum and elective courses, degree candidates must complete either (1) a master's paper or (2) a supervised internship placement. The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis; the supervised internship placement must be of sufficient depth and professionalism to allow the student to experience the integration of his/her curricular studies in a professional environment. A reflective paper will be submitted as a part of this credit requirement.

## **M.L.A.--Additional Specific Requirements**

The Master of Landscape Architecture program is structured as advanced scholarly inquiry within the professional discipline. The intent is to provide specialized expertise in a niche area of landscape architecture to individuals who already have completed a practice-oriented professional program. Prospective students must hold a degree from an accredited program (or foreign equivalent) in landscape architecture or architecture.

Penn State's MLA program offers particular opportunities for study in four expertise areas: community and urban design, through affiliation with the Hamer Center for Community Design Assistance; ecological issues with emphasis on watershed stewardship, through affiliation with the Center for Watershed Stewardship; design computing, through affiliation with the Stuckeman Center for Design Computing; and landscape history, through affiliation with the Historic Places Initiative.

Students may choose one of two curricular tracks in the MLA: a practicum-oriented option in one of the four centers, or pursuit of a unique independent study in conjunction with a center topic or faculty research. In both tracks, students pursue individual inquiry intended to contribute to advancement of the profession: a paper (or papers) in the option track, and in the independent track a major project that forms the focus of the student's curriculum.

A minimum of 44 credits is required, at least 34 credits at University Park campus: 19 credits are studio/research, 4 are in seminar, 21 are supporting electives. The majority of the course work must be at the 500 level.

## **M.L.D.--Additional Specific Requirements**

The Master of Leadership Development is a 36-credit interdisciplinary professional graduate program that blends the social and behavioral sciences with ethical studies to develop outstanding organizational and community leaders. A series of cornerstone, competency, and context courses are required to provide all students with a common body of knowledge. All students must complete a capstone course (LEAD 582 Social Entrepreneurship and Community Leadership) that provides students with an opportunity to enact what is learned in the course work in the context of promoting a positive change in the community. The program is geared to individuals in mid- to upper levels of management and administration who have at least five years of related professional experience.





## **M.Mus.--Additional Specific Requirements**

The program leading to the Master of Music degree provides training for increased professional competence in performance, pedagogy, conducting, composition. It should be distinguished carefully from the research-oriented program that leads to the academic degree of Master of Arts.

Admission requirements include an audition for performance and conducting applicants and submission of a composition portfolio for composition applicants.

A minimum of 36 credits is required, of which 30 must be earned at the University Park campus. At least one-half of the required credits must be at the 500 level.

Depending on the major option, a professional project in performance, conducting, or composition is required. A master's paper and a comprehensive examination also are required in certain areas.

## **M.M.E.--Additional Specific Requirements**

The Master of Music Education degree provides opportunity for advanced study in the art of music, pedagogy, and systematic problem solving. In addition to the traditional academic year program, a "summer only" option is available.

A minimum of 30 credits is required, of which 20 must be earned at the University Park campus. At least 18 credits at the 500 level or above (with at least 6 credits in 500 level) must be included in the program.

Admission requires 12–15 credits in music education methods at the undergraduate level, successful teaching or student teaching experience, and a video taped demonstration of teaching and musical competence. Also required are a master's paper and a comprehensive examination.

## **M.P.A.--Additional Specific Requirements**

The Master of Public Administration (MPA) program is intended for those with career interests in public management, health and human services, government, and other public service and nonprofit organizations. The MPA program is accredited by the National Association of Schools of Public Affairs and Administration. The M.P.A. degree is offered at Penn State Harrisburg.

The M.P.A. degree requires 36 graduate credits—18 in prescribed core courses, 15 in electives, and 3 for a professional master's project. In addition, a 9-credit internship is required of students who do not have at least three years of full-time, relevant work experience, which consists of supervisory, managerial, or professional work. The internship is waived for students with this experience before they enter the program or who gain it during the program.

## **M.P.M.--Additional Specific Requirements**

The Master of Project Management is a 30-credit graduate program that emphasizes all aspects of project management theory and practice. The M.P.M. is interdisciplinary and utilizes problem-based learning as well as a combination of face-to-face and Web-based instructional methods to transcend time and space, and to support effective teaching and learning. The M.P.M. curriculum requires the completion of eight courses (24 credits) in which students are required to apply course concepts to project management situations in their employing organizations. In addition, an applied research project (6 credits) focusing on some aspect of project management is required.

## **M.P.S. -- Additional Specific Requirements**

The Master of Professional Studies is a professional degree. Programs leading to the M.P.S. degree provide opportunities for students to increase their knowledge and competencies in specific careers (as practitioners). The M.P.S. is often considered the "terminal" degree in the field and students entering often need not have undergraduate training in the field, as the curriculum provides foundation material assuming a diversity of backgrounds.

A minimum of 30 graduate credits is required, of which at least 18 credits must be at the 500-level and above, with a minimum of 6 credits of 500-level course work. A significant culminating or "capstone" experience or other mechanism to demonstrate evidence of analytical ability and synthesis of material is required. These may typically include, but are not limited to, a paper, an internship, an exhibition, a production, a comprehensive examination, or a capstone course. The specific form of the culminating experience is determined by the major program.

The department head or program chair shall report to the Office of Graduate Enrollment Services the nature of the culminating experience and is responsible for ensuring that the work is finalized by the deadline for the semester in which the student intends to graduate.

## **M.S.E.--Additional Specific Requirements**

The Master of Software Engineering degree is a professional degree that focuses on exploring and examining software engineering practices and solutions that address emerging industry issues, such as e-commerce and enterprise integration

The program is designed to meet the educational needs of technical professionals who want to build upon their software engineering knowledge.

Applicants for admission should hold an undergraduate degree in an appropriate technical field. Applicants not holding a technical degree should present a minimum of three years' work experience in the software profession. All applicants must have proficiency in a high-level language and in the principles of computer architecture, or complete prerequisite courses upon admission to the program.

The degree program requires completion of 36 credits of graduate course work, including a 3-credit advanced studio leading to the development of an actual software product, participation in a research institute, or a 3-credit professional paper.

For maximum career flexibility, students may broaden their study by selecting approved courses from allied fields, such as artificial intelligence, computer science and engineering, and management information systems.



## University Course Descriptions

### COURSE-NUMBERING SYSTEM

UNDERGRADUATE COURSES (1 to 399): General courses accepted in fulfillment of requirements for the bachelor's degrees.

ADVANCED UNDERGRADUATE COURSES (400 to 499): Courses open to graduate students and to juniors and seniors and, with the special written permission of the head of the department or the chair of the program sponsoring the course, to qualified students in earlier semesters.

GRADUATE COURSES (500 to 699; 800 to 899): Courses restricted to students registered in the Graduate School, seniors with an average of at least 3.50, and other students who have been granted permission to enroll by the dean of the Graduate School. These courses are described in the Penn State *Graduate Degree Programs Bulletin*.

MEDICAL COURSES (700-799): Courses restricted to students registered in the College of Medicine.

LAW COURSES (900-999): Courses restricted to students registered in The Dickinson School of Law.

### COMMON COURSE NUMBERS

The following courses for which students may register have been set up for common use by major programs to encourage innovation and provide flexibility in designing graduate programs. For courses 594, 595, 596, 597, 598, and 599, special titles may be requested by a graduate program for a given semester, through the Senate Curriculum Coordinator, 101 Kern Building, University Park campus.

590. COLLOQUIUM--Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

594. RESEARCH TOPICS--Supervised student activities on research projects identified on an individual or small-group basis. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

595. INTERNSHIP--Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc. Prerequisite: prior approval of proposed assignment by instructor.

596. INDIVIDUAL STUDIES--Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

597, 598. SPECIAL TOPICS--Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

599. FOREIGN STUDIES (1-2 per semester, maximum of 4) Courses offered in foreign countries by individual or group instruction. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

600, 610. THESIS RESEARCH--In registering for thesis research a student uses the appropriate number (600, 610) preceded by the abbreviation designating the major field. The numbers 600 (on campus) and 610 (off campus) are available for credit in thesis research in all graduate major programs. The bursar assesses charges for these courses at the current rate of tuition, according to the student's status at the time of registration.

601, 611. PH.D. DISSERTATION--The numbers 601 and 611, with associated special fees, are available to Ph.D. degree candidates who have passed the comprehensive examination and met the two-semester residence requirement. They may be used for dissertation preparation work during its later stages, when the academic activity of the candidate consists partly (611) or solely (601) of work on the completion of research and writing of the dissertation.

SUBJ 601 and SUBJ 611 do not carry academic credit. They are entered on the academic transcript to indicate the registration and the nature of the candidate's academic activity. A candidate registered for SUBJ 601 is classified as a full-time student, while one registered for SUBJ 611 is classified as a part-time student. (See also Thesis/Dissertation, in the General Information section of this bulletin.)

The numbers 600, 601, 610, and 611 may not appear in the Schedule of Courses for each semester.

602. SUPERVISED EXPERIENCE IN COLLEGE TEACHING--May be offered by any graduate program in a department that also offers undergraduate courses. A graduate program with no counterpart undergraduate program may offer SUBJ 602 when cooperative arrangements are made with an administrative unit that does not offer graduate degrees but that uses graduate assistants in its teaching. SUBJ 602 may be offered in any semester and is subject to the following restrictions:

1. SUBJ 602 will not be counted in fulfilling any specific credit requirement for an advanced degree.
2. SUBJ 602 will be graded (A, B, C, D, F). The grade will appear on the student's transcript.
3. SUBJ 602 will not be used in calculating grade-point averages.
4. SUBJ 602 shall be offered only in those graduate programs that want to provide opportunity for supervised and graded teaching experience. Enrollment will be restricted to students for whom the major program is prepared to provide such experience.
5. SUBJ 602 will be counted as a part of the student's credit load unless the program specifies otherwise.



SUBJ 603. FOREIGN ACADEMIC EXPERIENCE (1-12)--Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.

890. COLLOQUIUM--Continuing, professionally oriented seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

894. CAPSTONE EXPERIENCE--Supervised, professionally oriented student activities that constitute the culminating experience for the program. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

895. INTERNSHIP--Supervised, professionally oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc. Prerequisite: prior approval of proposed assignment by instructor.

896. INDIVIDUAL STUDIES--Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

897, 898. SPECIAL TOPICS--Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently; several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

899. FOREIGN STUDIES (1-2 per semester, maximum of 4) Courses with a professional orientation offered in foreign countries by individual or group instruction. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

## **COURSE ABBREVIATION CODES AND DESCRIPTIONS TO BE USED FOR TRANSFER OF CREDIT**

**NOTE: The following course abbreviation codes are for use by the Office of Graduate Enrollment Services in The Graduate School only and may appear on transcripts/degree audits.**

### **EXTTR (EXT TRNSF FOR DGR RQ)**

Course(s) transferred from an external institution to meet requirements toward a graduate degree.

### **EXTMJ (EXT TRNSF FOR MJR RQ)**

Course(s) transferred from an external institution to meet program-specific requirements toward a graduate degree.

### **CIPTR (CIP TRNSF FOR DGR RQ)**

Course(s) transferred from an external institution to meet requirements toward a collaborative institutional integrated undergraduate-graduate or concurrent graduate degree program.

### **CIPMJ (CIP TRNSF FOR MJR RQ)**

Course(s) transferred from an external institution to meet program-specific requirements toward a collaborative institutional integrated undergraduate-graduate or concurrent graduate degree program.

4/25/12

## Accounting (ACCTG)

ACCTG 403 **Auditing** (3) Financial compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses.

Effective: Spring 2008

Prerequisite:

ACCTG 403W **Auditing** (3) Financial, compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses.

Effective: Spring 2008

Prerequisite:

ACCTG 404 **Managerial Accounting: Economic Perspective** (3) Accounting techniques as planning, control, and motivating devices in business and other organizations; accounting data for decision making and performance evaluation.

Effective: Spring 2011

Prerequisite:

ACCTG 405 **Principles of Taxation I** (3) Elements of tax policy and tax-planning concepts for personal and business decision making; with emphasis on taxation of individuals.

Effective: Spring 2008

Prerequisite:

ACCTG 406 **Principles of Taxation II** (3) Impact of federal tax structure on business decisions, research methodology, tax planning; ethical considerations of tax practice.

Effective: Spring 2008

Prerequisite:

ACCTG 410 **Federal Taxation II** (3) An examination of the rules and forms used to compute the federal tax liability of corporations and partners.

Effective: Spring 2008

Prerequisite:

ACCTG 411 **Accounting Practicum: VITA** (3) Introduces students to practical aspects of tax preparation through the IRS' VITA program and completion of a tax research project.

Effective: Spring 2008

Prerequisite:

ACCTG 422 **Accounting Systems** (3) Understanding flow and documentation of accounting information and internal controls in the context of accounting cycles.

Effective: Spring 2008

Prerequisite:

ACCTG 426 **Financial Statement Analysis** (3) The exploration of conventional and advanced methods of analyzing financial statements, including the assessment of earnings quality.

Effective: Spring 2008

Prerequisite:

ACCTG 431 **Advanced Auditing** (3) Examination of legal liability, EDP, statistical sampling, SEC reporting, internal control, and financial reporting in specialized industries.

Effective: Spring 2008

Prerequisite:

ACCTG 432 **Accounting Information Systems** (3) Systems analysis tools and techniques; internal control concepts; development of computer control procedures.

Effective: Spring 2008

Prerequisite:

ACCTG 440 **Advanced Management Accounting** (3) Management accounting topics such as decision models, quantitative techniques, variance analysis, and their use in accounting.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

ACCTG 440 **Advanced Management Accounting** (3) Management accounting topics such as decision models, quantitative techniques, variance analysis, and their use in accounting.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

ACCTG 450 **Advanced Accounting** (3) Accounting theory and practice for business combinations, branches, international operations, partnerships, consolidated financial statements, corporate liquidations, nonprofit organizations, estates, and trusts.

Effective: Spring 2008

Prerequisite:

ACCTG 461 (IL) **International Accounting** (3) Study of international accounting issues with emphasis on need, use, and interpretation of financial accounting required in global business environment.

Effective: Fall 2012

Prerequisite:

ACCTG 462 **Governmental and Not-for-Profit Accounting** (3) Provides an understanding of governmental and not-for-profit accounting theory, procedures, and financial statements.

Effective: Spring 2010

Prerequisite:

ACCTG 463 **Accounting Theory** (3) An analysis of the development of accounting theory and its current and future impact on accounting.

Effective: Spring 2008

Prerequisite:

ACCTG 471 **Intermediate Financial Accounting I** (3) Theory and practice issues in income concepts and value measurement; GAAP; revenues, costs, assets, liabilities, and equities.

Effective: Spring 2008

Prerequisite:

ACCTG 472 **Intermediate Financial Accounting II** (3) Off-balance-sheet financing; special issues in cost capitalization, liabilities, and equities; matching; funds flow statements; statement analysis; inflation accounting.

Effective: Spring 2008

Prerequisite:

ACCTG 473 **Advanced Financial Accounting** (3) Reporting for multi-corporate enterprises, business combinations, quasi-reorganizations, and selected contemporary reporting problems.

Effective: Spring 2010

Prerequisite:

ACCTG 481 **Financial Statement Analysis: Accounting Based Evaluation and Decision Making** (3) An accounting based evaluation and decision making approach to analyzing financial statements by studying business and firm valuation.

Effective: Spring 2008

Prerequisite:

ACCTG 483 **Forensic Accounting** (3) Study of investigative accounting, consulting and litigation support activities undertaken in forensic accounting engagements.

Effective: Spring 2011

Prerequisite:

ACCTG 489 **Seminar in Accounting** (3) New trends and concepts in accounting; applications and impact on problem solving and decision making.

Effective: Spring 2008

Prerequisite:

ACCTG 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2003

ACCTG 494H **Research Project** (1-3 per semester/maximum of 6) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2005

ACCTG 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

ACCTG 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1992

ACCTG 496A **Oil and Gas Tax Accounting** (1-6) Oil and gas tax accounting, including treatment of intangible drilling costs, application of percentage depletion accounting, alternative minimum tax consequences and related issues.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

ACCTG 496A **Advanced Accounting** (1-6) Accounting theory and practice for business acquisitions, consolidations, foreign currency, international operations and governmental accounting.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

ACCTG 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

ACCTG 497A **Hot Tax Topics** (3) The course will highlight principles and concepts in US international tax, trusts, and estates, and estate planning.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ACCTG 497B **Financial Reporting in Special Industries** (3) Covers definitions, measurements and disclosures for

revenues, expenses, assets, and liabilities not traditionally covered by financial accounting courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

ACCTG 497H **Sustainability** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ACCTG 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest. .

Effective: Summer 2003

ACCTG 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2007

ACCTG 501 **Research Methods in Accounting** (3) An introduction to the methods and techniques of contemporary research in accounting.

Effective: Fall 1992

Prerequisite:

ACCTG 504 **Seminar in Managerial Accounting** (3-6) Accounting and the managerial processes of planning, control, and decision making.

Effective: Fall 1992

ACCTG 507 **Seminar in Financial Accounting** (3) Theoretical basis of financial accounting.

Effective: Fall 1992

ACCTG 511 **Financial and Managerial Accounting** (3) Fundamental financial and managerial accounting concepts and issues from the viewpoint of the report user.

Effective: Fall 1992

ACCTG 512 **Financial Accounting Theory and Reporting Problems** (3) Measurement and reporting of financial information for external purposes, with particular attention to current problems in asset and income measurement.

Effective: Fall 1992

Prerequisite:

ACCTG 524 **Managerial Accounting** (3) Concepts and techniques of accounting for planning, control, and motivation.

Effective: Fall 1992

Prerequisite:

ACCTG 550 **Taxation and Management Decisions** (2) Framework for understanding the effects of taxes on business decisions and for devising effective tax planning strategies.

Effective: Summer 2002

Prerequisite:

ACCTG 560 **Accounting and Business Analysis** (2) Develop ability to assess the relation between accounting data in financial statements and the economic fundamentals represented.

Effective: Summer 2002

Prerequisite:

ACCTG 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1992

ACCTG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1992

ACCTG 596A **Managerial Accounting** (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

ACCTG 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 1992

ACCTG 597A **Hot Tax Topics** (3) The course will highlight principles and concepts in US international tax, trusts and estates, and estate planning.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ACCTG 597A **Empirical Accounting Seminar** (4) Seminar for 2nd year Accounting doctoral students.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ACCTG 597B **Financial Reporting in Special Industries** (3) Covers definitions, measurements and disclosures for revenues, expenses, assets, and liabilities, within industries not traditionally covered by financial accounting courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

ACCTG 597D **Research Methods** (1) Continuation course for ACCTG 501.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ACCTG 597E **Research Seminar in Analytical Modeling** (4) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ACCTG 597K **Accounting Scandals** (3) This special topics course will cover accounting scandals.  
Effective: Summer 2013 Ending: Summer 2013

ACCTG 597K **Advanced Empirical Accounting Seminar** (4) Seminar for 3rd year Accounting doctoral students.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ACCTG 599 (IL) **Foreign Study--Accounting** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

ACCTG 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1992

ACCTG 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1992

ACCTG 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) The student assists in teaching one of the following courses: Acctg. 16, 101, 104, 201, 202, 206, or 400.  
Effective: Fall 1992

ACCTG 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1992

ACCTG 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1992

ACCTG 803 **Forensic Accounting and Litigation Support** (3) Study of investigative accounting, consulting and litigation support activities undertaken in forensic accounting engagements.  
Effective: Summer 2009  
Prerequisite:

ACCTG 806 **Taxes and Business Planning** (3) Effects of tax regimes on decision-making, tax planning and market outcomes. Also, ethics, tax research, and policy.  
Effective: Summer 2009  
Prerequisite:

ACCTG 873 **Advanced Topics in Financial Reporting** (3) Financial disclosure and reporting for complex business enterprises and activities; current issues in financial reporting.  
Effective: Summer 2009  
Prerequisite:

ACCTG 881 **Financial Statement Analysis** (3) Analysis of financial reports to identify business strategy, assess performance and economic standing, and value claims.  
Effective: Summer 2009  
Prerequisite:

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## Accounting - Behrend (ACNTG)

ACNTG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

ACNTG 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1987

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## Accounting-CI (ACCT)

**ACCT 501 Financial Statement Analysis** (3) Study of financial reporting, financial statement analysis, capital markets, asset pricing and impact of ethical, legal, regulatory and environmental concerns.

Effective: Spring 2002

Prerequisite:

**ACCT 504 Auditing Theory and Practice** (3) Auditing theory pertaining to the regulatory environment, risk assessment, internal controls, materiality, computerization, analytical procedures, sampling, fraud, ethics, and professional responsibilities.

Effective: Summer 2012

Prerequisite:

**ACCT 510 Business Tax Planning Theory and Practice** (3) Tax theory pertaining to corporations, partnerships and conduit entities, estates, trusts, ethics, and professional tax responsibilities.

Effective: Summer 2012

**ACCT 540 Accounting for Managerial Decisions** (2) Application of accounting to monitoring and improving the internal operation of an organization.

Effective: Fall 2005

Prerequisite:

**ACCT 545 Strategic Cost Management** (3) Current managerial accounting topics such as activity-based costing, theory of constraints, performance measures and their use in organizations.

Effective: Spring 2002

Prerequisite:

**ACCT 561 Financial Statement Analysis II** (3) The exploration of conventional and advanced methods of analyzing financial statements, including earnings quality and financial distress assessment.

Effective: Summer 2004

Prerequisite:

**ACCT 571 Strategic Tax Planning** (3) Study of strategic aspects of tax for planning business operations, growth, expansion, capital transactions, and transfer of wealth.

Effective: Summer 2004

Prerequisite:

**ACCT 572 Financial Reporting I** (3) Accounting theory and practice for reporting consolidations, foreign currency transactions, and preparing financial statements for governmental and NGOs.

Effective: Summer 2012

Prerequisite:

**ACCT 573 Financial Reporting II** (3) Topics involving consolidated financial statements, special purpose entities, derivative financial instruments, and use of the Financial Accounting Research System (FARS).

Effective: Summer 2012

Prerequisite:

**ACCT 574 Accounting and Management Control Systems** (3) Study of theories, practices and issues associated with accounting and management control as reflected in relevant literature.

Effective: Summer 2004

Prerequisite:

**ACCT 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2009

**ACCT 596 Individual Studies** (1-9) Creative projects, including research and design, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2002

**ACCT 597 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2002

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## Acoustics (ACS)

**ACS 402 Introduction to Acoustics (3)** Basic principles of acoustics and perception of sound; fundamentals of applications: electroacoustic transducers, noise measurement and control, architectural and building acoustics, underwater sound. Offered for science and engineering majors.

Effective: Fall 1983

Prerequisite:

**ACS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**ACS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**ACS 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1996

**ACS 501 Fundamentals of Acoustics I (2)** Vibrational concepts of acoustics: natural frequency and modes, resonances of lumped parameter systems, strings, elastic rods, beams and membranes.

Effective: Spring 1991

Prerequisite:

**ACS 502 Fundamentals of Acoustics II (2)** Acoustical wave phenomena: propagation, transmission, reflection and energy; periodic and transient waves; plane, spherical, and standing waves.

Effective: Spring 1991

Prerequisite:

**ACS 505 Experimental Techniques in Acoustics (2)** Properties of acoustical and vibrational transducers, electronic and other instrumentation used in fundamental data measurement, acquisition and analysis.

Effective: Fall 1990

Prerequisite:

**ACS 511 Underwater Sound Propagation (3)** Theoretical and empirical treatment of sound propagation in the ocean, including effects of the environment, characteristics of targets, and transducers.

Effective: Winter 1978

**ACS 513 Digital Signal Processing (3)** Discrete linear systems, transforms, digital filter design and applications, discrete fourier transforms, spectrum analysis.

Effective: Spring 1984

**ACS 514 Electroacoustic Transducers (3)** The theory, design, and calibration of passive, linear, reciprocal electroacoustic transducers for use in both air and water media.

Effective: Spring 2012

Prerequisite:

**ACS 515 Acoustics in Fluid Media (3)** Wave propagation in stationary and moving fluids; acoustic radiation and scattering; standing waves in ducts and cavities.

Effective: Spring 2012

Prerequisite:

**ACS 516 Acoustical Data Measurement and Analysis (3)** Presents the engineering applications of recent developments in correlation and spectral analysis to acoustical measurement problems.

Effective: Fall 1983

**ACS 519 Sound-Structure Interaction (3)** Acoustic radiation from and effects of fluid-loading on vibrating infinite and finite plates and shells. Acoustic transmission through and reflection from elastic plates and shells, acoustic excitation of elastic plates and coupling between panels and acoustic spaces.

Effective: Spring 2012

Prerequisite:

**ACS 521 (E MCH 521) Stress Waves in Solids (3)** Recent advances in Ultrasonic Nondestructive Evaluation: waves; reflection and refraction; horizontal shear; multi-layer structures; stress; viscoelastic media; testing principles.

Effective: Spring 1998

Prerequisite:

**ACS 530 Flow-Induced Noise (3)** Introduction to the basic and applied aspects of flow-induced noise created by subsonic flows of various complexities.

Effective: Summer 2004



Prerequisite:

**ACS 537 Noise Control Engineering I (3)** As the first of three courses, this course provides an orientation to the program and covers fundamentals of noise control.

Effective: Spring 2003

Prerequisite:

**ACS 573 (M E 573) Designing Quiet Structures (3)** Course integrates structural dynamics, acoustics and optimization into unified method for designing quiet structures virtually for early product development.

Effective: Fall 2007

Prerequisite:

**ACS 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**ACS 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2005

**ACS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**ACS 596A Propagation Uncertainty Analysis (4)** Model assessment of uncertain acoustic propagation models including genetic algorithm methodologies.

Effective: Summer 2013 Ending: Summer 2013

**ACS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**ACS 597A Fundamentals of Acoustics (3)** Vibration concepts of acoustics; natural frequency and modes, resonances of lumped parameter systems, strings, elastic rods, beams and membranes.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ACS 597B Acoustics in Fluid Media (3)** This course lays the fundamental groundwork for the propagation of acoustic waves in fluids. Topics include: basic equations of fluid dynamics, acoustic lumped elements, speed of sound, linear acoustic wave propagation, plane and spherical waves, radiation of sound from sources and arrays, sound intensity and power, reflection and transmission of sound at boundaries, absorption of sound, normal modes in rooms, propagation of sound in pipes and acoustic filters.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ACS 597C Marine Bioacoustics (3)** The role of acoustics in studying biology-related topics in the marine environment. Topics include underwater sound propagation, major groups of sound producing marine organisms, marine organism sound production and reception, marine noise and its effects on marine life, and the use of both passive and active sound for remote sensing of marine organisms. Integrated activities and problem-based assignments will provide an interactive learning experience.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ACS 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1996

**ACS 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

**ACS 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 1983

**ACS 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 1983

**ACS 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Fall 1983

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## Adult Education (ADTED)

ADTED 456 **Introduction to Family Literacy** (3) Explores comprehensive family literacy models, focusing upon families, services, outcomes, and roles and responsibilities of individuals, organizations, and communities.

Effective: Spring 2008

Prerequisite:

ADTED 457 **Adult Literacy** (3) Surveys adult basic and literacy education programs and best practices; applies recent research on adult and family literacy.

Effective: Spring 2008

Prerequisite:

ADTED 458 **Early Literacy Development and Parental Involvement** (3) Focuses on young children's language and literacy development, including parental and staff support, grounded in scientifically based reading research.

Effective: Spring 2008

Prerequisite:

ADTED 459 **Interactive Literacy: Parents and Children** (3) Focuses on literacy and language interactions between parents and their young children (including English language learners), implementing intentional/planned learning.

Effective: Spring 2008

Prerequisite:

ADTED 460 **Introduction to Adult Education** (3) History, methods, agencies, program areas, and problems of adult education in the United States.

Effective: Fall 2001

ADTED 470 (CI ED 470) **Introduction to Distance Education** (3) An introduction to the history, philosophy, organizations, learning theories, and instructional procedures used in American and foreign distance education.

Effective: Summer 1996

ADTED 496 **Independent Studies** (1-18) Creative projects supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1996

ADTED 497 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1996

ADTED 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1996

ADTED 501 **Foundations of Medical Education** (3) This course provides an overview of medical education, and considers how it operates as a specific form of adult education.

Effective: Summer 2010

Prerequisite:

ADTED 502 **Program and Instructional Design in Medical Education** (3) This course focuses on program planning and instructional design in a medical setting with an emphasis on teaching with simulation.

Effective: Spring 2011

Prerequisite:

ADTED 505 **The Teaching of Adults** (3) Examination of direct and indirect teaching; contracts, application of current technology, andragogy, motivation, evaluation; knowledge of research.

Effective: Summer 1996

Prerequisite:

ADTED 506 **Program Planning in Adult Education** (3) Intensive study of theoretical foundations, policies, evaluation models, methods, and materials in program planning in adult education.

Effective: Summer 1996

Prerequisite:

ADTED 507 **Research and Evaluation in Adult Education** (3) Guided discussion and reading in selected research and evaluation methods and trends as applied in adult education settings.

Effective: Summer 1996

Prerequisite:

ADTED 508 (CI ED 508) **Globalization and Lifelong Learning** (3) Examination of globalization discourses and their relationships, implications and impacts on lifelong learning processes and contexts.

Effective: Summer 2004

ADTED 509 (CI ED 509) **Language, Literacy, Identity, and Culture in a Global Context** (3) Examines the relationship

between issues of language, identity and culture for adult learners in an increasingly global context.

Effective: Spring 2004

Prerequisite:

**ADTED 510 Historical and Social Issues in Adult Education (3)** Social and historical foundations of adult education in the United States and selected nations.

Effective: Summer 1996

Prerequisite:

**ADTED 531 Course Design and Development in Distance Education (3)** In depth study of the practices of designing courses taught by print, broadcast, and telecommunications media to adult distance learners.

Effective: Summer 1996

Prerequisite:

**ADTED 532 Research and Evaluation in Distance Education (3)** Study of previous, current, and needed research strategies, and issues concerning evaluation in distance education.

Effective: Fall 2001

**ADTED 541 (WMNST 541) Women and Minorities in Adult Education (3)** Seminar on women and minority adults as learners and leaders in the various contexts of adult education.

Effective: Spring 1998

Prerequisite:

**ADTED 542 Perspectives on Adult Learning Theory (3)** Introduction to adult education learning theory, principles, and models of adult learning by adults alone, in groups, and in communities.

Effective: Fall 1997

**ADTED 549 (HI ED 549) Community Junior College and the Technical Institute (2-3)** Distinctive contributions to meeting the need for postsecondary education; development, functions, curriculum and instruction, government, administration, and finance.

Effective: Summer 1996

**ADTED 550 Qualitative Research in Adult Education (3)** Introduction to the theory, principles, and practice of qualitative research.

Effective: Fall 1997

**ADTED 551 Qualitative Data Analysis (3)** Students learn to analyze data qualitatively by engaging in, and continuously reflecting on the process.

Effective: Summer 2004

Prerequisite:

**ADTED 552 Participatory Action Research (3)** Examines origins, historical development, main characteristics, methodological assumptions and models, practice of participatory action research adult education and community development.

Effective: Summer 2004

**ADTED 560 (LL ED 560) Teaching Reading to College Students and Adults (3)** Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

Effective: Summer 1996 Ending: Fall 2013

Prerequisite:

**ADTED 560 Teaching Reading to College Students and Adults (3)** Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**ADTED 561 Family Literacy (3)** Examines the research related to the four components of family literacy, program effectiveness, and theoretical underpinnings.

Effective: Summer 2004

**ADTED 562 Politics, Language and Pedagogy: Applying Paulo Freire today (3)** Examines the work of Paulo Freire as it applies to community action projects.

Effective: Fall 2011

**ADTED 564 (CI ED 564) Social and Cultural Contexts of Learning and Work (3)** Examines the relationship between learning and work with special attention given to how certain forms of learning are legitimized.

Effective: Summer 2004

Prerequisite:

**ADTED 570 (CI ED 570) Comparative and International Adult Education (3)** Critical and comparative analysis of adult education theory and practice outside North America, including international agency involvement.

Effective: Summer 1996

Prerequisite:

**ADTED 572 (CI ED 572) Policy Studies in Lifelong Learning (3)** Examine lifelong learning policies and the relationship between lifelong learning issues and problems, policy development, policy actors and institutional structures.

Effective: Summer 2004

Prerequisite:

**ADTED 575 Administration of Adult Education (3)** Organization of a program of adult education; legal status, finances, selection of teachers, learning personnel, housing; other administrative problems.

Effective: Summer 1996

Prerequisite:

**ADTED 580 Adult Education Research Seminar (1-3)** A seminar dealing with specific research topics and methods in adult education. Open to advanced students in adult education.

Effective: Summer 1996

Prerequisite:

**ADTED 588 Professional Seminar: Research and Adult Education (3)** Review of research in adult education, current and past, with analysis of its directions, effects, methodology, quality, financing, and prospects.

Effective: Summer 1996

Prerequisite:

**ADTED 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 1996

**ADTED 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1997

**ADTED 595 Internship in Adult Education (3-9)** Supervised student internship in adult education agency.

Effective: Summer 1996

Prerequisite:

**ADTED 596 Individual Studies (1-9)** Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1996

**ADTED 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1996

**ADTED 597A (CI ED 597A) Concept Mapping in Cross-Cultural Research in Education (3)** This course explores concept mapping as analytical tool for research in cross-cultural and comparative contexts.

Effective: Summer 2013 Ending: Summer 2013

**ADTED 597A Doctoral Pro-Seminar in Adult Education (3)** This course provides both an orientation to the field of adult education as an area of study and an initial seminar for doctoral students to understand the process of graduate study in this program.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ADTED 597B The Modern Practice of Distance Education (3)** Students will explore current practices and issues in DE including: the changing relationship between Adult Education and DE; the growth of DE and online education in particular including open educational resources, for-profit online education, and MOOCs (massive open online courses); the changing information technology landscape driving changes to DE; and the pedagogical organizational, instructional design and research challenges these changes create.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ADTED 597C (CI ED 597A) Multicultural Education Schools and the Workplace (3)** Describes multicultural education as "an educational reform movement designed to increase educational equity for all students from diverse racial and ethnic groups, gender groups, exceptional students, and students from each social-class group."

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ADTED 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1996

**ADTED 600 Thesis Research (1-15)** No description.

Effective: Summer 1996

**ADTED 601 Dissertation Research Ph.D.** Dissertation research.

Effective: Summer 2004 Ending: Fall 2013

Prerequisite:

ADTED 601 **Ph.D. Dissertation Full-Time** Ph.D. Dissertation research.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

ADTED 602 **College Teaching** (1-3) Experience in teaching in the Adult Education Program.  
Effective: Fall 2006  
Prerequisite:

ADTED 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1996

ADTED 611 **Dissertation Research** Ph.D. dissertation research  
Effective: Summer 2004 Ending: Fall 2013  
Prerequisite:

ADTED 611 **Ph.D. Dissertation Part-Time** Ph.D. dissertation research  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

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## Aerospace Engineering (AERSP)

**AERSP 401A Spacecraft Design--Preliminary** (3) Conceptual and preliminary design of a spacecraft, its constituent subsystems, and related systems, to satisfy a given set of specifications.

Effective: Spring 2007

Prerequisite:

**AERSP 401B Spacecraft Design--Detailed** (2) Detailed design of the constituent subsystems and related support systems for a spacecraft.

Effective: Spring 2007

Prerequisite:

**AERSP 402A Aircraft Design--Preliminary** (3) Conceptual and preliminary design of an aircraft, its constituent subsystems, and related systems, to satisfy a given set of specifications.

Effective: Spring 2007

Prerequisite:

**AERSP 402B Aircraft Design--Detailed** (2) Detailed design of the constituent subsystems and related support systems for an aircraft.

Effective: Spring 2007

Prerequisite:

**AERSP 404H Flight Vehicle Design and Fabrication II** (3 per semester/maximum of 12) Project management, design, fabrication, aerodynamic and structural testing, and flight evaluation of an advanced composite flight vehicle.

Effective: Spring 2000

Prerequisite:

**AERSP 405 Experimental Methods and Projects** (3) Experimental methods involving a variety of aerospace engineering topics; teams of students focus on advanced measurement techniques and project engineering.

Effective: Summer 2012

Prerequisite:

**AERSP 407 Aerodynamics of V/STOL Aircraft** (3) Rotary wing aircraft; VTOL and STOL performance; propeller-wing combinations; jet flap; high lift devices.

Effective: Fall 1984

Prerequisite:

**AERSP 410 Aerospace Propulsion** (3) Analysis and performance characteristics of reciprocating engine, turbo-jet, turbo-prop, turbo-fan, ram-jets, and chemical rockets. Aerothermodynamics of inlets, combustors, and turbomachinery.

Effective: Fall 1983

Prerequisite:

**AERSP 412 Turbulent Flow** (3) Homogeneous turbulence; spectral transfer of energy, viscous dissipation; turbulent shear flow: mixing-length theory, eddy viscosity, scaling laws, energy budget.

Effective: Winter 1978

Prerequisite:

**AERSP 413 Stability and Control of Aircraft** (3) Static and dynamic stability and control of aircraft; open and closed loop systems.

Effective: Fall 1989

Prerequisite:

**AERSP 420 Principles of Flight Testing** (3) In-flight and analytical studies of airplane performance, stability, and control; reduction of data; instrumentation; flight test techniques.

Effective: Fall 1983

Prerequisite:

**AERSP 423 Introduction to Numerical Methods in Fluid Dynamics** (3) Finite difference methods applied to solving viscous/inviscid fluid dynamics problems, error control, numerical stability.

Effective: Spring 2008

Prerequisite:

**AERSP 424 Advanced Computer Programming** (3) Engineering and scientific programming topics: object oriented programming, parallel programming, and various modern languages (e.g. C++, Java, and Ada).

Effective: Spring 2008

Prerequisite:

**AERSP 425 Theory of Flight** (3) Advanced wing and airfoil theory, conformal mapping, slender body theory.

Effective: Spring 2001

Prerequisite:

**AERSP 430 Space Propulsion and Power Systems** (3) Analysis and performance of chemical and nuclear rockets, electric propulsion systems. Introduction to solar, chemical, thermoelectric, and nuclear power sources.

Effective: Fall 2007

Prerequisite:

**AERSP 440 Introduction to Software Engineering for Aerospace Engineers** (3) Software engineering for safety- and mission-critical systems, including requirements, management, processes, designs, programming, validation/ verification,

and other aspects of software development.

Effective: Spring 2008

Prerequisite:

**AERSP 450 Orbit and Attitude Control of Spacecraft** (3) Principles of mechanics and vector analysis applied to basic concepts of satellite motion and control, rocket ballistics, and gyroscopic instruments.

Effective: Fall 1987

Prerequisite:

**AERSP 460 Aerospace Control Systems** (3) Design and analysis of feedback control systems for aerospace applications; stability, root locus, time- and frequency-domain, state-space methods.

Effective: Summer 2006

Prerequisite:

**AERSP 470 Advanced Aerospace Structures** (3) Design and analysis of aerospace structures. Plates and sandwich panels; composite materials; structural dynamics; aeroelasticity; damage tolerance.

Effective: Spring 2008

Prerequisite:

**AERSP 473 (E MCH 473) Composites Processing** (3) An introduction to the principles of mechanics governing manufacturing, computer-aided design, and testing of composite materials and structures.

Effective: Summer 1988

Prerequisite:

**AERSP 490 (E E 471, NUC E 490) Introduction to Plasmas** (3) Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

Effective: Spring 2008

Prerequisite:

**AERSP 492 (E E 472) Space Astronomy and Introduction to Space Science** (3) The physical nature of the objects in the solar system; the earth's atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

Effective: Spring 2008

Prerequisite:

**AERSP 494 Aerospace Undergraduate Thesis** (1-3 per semester/maximum of 6) Individual problem investigations reported in written thesis and seminar lectures. Cooperative research with faculty guidance on topics of current interest.

Effective: Fall 1992

Prerequisite:

**AERSP 494H Aerospace Undergraduate Thesis** (1-3 per semester/maximum of 6) Individual problem investigations reported in written thesis and seminar lectures. Cooperative research with faculty guidance on topics of current interest.

Effective: Fall 2007

Prerequisite:

**AERSP 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1992

**AERSP 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1983

**AERSP 497A Advanced Orbital Mechanics** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 497C Wind Energy Engineering & Projects** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 497D Special Topics in Aerodynamics** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 497I Spacecraft/Environment Interactions** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2006

**AERSP 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2008



AERSP 504 **Aerodynamics of V/STOL Aircraft** (3) Jet wings, high lift devices, propellers and ducted propellers, circulation and boundary layer control, unsteady airfoil theory.

Effective: Fall 1983

Prerequisite:

AERSP 505 **Aero- and Hydroelasticity** (3) Interaction of elastic systems having several degrees of freedom with fluid flows in various configurations.

Effective: Winter 1978

AERSP 506 **Rotorcraft Dynamics** (3) Modeling and analysis techniques for dynamic response, vibration, aeroelastic stability, and aeromechanical stability of rotary-wing vehicles.

Effective: Fall 2007

Prerequisite:

AERSP 507 **Theory and Design of Turbomachinery** (3) Theory and principles of machinery design: compressors, turbines, pumps, and rotating propulsors; opportunity to work out design examples.

Effective: Winter 1978

AERSP 508 **Foundations of Fluid Mechanics** (3) Mathematical review, fluid properties, kinematics, conservation laws, constitutive relations, similarity principles, the boundary layer, inviscid flow, vorticity dynamics, wave motion.

Effective: Spring 1972

AERSP 509 **Dynamics of Ideal Fluids** (3) Irrotational flow theory, two-dimensional and axisymmetric flows, airfoil theory, complex variables, unsteady phenomena; flow with vorticity, finite wing theory.

Effective: Winter 1978

Prerequisite:

AERSP 510 **Compressible Flow** (3) Classification and solution of compressible flow problems, high-speed gasdynamics, unsteady motion, transonic and hypersonic flows, atmospheric reentry.

Effective: Fall 1983

AERSP 511 **Aerodynamically Induced Noise** (3) Review of fluid mechanics. General theory of aerodynamic sound. Noise radiation from jets, boundary layers, rotors and fans. Structural response.

Effective: Winter 1978

AERSP 514 **Stability of Laminar Flows** (3) The stability of laminar motions in various geometries as influenced by boundary conditions and body forces of various kinds.

Effective: Winter 1978

AERSP 518 **Dynamics and Control of Aerospace Vehicles** (3) Dynamical problems of aircraft and missiles, including launch, trajectory, optimization, orbiting, reentry, stability and control, and automatic control.

Effective: Fall 1987

Prerequisite:

AERSP 524 (M E 524) **Turbulence and Applications to CFD: DNS and LES** (3) First of two courses: Scalings, decompositions, turbulence equations; scale representations, Direct and Large-Eddy Simulation modeling; pseudo-spectral methods; 3 computer projects.

Effective: Spring 2011

Prerequisite:

AERSP 525 (M E 525) **Turbulence and Applications to CFD: RANS** (3) Second in two courses: Scalings, decomposition, turbulence equations; Reynolds Averaged Navier Stokes (RANS) modeling; phenomenological models; 3 computer projects.

Effective: Spring 2011

Prerequisite:

AERSP 526 (M E 526) **Computational Methods for Shear Layers** (3) Study of numerical solution methods for steady and unsteady laminar or turbulent boundary-layer equations in two and three dimensions.

Effective: Fall 2007

Prerequisite:

AERSP 527 (M E 527) **Computational Methods in Transonic Flow** (3) Numerical solution of partial differential equations of mixed type, with emphasis on transonic flows and separating boundary layers.

Effective: Fall 2007

Prerequisite:

AERSP 530 **Aerothermochemistry of Advanced Propulsion Systems** (3) Physics and chemistry needed to analyze high performance rocket propulsion systems including reacting high temperature radiating gas and plasma flows.

Effective: Fall 2007

Prerequisite:

AERSP 535 (M E 535) **Physics of Gases** (3) An introduction to kinetic theory, statistical mechanics, quantum mechanics, atomic and molecular structure, chemical thermodynamics, and chemical kinetics of gases.

Effective: Spring 2010

**AERSP 540 (NUC E 540) Theory of Plasma Waves** (3) Solutions of the Boltzmann equation; waves in bounded and unbounded plasmas; radiation and scattering from plasmas.

Effective: Spring 2012

Prerequisite:

**AERSP 550 Astrodynamics** (3) Applications of classical celestial mechanics to space flight planning. Determination and construction of orbital parameters by approximation methods. Perturbation techniques.

Effective: Fall 1987

Prerequisite:

**AERSP 560 Finite Element Method in Fluid Mechanics and Heat Transfer** (3) Application of finite element techniques to viscous/unsteady fluid flow/heat transfer problems.

Effective: Summer 2000

Prerequisite:

**AERSP 571 (E MCH 571, M E 571) Foundations of Structural Dynamics and Vibration** (3) Modeling approaches and analysis methods of structural dynamics and vibration.

Effective: Fall 2007

Prerequisite:

**AERSP 583 Wind Turbine Aerodynamics** (3) Analysis of wind turbine performance, aeroacoustics, and loads; turbine selection for site-specific application.

Effective: Summer 2013

**AERSP 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**AERSP 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**AERSP 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 1983

**AERSP 597A Advanced Experimental Methods and Projects** (3) The goal of this course is to provide instruction in the advanced experimental methods used in a variety of research areas in Aerospace Engineering. Team projects will be chosen to design experiments and fabricate modifications to existing apparatus, conduct the experiments, process and interpret the data, and assemble progress reports and a final report.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AERSP 597B Rotorcraft Stability and Control** (3) Development of a set of general equations of motion of a rotorcraft in maneuvering flight. The generalized trip problem. Linearized equations of motion and stability derivatives. Stability and control analysis of rotorcraft. Rotorcraft flight simulation. Handling qualities analysis and automatic flight control design for rotorcraft.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 597D Special Topics in Aerodynamics** (3) Topics of subsonic aerodynamics.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 597G GPS Theory and Application** (3) GPS architecture, signals, measurement, performance and estimation of position, velocity and time. Augmentation such as differential GPS and carrier phase measurements.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 597I Spacecraft Environment Interactions** (3) Aspects of spacecraft aerodynamics and interactions with the space environment; spacecraft design and the latest computational methods for calculating spacecraft aerodynamic forces and moments and thruster plume contamination.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AERSP 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2008

**AERSP 600 Thesis Research** (1-15) No description.

Effective: Fall 1983

AERSP 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

AERSP 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in aerospace engineering courses.  
Effective: Fall 1983

AERSP 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Fall 2006

AERSP 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

AERSP 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

AERSP 880 **Wind Turbine Systems** (3) Wind turbine technology and the critical elements of turbine systems design.  
Effective: Summer 2013

AERSP 886 **Engineering of Wind Project Development** (3) An overview of the wind project development process and technical considerations for onshore and offshore applications.  
Effective: Summer 2013

AERSP 897 **Special Topics** (1-9 per semester/maximum of 9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 2012

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## Afr Amer Studies (AF AM)

AF AM 401 **Afro-American Studies Seminar** (3) A seminar examining theoretical and methodological issues in Afro-American Studies.

Effective: Spring 2013

Prerequisite:

AF AM 409 (US) (SOC 409) **Racial and Ethnic Inequality in America** (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

Effective: Spring 2013

Prerequisite:

AF AM 409U (US) (SOC 409U) **Racial and Ethnic Inequality in America** (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

AF AM 410 **Spirit, Space, Survival: Contemporary Black Women** (3) How recent Black women have used spirit and space to survive.

Effective: Fall 2012

Prerequisite:

AF AM 412 (US;IL) (THEA 412) **African American Theatre** (3) Exploration of the development of African American theatre from its roots in Africa through the Diaspora to the present time.

Effective: Spring 2013

Prerequisite:

AF AM 416 (US;IL) (S T S 416, WMNST 416) **Race, Gender and Science** (3) The class will focus on race and gender as products of science, and how societal values shape scientific activity.

Effective: Spring 2013

Prerequisite:

AF AM 422 (US) (CAS 422) **Contemporary African American Communication** (3) A focused study on the continuities between African and African American culture and communication.

Effective: Spring 2013

Prerequisite:

AF AM 431 (US;IL) (HIST 431) **Black Liberation and American Foreign Policy** (3) This course deals with American foreign policy and Black liberation in Africa since 1945.

Effective: Spring 2013

Prerequisite:

AF AM 432 (IL) (HIST 432) **Between Nation and Empire: The Caribbean in the 20th Century** (3) An exploration of the political evolution of the Caribbean Region over the course of the 20th Century.

Effective: Fall 2012

Prerequisite:

AF AM 445Y (US) (PL SC 445Y, LER 445Y) **Politics of Affirmative Action** (3) Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S.

Effective: Fall 2012

Prerequisite:

AF AM 460 (US;IL) (PHIL 460) **African American Philosophy** (3) Major works by African American Philosophers, on topics of race, freedom, citizenship, nationhood, law and society.

Effective: Spring 2013

Prerequisite:

AF AM 465 (US) (HIST 465) **Civil Rights and American Politics 1933-1968** (3) The civil rights struggle and its impact upon American politics.

Effective: Spring 2013

Prerequisite:

AF AM 469 (US) (ENGL 469) **Slavery and the Literary Imagination** (3) The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans.

Effective: Fall 2012

Prerequisite:

AF AM 494 **Research Project** (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2012

AF AM 494H **Research Project** (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2012

AF AM 495 **Internship** (1-18 per semester/maximum of 18) Supervised off-campus, nongroup instruction including field

experiences, practica, or internships.  
Effective: Summer 2012

AF AM 496 **Independent Studies** (1-18 per semester/maximum of 18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2012

AF AM 497 **Special Topics** (1-9 per semester/maximum of 9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2012

AF AM 497C **Hurricane Katrina: Lessons & Legacy** (3) Significance of Hurricane Katrina to national life. Disaster's impact on public culture, class, gender, and ethnic/race relations as depicted in media.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

AF AM 499 **Foreign Studies** (1-12 per semester/maximum of 12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2012

AF AM 501 **Seminar in African American Studies** (3) A survey of the academic field of African American Studies.  
Effective: Summer 2013

AF AM 502 **Blacks and African Diaspora** (3) Seminar in the theory and history of Blacks in the African Diaspora.  
Effective: Summer 2013

AF AM 503 **Sexual and Gender Politics in the African Diaspora** (3) A seminar in the theory and history of sexual and gender politics in the Black Diaspora from the Colonial Era forward.  
Effective: Summer 2013  
Prerequisite:

AF AM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2013

AF AM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 2013

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## African Studies (AFR)

AFR 405 **African Studies Methodologies** (3) Multidisciplinary research techniques for studying in and about Africa.  
Effective: Fall 2012

AFR 434 (IL) (PL SC 434) **War and Development in Africa** (3) This course will examine the relationship between war and development in sub-Saharan Africa in the post colonial era.

Effective: Fall 2012

Prerequisite:

AFR 440 (US;IL) (PL SC 440, I B 440) **Globalization and Its Implications** (3) This course explores the socioeconomic implications of globalization.

Effective: Spring 2013

Prerequisite:

AFR 443 (IL) (PL SC 443) **Ethnic Conflict in Africa** (3) This course explores the various causes and impacts of ethnic conflicts in the African context.

Effective: Spring 2013

Prerequisite:

AFR 446 (IL) (ART H 446) **Topics in African Art** (3 per semester/maximum of 9) Topics vary from "Arts of Eastern and Southern Africa" to "Art of West Africa."

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

AFR 447 (IL) (ART H 447) **Topics in the Art of the African Diaspora** (3 per semester/maximum of 6) Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

AFR 454 (IL) (PL SC 454) **Government and Politics of Africa** (3) Contemporary African Politics, institutions, and ideologies; patterns of change, social forces, and nation building in selected African states.

Effective: Fall 2012

Prerequisite:

AFR 459 (IL) (PL SC 459) **Culture and World Politics** (3) Role of culture in world politics.

Effective: Spring 2013

Prerequisite:

AFR 464 (IL) (PL SC 464) **Globalization, Extractive Industries, and Conflict in Africa** (3) Socioeconomic and environmental impacts of extractive industries in Africa.

Effective: Fall 2012

Prerequisite:

AFR 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2012

AFR 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Fall 2012

Prerequisite:

AFR 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2012

AFR 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2012

AFR 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2012

AFR 501 **Key Issues in African Studies** (3) A seminar to review leading issues in African Studies and African development.

Effective: Summer 2012

AFR 527 (SOC 527) **Migration, Urbanization, and Policy in the Developing World** (3) This course examines the dynamics of migration and urbanization processes, as well as their policy implications, in non-industrialized regions of the world.

Effective: Summer 2012

AFR 532 **Environment and Livelihoods in Africa** (3) An enquiry into the relationships between the environment, resource control, resource conservation, rural livelihood systems and poverty in Africa.  
Effective: Summer 2013

AFR 534 (PL SC 534) **Political Economy of Energy and Extractive Industries in Africa (Oil and Mining)** (3) Students will examine how the expansion of petroleum and mining industries has impacted Africa's political economies and external relations.  
Effective: Spring 2013

AFR 537 (WMNST 537) **Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship** (3) A course about discourses of sexuality and gender in studies of Islam in Africa, with South Africa as a case study.  
Effective: Spring 2013

AFR 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Future: Fall 2013

AFR 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2013 Future: Fall 2013

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## **African and African American Studies (AAA S)**

AAA S 403 **South Africa Today** (3) A course examining the South African government's policy of apartheid: its history, why it exists, how it works, and the prospects for change.

Effective: Spring 2001

Prerequisite:

AAA S 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

AAA S 530 **Globalization in Africa** (3) Students will examine globalization and its socioeconomic implications in Africa.

Effective: Fall 2008

AAA S 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1996 Ending: Summer 2013

AAA S 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1996 Ending: Summer 2013

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## **Agricult Biosecurity (AGBIO)**

**AGBIO 520 Agricultural Biosecurity: Protecting a Key Infrastructure** (3) Course will explore intentional and unintentional threats to the agriculture- food system, history and current approaches for safeguarding this key infrastructure.

Effective: Spring 2012

Prerequisite:

**AGBIO 521 (FD SC 521) Food Defense: Prevention Planning for Food Processors** (3) Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply.

Effective: Summer 2013

Prerequisite:

**AGBIO 594 Agricultural Biosecurity and Food Defense Capstone Experience** (3) Culminating experience in the iMPS-HLS for the online Agricultural Biosecurity and Food Defense option.

Effective: Summer 2013

Prerequisite:

**AGBIO 801 (PATH 801) Veterinary Infectious Disease Diagnostic and Surveillance Systems** (3) This course provides knowledge of diagnostic and surveillance systems used to detect infectious diseases and protect against animal agricultural biological attack.

Effective: Summer 2013

Prerequisite:

**AGBIO 802 (PPATH 802) Plant Protection: Responding to Introductions of Threatening Pests and Pathogens** (3) This course provides knowledge of plant biosecurity, plant disease, regulations, and technologies using case study examples.

Effective: Summer 2013

Prerequisite:

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## Agricultural Economics & Rural Sociology (AEREC)

AEREC 502 **Economics of Natural Resources and Rural Development** (3) Emphasis will be placed on the application of economic concepts to problems and policies in rural areas.

Effective: Spring 2011

Prerequisite:

AEREC 503 **Agricultural Marketing** (3) Economic analysis of food marketing firms and institutions; identification and measurement of dimensions of market performance; public policy.

Effective: Spring 2011

Prerequisite:

AEREC 510 **Econometrics I** (3) General linear model, multicollinearity, specification error, autocorrelation, heteroskedasticity, restricted least squares, functional form, dummy variables, limited dependent variables.

Effective: Spring 2011

Prerequisite:

AEREC 511 **Econometrics II** (3) Stochastic regressors, distributed lag models, pooling cross-section and time-series data, simultaneous equation models.

Effective: Summer 2013

AEREC 519 **Resource and Environmental Economics I** (3) Theories and methods for economic analysis of natural resource and environmental policies with applications to current issues.

Effective: Spring 2011

Prerequisite:

AEREC 527 **Quantitative Methods I** (3) Quantitative techniques applied to agricultural economic issues.

Effective: Spring 2011

Prerequisite:

AEREC 533 (CEDEV 533) **Rural Development Research Methods and Topics** (3) Advanced theories and methods for rural economic development research.

Effective: Spring 2011

Prerequisite:

AEREC 534 **Agricultural Production Economics II** (3) Current problems and methods of analysis in production economics research.

Effective: Spring 2011

Prerequisite:

AEREC 536 **Agricultural Commodity Markets** (3) Specification, identification, and estimation of models for use in the evaluation and control of agricultural market behavior.

Effective: Spring 2011

Prerequisite:

AEREC 541 **Resource and Environmental Economics II** (3) Key theories and analytical methods of resource and environmental economics.

Effective: Spring 2011

Prerequisite:

AEREC 550 **International Economic Development and Agriculture** (3) The economic development process with particular emphasis on agriculture.

Effective: Spring 2011

Prerequisite:

AEREC 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 2011

AEREC 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2011

AEREC 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 2013

AEREC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and fall outside the scope of formal courses.

Effective: Summer 2013

AEREC 597 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of specific interest.

Effective: Spring 2011

**AEREC 597A Applied Micro Econometrics** (3) Advanced methods for analyzing micro-level economic data.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**AEREC 597B Dynamic Production Analysis** (1) The dynamic economic optimization is investigated given different primal and dual representations of the dynamic technology, with empirical implementation.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AEREC 597C Micro Theory** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of specific interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AEREC 597D Renewable Resource Economics** (1) The course will explore contemporary economic theory on the economic of renewable resources with an emphasis on biological populations.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AEREC 597E Applied Microeconomic Theory** (3) Microeconomic theory and concepts that provide a foundation for applied research and analysis.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**AEREC 598 Special Topics** (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2011

**AEREC 599 (IL) Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2011

**AEREC 600 Thesis Research** (1-15) No description.  
Effective: Summer 2013

**AEREC 601 Thesis Preparation** No description.  
Effective: Summer 2013

**AEREC 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Summer 2013

**AEREC 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 2011

**AEREC 611 Ph.D. Dissertation Part-Time** No description.  
Effective: Spring 2011

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## Agricultural and Biological Engineering (A B E)

A B E 500 **Research Methods in Agricultural and Biological Engineering** (3) Introduction to research philosophy(ies), methodologies, issues and policies; measures of research quality; research report writing; research ethics.  
Effective: Spring 1997 Ending: Fall 2013

A B E 500 (BRS 500) **Research Methods** (3) Foundation in research philosophies, methodologies, issues and policies; measures of research quality; critical thinking and discourse; research report writing; professional development; research ethics.  
Effective: Spring 2014 Future: Spring 2014

A B E 504 **Mechanics and Properties of Particulate Materials** (3) Constitutive equations for cohesionless and cohesive particulate materials; measurement of properties; application to storage, flow, and consolidation.  
Effective: Spring 1996

A B E 513 **Applied Finite Element, Finite Difference, and Boundary Element Methods** (3) Applications of numerical methods in the areas of structures, fluid dynamics, heat and mass transfer, and machine design.  
Effective: Fall 1996

A B E 517 **Surface Transport of Agricultural Pollutants** (3) Understanding and modeling the surface transport processes of agricultural pollutants; particularly erosion, sediment transport, and movement of sediment-attached constituents.  
Effective: Spring 1996

A B E 559 **Biological and Agricultural Systems Simulation** (3) Continuous simulation modeling of biological and physical systems, numerical simulation techniques, validation and verification, difference measures, sensitivity analysis.  
Effective: Spring 2006  
Prerequisite:

A B E 562 (E MCH 562) **Boundary Element Analysis** (3) Numerical solution of boundary value problems using fundamental solutions; application to problems in potential theory, diffusion, and elastostatics.  
Effective: Spring 1996  
Prerequisite:

A B E 568 **Food Safety Engineering** (3) Predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, applied to plant layout, construction materials, and equipment design for microbial food safety.  
Effective: Spring 2008  
Prerequisite:

A B E 589 **Management and Design of Renewable Energy and Sustainability Systems** (3) Real-world renewable energy systems projects using a systems analysis and case-study approach.  
Effective: Summer 2013  
Prerequisite:

A B E 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1996

A B E 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1996

A B E 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1996

A B E 600 **Thesis Research** (1-15) No description.  
Effective: Spring 1996

A B E 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1996

A B E 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in undergraduate Agricultural Engineering courses (1-499).  
Effective: Spring 1996

A B E 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1996

A B E 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1996

A B E 884 **Biomass Energy Systems** (3) Theories and applied technologies for production and conversion of biomass into energy and co-products.  
Effective: Summer 2013

A B E 885 **Biomass Harvesting and Logistics** (3) Biomass harvesting and handling scenarios and relevant cost analysis and systematic considerations.  
Effective: Summer 2013  
Prerequisite:

A B E 888 **Conversion Technologies for Bioenergy Production** (3) Applications of chemical, biochemical, thermochemical, and bioseparation technologies for the production of bioenergy.  
Effective: Summer 2013  
Prerequisite:

A B E 897 **Special Topics** (1-9 per semester/maximum of 15) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2013

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## Agricultural and Extension Education (AEE)

**AEE 400 Educational Programs in Agriculture for Developing Countries** (3) Development and implementation of educational programs in agriculture in developing countries.

Effective: Summer 2013

Prerequisite:

**AEE 412 Methods of Teaching Agriculture and Environmental Science** (4) Instructional strategies and media; directing individual and group learning activities; assessing student performance and quality of instruction in vocational agriculture.

Effective: Summer 2013

**AEE 413 Program Planning and Instructional Development** (3-4) A course in planning, developing, and organizing school-based curriculum, summer programs, advisory councils, and facilities for environmental/ agricultural education.

Effective: Summer 2013

**AEE 434 Agricultural and Environmental Development** (1-6) Intensive professional and technical treatment of various subject-matter fields to aid teachers in maintaining competence.

Effective: Summer 2013

Prerequisite:

**AEE 437 (AN SC 437) Equine Facilitated Therapy** (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

Effective: Spring 2002 Ending: Summer 2013

**AEE 437 (AN SC 437) Equine Facilitated Therapy** (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**AEE 440 Communication Methods and Media** (3) Mass media techniques for reporting and promoting extension and related programs, including message preparation, presentation, and strategy development.

Effective: Summer 2013

Prerequisite:

**AEE 450 Program Design and Delivery** (3) Principles, methods, and practices of extension education in agriculture, community resource development, family living, environmental affairs, 4-H, and youth programs.

Effective: Summer 2013

Prerequisite:

**AEE 460 Foundations in Leadership Development** (3) This course explores historical and contemporary leadership theories, models and perspectives within social, cross-cultural, and political contexts.

Effective: Summer 2013

Prerequisite:

**AEE 465 Leadership Practices: Power, Influences, and Impact** (3) Explores the leader role as it relates to issues of purpose, social responsibility, political influences, and legal constraints.

Effective: Summer 2013

**AEE 490 Colloquium** (1-3) Seminars consisting of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2013

**AEE 494 Undergraduate Research** (1-12) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Summer 2013

**AEE 495 Internship in Agricultural and Extension Education** (1-15) Participation in the total program of instruction in agriculture in a selected high school.

Effective: Summer 2013

Prerequisite:

**AEE 495D Leadership Development Minor Internship** (3) Leadership Development Minor Internship

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**AEE 495D Leadership Development Minor Internship** (3) Leadership Development Minor Internship

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**AEE 495D Leadership Development Minor Internship** (3) Leadership Development Minor Internship.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**AEE 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

**AEE 497 Special Topics** (1-9) Formal courses given on topical or special interest subjects which may be offered infrequently.  
Effective: Summer 2013

**AEE 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2013

**AEE 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2013

**AEE 499A (IL) Global School-Based Agricultural Education** (3) Global School-Based Agricultural Education  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AEE 501 Foundations of Agricultural and Extension Education** (3) Historical development, social and philosophical foundations, and current status in relation to the total vocational-technical education program.  
Effective: Summer 2013

**AEE 505 (CEDEV 505) Leadership Development** (3) Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.  
Effective: Summer 2013

**AEE 508 Administration and Supervision of Agricultural and Extension Education** (3) Basics of vocational funding, supervision, leadership, and management for agricultural education.  
Effective: Summer 2013

**AEE 509 Contemporary Research in Agricultural and Extension Education** (1-6) Analysis of contemporary research issues in agricultural education and extension education through lecture, review of literature, discussion, speakers, and active participation.  
Effective: Summer 2013

**AEE 511 Youth Leadership Development in the Agricultural and Life Sciences** (3) This course will address youth leadership development theories and emphasize formal and nonformal youth programs in agricultural and life sciences.  
Effective: Summer 2013

**AEE 515 Engagement Through Outreach Scholarship in Higher Education** (3) To develop an understanding of outreach scholarship as a nonformal educational system and its relationship to relevant social systems.  
Effective: Summer 2013  
Prerequisite:

**AEE 520 Scientific Method in the Study of Agricultural and Extension Education** (1-4) Methods of procedure in investigation and experimentation in education, accompanied by a critical examination of studies made in agricultural education.  
Effective: Summer 2013

**AEE 521 Basic Applied Data Analysis in Agricultural and Extension Education** (1-4) Continuation of AEE 520; emphasis upon statistical techniques for students' individual problems.  
Effective: Summer 2013

**AEE 524 Change in Education** (1-3) Analysis of occupational needs of students and employment prospects; organization of courses of study and other activities of teachers.  
Effective: Summer 2013

**AEE 530 Teaching and Learning in Agricultural Science** (3-4) Organization, planning and delivery of effective college teaching methods, matching/learning styles, evaluation of instruction and learning.  
Effective: Summer 2013

**AEE 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2013

**AEE 595 Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or

internships. Written and oral critique of activity required.

Effective: Summer 2013

Prerequisite:

**AEE 596 Individual Studies (1-9)** Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

**AEE 596A Agriculture in the Classroom (1-3)** Development of instructional materials integrating agricultural science concepts into elementary and middle school curricula.

Effective: Summer 2013 Ending: Summer 2013

**AEE 596A Quantitative Analysis of Teacher Effectiveness Data (3)** Multivariate analysis of national teacher effectiveness data using NCES data files.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AEE 596B SPSS Applications for Data Analysis (3)** Using SPSS 21 and AMOS 21 to analysis data for graduate research applications.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AEE 596C Qualitative Design and Research Implementation (3)** Designing qualitative and mixed method studies and implementation of such designs and approaches.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AEE 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 2013

**AEE 597B Introduction to Program Design, Delivery, and Evaluation (3)** This course is designed to help enrollees develop a basic understanding of planning, developing, delivering, and evaluating educational programs in formal and nonformal settings with a special emphasis on Cooperative Extension System in the United States and around the world. Enrollees will explore the principles, methods, models and practices of designing and delivering educational programs in non-formal settings. In addition, enrollees will complete a final project applying program design, delivery and evaluation principles and methods learned during class sessions.

Effective: Summer 2013 Ending: Summer 2013

**AEE 600 Thesis Research (1-15)** No description.

Effective: Summer 2013

**AEE 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Summer 2013

**AEE 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Involves experience in teaching undergraduate agricultural education courses under the supervision of the faculty.

Effective: Summer 2013

**AEE 610 Thesis Research Off-Campus (1-15)** No description.

Effective: Summer 2013

**AEE 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Summer 2013

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## Agronomy (AGRO)

AGRO 410W **Physiology of Agricultural Crops** (4) Study of the relation of plants to their environment and the physiology of crop plant growth.

Effective: Summer 2013

Prerequisite:

AGRO 423 **Forage Crop Management** (3) Application of agronomic, ecological, and physiological principles to the production and management of pasture and forage crops.

Effective: Summer 2013

Prerequisite:

AGRO 425 **Field Crop Management** (3) Application of agronomic, ecological, and physiological principles to management systems for the efficient production of the major field crops.

Effective: Summer 2013

Prerequisite:

AGRO 438 (AGECO 438) **Principles of Weed Management** (4) Weedy plant taxonomy, biology and ecology of weedy plant populations, and integration of biological, chemical, cultural and biological controls.

Effective: Summer 2013

Prerequisite:

AGRO 460 (BIOTC 460) **Advances and Applications of Plant Biotechnology** (3) This course provides a comprehensive overview and current status of plant biotech research. The course provides knowledge of plant systems that fall in the category of GMOs.

Effective: Summer 2013

Prerequisite:

AGRO 489 **Supervised Experience in College Teaching** (1-3) Participate with instructors in teaching an undergraduate agronomy course; assist with teaching, evaluation, and development of instructional materials.

Effective: Summer 2013

Prerequisite:

AGRO 490 (SOILS 490) **Colloquium** (1) Continuing written and oral presentations developed by students in consultation with the course instructor.

Effective: Summer 2013

Prerequisite:

AGRO 495 **Internship** (1-5) Supervised field experience related to the student's major.

Effective: Summer 2013

Prerequisite:

AGRO 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

AGRO 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

AGRO 501 **Graduate Student Dialogue** (1) Orientation discussion group for incoming graduate students. Review departmental policies and learn about the diverse faculty programs in the department.

Effective: Summer 2013

AGRO 510 **Ecology of Agricultural Systems** (3) Examination of ecological concepts and research on agroecosystem processes and dynamics via discussion and analysis of review and research papers.

Effective: Summer 2013

Prerequisite:

AGRO 518 **Responses of Crop Plants to Environmental Stress** (3) Physiological and ecological aspects of the response of crop plants to environmental stresses in establishment, persistence, and reproduction.

Effective: Summer 2013

Prerequisite:

AGRO 555 **Effective Scientific Communications** (2) Instruction and practice in verbal communication of scientific information to technical and non-technical audiences through realistic exercises with invited audiences.

Effective: Summer 2013

AGRO 590 (SOILS 590) **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1993 Ending: Fall 2013

AGRO 590 **Colloquium** (1-3 per semester/maximum of 3) Continuing seminars which consist of a series of individual

lectures by faculty, students, or outside speakers.  
Effective: Spring 2014 Future: Spring 2014

AGRO 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

AGRO 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2013

AGRO 597C **Applied Computational Analysis** (2) A 2-credit course that appraises experimental designs for agricultural and environmental field research, outlines methods of data collection and management, describes practical aspects of modern statistical analysis, and reviews computational techniques supporting critical analysis of field data.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

AGRO 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2013

AGRO 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2013

AGRO 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised training in teaching methodology for classroom and laboratory type instruction. Supervision provided by faculty member responsible for course.  
Effective: Summer 2013

AGRO 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2013

AGRO 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2013

AGRO 851 **Applied Plant Population Biology** (3) Lectures and exercises designed to develop student competency in plant selection to promote ecological diversity and genetically superior plants.  
Effective: Summer 2013

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## American Studies (AM ST)

AM ST 400 **Early America to 1765** (3) American society and culture in the colonial period.

Effective: Fall 2007

Prerequisite:

AM ST 401 **Revolution and Early Republic, 1765-1815** (3) American society and culture during the period of the Revolution and the Early Republic.

Effective: Fall 2007

Prerequisite:

AM ST 402 **Antebellum and Civil War Era, 1815-1876** (3) Social and cultural conditions, sectional rivalry, political crises, warfare, and Reconstruction from 1815 to 1876.

Effective: Fall 2007

Prerequisite:

AM ST 404 **Industrial America** (3) An analysis of American politics, literature, society, and economics from the 1870s to World War II.

Effective: Fall 2007

Prerequisite:

AM ST 405 **Cold War** (3) Examination of social and cultural currents in American life from World War II to 1990.

Effective: Fall 2007

Prerequisite:

AM ST 406 **Contemporary America** (3) A study of the historic and cultural currents of life in the United States during the recent past.

Effective: Fall 2007

Prerequisite:

AM ST 412 **American Eras** (3) Examination in depth of various and distinctive American time periods; subtitle expresses specific content. (May be repeated for credit.)

Effective: Fall 2007

Prerequisite:

AM ST 417 **American Beliefs and Myths** (3) A study of symbols, beliefs, and myths in the American experience; subtitles express specific content. (May be repeated for credit.)

Effective: Fall 2007

Prerequisite:

AM ST 421 (PHIL 401) **American Philosophy** (3) Survey of key figures and movements in American thought, including the Transcendentalists, the Pragmatists, and contemporary developments.

Effective: Fall 2007

Prerequisite:

AM ST 422 (RL ST 422) **Religion and American Culture** (3 per semester, maximum of 6) Selected topics, problems, or historical movements in American religion; relation between religion and American culture.

Effective: Summer 1996

AM ST 430 (US) (WOMST 430) **Women in American Society** (3) A historical study of women's roles and experiences in the United States.

Effective: Fall 2007

Prerequisite:

AM ST 431 **National Character** (3) An examination of the characteristics of the American people and other national groups.

Effective: Fall 2007

Prerequisite:

AM ST 432 **Ethnicity and the American Experience** (3) Theoretical and conceptual framework of ethnic studies: examination of specific issues related to major American ethnic and racial groups.

Effective: Fall 2007

AM ST 435 **Americans at Work** (3) A study of occupational and organizational cultures in America.

Effective: Fall 2007

Prerequisite:

AM ST 439 **American Regional Cultures** (3-6) An interdisciplinary study of the culture of a region of the United States, such as the south or the west.

Effective: Fall 2007

Prerequisite:

AM ST 441 (US) (KINES 441) **History of Sport in American Society** (3) Background, establishment, and growth of sport in America from colonial times to the present.

Effective: Fall 2007

Prerequisite:

AM ST 447 (US) (HIST 447) **Recent American History** (3) Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

AM ST 448 (ANTH 448) **Ethnography of the United States** (3) Ethnographic descriptions of various dimensions of life in the United States.  
Effective: Fall 2007  
Prerequisite:

AM ST 451 (COMM 451) **Topics in American Film** (3 per semester/maximum of 6) Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

AM ST 462 **American Art and Architecture of the 20th Century** (3) A survey of American painting, sculpture, decorative arts, and architecture of the twentieth century.  
Effective: Fall 2007

AM ST 472 (ENGL 434) **Topics in American Literature** (3) Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.)  
Effective: Fall 2007  
Prerequisite:

AM ST 475 (US) (ENGL 431) **Black American Writers** (3 per semester, maximum of 6) A particular genre or historical period in the development of Black American literature.  
Effective: Fall 2007  
Prerequisite:

AM ST 476 (ENGL 492, WMNST 491) **American Women Writers** (3) A study of selected American women writers.  
Effective: Spring 2008  
Prerequisite:

AM ST 479 **American Expressive Forms** (3) Examination in depth of various and distinctive American expressive forms; subtitle expresses specific content. (May be repeated for credit.)  
Effective: Fall 2007  
Prerequisite:

AM ST 480 **Museum Studies** (3) An introduction to the basic purposes, philosophies, and functions of a museum, with emphasis on the problems of museum administration. (May be repeated for credit.)  
Effective: Fall 2007  
Prerequisite:

AM ST 481 **Historic Preservation** (3) A study of preservation practices and programs in America.  
Effective: Fall 2007  
Prerequisite:

AM ST 482 **Public Heritage** (3) A study of public heritage practices and programs in America. (May be repeated for credit.)  
Effective: Fall 2007  
Prerequisite:

AM ST 483 **Oral History** (3) A study of oral history techniques and issues in America.  
Effective: Fall 2007  
Prerequisite:

AM ST 491W **American Themes, American Eras** (3-6) Interdisciplinary American culture course on major themes and eras such as the American Revolutionary Era or the 1930s.  
Effective: Fall 2007  
Prerequisite:

AM ST 493 (ENGL 493) **The Folktale in American Literature** (3) A survey of the literary uses of the folktale and legendary materials, with particular concentration on the literature of America.  
Effective: Spring 1986  
Prerequisite:

AM ST 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1994

AM ST 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

AM ST 495 **Internship** (1-6) Supervised internship for undergraduate or graduate American Studies majors at a museum or another cultural, historical, or arts agency.  
Effective: Fall 2007  
Prerequisite:

AM ST 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

AM ST 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

AM ST 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

AM ST 500 **Theory and Methods** (3) Introduction to graduate work in American Studies through exploration of the approaches, materials, and interpretations of the field.  
Effective: Fall 2007

AM ST 502 **Problems in American Studies** (3-6) A variable-content course, addressed each term to a specific problem, topic, or period in American culture.  
Effective: Summer 1970

AM ST 510 **U.S. Literature and Culture** (3) Studies exploring the relationship between literature and culture in American Studies.  
Effective: Summer 2007

AM ST 511 **Pivotal Books** (3-9) Exploration of a number of books which have been particularly influential in shaping thinking about American civilization.  
Effective: Fall 2007

AM ST 520 **Topics in Popular Culture** (3) A detailed exploration of aspects of American popular culture, including popular culture's relationship to society and scholarship.  
Effective: Summer 2007

AM ST 530 **Topics in American Folklore** (3) A detailed exploration of aspects of folklore and folklife in America.  
Effective: Fall 2007

AM ST 531 **Material Culture and Folklife** (3) Investigation of American material culture and folklife, including topics such as traditional design, cultural landscape, architecture, art, craft and food.  
Effective: Summer 2007

AM ST 533 **American Civilization in the Eighteenth Century** (3-9) Detailed investigation of specific topics in eighteenth-century American civilization.  
Effective: Fall 2007

AM ST 534 **American Civilization in the Nineteenth Century** (3-9) Representative interdisciplinary investigation of social, historical, economic, and aesthetic forces predominant in nineteenth-century America.  
Effective: Fall 2007

AM ST 535 **American Civilization in the Twentieth Century** (3-9) Detailed investigation of specific periods or topics in twentieth-century American civilization.  
Effective: Fall 2007

AM ST 536 **American Civilization in the Twenty-first Century** (3) Detailed investigation of specific topics in twenty-first century American civilization.  
Effective: Summer 2007

AM ST 540 **Ethnography and Society** (3) An advanced course on ethnographic theories, methods, and case studies, emphasizing current controversies and new strategies in field work.  
Effective: Summer 2007

AM ST 550 **Seminar in Public Heritage** (3) A study of the ways Americans use and understand heritage in public settings.  
Effective: Summer 2007  
Prerequisite:

AM ST 551 **Seminar in Local and Regional Studies** (3) Detailed investigation of local and regional historical themes and topics, emphasizing research methods.  
Effective: Summer 2007

AM ST 560 **Seminar in Race and Ethnicity** (3) Studies exploring issues of race and ethnicity in America that can be addressed with theories and methods of American Studies.  
Effective: Summer 2007

AM ST 561 **Seminar in Gender and Culture** (3) Thematic study of gender issues in American history and culture.  
Effective: Summer 2007

AM ST 570 **Topics in American Art** (1-6) Various themes within the American arts will be explored under this rubric.  
Effective: Fall 2007

AM ST 575 **Museum Internship** (3) A supervised museum internship experience featuring a "hands on" introduction into aspects of the curatorial profession.  
Effective: Fall 2007

AM ST 579 **Readings in American Studies** (3-9) Directed readings in selected areas of American Studies.  
Effective: Fall 2008  
Prerequisite:

AM ST 580 **Projects in American Studies** (1-6) Independent exploration within American Studies; evidenced by major paper, film, exhibition or specialized examination.  
Effective: Fall 2007

AM ST 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 2007

AM ST 591 **Seminar in American Studies** (3) An advanced seminar covering particular themes and issues in American Studies.  
Effective: Fall 2007  
Prerequisite:

AM ST 592 **Field Experience in American Studies** (3) Field projects and study tours to off-campus sites using American Studies methodologies.  
Effective: Summer 2007  
Prerequisite:

AM ST 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

AM ST 595 **Internship** (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Fall 2008

AM ST 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

AM ST 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2007

AM ST 600 **Thesis in American Studies** (6) A thesis supervised by the American Studies Program.  
Effective: Summer 2007  
Prerequisite:

AM ST 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 2008

AM ST 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Fall 2008  
Prerequisite:

AM ST 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 2008

AM ST 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 2008

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## Anatomy-Hy (ANAT)

ANAT 503 **Gross Anatomy** (6) Gross structure, organization, and function of the human body with laboratories devoted to dissection of the human body.  
Effective: Summer 1983

ANAT 505 **Histology and Embryology I** (2) Light and electron microscopic structure of cells, specialized tissues, organization, basic organogenesis, correlation between cellular structure and physiological function.  
Effective: Spring 1995

ANAT 506 **Histology and Embryology II** (2) Continuation of ANAT 505; microscopic structure of cells, specialized tissues, organization, basic organogenesis, correlation between cellular structure and physiological function.  
Effective: Summer 1994  
Prerequisite:

ANAT 511 (NEURO 511) **Neurobiology II** (3) Structure and physiology of central and peripheral nervous system, including specific sense organs.  
Effective: Summer 1987  
Prerequisite:

ANAT 512 **Human Embryology and Teratology** (2) Study of developing human embryo including gamete production and fusion, implantation, organogenesis and major abnormalities of organ systems.  
Effective: Fall 1983

ANAT 515 (NEURO 515) **Developmental Neurobiology** (2) Development of the nervous system in all its aspects.  
Effective: Fall 1986

ANAT 584 (PHARM 584) **Human Anatomy and Development A: Gross Human Anatomy** (1) Explore gross human anatomy providing orientation to organs and the overall relationship of organs and structures within the human body.  
Effective: Fall 2007

ANAT 585 (PHARM 585) **Human Anatomy and Development B: Human Development** (1) Explores human embryology and organogenesis beginning at the third week of gestation through parturition.  
Effective: Fall 2007

ANAT 586 (PHARM 586) **Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine** (1) Exploration of stem cell biology and the role of stem cells in regenerative medicine.  
Effective: Fall 2007

ANAT 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

ANAT 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

ANAT 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

ANAT 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

ANAT 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

ANAT 602 **Supervised Experience in College Teaching** (1-6 per semester/maximum of 99) Supervised experience in the development of instructional materials, the organization and conduct of lectures/laboratories, the evaluation and counseling of students.  
Effective: Fall 2005

ANAT 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983



ANAT 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

ANAT 715 **Human Gross Anatomy** (6) This course will provide exposure to core human anatomical structures, emphasizing critical relationships and clinical significance.

Effective: Summer 2013

Prerequisite: Concurrent: Foundations of Patient Centered Care; Public Health and Socio- Ecological Medicine

ANAT 743 **Musculoskeletal Advanced Anatomy** (3) This course provides exposure to the relevancy of anatomy to the clinical setting and specifically covers topics related to musculoskeletal clinical presentations.

Effective: Spring 2012

Prerequisite:

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## Anesthesiology-Hy (ANSTH)

**ANSTH 700 Anesthesia for Third Year Students (5)** Introduction to clinical anesthesia practice, local and general and cardiopulmonary resuscitation.

Effective: Spring 2010

Prerequisite:

**ANSTH 740 Anesthesia Acting Internship (5)** The acting internship in anesthesia is designed to expand on the experiences obtained in courses ANSTH 700 and 770.

Effective: Spring 2009

Prerequisite:

**ANSTH 770 Anesthesiology Clinical Elective (5)** The objectives for this course utilize the objectives of Ansth. 700 as a base.

Effective: Winter 1978

Prerequisite:

**ANSTH 772 Pain Management (5)** Includes evaluation, diagnosis, and treatment of complex chronic pain problems in an outpatient model. A hands-on approach will be emphasized.

Effective: Summer 1985

Prerequisite:

**ANSTH 796 Anesthesia Individual Studies (5)** Special studies program, usually involving investigative work, all hours and assignments by arrangement with a member of the anesthesia staff-faculty.

Effective: Spring 2009

Prerequisite:

**ANSTH 796A Anesthesiology Individual Studies (2.5)** Anesthesiology Individual Studies for 3rd year medical students.

Effective: Spring 2009

**ANSTH 797 Anesthesia Special Topics (5)** Anesthesia Special Topics

Effective: Spring 2009

Prerequisite:

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## Animal Science (AN SC)

AN SC 405 **Advanced Canine Nutrition and Management** (3) Application of biological principles to the care and nutrition of dogs; interactive discussions of contemporary nutrition and management issues.

Effective: Spring 2002 Ending: Summer 2013

Prerequisite:

AN SC 405 **Advanced Canine Nutrition and Management** (3) Application of biological principles to the care and nutrition of dogs; interactive discussions of contemporary nutrition and management issues.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 407 **Advanced Horse Management** (3) Detailed study of anatomy and physiology of the horse as related to nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Detailed discussion of management practices, facility design and contemporary issues.

Effective: Summer 1999 Ending: Summer 2013

Prerequisite:

AN SC 407 **Advanced Horse Management** (3) Detailed study of anatomy and physiology of the horse as related to nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Detailed discussion of management practices, facility design and contemporary issues.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 410 **Advanced Dairy Herd Management** (4) Application of dairy herd management principles using case studies and actual dairy farm situations.

Effective: Spring 2004 Ending: Summer 2013

Prerequisite:

AN SC 410 **Advanced Dairy Herd Management** (4) Application of dairy herd management principles using case studies and actual dairy farm situations.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 413 **Transgenic Biology** (3) The principles and concepts used to generate genetically engineered animals by pronuclear, knockout, and cloning methods; and applied biotechnology applications.

Effective: Summer 2002 Ending: Summer 2013

Prerequisite:

AN SC 413 **Transgenic Biology** (3) The principles and concepts used to generate genetically engineered animals by pronuclear, knockout, and cloning methods; and applied biotechnology applications.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 415 **Companion Animal Behavior** (3) Detailed study of companion animal behavior; including individual, developmental, and environmental bases of behavior with applied demonstration and discussion.

Effective: Spring 2013

Prerequisite:

AN SC 417 **Horse Judging** (2) Evaluation and selection of halter and performance horses, and presentation of oral reasons.

Effective: Spring 2002 Ending: Summer 2013

AN SC 417 **Horse Judging** (2) Evaluation and selection of halter and performance horses, and presentation of oral reasons.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 418 (AGECO 418, SOILS 418) **Nutrient Management in Agricultural Systems** (3) Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices.

Effective: Summer 2013

AN SC 419W **Applied Animal Welfare** (3) Assessment of management practices impacting animal welfare; devoted to livestock species, companion animals, captive exotic species, and animals in research.

Effective: Summer 2013

Prerequisite:

AN SC 420 **Animal Nutrition and Feed Technology** (4) Feedstuff evaluation, quality control, handling, storage: life cycle feeding of beef cattle, dairy cattle, sheep, swine, horses, and poultry.

Effective: Summer 2013

Prerequisite:

AN SC 421 **Poultry Evaluation and Selection** (2) Introduction and application of standards and principles used to evaluate live poultry and poultry products.

Effective: Summer 2013

Prerequisite:

AN SC 422 **Dairy Cattle Evaluation and Selection** (3) Methods used in evaluation of production and type traits and their role in selecting dairy breeding stock domestically and internationally.

Effective: Summer 2013

Prerequisite:

AN SC 423 **Comparative Physiology of Domestic Animals** (3) A comparative approach to understanding body function in domesticated avian and mammalian species.

Effective: Summer 2013

Prerequisite:

AN SC 424 **Livestock Breeding Evaluation and Selection** (3) Evaluation and selection of beef cattle, sheep, swine, and horses; critical analysis of performance records and genetic evaluations.

Effective: Summer 2013

Prerequisite:

AN SC 425 (VB SC 425) **Principles of Avian Diseases** (3) Principles of pathogenesis and control of diseases in poultry and other avian populations. Case material used where appropriate.

Effective: Summer 2013

Prerequisite:

AN SC 426 **Advanced Judging and Selection** (2 per semester, maximum of 4) Development of critical thinking and communication skills through evaluation and selection of animals and animal products.

Effective: Summer 2013

Prerequisite:

AN SC 427 **Milk Secretion** (3) Development and physiology of the mammary gland and factors which affect the amount and composition of milk produced.

Effective: Spring 2009 Ending: Summer 2013

Prerequisite:

AN SC 427 **Milk Secretion** (3) Development and physiology of the mammary gland and factors which affect the amount and composition of milk produced.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 429 **Advanced Beef Cattle Production** (3) Application of scientific and business principles to practical production and management issues using case studies or selected live settings.

Effective: Summer 2013

Prerequisite:

AN SC 431W **Physiology of Mammalian Reproduction** (4) Physiological processes of reproduction in animals, including the use of current and emerging technologies.

Effective: Summer 2013

Prerequisite:

AN SC 432 **Techniques in Livestock Reproduction** (2) Demonstration and practice in estrus detection, inseminating techniques, pregnancy detection, embryo recovery and transfer methods.

Effective: Summer 2013

Prerequisite:

AN SC 437 (AEE 437) **Equine Facilitated Therapy** (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

Effective: Spring 2002 Ending: Summer 2013

AN SC 437 (AEE 437) **Equine Facilitated Therapy** (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 447 **Applied Equine Behavior** (3) Theory and application of behavior principles as they apply to horses in free-running and domestic situations.

Effective: Summer 2013

Prerequisite:

AN SC 450 **Dairy Farm Management Systems** (3) Capstone course emphasizing integration of dairy farm management principles into whole farm systems.

Effective: Summer 1998 Ending: Summer 2013

Prerequisite:

AN SC 450 **Dairy Farm Management Systems** (3) Capstone course emphasizing integration of dairy farm management principles into whole farm systems.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

AN SC 451 **Dairy Systems Analysis** (1-2 per semester/maximum of 2) Students will evaluate all systems of a working dairy farm business.

Effective: Summer 2013

Prerequisite: Concurrent: AN SC 450 prerequisite or concurrent: AN SC 410

**AN SC 457 Equine Reproduction and Breeding Farm Management (3)** Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares.  
Effective: Summer 2008 Ending: Summer 2013  
Prerequisite:

**AN SC 457 Equine Reproduction and Breeding Farm Management (3)** Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**AN SC 467W Equine Nutrition and Feeding (3)** Equine gastrointestinal anatomy and physiology; energy and nutrient requirements for body functions; applied interrelationships between nutrition, health, and performance.  
Effective: Summer 2013  
Prerequisite:

**AN SC 477 Riding Instructor Training (1)** Management of equestrian riding lessons, teaching techniques, lesson plans, program planning, time management, and handling of mounted groups.  
Effective: Summer 2013  
Prerequisite:

**AN SC 479 (BIOL 479) General Endocrinology (3)** Endocrine mechanisms regulating the morphogenesis, homeostasis, and functional integration of animals.  
Effective: Summer 2013  
Prerequisite:

**AN SC 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

**AN SC 496A Animal Science Teaching Assistant (2)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AN SC 496A Animal Science Teaching Assistant (2)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AN SC 496H AN SC Honors Independent Study (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**AN SC 496H AN SC Honors Independent Study (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**AN SC 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2013

**AN SC 497A Natural Toxicants in Feedstuffs and Poisonous Plants: Effects on Animal Health and Productivity (3)** An overview of plant toxicants and mycotoxins in cereal grains, roots and tubers, protein supplements, grain legumes, and forages, and the adverse effects that they cause when consumed by animals. Emphasis will be placed on the occurrence and chemical nature of plant and fungal toxins, their mechanism of action and metabolism, the pathological effects that they produce in livestock poultry, and companion animals, and strategies to overcome their toxicity.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**AN SC 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2013

**AN SC 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2013

**AN SC 499A (IL) German Poultry Industry Study Tour (2)** The course will consist of an embedded program during Spring Break (7-day Study Tour of the German poultry industry as well as selected cultural and historical sites), pre-trip information sessions and faculty presentations, and post-trip student presentations. Students also will be required to write term papers on both a professional topic and a cultural or historical topic related to the Study Tour. The course will enhance student understanding of global poultry production systems, will increase student awareness of key issues facing the poultry industries of German and the European Union, and will introduce students to German culture, food, and history.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

AN SC 499B (IL) **Normandy France Equine Industry Studies** (0.5) Students will explore/compare United States and French Equine Industry. Topics will include breeding, training, trade issues, agricultural trade policy, animal welfare, animal health and research, marketing, equestrian event management, and farm management.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

AN SC 499B (IL) **Normandy France Equine Industry Studies** (2.5) Students will explore/compare United States and French Equine Industry. Topics will include breeding, training, trade issues, agricultural trade policy, animal welfare, animal health and research, marketing, equestrian, event management, and farm management.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

AN SC 499C (IL) **Normandy France Equine Industry Studies** (0.5) Students will explore/compare United States and French Equine Industry. Topics will include breeding, training, trade issues, agricultural trade policy, animal welfare, animal health and research, marketing equestrian event management, and farm management.

Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

Prerequisite:

AN SC 500 **Foundation Readings in Animal Science** (1 per semester/maximum of 2) Scientific articles that have significantly impacted the animal sciences will be read and discussed.

Effective: Summer 2013

AN SC 502 **Scientific Scholarship** (2) Consideration of the scientific method and thinking relative to scholarship, grantsmanship, and the mechanism of grantsmanship.

Effective: Summer 1996

AN SC 506 (NUTR 506) **Ruminology** (3) Physiological, biochemical, and microbiological activities occurring within the rumen and the relation of rumen function to animal response.

Effective: Summer 2013

Prerequisite:

AN SC 515 **Advanced Physiology of Reproduction in Farm Animals** (1-6) Advanced physiology of reproduction in farm animals.

Effective: Summer 2013

Prerequisite:

AN SC 590 **Colloquium** (1-9; 1 per semester) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2013

AN SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

AN SC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 2013

AN SC 597A **Animal Genomics** (3) Introduction to genomics, proteomics, epigenomics, and basic bioinformatics, and their applications in animal breeding, animal health and production, reproduction, nutrition, and medicine.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

AN SC 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2013

AN SC 600 **Thesis Research** (1-15) No description.

Effective: Summer 2013

AN SC 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Summer 2013

AN SC 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Experience in developing, organizing, and conducting lectures/laboratories; evaluation and counseling students and related resident education activities.

Effective: Summer 2013

AN SC 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Summer 2013

AN SC 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2013

AN SC 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Summer 2013

NOTE: Also see course listed under Animal Nutrition, Poultry Science, and Veterinary Science.

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## Anthropology (ANTH)

**ANTH 401 Human Evolution: The Material Evidence** (3) Human origins as seen in the fossil record and comparative biology of humans and their primate relatives.

Effective: Fall 1986

Prerequisite:

**ANTH 403 Evolution of Human Walking** (3) An in depth analysis of the biology, biomechanics, evolutionary history of human walking and running.

Effective: Spring 2013

Prerequisite:

**ANTH 405 Primatology** (3) Nonhuman primate origins, evolution, comparative physical and behavioral characteristics, ecological context, phylogeny and taxonomy; and their importance in anthropology.

Effective: Spring 2001

Prerequisite:

**ANTH 408 Anthropological Demography** (3) Analysis of demographic studies in traditional and very small populations.

Effective: Fall 2003

Prerequisite:

**ANTH 410 Osteology** (4) Introduction to the systematic study of the human skeleton from an evolutionary developmental biological perspective.

Effective: Spring 2007

Prerequisite:

**ANTH 411 Skeletal Forensic Anthropology** (3) An introduction to anthropological forensic science with an emphasis on what can be learned from human skeletons and archaeological recovery methods.

Effective: Spring 2007

Prerequisite:

**ANTH 412 Settlement Demography** (3) Examination of the demography and ecology of human settlement systems in the preindustrial past.

Effective: Summer 2008

Prerequisite:

**ANTH 413 Molecular Forensic Anthropology** (3) An introduction to the field of the application of DNA methods to estimating forensically useful phenotypes.

Effective: Summer 2006

Prerequisite:

**ANTH 416 The Evolution of Human Mating** (3) The Evolution of Human Mating is a science course designed to familiarize students with the primary literature on the evolution and development of human mating behavior and sex differences.

Effective: Spring 2013

Prerequisite:

**ANTH 420 (J ST 420) Archaeology of the Near East** (3) Culture of the Near East and India from Paleolithic times through the Bronze Age.

Effective: Summer 1999

Prerequisite:

**ANTH 421 Intro to Geospatial Science in Anthropology and Archaeology** (3) This course is a practical, data driven, introduction to applications of Geospatial tools in anthropological and archaeological research.

Effective: Summer 2009

Prerequisite:

**ANTH 422 Meso-American Archaeology and Ethnography** (3) Survey of ethnohistorical and ethnographic patterns of Meso-American society; origin and development of ancient civilization in Mexico, Guatemala, and Honduras.

Effective: Spring 1999

Prerequisite:

**ANTH 423 The Evolution of American Indian Culture** (3) Historic and archaeological sources used to trace American Indian lifestyles from the first immigrants to the period of Euro-American contact.

Effective: Spring 1999

Prerequisite:

**ANTH 424 Andean Ethnology and Archaeology** (3) Cultures of the Andes from earliest settlements to Inka Empire; includes discussion of life in modern Andean communities.

Effective: Spring 2002

Prerequisite:

**ANTH 425 Zooarchaeology** (3) Introduction to the systematic study of animal skeletal remains from archaeological sites.

Effective: Summer 2013

Prerequisite:

**ANTH 426W Archaeological Laboratory Analysis** (3) Scientific laboratory methods used in the analysis of ceramic and lithic artifacts.



Effective: Summer 2004

Prerequisite:

**ANTH 427W Forensic Archaeology (3)** Application of archaeological techniques to crime scene investigations, with practical experience in field and laboratory contexts.

Effective: Summer 2007

Prerequisite:

**ANTH 428 Archaeological Methods and Theory (3)** Scientific methods as applied to archaeological data: evolution, ecology, diffusion, and cyclicalism theory.

Effective: Spring 1999

Prerequisite:

**ANTH 429 Paleoethnobotany (3)** Introductory course in paleoethnobotany, the study of the interrelationships between people of the past, natural environment, and plant resources.

Effective: Spring 2010

Prerequisite:

**ANTH 430 The Aztecs (3)** This course examines the development and organization of the great Aztec culture of highland Mexico.

Effective: Summer 2013

Prerequisite:

**ANTH 431 Advanced Geospatial Science for Anthropologists and Archaeologists (3)** This course is an intensive, data driven, treatment of the use of geographic information systems in anthropological and archaeological research.

Effective: Summer 2009

Prerequisite:

**ANTH 432 Environmental Archaeology (3)** Introductory course in Environmental Archaeology, with emphasis on method and theory in the subfields archaeobotany, pediaeology, and zooarchaeology.

Effective: Spring 2010

Prerequisite:

**ANTH 433 Archaeological Ethics and Law (3)** Introductory course that examines prominent ethical and legal issues in archaeology integral to modern applied research and practice.

Effective: Spring 2010

Prerequisite:

**ANTH 435 (IL) Ancient Economy (3)** The course examines the comparative organization and development of ancient economies in both the Old and New Worlds.

Effective: Summer 2013

**ANTH 440 South American Tribal Societies (3)** Ethnographic survey of tribal societies in South America. Special emphasis on non-Andean area.

Effective: Fall 1986

**ANTH 441 (IL) From Stone Ax to Uzi: Tradition and Change in the New Guinea Highlands (3)** This course explores cultural change and innovation among tribal peoples of Highland New Guinea from stone tool technology to globalization.

Effective: Fall 2009

Prerequisite:

**ANTH 444 Primitive Warfare (3)** Critical overview of the ethnography and theory of primitive warfare.

Effective: Summer 2002

Prerequisite:

**ANTH 445W Ethnographic Film (3)** Comparisons of written and visual ethnography; critical assessment of ethnographic film; cross-cultural variation.

Effective: Summer 2000

Prerequisite:

**ANTH 446 Mating and Marriage (3)** An examination of human mating mainly from the viewpoint of behavioral ecology, centering on the species-typical institution of marriage.

Effective: Summer 2006

Prerequisite:

**ANTH 448 (AM ST 448) Ethnography of the United States (3)** Ethnographic descriptions of various dimensions of life in the United States.

Effective: Fall 2007

Prerequisite:

**ANTH 450 Comparative Social Organization (3)** Social structure and cultural change among nonliterate societies.

Effective: Fall 1986

Prerequisite:

**ANTH 450W Comparative Social Organization (3)** Social structure and cultural change among nonliterate societies.

Effective: Summer 1996

Prerequisite:

**ANTH 451 Economic Anthropology (3)** Different approaches to the study of the economics of non-Western societies,

emphasizing the interrelationships between noneconomic factors and economic behavior.

Effective: Fall 1986

Prerequisite:

**ANTH 453 Anthropology of Religion** (3) Traditional and modern religions and historical and contemporary religious movements from an anthropological perspective.

Effective: Fall 2003

Prerequisite:

**ANTH 455 Global Processes and Local Systems** (3) Ethnographic, comparative, historic, evolutionary treatment of global economic, political, and cultural processes and their consequences for local systems.

Effective: Fall 2001

Prerequisite:

**ANTH 456 Cultural Ecology** (3) Survey of the methods and concepts of cultural ecology, focusing on the interaction between cultural and geographical systems.

Effective: Fall 1986

Prerequisite:

**ANTH 457 (US;IL) (J ST 457, SOC 457) Jewish Communities: Identity, Survival, and Transformation in Unexpected Places** (3) Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.

Effective: Summer 2006

Prerequisite:

**ANTH 458 Ethnographic Field Methods** (3) Course introduces students to ethnographic field methods, includes student projects and simple analyses that don't require statistical sophistication.

Effective: Spring 2009

Prerequisite:

**ANTH 459 Applied Anthropology** (3) A survey of the development of applied anthropology and the current issues facing anthropologists working in non-academic settings.

Effective: Summer 2002

Prerequisite:

**ANTH 460 (BIOL 460) Human Genetics** (3) The human genome, its variation, origins, and relation to disease and other traits.

Effective: Fall 2011

Prerequisite:

**ANTH 460H (BIOL 460H) Human Genetics** (4) Gene mapping in humans; molecular basis of genetic disease; genomic structure; immunogenetics; and genetic evidence for human evolutionary history.

Effective: Fall 2001

Prerequisite:

**ANTH 461 Molecular Anthropology** (3) Provides framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species.

Effective: Spring 2005

Prerequisite:

**ANTH 465H Fifteen Great Biology Papers** (3) Reading and discussion of the most influential papers in the history of biology that illustrate exceptional insight and elegant reasoning.

Effective: Spring 2003

Prerequisite:

**ANTH 466 The Skull** (3) Survey of the mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull.

Effective: Spring 2003

Prerequisite:

**ANTH 468 Evolution and Development of Human Origins** (3) In depth analysis of the genetic and developmental basis for phenotypic variation and evolution of humans and primates.

Effective: Summer 2013

Prerequisite:

**ANTH 470H Our Place in Nature** (3) An evolutionary and genetic consideration of our understanding of human beings as a part of the natural world.

Effective: Fall 2001

Prerequisite:

**ANTH 471H Biology, Evolution, and Society** (3) Exploration of the genetic theory of evolution and development, its history and application within Biology and beyond.

Effective: Spring 2008

Prerequisite:

**ANTH 472 The Ecology of Traditional Farming** (3) This course will examine the ecology of traditional farming, focusing on the farming household, its farm, and its subsistence needs.

Effective: Summer 2013

Prerequisite:

**ANTH 476W Anthropology of Gender** (3) Cross-cultural construction of gender and sex roles; theories of gender

construction; case studies and practical effects.

Effective: Summer 2011

Prerequisite:

ANTH 477 (US;IL) **Language, Culture, and Society** (3) Relationships among language, culture and society, with an anthropological emphasis.

Effective: Spring 2007

Prerequisite:

ANTH 478 (IL) **Cannibalism** (3) Explores the cultural institution of cannibalism, uses of the "cannibal" label, and cannibalism's meaning among those who practiced it.

Effective: Spring 2010

Prerequisite:

ANTH 492 **Intermediate Field Methods** (3-6) On-site experience in collecting archaeological, behavioral, or biological data.

Effective: Spring 2001

Prerequisite:

ANTH 493 **Field Techniques** (3-6) Training in techniques involving analyses of archaeological, behavioral, or biological data.

Effective: Spring 2001

Prerequisite:

ANTH 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

ANTH 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

ANTH 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2000

Prerequisite:

ANTH 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1986

ANTH 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1986

ANTH 497A **Peoples of South Asia** (3) The course will cover nation states of Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka and Maldives. This course looks at the diverse peoples of South Asia and their dynamic cultures.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ANTH 497H **Evolution and Development of Human Origins** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ANTH 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

ANTH 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

ANTH 501 **Human Evolution: The Material Evidence** (3) Human origins as seen in the fossil record and comparative biology of humans and their primate relatives.

Effective: Spring 2002

Prerequisite:

ANTH 508 **Research Problems in Culture History** (3-9) No description.

Effective: Spring 1987

ANTH 509 **Research Design in Anthropological Fieldwork** (3) A survey of research design, sampling strategies, potential biases, confounding problems, and the limits of inference in anthropological fieldwork.

Effective: Summer 1990

Prerequisite:

ANTH 521 **Current Literature in Archaeology** (1) Seminar designed to expand general knowledge of archaeology through exposure to current research and related issues in contemporary archaeology.  
Effective: Fall 2000

ANTH 541 **Current Literature in Cultural Anthropology** (1) This seminar is designed to expand general knowledge of cultural anthropology through exposure to current research/related issues in contemporary cultural anthropology.  
Effective: Spring 2002

ANTH 545 **Seminar in Anthropology** (1-9) Critical analysis of research in selected areas of anthropology.  
Effective: Spring 1987

ANTH 556 **Social Organization of Traditional Societies** (3) Cultural bases of social organization of traditional societies.  
Effective: Summer 1990

ANTH 559 **Human Ecology** (3) Ecological anthropology, emphasizing the adaptive aspects of subsistence, including foraging and settlement pattern.  
Effective: Spring 2011

ANTH 560 **History of Anthropological Theory** (3) Survey of origin and development of anthropology in the Nineteenth Century and trends during the Twentieth Century.  
Effective: Fall 1986  
Prerequisite:

ANTH 562 **Laboratory Methods in Anthropology** (3-9) Supervised laboratory research, utilizing materials from physical anthropology or archaeology or cultural anthropology.  
Effective: Spring 1987

ANTH 563 **Current Literature in Biological Anthropology** (1) Seminar designed to expand general knowledge of Biological Anthropology through exposure to current research and issues in contemporary Biological Anthropology.  
Effective: Fall 2001

ANTH 566 **Infectious Diseases in Anthropological Populations** (3) Surveys infectious diseases in history and prehistory; introduces concepts from microbiology, immunology, and epidemiology, applies them to past human populations.  
Effective: Spring 2002

ANTH 571 **Principles of Human Evolutionary Biology** (3) Mechanisms and quantification of human genetic variation and survey of evolutionary aspects of human ecology, life cycle, and population biology.  
Effective: Spring 2002

ANTH 575 **Population, Food, and Traditional Farming** (3) This course explores the relationship between demographic processes (fertility, mortality, migration) and traditional farming, especially farming near the subsistence level.  
Effective: Summer 2009  
Prerequisite:

ANTH 579 (SOC 579) **Spatial Demography** (3) This graduate course will expose students to spatial analysis tools and analytical methods applied to demographic research.  
Effective: Spring 2008  
Prerequisite:

ANTH 588 **Method and Theory in Archaeology** (3) Methodological strategies and tactics in archaeological research; major theories in cultural anthropology as applied to archaeological data.  
Effective: Spring 2002

ANTH 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1987

ANTH 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2001

ANTH 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1987  
Prerequisite:

ANTH 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

ANTH 599 (IL) **Foreign Studies** (1-12 per semester, maximum of 24) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

ANTH 600 **Thesis Research** (1-15) No description.

Effective: Fall 1986

ANTH 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 1986

ANTH 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at the Pennsylvania State University.

Effective: Fall 2003

ANTH 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Spring 2002

ANTH 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1986

ANTH 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1986

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## **Appellate Team (APTEM)**

APTEM 995A **Irving R. Kaufman Securities Law Team** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995B **Jessup International Law Team** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995C **National Appellate Moot Court Team** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995D **Environmental Law Team** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995E **Robert Wagner Memorial Labor Law Team** (2) See Handbook for description.  
Effective: Spring 1998

APTEM 995F **Information and Privacy Law Team** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995G **Constitutional Law Team** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995I **Miscellaneous Appellate Moot Court Teams** (2) See Handbook for description.  
Effective: Fall 1998

APTEM 995K **BLSA Appellate Moot Court Team** (2) See Handbook for description.  
Effective: Spring 2005

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## Applied Behavioral Analysis (ABA)

ABA 500 **Experimental Analysis of Behavior** (3) This course covers the scientific, conceptual, theoretical, and philosophical roots of the experimental analysis of behavior.

Effective: Summer 2003

Prerequisite:

ABA 511 **Behavior Modification** (3) Provides an overview of principles and procedures and use of behavior modification with individuals in diverse settings.

Effective: Spring 2009

ABA 522 **Single Subject Research** (3) This course aims to teach how to critique, design, and analyze single subject research.

Effective: Fall 2001

Prerequisite:

ABA 533 **Applied Analysis of Behavior** (3) Overview of the application of behavior analysis in education, rehabilitation, medicine, business, counseling, and therapy across the age range.

Effective: Summer 2006

Prerequisite:

ABA 555 **Behavioral Intervention in Autism** (3) Overview of the use of Behavior Analysis in the education, assessment, and treatment of individuals with autism.

Effective: Summer 2006

Prerequisite:

ABA 566 **Behavioral Pediatrics** (3) Overview of behavioral pediatrics and discusses the role of Behavior Analysis within this field.

Effective: Summer 2006

Prerequisite:

ABA 577 **Behavioral Assessment and Treatment of Behavior Disorders** (3) Overview of the use of Applied Behavior Analysis in the assessment and treatment of individuals with behavior and emotional disorders.

Effective: Summer 2006

Prerequisite:

ABA 588 **Ethics and Legal Issues in Applied Behavior Analysis** (3) This course will cover ethical and legal issues related to applied behavior analysis research and practice.

Effective: Spring 2004

Prerequisite:

ABA 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2001

ABA 594A **Research Topics** (3) Supervised research project in behavior analysis for degree candidates.

Effective: Fall 2001 Ending: Summer 2013

Prerequisite:

ABA 594A **Research Topics** (3-9 per semester/maximum of 18) Supervised research project in behavior analysis for degree candidates.

Effective: Fall 2013 Future: Fall 2013

ABA 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 2001

Prerequisite:

ABA 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Fall 2001

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## Applied Linguistics (APLNG)

APLNG 410 **Teaching American English Pronunciation** (3) Study and application of principles of North American English phonetics and theories of teaching pronunciation.  
Effective: Fall 2001

APLNG 412 **Teaching Second Language Writing** (3) This course provides opportunities for exploring various perspectives on theory, research, and pedagogical applications in second language writing.  
Effective: Summer 2003

APLNG 482Y (IL) **Introduction to Applied Linguistics** (3) Application of theories of language to psycholinguistics, philosophy of language, anthropological linguistics, sociolinguistics, bi/multilingualism, second language acquisition and teaching.  
Effective: Spring 2006

APLNG 484 **Discourse-Functional Grammar** (3) Develop a working knowledge of the structure of English and apply such knowledge to research and/or classroom situations.  
Effective: Fall 2004

APLNG 491 **Theory: Second Language Acquisition** (3) An investigation into current issues in the theoretical bases of second language acquisition.  
Effective: Fall 2006

APLNG 493 (IL) **Teaching English as a Second Language** (3) Theory, research, and pedagogy that focus on the teaching of English to speakers of other languages in varied contexts.  
Effective: Spring 2006

APLNG 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2001

APLNG 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2002

APLNG 500 **Practice Teaching in ESL** (3) Provides instructional support and professional mentoring for second language teachers during the practice teaching experience.  
Effective: Fall 2009

APLNG 510 **Health and Aging in Multilingual Contexts** (3) This course focuses on anthropological approaches to health and aging in multilingual contexts.  
Effective: Spring 2007

APLNG 511 **Applied Linguistics and Health Sciences** (3) A theoretical and practical introduction to concepts and methods associated with multilingualism and health care services and research.  
Effective: Summer 2006

APLNG 512 **Language and Adult Lifespan Development** (3) The effects of adult cognitive development and decline on the production and comprehension of language in mono- and multilinguals.  
Effective: Summer 2006

APLNG 570 **Second Language Reading** (3) Theoretical and practical introduction to concepts, methods and practices of research and instruction of second language reading development.  
Effective: Summer 2006

APLNG 571 **'Foreign' Language Materials Development** (3) This course focuses on the development and critical analysis of 'foreign' language teaching materials in applied linguistics and language learning.  
Effective: Summer 2005

APLNG 572 **Communication in Second Language Classrooms** (3) The study of communication in second language classrooms.  
Effective: Spring 2002



APLNG 573 **Communicative Language Teaching** (3) Cognitive, linguistic, and sociocultural foundations of communicative language teaching (CLT) as reflected in current international language teaching policies/practices.  
Effective: Fall 2001

APLNG 574 **World Englishes: Pluralizing Policy, Pedagogy, and Proficiency** (3) This course explores the global spread of English, the diversification of its norms, and their pedagogical and policy implications.  
Effective: Summer 2012

APLNG 575 **Language Ideology** (3) This course is designed to offer a range of perspectives on language ideology as an analytical construct.  
Effective: Summer 2006

APLNG 576 **Language Socialization across Home, School, and Community Contexts** (3) A survey of research on language socialization from a variety of sociocultural groups across a range of sociolinguistic contexts.  
Effective: Summer 2006

APLNG 577 **Language Analysis** (3) An overview of cognitive/conceptual/functional approaches to language analysis with applications to research, second language acquisition, and language pedagogy.  
Effective: Fall 2011

APLNG 578 **Computational and Statistical Methods for Corpus Analysis** (3) A hands-on introduction to the core and advanced computational and statistical methods for analyzing corpus data.  
Effective: Fall 2010

APLNG 580 **Proseminar in Applied Linguistics** (1) This team-taught seminar introduces PhD students to the scholarly areas and research perspectives in Applied Linguistics represented by department faculty.  
Effective: Summer 2008

APLNG 581 (CAS 581) **Discourse Analysis** (3) Overview of theories and approaches to the analysis of spoken and/or written discourse.  
Effective: Fall 2005

APLNG 582 **Seminar in Approaches to Language Use** (3) Examines the historical and contemporary landscape of research on language use.  
Effective: Fall 2011

APLNG 583 **Methods of Language Assessment** (3) Introduces methodology for selecting, developing, applying, and analyzing tests and questionnaires for research and evaluation in communication and language education.  
Effective: Spring 2002

APLNG 584 **Sociocultural Theory and Second Language Learning** (3) The course is an introduction to research on second language learning from a sociocultural theoretic perspective.  
Effective: Spring 2004

APLNG 586 **Analyzing Classroom Discourse** (3) A theoretical and practical introduction to concepts and methods associated with the analysis of classroom discourse.  
Effective: Summer 2006

APLNG 587 **Theory & Research in L2 Teacher Education** (3) Examines the historical and contemporary landscape of theory and research in second language teacher education.  
Effective: Fall 2009

APLNG 588 **Design and Research of Technology-Mediated Language Learning** (3) Using computer and multimedia technologies to support materials development and second language acquisition research.  
Effective: Spring 2010

APLNG 589 (CMLIT 589, GER 589, FR 589) **Technology in Foreign Language Education: An Overview** (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)  
Effective: Fall 2003

APLNG 591 **Seminar in Second Language Acquisition** (3) Seminar in second language acquisition by second/foreign language learners and implications for language pedagogy and assessment.  
Effective: Spring 2002

APLNG 592 **Qualitative Research in Applied Linguistics** (3:2) This course offers an introduction to qualitative research methods in applied linguistics.  
Effective: Spring 2009

APLNG 593 **Experimental Research on Language** (3) Standard methodologies for planning, conducting, interpreting, and reporting research in Applied Linguistics.  
Effective: Spring 2009

APLNG 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Fall 2001  
Prerequisite:

APLNG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2001

APLNG 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2001

APLNG 597A **Designing Courses: Materials Development & Curriculum Design for ESL Teachers** (3) This course introduces basic principles, relevant for instructors, program directors, and teacher educators, of materials development and curriculum design.  
Effective: Summer 2013 Ending: Summer 2013

APLNG 597A **Research in Cognitive Linguistics** (3) This course aims to introduce to the students cognitive linguistic research on how embodied cognition is manifested in language.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

APLNG 597A **Gesture in Second Language Learning and Teaching** (3) Course focuses on an important component of meaning that has been, until very recently, overlooked in L2 research: the synchronization of speech and gesture in utterance production.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

APLNG 597B **The Construction of Social Identity Through Language** (3) This course examines the role of language and interaction in the construction of social identities.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

APLNG 597B **Cognitive Linguistics and Second Language Teaching** (3) This course will introduce to the students the literature on what Cognitive Linguistics has to offer to second language research and instruction.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

APLNG 597C **Pragmatics in Language Learning and Teaching** (3) In this course, students will survey the literature on the development of pragmatic abilities among learners in classroom, technology-enhanced, and immersion/study abroad environments.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

APLNG 600 **Thesis Research** (1-15) No description.  
Effective: Fall 2001

APLNG 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 2001

APLNG 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Students experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Fall 2001

APLNG 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 2003

APLNG 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 2001

APLNG 802 **Focus on English: Teaching Form, Meaning and Use** (3) Develops an understanding of the various domains of the English language as relevant for adult English language learning and teaching.

Effective: Summer 2010

**APLNG 804 Focus on Learners: Identity, Community and Language Learning (3)** Explores how individual identities shaped by cultural differences, social positioning, institutional roles and structures influence English language learning and teaching.

Effective: Summer 2010

**APLNG 806 Focus on Classrooms: Planning and Supporting Language Learning (3)** Develops a critical awareness of one's teaching practice and highlights instructional planning and classroom interactions with adult English language learners.

Effective: Summer 2010

**APLNG 808 Focus on Instruction: Teaching and Assessing Language Learning (3)** Develops an understanding of and ability to use effective teaching and assessment practices that support adult English language learning.

Effective: Summer 2010

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## Applied Youth, Family and Community Education (AYFCE)

AYFCE 438 (US) **Living in an Increasingly Diverse Society** (1-3) Students in this course will explore selected dimensions of diversity through lecture, discussion, speakers, active participation, and experiential learning.  
Effective: Summer 2013

AYFCE 455 **Extension Youth Development Programs and Volunteer Management** (3) A study of 4-H/Extension youth programs and the variety of roles played by volunteer leaders.  
Effective: Summer 2013  
Prerequisite:

AYFCE 495 **Internship in Youth and Family Education Programs** (6-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.  
Effective: Summer 2013  
Prerequisite:

AYFCE 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

AYFCE 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2013

AYFCE 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2013

AYFCE 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2013

AYFCE 535 **Youth Civic Development** (3) This course critically examines processes enabling youth to become members of local communities and "citizens" of nations and global societies.  
Effective: Summer 2013

AYFCE 550 **Program Development and Evaluation in Youth, Families and Communities** (3) Examination of concepts, theories, models, and procedures relative to program development and evaluation in youth, families and communities.  
Effective: Summer 2013  
Prerequisite:

AYFCE 555 **Volunteer Program Management** (3) The study and application of concepts and principles of volunteerism and administration relevant to volunteer program management.  
Effective: Summer 2013

AYFCE 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2013

AYFCE 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 2013  
Prerequisite:

AYFCE 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

AYFCE 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2013

AYFCE 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2013

AYFCE 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2013

AYFCE 840 **Applied Youth Development** (3) Background and current issues related to youth development programs in their application to actual youth programs in community settings.  
Effective: Summer 2013

AYFCE 845 (CI ED 845) **Intergenerational Programs and Practices** (3) Background, intervention strategies, and issues related to developing intergenerational programs and practices aimed at addressing vital social and community issues.  
Effective: Summer 2013

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## Architectural Engineering (A E)

**A E 401 Design of Steel and Wood Structures for Buildings** (3) Application of principles of engineering mechanics to layout, analysis, design, and detailing of structural elements in steel and wood of simple buildings.

Effective: Fall 2005

Prerequisite:

**A E 402 Design of Concrete Structures for Buildings** (3) Application of principles of engineering mechanics to layout, analysis, design, and detailing of structural elements in concrete of simple buildings.

Effective: Fall 2005

Prerequisite:

**A E 403 Advanced Steel Design for Buildings** (3) Continuation of A.E. 401. Advanced analysis, design, and detail of the structural elements in wood and steel.

Effective: Fall 2005

Prerequisite:

**A E 404 Building Structural Systems in Steel and Concrete** (3) Basic analysis, design, and detailing of steel and concrete structural elements for buildings, emphasizing systems design and comparisons. A E 404 is not permitted for AE Structural Option students or for Architecture students.

Effective: Summer 2006

Prerequisite:

**A E 421 Architectural Structural Systems I** (3) Qualitative and quantitative analysis and design of architectural structures, force flow; structure configurations; measurement and experiments; design studio critique.

Effective: Spring 1990

Prerequisite:

**A E 422 Architectural Structural Systems II** (3) Continuation of A E 421, with emphasis on structural configuration and construction assemblies.

Effective: Spring 1990

Prerequisite:

**A E 424 Environmental Control Systems I** (3) Fundamental principles and applications of environmental systems in buildings. This course is intended for Architecture students.

Effective: Fall 2005

Prerequisite:

**A E 430 Indeterminate Structures** (3) Classical methods of analysis for beams, frames, arches, and secondary stresses as applied to buildings; introduction to modern methods.

Effective: Summer 1984

Prerequisite:

**A E 431 Advanced Concrete Design for Buildings** (3) Continuation of A.E. 402. Advanced analysis, design, and detail of concrete masonry, prestressed and reinforced concrete.

Effective: Fall 2005

Prerequisite:

**A E 432 Design of Masonry Structures** (3) Analysis and design of unreinforced and reinforced masonry: non-bearing walls, bearing walls, shear walls, masonry building systems.

Effective: Spring 2005

Prerequisite:

**A E 439 Modern Structural Systems** (3) Analysis and design of building structures of unusual types.

Effective: Summer 1981

Prerequisite:

**A E 444 Micro CADD Applications for Buildings** (3) Application of microcomputer based CADD systems to architectural engineering problems including graphics, system customization, and AI programming techniques.

Effective: Spring 2008

Prerequisite:

**A E 454 Advanced Heating, Ventilating, and Air Conditioning** (3) Engineering design and performance analysis procedures for complex commercial building systems, including energy conservation techniques; design project.

Effective: Fall 1986

Prerequisite:

**A E 455 Advanced Heating, Ventilating, and Air Conditioning System Design** (3) Design of several different systems for a course project building; control strategy; economic comparisons using life-cycle cost techniques.

Effective: Fall 1983

Prerequisite:

**A E 456 Solar Energy Building System Design** (3) Solar radiation, collectors, and thermal storage; design and analysis of a heating system using system-simulation computer program.

Effective: Summer 1984

Prerequisite:

**A E 457 HVAC Control Systems** (3) Theory of automatic control. HVAC control applications. Control system components,

control loops, development and documentation of control logic, control commissioning.

Effective: Summer 2006

Prerequisite:

**A E 458 Advanced Architectural Acoustics and Noise Control (3)** Advanced consideration of noise control in buildings; ventilating system noise and vibration; acoustic design variables.

Effective: Fall 1983

Prerequisite:

**A E 461 Architectural Illumination Systems & Design (3)** Lighting units & photometry; lighting equipment; design criteria, calculation methods; the design process; energy codes.

Effective: Fall 2005

Prerequisite:

**A E 464 Advanced Architectural Illumination Systems & Design (3)** Flux transfer theory; advanced lighting and control systems; emergency lighting; daylighting; visual performance issues; psychological aspects of lighting.

Effective: Fall 2005

Prerequisite:

**A E 466 Computer Aided Lighting Design (3)** Design and analysis for outdoor area; floodlighting; and interior applications, including design criteria; economic analysis; modeling algorithms; and visualization.

Effective: Fall 2005

Prerequisite:

**A E 467 Advanced Building Electrical System Design (3)** Design of electrical systems for commercial and industrial facilities emphasizing design practice and integration with codes and standards.

Effective: Spring 2008

Prerequisite:

**A E 470 Residential Building Design and Construction (3)** Managerial aspects; architectural and code considerations; cost estimating, design, and construction of structural, plumbing, HVAC, and electrical systems.

Effective: Spring 1994

Prerequisite:

**A E 472 Building Construction Planning and Management (3)** Construction organization and contracts; preconstruction services; estimating; scheduling; cash flow; site planning and preparation; building construction sequences; construction business presentations; value engineering.

Effective: Fall 2005

Prerequisite:

**A E 473 Building Construction Management and Control (3)** Building construction project planning; construction cost, schedule, quality and safety control systems; project cost accounting; change management; construction company management.

Effective: Fall 2005

Prerequisite:

**A E 474 Building Construction Estimating (3)** Construction estimating and cost engineering fundamentals; quantity take off; pricing, bid preparation; estimating, cost accounting by computer.

Effective: Spring 2001

Prerequisite:

**A E 475 Building Construction Engineering I (3)** Project planning, supervision, inspection of architectural and structural operations in major buildings; mobilization, coordination of trades; offsite testing and fabrication.

Effective: Fall 2012

Prerequisite:

**A E 476 Building Construction Engineering II (3)** Construction of mechanical and electrical systems in major buildings; fire protection, sound control, elevating; trade coordination; manufacturers' developments; computer application.

Effective: Fall 1983

Prerequisite:

**A E 481W Comprehensive Architectural Engineering Senior Project I (4)** Building project selection and preparation of overall plan; preliminary investigation of building design and construction issues; creation of individual Capstone Project Electronic Portfolio (CPEP) and project proposal required.

Effective: Fall 2005

Prerequisite:

**A E 482 Comprehensive Architectural Engineering Senior Project II (4)** Continuation of A E 481W. Engineering analysis of building systems; emphasis on analysis and design of building structural, mechanical, lighting/electrical, and construction related systems. Final written report, web-based project portfolio and verbal presentation are required.

Effective: Fall 2005

Prerequisite:

**A E 486 Professional Engineering Practice (3)** A study of the influences which affect the practice of architectural engineering, particularly codes, ethics, legal considerations, and contract documents.

Effective: Fall 1983

Prerequisite:

**A E 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**A E 496A Ancient Rome and Medieval Structural Design (3)** Study of structural design employed in ancient Rome and other medieval locations. Offered on location in Rome.  
Effective: Summer 2013 Ending: Summer 2013

**A E 496F Study of Urbanization in China (2)** The course provides both local and regional background awareness for overseas students concerned with urbanisation and city development issues in contemporary China. Offered on location in Hong Kong.  
Effective: Summer 2013 Ending: Summer 2013

**A E 496G Building Project Case Studies (3)** Study of the building developments in China using case studies of contemporary projects in China. The factors include economics, social/ political, and technologies. Students will tour the projects and interact with on site personnel. Offered on location in China.  
Effective: Summer 2013 Ending: Summer 2013

**A E 496K International Construction Seminar (3)** Seminar in project engineering in international construction. Offered on location in Beijing, China.  
Effective: Summer 2013 Ending: Summer 2013

**A E 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**A E 497A Ancient Rome and Medieval Structural Design (3)** Study of structural design employed in ancient Rome and other medieval locations. Offered on location in Rome.  
Effective: Summer 2013 Ending: Summer 2013

**A E 497E Building Electrical and Communication Systems (3)** This course addresses specialized topics in building electrical and communication systems that are typically the responsibility of the electrical engineer in a building design firm, including: emergency power, coordination and fault studies, alternate and sustainable power sources, fire alarm systems, voice, video and data communication systems, and HVAC control systems.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**A E 497F Load/Energy Simulation (3)** Developing models of the time dependent loads on building system on the basis of fundamental conservation of energy and heat transfer relationships; energy utilization modeling skills that allow alternative building system designs to be explored.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**A E 498 Special Topics (1-9)** Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1992

**A E 520 Room and Building Acoustics (4)** Sound propagation in enclosures. Transmission through partitions. Design of spaces for optimum listening and industrial buildings for low noise.  
Effective: Fall 1989  
Prerequisite:

**A E 530 Computer Modeling of Building Structures (3)** Theory and application of structural analysis using the direct stiffness method. Modeling assumptions, validation, interpretation of computer output.  
Effective: Summer 2011  
Prerequisite:

**A E 534 Analysis and Design of Steel Connections (3)** Connection analysis and design for steel buildings with an emphasis on the AISC Specification.  
Effective: Summer 2005  
Prerequisite:

**A E 536 Stability of Building Structures (3)** Elastic and inelastic buckling of beams, beam-columns, frames; applications to design of multi-story buildings.  
Effective: Spring 1999  
Prerequisite:

**A E 537 Building Performance Failures and Forensic Techniques (3)** This course provides a background in identification, evaluation, and analysis of a broad set of architectural and structural performance failures.  
Effective: Summer 1999  
Prerequisite:

**A E 538 Earthquake Resistant Design of Buildings (3)** Introductory engineering seismology, basic principles of structural dynamics, application of earthquake design provisions of model building codes to design of buildings.  
Effective: Spring 2005  
Prerequisite:



A E 542 (C E 542) **Building Enclosure Science and Design** (3) The building enclosure: nature, importance, loadings; building science: control of heat, moisture, air, hygrothermal analysis; design: walls, windows, roofs, joints.  
Effective: Summer 2002

A E 543 **Research Methods in Architectural Engineering** (3) Research skills, critical thinking, academic writing, presentations, use of electronic media, and experimental design applied to AE research topics.  
Effective: Spring 2012

A E 551 **Combined Heat and Power System Design for Buildings** (3) Thermodynamic and thermo-economic analyses methods for determination of optimal, on-site, total energy systems for commercial buildings.  
Effective: Fall 2008  
Prerequisite:

A E 552 **Air Quality in Buildings** (3) Indoor air pollutants, their sources and health effects; transport of pollutants; modelling of pollutant concentration in buildings.  
Effective: Fall 2007  
Prerequisite:

A E 553 **Building Energy Analysis** (3) Fundamentals of building energy dynamics and the simulation of energy flows in a building; validation of programs; practical applications.  
Effective: Fall 2007  
Prerequisite:

A E 554 **Building Thermal Systems Design and Optimization** (3) A study of building thermal comfort systems emphasizing analytical peak and off-peak design performance modeling, simulation, optimization and economics.  
Effective: Fall 1989  
Prerequisite:

A E 555 **Building Automation and Control Systems** (3) Advanced techniques in the theoretical analysis and practical design of the automatic comfort controls used in building thermal systems.  
Effective: Fall 2011  
Prerequisite:

A E 556 **Solar Engineering of Thermal Processes** (3) Advanced quantitative methods of predicting transient active and passive solar process performance with an emphasis on building solar applications.  
Effective: Fall 2007  
Prerequisite:

A E 557 **Centralized Cooling Production and Distribution Systems** (3) Central cooling plant and distribution components and systems; thermal, hydraulic, and economic modeling for planning and design.  
Effective: Fall 2007  
Prerequisite:

A E 558 **Centralized Heating Production and Distribution Systems** (3) Description and analysis of central heating plant and distribution components and systems; thermal and economic modeling for planning and design.  
Effective: Fall 2007  
Prerequisite:

A E 559 **Computational Fluid Dynamics in Building Design** (3) Theory and applications of building environmental modeling with Computational Fluid Dynamics (CFD).  
Effective: Fall 2007  
Prerequisite:

A E 561 **Science of Light Sources** (3) In-depth scientific principles of light generation in modern electric light sources, and the resultant characteristics that influence their use for buildings.  
Effective: Spring 1999  
Prerequisite:

A E 562 **Luminous Flux Transfer** (3) Radiative transfer applied to lighting analysis; methods for computing direct and interreflected illumination; nearfield photometry.  
Effective: Spring 2008  
Prerequisite:

A E 563 **Luminaire Optics** (3) Optical design of reflectors and refractors for lighting systems; manufacturing methods.  
Effective: Spring 1999  
Prerequisite:

A E 564 **Lighting Design for Visual Appearance** (3) Color; the impact of light on materials, architectural spaces, and human perception.  
Effective: Summer 2007  
Prerequisite:

A E 565 **Daylighting** (3) Design concepts, solar position, sky luminance distribution models, integration of daylighting and electric lighting controls, physical modeling, computer analysis techniques.  
Effective: Fall 1996  
Prerequisite:

A E 569 **Research Topics in Illumination Engineering** (3) Seminar on prior and current research in illumination

engineering which define current recommendations and design practice.

Effective: Spring 1999

Prerequisite:

**A E 570 Production Management in Construction (3)** Applications of production management tools to capital facility projects; theory of production systems in construction; development of production control manual.

Effective: Fall 2007

Prerequisite:

**A E 571 International Construction Management and Planning (3)** Evaluation of international project environments and participants, modeling and planning international projects.

Effective: Spring 2005

Prerequisite:

**A E 572 Project Development and Delivery Planning (3)** Methods employed by owners and developers to initiate capital facility projects; defining project objectives, constraints, participants, financing, and delivery methods.

Effective: Summer 2006

Prerequisite:

**A E 573 Strategic Management in Construction (3)** Analysis tools and principles for design of effective construction organizations' strategy and structure in various markets.

Effective: Spring 2002

Prerequisite:

**A E 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**A E 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Spring 1987

**A E 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**A E 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

**A E 597B Historical Methods of Structural Analysis (3)** Quantitative investigation of historical methods of structural analysis. Graphic statics, arch, dome, vault analysis, indexing methods for trusses, Clapeyron's method.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**A E 597E Color Science for Illuminating Engineering (3)** Basis for color in illuminating engineering. Foundations for: theoretical CMFs, color spaces, chromaticity, color temperature, color rendering, color appearance, and color difference.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**A E 597F Virtual Facility Prototyping (3)** Computer modeling tools to develop virtual prototypes for building design and construction projects.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**A E 597G Building Information Modeling Execution Planning (3)** This course will focus on the skills and information needed to create a building information modeling execution plan for building construction project.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**A E 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 2006

**A E 598C Sustainable Construction Project Management (3)** Theory, methods, and practices of high performance building design and construction.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**A E 598D Legal Aspects of Engineering and Construction (3)** Legal doctrines, contractual relations between parties, analysis of construction contract clauses, contract performance, and professional practice problems.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**A E 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

A E 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1993

A E 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the professional at the Pennsylvania State University.  
Effective: Summer 2006

A E 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2004

A E 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

A E 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1993

A E 862 **Distributed Energy Planning and Management** (3) Theories and practices of distributed energy production and management in the context of regional and integrated energy grid structures.  
Effective: Summer 2013

A E 868 **Commercial Solar Electric Systems** (3) Theories and practices of solar electric systems including component selection, performance simulation, grid interconnection, codes, and design documentation.  
Effective: Summer 2013

A E 878 **Solar Project Development and Finance** (3) Economic analysis of solar energy projects, project development process, energy policies, finance methods, and economic analysis tools.  
Effective: Summer 2013

A E 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2008

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## Architecture (ARCH)

ARCH 412 **Integrative Energy and Environmental Design** (3) Concepts and strategies for the environmentally conscious design of the built environment.  
Effective: Spring 2013

ARCH 417 **The Language of Boundaries in Architecture and the Landscape** (3) This course examines the development and significance of boundaries in the construction of human space and time. Students who have taken other courses from Architecture Visual Arts, Geography, or Philosophy that treat some aspect of spatial perception, conception, construction, or visualization, or who have completed equivalent study independently, may enroll with the permission of the program.  
Effective: Summer 2009  
Prerequisite:

ARCH 431 **Architectural Design V** (6) Continuation of ARCH 331 and 332, with design and research in program option areas.  
Effective: Fall 2011  
Prerequisite:

ARCH 431A (IL) **Architectural Design V--Foreign Study** (6) A studio offered in Rome, Italy, which emphasizes urban planning and architectural design in an urban context.  
Effective: Fall 2011  
Prerequisite: Concurrent: ARCH 499B and ARCH 499C

ARCH 432 **Architectural Design VI** (6) A continuation of ARCH 431, this course explores in greater depth urban planning and architectural design in an urban context.  
Effective: Fall 2011  
Prerequisite:

ARCH 432A (IL) **Architectural Design VI--Foreign Study** (6) A continuation of ARCH 431, this course explores urban planning and architectural design in an urban context in Rome, Italy.  
Effective: Fall 2011  
Prerequisite: Concurrent: ARCH 499B and ARCH 499C

ARCH 441 **Architectural Design Analysis** (3) Studies in principles and elements of design; planning for human use; the relationship of space to physical and social environment. Architectural Engineering majors only.  
Effective: Spring 2008  
Prerequisite:

ARCH 442 **Architectural Design Analysis** (3) Continuation of ARCH 441, with emphasis on functional relationship of space, form, structure, and building groups. Architectural Engineering majors only.  
Effective: Spring 2008  
Prerequisite:

ARCH 443 **Architectural Design Analysis Inspection Trip** (1) Faculty guided trip to metropolitan areas to investigate noteworthy architecture and building construction and to visit professional offices.  
Effective: Spring 2001  
Prerequisite:

ARCH 451 **Architectural Professional Practice** (3) A study of architectural practice in today's society: education, registration, office practice, codes, standards, construction industry, contracts, and legal documents.  
Effective: Fall 2011  
Concurrent: ARCH 491

ARCH 480 **Technical Systems Integration** (3) Presentations of buildings' analyses from a multiplicity of viewpoints: architectural, spacial, environmental, mechanical, construction assembly.  
Effective: Fall 2011 Ending: Summer 2013  
Prerequisite: Concurrent: ARCH 492

ARCH 480 **Technical Systems Integration** (3) Presentations of buildings' analyses from a multiplicity of viewpoints: architectural, spacial, environmental, mechanical, construction assembly.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite: Concurrent: ARCH 431

ARCH 481 **Digital Design Media** (3) Advanced course in digital modeling, rendering, animation and non-linear video for architectural investigations.  
Effective: Summer 2006  
Prerequisite:

ARCH 491 **Architectural Design VII-Thesis** (6) Problems in architectural planning and design; programming and/or implementation methodologies and applications for various environmental design scales.  
Effective: Fall 2011  
Prerequisite: Concurrent: ARCH 451

ARCH 492H **Architectural Design VIII-Thesis** (6) Continuation of ARCH 491 with concentration and specialization options.  
Effective: Summer 2012

Prerequisite: Concurrent: ARCH 480

ARCH 495 **Advanced Architectural and Related Design/Construction Work Experience II** (1-3 per semester/maximum of 6) Supervised off-campus, nongroup instruction including field experiences, practica, or architectural and related design/construction work experience.

Effective: Fall 2011

Prerequisite:

ARCH 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1986

ARCH 496H **Independent Study - Honors** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

ARCH 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1986

ARCH 497C **Building Materials Reclamation & Reuse** (3) This course is a hands-on, project-based seminar focusing on the practice of building material salvage and recycling. This course consists of a variety of design-build projects where students learn and practice the methods and techniques of reclamation and explore the design possibilities of reused material.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ARCH 498 **Special Topics** (1-15) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2001

ARCH 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2006

Prerequisite:

ARCH 499A (IL) **Foreign Study--Architectural Design VI** (6) Individual or group instruction conducted in a foreign country.

Effective: Spring 2007

Prerequisite:

ARCH 499B (IL) **Architectural Analysis** (3) Comparative study of architectural elements and building types through on-site drawing, recording, measurement, sketching and decomposition activity.

Effective: Fall 2011

Prerequisite: Concurrent: ARCH 431A or ARCH 432A and ARCH 499C

ARCH 499C (IL) **Urban Studies Topics** (3) A presentation of the history of Rome through the medium of its maps and walking tours of the city.

Effective: Fall 2011

Prerequisite: Concurrent: ARCH 431A or ARCH 432A and ARCH 499B

ARCH 499D (IL) **International Architectural Design Studio** (4) Architectural design studio in an international setting; the relationship of designed space in an urban context. Architectural Engineering majors only.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

ARCH 511 **Theoretical Perspectives in Architecture** (3) The impact of rationalism and romanticism on contemporary developments and theoretical postures in architectural design.

Effective: Summer 1992

ARCH 512 **Critical Theory in Architecture** (6) Inquiry into paradigms of critical theory in architecture theory, practice, and teaching. Evaluation of central texts, methods, theories, and outcomes.

Effective: Summer 2010

Prerequisite:

ARCH 520 **Methods of Inquiry in Architecture and Urban Design** (3) Introduction to the methods of research and inquiry commonly used in architecture and urban design.

Effective: Summer 1992

ARCH 536 **Design-Inquiry** (1-12) Integration of research with the designing of architectural and urban settings.

Effective: Fall 1995

Prerequisite:

ARCH 541 **Topics in Theory** (3) A series of presentations on the development of contemporary architectural theory.

Effective: Summer 2002

Prerequisite:

**ARCH 542 Topics in Community and Urban Design** (3) Community and urban design as an area of design inquiry and interdisciplinary practice.  
Effective: Summer 2002  
Prerequisite:

**ARCH 543 Topics in Digital Design** (3) Inquiry into digital design paradigms of architecture and related disciplines; exploration design principles and operations supported in digital/virtual design environments.  
Effective: Summer 2002  
Prerequisite:

**ARCH 545 Pedagogical Practices in Architectural Education** (3) Review and application of pedagogical topics in studio teaching. Comparative evaluation of accepted and experimental practices.  
Effective: Summer 2010

**ARCH 550 Ethics in Architecture** (3) Ethics in Architecture focuses on the nature of human interactions with natural and artificial worlds.  
Effective: Summer 2002  
Prerequisite:

**ARCH 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1995

**ARCH 591 Architectural Research** (2-12) Guided research project.  
Effective: Winter 1978

**ARCH 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**ARCH 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 1983

**ARCH 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2006

**ARCH 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**ARCH 603 Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2007

**ARCH 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**ARCH 897 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject.  
Effective: Spring 2011

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## Art (ART)

ART 402 **Portfolio Design and Professional Practices** (3) This course emphasizes the development of presentation skills for digital artists in audience/client interactions.

Effective: Summer 2010

Prerequisite:

ART 405 **Advanced Studio Art** (3 per semester/maximum of 9) Advanced work in drawing and painting, with an emphasis on individual development.

Effective: Spring 2008

Prerequisite:

ART 409 (ART H 409) **Museum Studies** (3) An introduction to the professional activities that occur in art museums.

Effective: Summer 2004

Prerequisite:

ART 411 (US) **Seminar in Contemporary Art** (3 per semester/maximum of 6) Trends in contemporary art investigated within the framework of studio visitations, museum tours, and through other related avenues of encounter.

Effective: Fall 2006

Prerequisite:

ART 413 **Performance Art** (3) The development, production, and presentation of performance art works, and the study of performance art theory and history.

Effective: Spring 2000

Prerequisite:

ART 415 **Integrating Media: Convergence in Practice** (4 per semester/maximum of 12) A studio course concentrating on the integration of new media technologies in contemporary art practice.

Effective: Fall 2006

Prerequisite:

ART 416 **Advanced Web and Net Art: Multimedia Publishing** (4 per semester/maximum of 12) A studio course concentrating on multimedia online "net art" practice and Web publishing.

Effective: Spring 2008

Prerequisite:

ART 417 **Metal Art/Technology III** (4 per semester/maximum of 12) Advanced exploration of current and emerging metal art technologies and processes as medium for conceptual, aesthetic, and functional artworks.

Effective: Spring 2005

Prerequisite:

ART 419 **Advanced New Media: Capstone** (4 per semester/maximum of 8) A new media and digital arts capstone course concentrating on the integration of art and technology in advanced thesis projects.

Effective: Summer 2007

Prerequisite:

ART 421 **Drawing** (4 per semester/maximum of 12) Drawing for advanced students, with total emphasis on sustained individual approaches.

Effective: Summer 1992

Prerequisite:

ART 422 **Advanced Figure Drawing** (4 per semester/maximum of 8) Concentrated work in recording and understanding the human figure.

Effective: Fall 1998

Prerequisite:

ART 430 **Advanced Sculpture** (4 per semester/maximum of 12) Advanced work in sculpture, with an emphasis on individual development.

Effective: Summer 1992

Prerequisite:

ART 431 **Installation Art** (4) Study and production of original visual statements through installation work as an art form.

Effective: Spring 1998

Prerequisite:

ART 440 **Advanced Printmaking** (4 per semester/maximum of 12) Individual projects in one or more of the printmaking processes. Emphasis is on developing a portfolio of prints.

Effective: Fall 1998

Prerequisite:

ART 446 **Artists Books** (4) Study and production of original visual statements through the book as an art form.

Effective: Spring 2009

Prerequisite:

ART 447 **Photo Based Printmaking** (4) Study and production of original visual statements through photographic based printmaking as an art form.

Effective: Spring 2000

Prerequisite:

**ART 450 Advanced Painting** (4 per semester/maximum of 12) Development of the artist through a series of commitments; each semester serves as a contractual agreement along professional lines.  
Effective: Summer 1992  
Prerequisite:

**ART 455 Advanced Painting Critique** (4 per semester/maximum of 8) The painter in relation to his peers and his profession.  
Effective: Fall 1983  
Prerequisite:

**ART 465 Individual Approaches I** (3) An advance studio where students are expected to explore personal themes and individual concepts in their art work.  
Effective: Spring 2007  
Prerequisite:

**ART 466W Individual Approaches II** (6) An advance studio/lecture addressing the preparation for potential employment and/or entrance into graduate studies.  
Effective: Summer 2007  
Prerequisite:

**ART 468 The Intermediate Digital Medium** (3) An advanced studio course using the computer as an artistic media.  
Effective: Spring 2007  
Prerequisite:

**ART 469 Methods and Materials II** (3 per semester/maximum of 9) A studio course that focuses on specific media or techniques reflecting varied faculty expertise.  
Effective: Spring 2007  
Prerequisite:

**ART 475 (US) (ART H 475) Contemporary Women Artists** (3) An interdisciplinary course that investigates women artists who were integral to the production of contemporary art primarily in the Americas, Europe, and Asia.  
Effective: Spring 2009  
Prerequisite:

**ART 476 (ART H 476) History and Theory of Digital Art** (3) History and theories of contemporary digital art emphasizing humanistic approaches to technology.  
Effective: Spring 2007  
Prerequisite:

**ART 480 Advanced Ceramic Arts** (4 per semester/maximum of 12) Individual exploration of ceramic materials and construction leading to graduate study or career development as a professional potter.  
Effective: Summer 1992  
Prerequisite:

**ART 481 Ceramic Materials and Glaze Calculation** (3) The study of raw materials and their use in formulating clays and glazes.  
Effective: Fall 2006  
Prerequisite:

**ART 490 View Camera Photography** (4) Experience with diverse camera formats and applications; particular emphasis on view camera.  
Effective: Summer 2002  
Prerequisite:

**ART 494H Research Projects Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2012

**ART 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  
Effective: Summer 1995  
Prerequisite:

**ART 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**ART 496H Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2012

**ART 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**ART 497A Compositing in 3D** (4) Course covers intermediate to advanced 3D and compositing techniques like color



correction, render pass and post-effects for 3D video.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497A Compositing in 3D** (4) This course covers intermediate to advanced 3D compositing techniques like color correction, render pass and post effects for 3D video.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ART 497B Mobile and Touch Screen Devices** (4) Through lectures and hands-on projects, students learn to develop using the latest technologies expressive applications targeting mobile touch screen devices.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497B Ceramic Surface Decoration** (4) The history of decoration and ornamentation will be learned and explored as ceramic ornamentation using clay techniques.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ART 497C Data Visualization** (4) Principles of data visualization introduces concepts of data analysis and visualization. Class focuses on video memes, mashups and remixes.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497C (ART 397B) Digital Hand Advanced** (3) Advanced approaches to digital fabrication techniques and an exploration of their impact on the technical and conceptual processes of sculpture.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ART 497D 3D Digital Arts II** (4) This studio course provides advanced students with an environment to work on computer animated projects using 3D software.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497D 3D Digital Arts II** (4) This studio course provides students who have advanced knowledge of 3D tools with an environment to create animated 3D works.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ART 497E Advanced Metal Cast Mold-Making** (4) Advanced development of technical and conceptual skills through casting and mold-making processes.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497E Constructing the Graphic Novel: Theory and Practice** (4) Exploring the graphic novel. The concept of story, sequential art, and the graphic image will culminate in authorship of a graphic novel.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ART 497F Advanced Body Issue Objects** (4) Advanced creating representations of the human body and related objects as a means of sculptural expression.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497G Art & Life: Where They Intersect** (3) The connection between life & art will be explored from both a personal and cultural perspective. Taking risks is expected.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 497I Multiples** (4) The concept of Multiples is explored via the processes of model making, mold making, slip casting and press molding.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ART 499 (IL) Foreign Studies--Art** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

**ART 501 Art Research** (2-6) Original study and practice in art relating to material, concept, or technique.  
Effective: Winter 1978

**ART 505 Graduate Seminar** (2 per semester, maximum of 8) Seminar covering special topics at the graduate level, emphasizing interdisciplinary discourse including criticism and review of graduate work.  
Effective: Summer 1999

**ART 511 Issues in Contemporary Art** (1-3 per semester, maximum of 6) A critical survey of issues in contemporary art.  
Effective: Summer 1999

**ART 515 New Media Art I** (1-7 per semester/maximum of 14) Individual problems in new media arts practice leading to development of a body of work representative of the artist.  
Effective: Spring 2008

**ART 516 New Media Art II** (1-7 per semester/maximum of 14) Individual problems in new media arts practice leading to development of a body of work representative of the artist.  
Effective: Spring 2008  
Prerequisite:

**ART 530 Sculpture I** (1-7 per semester/maximum of 14) Individual problems in sculpture leading to the development of a collection or body of work representative of the artist.  
Effective: Spring 2000

**ART 531 Sculpture II** (1-7 per semester, maximum of 14) Individual problems in sculpture leading to the resolution of a collection or body of work representative of the artist.  
Effective: Summer 1999  
Prerequisite:

**ART 545 Printmaking I** (1-7 per semester/maximum of 14) Individual problems in printmaking leading to the development of a collection or body of work representative of the artist.  
Effective: Spring 2000

**ART 546 Printmaking II** (1-7 per semester, maximum of 14) Individual problems in printmaking leading to the resolution of a collection or body of work representative of the artist.  
Effective: Summer 1999  
Prerequisite:

**ART 550 Painting I** (1-7 per semester/maximum of 14) Individual problems in painting leading to the development of a collection or body of work representative of the artist.  
Effective: Spring 2000

**ART 551 Painting II** (1-7 per semester, maximum of 14) Individual problems in painting leading to the resolution of a collection or body of work representative of the artist.  
Effective: Summer 1999  
Prerequisite:

**ART 570 Graphic Design I** (1-7 per semester/maximum of 14) Individual projects in design with special emphasis on specialized topics of graphic design.  
Effective: Spring 2000

**ART 571 Graphic Design II** (1-7 per semester, maximum of 14) Individual problems in design, with special emphasis on professional practice in the area of graphic design.  
Effective: Summer 1999  
Prerequisite:

**ART 580 Ceramics I** (1-7 per semester/maximum of 14) Individual problems in ceramics leading to the development of a collection or body of work representative of the artist.  
Effective: Spring 2000

**ART 581 Ceramics II** (1-7 per semester, maximum of 14) Individual problems in ceramics leading to the resolution of a collection or body of work representative of the artist.  
Effective: Summer 1999  
Prerequisite:

**ART 592 Photography I** (1-7 per semester/maximum of 14) Individual problems in photography leading to the development of a body of specialized work representative of the artist.  
Effective: Spring 2000  
Prerequisite:

**ART 593 Photography II** (1-7 per semester, maximum of 14) Individual problems in photography leading to the resolution of a collection or body of work representative of the artist.  
Effective: Summer 1999  
Prerequisite:

**ART 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1988

**ART 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1999

**ART 600 Thesis Research** (1-15) No description.

Effective: Fall 1983

ART 602 **Supervised Experience and College Teaching** (1-3 per semester/maximum of 6) Supervised and graded teaching experience.

Effective: Spring 1990

ART 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

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## Art Education (A ED)

A ED 401 **Curricula, Pedagogy, and Assessment in Art Education** (3) Preparation of curricula, pedagogical, and assessment strategies for elementary/secondary school and museum art education programs.

Effective: Summer 2002

Prerequisite:

A ED 440 **Cultural Institutions** (3) Role of the educator and educational programming in museums and other cultural institutions.

Effective: Spring 2003

Prerequisite:

A ED 488 **Cultural Institutions Practicum** (1-3) Supervised field experience in a museum or other cultural institution, including planning, implementation, and evaluation of an educational project.

Effective: Summer 2002

Prerequisite: Concurrent: A ED 490

A ED 489 **Advanced Practicum** (3) Supervised observation, unit planning, and teaching in Saturday Morning Arts School: analysis of creative expressions and art programs for learners.

Effective: Spring 2003

Prerequisite: Concurrent: A ED 490

A ED 490 **Capstone Course in Art Education** (3) Synthesis of preservice art education coursework; introduction to professional practices and standards; completion of teaching and learning portfolio.

Effective: Spring 2009

Prerequisite: Concurrent: A ED 489 majors in the Schools option

A ED 494 **Schools and Museums** (3) Museum education: issues, theories of aesthetic education and practices in schools, museums, and community art centers.

Effective: Winter 1978

Prerequisite:

A ED 494H **Schools and Museums** (3) Museum education: issues, theories of aesthetic education and practices in schools, museums, and community art centers.

Effective: Fall 2007

Prerequisite:

A ED 495 **Internship in Art Experiences** (15) Comprehensive instruction in craft, health, cultural, museum, studio, gallery or social agency. Students supervised by University personnel and arts personnel.

Effective: Spring 1989

Prerequisite:

A ED 495A **Art Education Student Teaching Practicum** (7) The elementary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

Effective: Summer 2006

Prerequisite: Concurrent: A ED 495B

A ED 495B **Art Education Student Teaching Practicum** (8) The secondary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

Effective: Summer 2006

Prerequisite: Concurrent: A ED 495A

A ED 495C **Art Education Student Teaching Practicum** (7) The elementary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

Effective: Summer 2006

Prerequisite: Concurrent: A ED 495D

A ED 495D **Art Education Student Teaching Practicum** (8) The secondary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

Effective: Summer 2006

Prerequisite: Concurrent: A ED 495A

A ED 495E **Internship in Museums and Cultural Institutions** (15) Twelve week, full time supervised internship in education in museums or other cultural institutions.

Effective: Summer 2006

Prerequisite:

A ED 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

A ED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

A ED 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2006

A ED 502 **Research in Art Education** (3) Examination of past and present research in art education, an introduction to general methods of research, and critical evaluation of research in art education.

Effective: Summer 1995

A ED 505 **Foundations of Art Education** (3) An examination of classic theories in art education and their relevance to current developments.

Effective: Summer 1987

A ED 536 **Curriculum Development in Art Education** (3) Factors affecting art curriculum decisions, analysis, selection, organization, preparation of curriculum. Evaluation and sources of art curriculum improvement and innovation.

Effective: Winter 1978

Prerequisite:

A ED 541 **Theories of Child Art** (3) Study of current theories of child art; application of recent psychological and anthropological theories to understanding child art.

Effective: Winter 1978

Prerequisite:

A ED 570 **Artistic Creation and Theories of Knowing** (3) A thematically organized course that makes connections between art-making and art as a way of knowing and inquiry.

Effective: Spring 1995

A ED 588 **History of Art Education** (3) Historical development of philosophies in art education in the United States and abroad.

Effective: Winter 1978

A ED 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

A ED 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1995

A ED 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 1995

A ED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1995

A ED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1995

A ED 597A **Professional Development Summer Institute** (3) Graduate-level course focuses on intersections between contemporary art and curriculum. Innovative instructional approach, intensive one-week on-campus experience, and on-line correspondence.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

A ED 597A (WMNST 597A, IST 597A) **Gender, Art & STEM** (3) This course introduces FemTechNet, a global network of feminist scientists and artists collaborating across areas of health, climate change, information-technology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

A ED 597A **Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research** (3) The course includes a symposium with controversial artist, Judy Chicago, to coincide with campus exhibitions of Chicagos's art and teaching.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

A ED 597B **Participatory Inquiry in the Public Sphere** (3) The course requires students to examine, theorize and engage in visual practices of participatory and public action.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

A ED 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

A ED 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

A ED 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Teaching of undergraduate art education classes under the supervision of two members of the graduate faculty.  
Effective: Fall 1983  
Prerequisite:

A ED 603 **Foreign Academic Experience** (1-12) Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.  
Effective: Fall 2003

A ED 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

A ED 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

A ED 811 **New Media and Pedagogy** (3) Exploration of relationships between communication technologies and beliefs about the nature of knowledge and the nature of art.  
Effective: Summer 2010

A ED 812 **Diversity, Visual Culture, and Pedagogy** (3) Diversity issues in museum and K-12 art education contexts.  
Effective: Summer 2010

A ED 813 **Public Pedagogy** (3) Inquiry into the public pedagogy of contemporary visual culture for relevancy to museum and K-12 art education contexts.  
Effective: Summer 2010

A ED 814 **Informal Learning** (3) Pedagogy and contexts for learning in museums and other cultural institutions.  
Effective: Summer 2010

A ED 815 **Action Research in Art Education** (3) Develop a reflective process to improve strategies, practices, and knowledge of the environments within which art education is practiced.  
Effective: Summer 2010

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## Art History (ART H)

ART H 401 (IL) **Greek Art and Architecture** (3-9) Developments in Greek art and architecture, tenth century B.C. to first century B.C.; emphasis on the importance of Greek sanctuaries.

Effective: Spring 2006

Prerequisite:

ART H 402 (IL) **The Illuminated Manuscript** (3) Specific stylistic periods in manuscript painting from A.D. 500-1500 in Western Europe and Byzantium.

Effective: Spring 2006

Prerequisite:

ART H 405 (US;IL) **Pioneers of Modern Architecture** (3 per semester/maximum of 6) Selected period or theme in the development of modern architecture during the nineteenth and/or early twentieth centuries.

Effective: Spring 2006

Prerequisite:

ART H 409 (ART 409) **Museum Studies** (3) An introduction to the professional activities that occur in art museums.

Effective: Summer 2004

Prerequisite:

ART H 410 **Taste and Criticism in Art** (3) History and literature of art criticism demonstrating the varied philosophic, cultural, iconographic, technical, and visual approaches.

Effective: Summer 1999

Prerequisite:

ART H 411 (IL) **Roman Art** (3-9) Roman sculpture and painting from Augustus to Constantine.

Effective: Spring 2006

Prerequisite:

ART H 412 (IL) **The Gothic Cathedral** (3) Specific aspects of Romanesque and Gothic church architecture of western Europe, especially France and England, between 1000-1500.

Effective: Spring 2006

Prerequisite:

ART H 413 **Architecture of the Medieval Monastery** (3) This course will examine design, construction, function and symbolism in the monastic architecture of Western Europe during the Middle Ages.

Effective: Spring 2013

Prerequisite:

ART H 414 (IL) **Italian Baroque Painting** (3) Survey of Italian Baroque painting from sixteenth-century proto-Baroque masters to painters of the late Baroque and Rococo periods.

Effective: Spring 2006

Prerequisite:

ART H 415 (US) **The Skyscraper** (3) Origin and evolution of the skyscraper as seen against the background of cultural conditions and technological factors.

Effective: Spring 2006

Prerequisite:

ART H 416 (US) **American Painting: 1876-1913** (3) Art in the United States between 1876 and 1913; emergence of an American art and transition to the modern styles.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

ART H 416 (US) **Studies in American Art** (3 per semester/maximum of 6) Selected time periods and/or issues in the art of the United States.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

ART H 420 (IL) **Russian Architecture** (3) Russian architecture from the first Orthodox churches of the late tenth century to the end of the Soviet Union.

Effective: Spring 2006

Prerequisite:

ART H 422 (IL) **Studies in Medieval Sculpture** (3-9) Specific studies of western European sculpture, 300-1500, with attention to sources, styles, type, and iconography.

Effective: Spring 2006

Prerequisite:

ART H 423 (IL) **Studies in Italian Renaissance Art** (3-9) Specific studies of Italian Renaissance art, including the work of artists such as Leonardo da Vinci, Michaelangelo, and Raphael.

Effective: Spring 2006

Prerequisite:

ART H 424 (IL) **Masters of Northern Baroque Art** (3) Seventeenth-century painters in Flanders and Holland, including the works of artists such as Rubens, Rembrandt, and Vermeer.

Effective: Spring 2006

Prerequisite:

ART H 426 (US;IL) **Iconoclasm: Powerful Images and their Destruction** (3) Iconoclasm: exploring the political, religious, and social motivations behind the destruction of powerful imagery throughout history.

Effective: Summer 2009

Prerequisite:

ART H 429 (IL) **Studies in Baroque Art** (3) Selected topics in the painting, sculpture, and architecture of seventeenth-century Italy, France, Flanders, Holland, and Spain.

Effective: Spring 2009

Prerequisite:

ART H 435 (IL) **Studies in Modern Art** (3-6) Lectures focusing on a selected movement of nineteenth- or twentieth-century art.

Effective: Spring 2006

Prerequisite:

ART H 440 (IL) (ASIA 440) **Monuments of Asia** (3-9 per semester/maximum of 9) An exploration of major Asian sites and monuments through a focus on their historical and cultural significance.

Effective: Summer 2012

Prerequisite:

ART H 442 (IL) **Late Antique and Early Christian Art** (3) Survey of the architecture, painting, and minor arts of Christian society from the beginning to the mid-sixth century.

Effective: Spring 2006

Prerequisite:

ART H 445 (IL) **Oceanic Art** (3) Survey of the arts of Oceania (Polynesia, Micronesia, Melanesia), including masks, sculpture, textiles, architecture and other art forms.

Effective: Summer 2012

Prerequisite:

ART H 446 (IL) **Topics in African Art** (3 per semester/maximum of 9) Topics vary from "Arts of Eastern and Southern Africa" to "Arts of West Africa."

Effective: Summer 2012 Ending: Fall 2013

Prerequisite:

ART H 446 (IL) (AFR 446) **Topics in African Art** (3 per semester/maximum of 9) Topics vary from "Arts of Eastern and Southern Africa" to "Arts of West Africa."

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

ART H 447 (IL) **Topics in the Art of the African Diaspora** (3 per semester/maximum of 6) Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

Effective: Summer 2012 Ending: Fall 2013

Prerequisite:

ART H 447 (IL) (AFR 447) **Topics in the Art of the African Diaspora** (3 per semester/maximum of 6) Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

ART H 450 (US;IL) **The History of Photography** (3) The history of photography from 1839, with particular emphasis on the relationship with the plastic arts.

Effective: Spring 2006

Prerequisite:

ART H 452 (IL) **Byzantine Art** (3) Monumental and minor arts of Byzantium and related areas from the reign of Justinian to the Turkish conquest of Constantinople.

Effective: Spring 2006

Prerequisite:

ART H 456 (IL) **Renaissance and Baroque Palaces** (3) This course examines palace architecture and decoration in Italy, France, England, and Germany from 1450-1700.

Effective: Spring 2011

Prerequisite:

ART H 458 (IL) **Baroque Capitals of Europe** (3) This course examines the architecture and urbanism of European capital cities from 1600-1800.

Effective: Spring 2010

Prerequisite:

ART H 460 (IL) **Art and Empire: Aztec, Inca and Spanish** (3) This course is a comparative study of the artistic production used in Aztec, Inca and Spanish empires.

Effective: Summer 2012

Prerequisite:

ART H 462 (IL) **Studies in Latin American Art** (3 per semester/maximum of 6) Specific studies of the visual and material culture created in Latin America from the colonial through the modern era.

Effective: Summer 2012



Prerequisite:

ART H 464 (IL) **French Baroque Painting** (3) Examination of seventeenth-century French painting, including Italian influences; the provincial, Classical, and official styles in France.

Effective: Spring 2006

Prerequisite:

ART H 470 (US) **American Painting and Sculpture Since 1940** (3) Painting and sculpture in the United States from the origins of Abstract Expressionism through the present.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

ART H 470 **Contemporary Art** (3 per semester/maximum of 9) A focused investigation of a special topic relating to art made after 1940.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

ART H 475 (US) (ART 475) **Contemporary Women Artists** (3) An interdisciplinary course that investigates women artists who are integral to the production of contemporary art primarily in the Americas, Europe, and Asia.

Effective: Spring 2009

Prerequisite:

ART H 476 (ART 476) **History and Theory of Digital Art** (3) History and theories of contemporary digital art emphasizing humanistic approaches to technology.

Effective: Spring 2007

Prerequisite:

ART H 494H **Research Projects - Honors** (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Spring 2012

ART H 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written or oral critique of activity required.

Effective: Fall 2012

ART H 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

ART H 496H **Independent Studies - Honors** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2012

ART H 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

ART H 497A **Jan van Eyck and his Artistic Legacy** (3) Investigation of artistic responses to Jan van Eyck from Durer and Velazquez to Hamilton and Mapplethorpe.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

ART H 497A **Rome: A City on Film. A Century of History, Fantasy, and Realism** (3) Viewing and critical analysis of films from the silent era to the present; examines the representation of Rome.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ART H 497B **Forging Aliances: Post-War Japanese Art at Penn State** (3) Culminating in an exhibition at the Palmer Art Museum, this course examines art as a catalyst in international relations.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ART H 497I **Multiples** (4) The concept of Multiples is explored via the processes of model making, mold making, slip casting and press molding.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ART H 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

ART H 499 (IL) **Foreign Study--Art History** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

ART H 511 **Seminar in Ancient Art** (3-12) Selected topics from the history of Greek and Roman art.  
Effective: Fall 1983

ART H 512 **Seminar in Medieval Art** (3-12) Original research into problems dealing with the art of the Middle Ages.  
Effective: Fall 1983

ART H 513 **Seminar in Renaissance Art** (3-12) Investigations in the area of Renaissance art, centering around major masters and monuments.  
Effective: Winter 1978

ART H 514 **Seminar in Baroque Art** (3-12) Investigations in the area of baroque art, centering around major masters and monuments.  
Effective: Winter 1978

ART H 515 **Seminar in Modern Art** (3-12) Lectures, readings, reports, and discussions in the field of modern art.  
Effective: Winter 1978

ART H 522 **Seminar in Byzantine Art** (3-12) Specific iconographical and stylistic problems in Byzantine art and its relation to classical antiquity, the medieval West, and Islam.  
Effective: Winter 1978

ART H 525 **Seminar in Modern Architecture** (3-12) Investigation into the works and problems of modern architecture as they relate to the culture of our times.  
Effective: Winter 1978

ART H 551 **Historiography of Art History** (1-6) The relationship between the definition of, and approach to, art-historical problems from Vasari to the present.  
Effective: Winter 1978

ART H 552 **Problems in Connoisseurship** (3) A study of the problems of authenticating, attributing, and dating paintings and sculpture through internal evidence.  
Effective: Winter 1978

ART H 560 **Methods of Research in Art History** (3) Preparation of graduate students for professional careers in academia and museum work, involving creation of publishable articles and grant writing.  
Effective: Summer 2013

ART H 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

ART H 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

ART H 597A **Methods of Research** (3) Preparation of graduate students for professional careers in academia and museum work, involving creation of publishable articles and grant writing.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ART H 597A **Graduate Seminar: Primitivism** (3) The history and development of European and American twentieth-century art have been influenced in a number of ways by the "discovery" of "Primitive art" and the often associated, notions of "Primitivism." The terms "Primitivism" and "Primitive art" have now become problematic and are rarely used because of such issues as colonialism, racism, and the continued economic disparities between the so-called "Developed" and "Third" Worlds. The terminology, however, was frequently used throughout the twentieth century and so is retained for our purposes to trace the historic development and use of these terms, rather than implying that the art referred to was either crude or unsophisticated. This seminar examines how fascinations with all things "Primitive" have shaped Western art, revealing more about the Western Imagination than the "Other".  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ART H 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

ART H 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

ART H 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience for teaching assistants in art history.  
Effective: Fall 1983

ART H 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

ART H 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Asian Studies (ASIA)

ASIA 401 **East Asian Studies** (3-6) An interdisciplinary, variable content, lecture-discussion course on the history, culture, politics, and international relations of China, Japan, and Korea.

Effective: Spring 2010

Prerequisite:

ASIA 404 (IL) (CMLIT 404) **Topics in Asian Literature** (3) Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan.

Effective: Fall 2010

Prerequisite:

ASIA 404Y (IL) **Topics in Asian Literature** (3) Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan, taught with focus on written analysis and interpretation.

Effective: Summer 2013

ASIA 405 **Seminar in Asian Studies** (3-6 per semester/maximum of 6) Advanced seminar in Asian Studies

Effective: Summer 2013

Prerequisite:

ASIA 405Y (IL) **Seminar in Asian Studies** (3-6 per semester/maximum of 6) An advanced, writing-focused seminar in Asian Studies.

Effective: Fall 2009

Prerequisite:

ASIA 440 (IL) (ART H 440) **Monuments of Asia** (3-9 per semester/maximum of 9) An exploration of major Asian sites and monuments through a focus on their historical and cultural significance.

Effective: Summer 2012

Prerequisite:

ASIA 489 (IL) (PL SC 486, HIST 489) **International Culture in East Asia** (3) Study of the role of culture in East Asian regional and East-West international relations.

Effective: Summer 2013

Prerequisite:

ASIA 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2010

ASIA 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2010

ASIA 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Spring 2010

ASIA 501 **Proseminar in Asian Studies I** (1-3) A seminar for graduate students in the Asian Studies dual-degree PhD programs.

Effective: Summer 2009

ASIA 502 **Proseminar in Asian Studies II** (1-3) Introduction to theories, methods, and disciplines of Asian Studies.

Effective: Fall 2009

ASIA 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2009

ASIA 595 **Internship** (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 2009

ASIA 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2009

ASIA 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2009

ASIA 599 **Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2009

ASIA 600 **Thesis Research** (1-15 per semester/maximum of 99) No description.  
Effective: Summer 2009

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## **Astrobiology (ABIOL)**

ABIOL 570 **Astrobiology Field Experience** (2) Geological field excursions to sites where the early evolution of life and the environment is revealed and to modern analogues.  
Effective: Summer 2004

ABIOL 574 **Planetary Habitability** (3) Aspects of star and planet formation, habitable zones, biospheric evolution, life in extreme environments, planet and life detection.  
Effective: Summer 2004

ABIOL 590 **Astrobiology Seminar** (2) Student-led presentations and discussions of current and classic literatures relevant to the themes of Astrobiology.  
Effective: Summer 2004

ABIOL 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2005

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## Astronomy and Astrophysics (ASTRO)

ASTRO 400H **Honors Seminar** (1 per semester, maximum of 2) Presentations of various branches and modes of modern astrophysical research, based on lectures, visits to telescopes and facilities, and discussions.

Effective: Spring 2003

Prerequisite:

ASTRO 401 **Fundamentals of Planetary Science and Astronomy** (4) Overview of the techniques used and results from studies of the Solar System, stars, and galaxies.

Effective: Summer 2013

Prerequisite:

ASTRO 402 **Astronomical Telescopes, Techniques, and Data Analysis** (3) Properties and use of optical telescopes, imaging and spectroscopy, multi-wavelength techniques, data analysis and statistics, practical research methods.

Effective: Summer 2013

Prerequisite:

ASTRO 410 **Computational Astrophysics** (3) Applications of numerical methods and computer programming to astrophysics, including stellar physics and cosmology.

Effective: Spring 2008

Prerequisite:

ASTRO 414 **Stellar Structure and Evolution** (3) Theory of Stellar structure and evolution including energy generation and transport and an examination of stellar models.

Effective: Summer 2010

Prerequisite:

ASTRO 420W **Planets and Planetary System Formation** (3) Solar system properties, star formation, protoplanetary disks and planet formation, solar system model, extrasolar planets, and astrobiology.

Effective: Summer 2004

Prerequisite:

ASTRO 440 **Introduction to Astrophysics** (3) Theoretical investigation of physical processes in astronomical objects and systems; modern physical interpretation of astronomical phenomena.

Effective: Spring 1994

Prerequisite:

ASTRO 451 **Astronomical Techniques** (3) Practical methods of modern observational astronomy, detectors, filters, instrumentation for both ground-based and space observations, and data analysis.

Effective: Fall 2008

Prerequisite:

ASTRO 475W **Stars and Galaxies** (3) Astronomical studies concerning the distribution and evolution of stars and gas in our and other galaxies.

Effective: Fall 1993

Prerequisite:

ASTRO 480 **Nebulae, Galaxies, and Cosmology** (3) Emission-line spectroscopy, structure and evolution of galaxies, physics of galactic nuclei and quasars, observational cosmology.

Effective: Spring 2002

Prerequisite:

ASTRO 485 **Introduction to High-Energy Astronomy** (3) The study of black holes, neutron stars, white dwarfs, supernova remnants, and extragalactic objects through x-ray and gamma ray observations.

Effective: Spring 1994

Prerequisite:

ASTRO 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1991

ASTRO 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 1991

ASTRO 497A **Fundamentals of Planetary Science and Astronomy** (3) Overview of the techniques used and results from studies of the Solar System, stars, and galaxies.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

ASTRO 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

ASTRO 501 **Fundamental Astronomy** (3) Concepts, tools and techniques, and essential background in stellar, Galactic, extragalactic astronomy and cosmology.

Effective: Fall 2008

**ASTRO 502 Fundamental Astrophysics (3)** Fundamental tools and results of modern astrophysical theory. Gravitation; gas dynamics; radiation processes; radiative transfer; atomic structure and transitions.  
Effective: Fall 2008

**ASTRO 504 Extragalactic Astronomy (3)** Properties and evolution of galaxies including their stellar, interstellar, black hole and Dark Matter components.  
Effective: Fall 2008  
Prerequisite:

**ASTRO 513 Observational Techniques in Astronomy (3)** Theoretical and practical aspects of modern multiwavelength observational astrophysics including detector physics, imaging techniques, spectroscopic techniques, and data analysis principles.  
Effective: Spring 2008  
Prerequisite:

**ASTRO 527 (PHYS 527) Computational Physics and Astrophysics (3)** Introduction to numerical methods for modeling physical phenomena in condensed matter, atomic and high energy physics, gravitation, cosmology and astrophysics.  
Effective: Fall 2008

**ASTRO 530 Stellar Atmospheres (3)** The structure, physics and observational manifestations of atmospheres of stars.  
Effective: Fall 2008  
Prerequisite:

**ASTRO 534 Stellar Structure and Evolution (3)** Physics of stellar interiors, stellar structure, and evolutionary changes of stars from pre-main sequence through final states.  
Effective: Fall 2008  
Prerequisite:

**ASTRO 542 Interstellar Medium and Star Formation (3)** Theory and observation of the interstellar medium of our Galaxy and the process of star and planet formation.  
Effective: Spring 2012

**ASTRO 545 (PHYS 545) Cosmology (3)** Modern cosmology of the early universe, including inflation, the cosmic microwave background, nucleosynthesis, dark matter and energy.  
Effective: Spring 2009

**ASTRO 550 High Energy Astrophysics (3)** Theory and observations of X-rays, gamma-rays and other high energy radiation from Galactic and extragalactic sources.  
Effective: Spring 2013

**ASTRO 585 Topics in Astronomy and Astrophysics (3)** Advanced study of issues in planetary, stellar, galactic, extragalactic and theoretical astronomy and astrophysics.  
Effective: Summer 2008  
Prerequisite:

**ASTRO 589 Seminar in Current Astronomical Research (1)** Contemporary issues in instrumental, observational and theoretical astronomy and astrophysics.  
Effective: Summer 2008  
Prerequisite:

**ASTRO 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1991

**ASTRO 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1991

**ASTRO 597 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 1991

**ASTRO 600 Thesis Research (1-15)** No description.  
Effective: Summer 1991

**ASTRO 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Summer 1991



ASTRO 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Summer 1991

ASTRO 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1991

ASTRO 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1991

ASTRO 801 **Planets, Stars, Galaxies, and the Universe** (3) Overview of the structure, formation, and evolution of planets, stars, galaxies, and the universe.  
Effective: Summer 2008

ASTRO 897 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2007

ASTRO 897A **Black Holes for Educators** (2) Workshop for educators grades 9-12 with a content area focus on the study of black holes.  
Effective: Summer 2013 Ending: Summer 2013

ASTRO 897B **Telescopes for Educators** (2) Workshop for educators with a content area focus on telescopes.  
Effective: Summer 2013 Ending: Summer 2013

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## Bar Preparation (BPREP)

**BPREP 900 Fundamental Skills for the Bar Examination (2)** The course provides students with a substantive review of selected material routinely tested on the bar exam, primarily through problems and exercises in a bar exam format designed to familiarize students with the exam and techniques for answering multiple choice questions. Individualized feedback is provided every week to assist each student identify areas of strength and weakness. The goal is to enhance student ability to prepare for the bar exam and is intended to supplement, not replace, commercial bar preparation courses. This course is not focused on any particular state, so all students will benefit regardless of where they are sitting for the bar exam. Students enrolled in BPREP 900 are not permitted to use laptops, phones or other devices during class. This course is not recommended for students ranked in the top third of their class. BPREP 900 is graded on a pass/fail basis but is not subject in any other respect to the Pass/Fail Option.  
Effective: Fall 2011

**BPREP 997 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2009

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## **Behavior Infl Health (BIH)**

BIH 722 **Behavioral Influences on Health** (3) Fundamental course addressing the physician's role in teaching the importance of individual choice and responsibility in maintaining health.

Effective: Fall 2008

Prerequisite:

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## **Behavioral Sci-Hy (BEHSC)**

BEHSC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

BEHSC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be OFFERED INFREQUENTLY.  
Effective: Spring 1987

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## Biobehavioral Health (BB H)

BB H 402 (IL) **African Health & Development** (3) Course will address African health and development strategies in the context of health promotion programs.

Effective: Summer 2010

Prerequisite:

BB H 407 (IL) **Global Health Equity** (3) Health, social disparities, and equity in the global environment.

Effective: Summer 2010

BB H 410 **Developmental and Health Genetics** (3) Discussion of genetic influences on development and the interrelationships between genetics and health.

Effective: Spring 2008

Prerequisite:

BB H 411W **Research and Applications in Biobehavioral Health** (3) Research methods, multi-level analyses, and applications in biobehavioral health.

Effective: Spring 2011

Prerequisite:

BB H 416 **Health Promotion II: Planning, Implementation, and Evaluation** (3) Planning, implementation, and evaluation of health promotion, prevention, and intervention programs; emphasizing evaluation.

Effective: Fall 2010

Prerequisite:

BB H 417 **Advanced Applications in Health Promotion** (3) Advanced learning experience in health promotion applications in which students will actively participate in planning, implementing, evaluating health programs.

Effective: Spring 2000

Prerequisite:

BB H 420 **Developing Stress Management Programs** (3) Planning, developing, and implementing strategies for stress management programs for health education professionals in school, community, and corporate settings.

Effective: Spring 1998

BB H 432 **Biobehavioral Aspects of Stress** (3) Comprehensive discussion on the mechanisms of stress-induced diseases.

Effective: Fall 2010

Prerequisite:

BB H 440 (US;IL) (H P A 440) **Principles of Epidemiology** (3) Theory of epidemiology and significant case studies; potential applications to health care.

Effective: Fall 2008

Prerequisite:

BB H 440U (US;IL) (H P A 440U) **Principles of Epidemiology** (3) Theory of epidemiology and significant case studies; potential applications to health care.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

BB H 446 **Human Sexuality as a Health Concern** (3) Examination of human sexuality as a integral part of basic health education and health care for persons of all ages.

Effective: Fall 2001

Prerequisite:

BB H 451 **Pharmacological Influences on Health** (3) Biological and behavioral aspects of therapeutic and recreational drug use and misuse, and their relationships to health.

Effective: Fall 2001

Prerequisite:

BB H 452 (US) (NURS 452, WMNST 452) **Women's Health Issues** (3) Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

Effective: Summer 2005 Ending: Summer 2013

Prerequisite:

BB H 452 (US) (NURS 452, WMNST 452) **Women's Health Issues** (3) Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

BB H 458 (WMNST 458) **Critical Issues in Reproduction** (3) Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

Effective: Spring 2007 Ending: Summer 2013

Prerequisite:

BB H 458 (GS) (WMNST 458) **Critical Issues in Reproduction** (3) Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**BB H 468 Neuroanatomical Bases for Disorders of Behavior and Health (3)** An examination of the anatomical/cellular/molecular bases for human central nervous system disorders and their impacts on victims/families/caregivers.

Effective: Spring 2007

Prerequisite:

**BB H 469 (BIOL 469) Neurobiology (3)** Comprehensive examination of neuroanatomy and physiology designed to integrate the principles of neurochemistry, neuroendocrinology and molecular biology.

Effective: Fall 1994

Prerequisite:

**BB H 470 (BIOL 470) Functional and Integrative Neuroscience (3)** Neurobiological function in motivated behaviors, motor and sensory function, learning and memory, development, sexual differentiation, and pathology.

Effective: Summer 1995

Prerequisite:

**BB H 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1995

**BB H 494H Senior Honors Thesis (1-6)** Independent study related to a student's interests directed by a faculty supervisor and culminating in the production of a thesis.

Effective: Summer 2005

Prerequisite:

**BB H 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 1995

**BB H 496H Independent Honors Study in BB H (1-3 per semester/maximum of 6)** For non-thesis independent study/research by Schreyer Honors College scholars.

Effective: Summer 2011

**BB H 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1995

**BB H 497A (H P A 497B) Biobehavioral Issues in Immigrant Health (3)** This course will review the demographic, cultural, economic, social, and political and ethical factors that impact the health of immigrants to the United States.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BB H 497A Biobehavioral Issues in Immigrant Health (3)** The demography of American communities is changing dramatically. Each year, immigrants from African, Asian, Eastern European and Latino backgrounds make the United States their new home. However, immigration from another country can have important effects on health - both positive and negative. In this course, we will review the demographic, cultural, economic, social, political, and ethical factors that impact the health of immigrants to the United States. This will be accomplished by providing an overview of current research issues and theories concerning the mental and physical health of immigrant populations in the United States. Topics to be addressed include: acculturation and identity theory, immigration, social support, and biopsychosocial patterns that shape health and illness.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**BB H 497B Health Works (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BB H 497C Clinic Volunteer Training (2)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BB H 497D Clinic Volunteers Training (2)** Training for clinic volunteers.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BB H 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2009

**BB H 501 Biobehavioral Systems in Health and Development: Theory and Processes (3)** Examination of theories and basic processes for understanding individuals as dynamic biobehavioral complex systems functioning through continual inter- actions.

Effective: Spring 2001

Prerequisite:

**BB H 502 (PSY 502) Health: Biobehavioral Perspectives (3)** Introduction to the role of psychology in maintaining health and in treating nonpsychiatric disorders.  
Effective: Spring 1992

**BB H 503 Biobehavioral Systems in Health and Development: Processes and Integration (3)** Examination and integration of basic processes for understanding individuals as dynamic biobehavioral complex systems functioning through continual interactions.

Effective: Spring 2001

Prerequisite:

**BB H 504 Behavioral Health Intervention Strategies (3)** Evaluation of intervention strategies from a biobehavioral health context. Theories of change processes as they pertain to health are analyzed.

Effective: Spring 1991

Prerequisite:

**BB H 505 Behavioral Health Research Strategies (3)** Research strategies in behavioral health investigations are examined. Designs and data analytic models relevant to biobehavioral research are included.

Effective: Spring 1991

Prerequisite:

**BB H 521 Structural Equation Modeling (3)** Structural Equation Modeling with LISREL and Amos. Confirmatory factor analysis; regression and path analysis with manifest/latent variables; special applications.

Effective: Summer 2002

Prerequisite:

**BB H 551 World Health Promotion (3)** Analysis of the various health problems that affect humans throughout the world; emphasis will be placed on personal health issues.

Effective: Spring 1998

**BB H 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1991

**BB H 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Spring 1991

**BB H 595 Internship (1-18)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 1991

**BB H 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1991

**BB H 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1991

**BB H 597A Introduction to SAS (1)** An introductory (5 week) course to accompany a basic statistics course.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BB H 597B NRSA/NIH Grant Preparation (1)** The focus of this course is to educate students to prepare a successful NIH F31 NRSA Grant application.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**BB H 597C Ethnographic Methods and Study Design (1)** The course is designed to teach students an array of approaches for collecting qualitative data.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BB H 600 THESIS RESEARCH (1-15)** NO DESCRIPTION.

Effective: Spring 1991

**BB H 601 PH.D. DISSERTATION FULL-TIME (0)** NO DESCRIPTION.

Effective: Spring 1991

**BB H 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6)** NO DESCRIPTION.

Effective: Spring 1991

**BB H 610 Thesis Research Off-Campus (1-15)** No description.

Effective: Spring 1991

**BB H 611 PH.D. DISSERTATION PART-TIME (0)** NO DESCRIPTION.

Effective: Spring 1991

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## Biochem Micrb & Molbi (BMMB)

**B M B 400 Molecular Biology of the Gene (2-3)** Biochemistry of genetic phenomena, including the structure, replication and dynamics of genes and chromosomes, their expression and regulation.

Effective: Fall 2008

Prerequisite:

**B M B 401 General Biochemistry (3)** Principles of the structure and function of biological molecules, including carbohydrates, lipids, membranes, proteins, and enzymes. Students may not receive credit for both CHEM 476 and B M B 401.

Effective: Fall 2009

Prerequisite:

**B M B 401H General Biochemistry (3)** Principles of the structure and function of biological molecules, including carbohydrates, lipids, membranes, proteins, and enzymes. Students may not receive credit for both CHEM 476 and B M B 401H.

Effective: Fall 2009

Prerequisite:

**B M B 402 General Biochemistry (3)** Comprehensive survey of the pathways and regulation of intermediary metabolism.

Effective: Fall 2007

Prerequisite:

**B M B 402H General Biochemistry (3)** Comprehensive survey of the pathways and regulation of intermediary metabolism.

Effective: Summer 2005

Prerequisite:

**B M B 403 Biochemistry Laboratory (1)** An introduction to techniques of experimental biochemistry, illustrating principles covered in B M B 402.

Effective: Spring 2010

Prerequisite:

**B M B 406 Molecular Biology (3)** A discussion of current aspects of cell molecular biology with a laboratory emphasizing current biotechnology techniques.

Effective: Fall 2007

Prerequisite:

**B M B 408 Laboratory Instructional Practice (1-2)** Participation in the instruction of undergraduate laboratory courses, including classroom preparation; discussion of principles and objectives of each exercise.

Effective: Spring 1995 Ending: Fall 2013

Prerequisite:

**B M B 408 Instructional Practice (1-2)** Participation in the instruction of undergraduate laboratory and lecture courses, including classroom preparation; discussion of principles and objectives of each exercise.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**B M B 411 Survey of Biochemistry and Molecular Biology Literature (1)** An introduction to readings and oral presentations in biochemistry and molecular biology.

Effective: Spring 1995

Prerequisite:

**B M B 428 Physical Chemistry with Biological Applications (3)** Chemical thermodynamics and kinetics with applications to biological problems.

Effective: Summer 2007

Prerequisite:

**B M B 430 (BIOL 430, ENT 430) Developmental Biology (3)** Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

Effective: Summer 1994

Prerequisite:

**B M B 432 (MICRB 432, VB SC 432) Advanced Immunology: Signaling in the Immune System (3)** The study of signaling pathways that regulate the immune response.

Effective: Fall 2007

Prerequisite:

**B M B 433 (VB SC 433) Molecular and Cellular Toxicology (3)** In-depth coverage of processes by which drugs/chemicals interact with biological systems and the experimental approaches used to study these interactions.

Effective: Fall 2007

Prerequisite:

**B M B 435 (MICRB 435, VB SC 435) Viral Pathogenesis (2)** A study of the molecular, immunological and pathological aspects of viral diseases as well as laboratory methods of diagnosis.

Effective: Fall 2007

Prerequisite:

**B M B 437 Physiological Biochemistry (2)** Physiological aspects of biochemistry, with emphasis on mammalian

metabolism, specialized tissue and fluid functions, detoxification mechanisms, energetics, and physiological interrelationships.

Effective: Spring 1995

Prerequisite:

**B M B 442 Laboratory in Proteins, Nucleic Acids, and Molecular Cloning (3)** Laboratory in enzyme purifications and assay techniques; nucleic acid isolation and characterization, including plasmid preparation.

Effective: Summer 2012

Prerequisite:

**B M B 443W Laboratory in Protein Purification and Enzymology (3)** Laboratory in protein isolation methodology, enzyme kinetics, and physico-chemical properties of proteins.

Effective: Spring 2009

Prerequisite:

**B M B 445W Laboratory in Molecular Genetics I (2)** Laboratory in molecular techniques in gene analysis and microbial genetics, emphasizing in vitro methodologies.

Effective: Spring 2009

Prerequisite:

**B M B 448 Model Systems and Approaches in Cell Biology Inquiry (2)** Advanced laboratory that uses inquiry-based approaches to the analysis of organelles, genetic mechanisms, and metabolic processes in eukaryotic organisms.

Effective: Spring 2013

Prerequisite:

**B M B 450 (MICRB 450) Microbial/Molecular Genetics (2)** Genetic phenomena, with emphasis on molecular mechanisms: gene transfer, recombination, gene conversion, gene fusion, suppression, transposons.

Effective: Fall 2010

Prerequisite:

**B M B 460 (MICRB 460) Cell Growth and Differentiation (3)** Mechanisms and regulation of protein trafficking, organelle biosynthesis, cell development, signaling and cell cycle control. Emphasizes experimental design and analysis.

Effective: Spring 2006

Prerequisite:

**B M B 464 Molecular Medicine (3)** An exploration of the impact of advances in molecular biology on understanding disease mechanisms, medical diagnosis, and therapeutics.

Effective: Spring 1999

Prerequisite:

**B M B 465 Protein Structure and Function (3)** A study of the relationship between structure and function of proteins; internet analysis to predict structure and function is included.

Effective: Fall 2007

Prerequisite:

**B M B 474 Analytical Biochemistry (3)** Physical/chemical theory and techniques that emphasize purification and characterization of biological macromolecules, including proteins, lipids and nucleic acids.

Effective: Fall 2008

Prerequisite:

**B M B 480 (MICRB 480) Tumor Viruses and Oncogenes (3)** Oncogenes, DNA and RNA tumor viruses, and relevant experimental techniques with emphasis on molecular basis of carcinogenesis and gene regulation.

Effective: Spring 2001

Prerequisite:

**B M B 488 Communities of Practice in Biochemistry and Molecular Biology (2 per semester/maximum of 16)** The course combines laboratory research in a community of practice and a seminar on topics in science, ethics, and society.

Effective: Spring 2013

Prerequisite:

**B M B 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1995

**B M B 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1995

**B M B 497F Introduction to Bioinformatics (3)** Introduction to the biological problems and computational solutions that motivate current applications in computational biology. Topics will be organized around three main themes: 1) Genomes, including assembly and annotation of genomic sequences; 2) Evolution, including sequence comparison, reconstruction of evolutionary relationships, and detection of disease associated traits; and 3) Function, including analysis of functional genomics experiments and characterization of regulatory relationships between genes.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**B M B 497G Bioremediation and Sustainable Chemistry (3)** Application of biological and engineering principles toward remediation of hazardous wastes and synthesis of chemicals in a sustainable manner. Emphasis on metabolic engineering systems biology, and protein engineering to accomplish these aims. Biological contacting devices for waste remediation.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**B M B 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1995

**B M B 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**BMMB 501 Core Concepts in Biomolecular Science (5)** Introduction to broaden one's understanding of biochemical and biophysical principles and the basic aspects of eukaryotic and prokaryotic cell biology.

Effective: Summer 2007

Prerequisite:

**BMMB 507 Seminar in Biochemistry, Microbiology, and Molecular Biology (1 per semester)** No description.

Effective: Spring 1996 Ending: Summer 2013

**BMMB 507 Seminar in Biochemistry, Microbiology, and Molecular Biology (2 per semester/maximum of 4)** No description.

Effective: Fall 2013 Future: Fall 2013

**BMMB 509 Ethics in Biomedical Science (1)** Discussion of ethical issues relevant to scientific research in the biomedical sciences.

Effective: Summer 1995

**BMMB 510 Current Literature in Molecular Biology (1)** Discussion and analysis of recent scientific papers that form the core of current literature in molecular biology and related disciplines.

Effective: Spring 1996

**BMMB 511 (IBIOS 511, VB SC 511) Molecular Immunology (2)** The study of molecular and biochemical events that influence immune responses and define current questions in immunology.

Effective: Spring 2008

Prerequisite:

**BMMB 515 (VB SC 515) Macrophage Biology (2)** The role of macrophages at the interface between innate and adaptive immunity.

Effective: Spring 2008

Prerequisite:

**BMMB 518 (VB SC 518) T Cell Recognition and Development (2)** An in-depth analysis of the mechanisms of T cell recognition, activation and development, and the acquired immune response.

Effective: Spring 2008

Prerequisite:

**BMMB 521 Microbial Biology I (4)** Survey of cutting-edge aspects of microbial ecology, phylogenetics, physiology, molecular biology, pathogenesis and genomics.

Effective: Summer 2013

Prerequisite:

**BMMB 525 (CHEM 525) Analytical Separations (3)** Fundamentals and applications of modern chromatographic separations.

Effective: Spring 2013

**BMMB 531 Biomolecular Structure (2)** Crystal structure determination and analysis of protein and nucleic acid three-dimensional structures.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**BMMB 533 Protein Evolution (2)** Consequences of evolution of protein-coding sequences: structures and functions.

Effective: Summer 2013

Prerequisite:

**BMMB 538 (CHEM 538) Spectroscopic Methods in Bioinorganic Chemistry (3)** Foundations in spectroscopic methods employed for the determination of the geometric and electronic structure of transition metal clusters in nature.

Effective: Spring 2013

**BMMB 539 (CHEM 539) Biochemical Reaction Mechanisms (3)** Mechanisms of the most important biochemical reactions, with emphasis on enzyme catalysis.

Effective: Spring 2013

Prerequisite:

**BMMB 541 Molecular Biology of Animal Development (3)** The course emphasizes comparative molecular genetic

analyses of developmental gene networks using vertebrate and Drosophila model systems.  
Effective: Summer 2007

**BMMB 542 Eukaryotic Cell Biology (3)** This course covers current areas of cell biology research, focusing on processes affecting the cell as a whole.  
Effective: Summer 2013

**BMMB 551 (IBIOS 551) Genomics (3)** Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics.  
Effective: Summer 2007

**BMMB 572 (CHEM 572) Nucleic Acids Chemistry (3)** Biophysical and biochemical approaches for studying structure-function relationships in nucleic acids.  
Effective: Spring 2013  
Prerequisite:

**BMMB 573 (CHEM 573) NMR Spectroscopy for Synthetic and Biological Chemistry (3)** Nuclear magnetic resonance approaches for characterizing the structure and dynamics of synthetic compounds, natural products, and biological macromolecules.  
Effective: Fall 2012  
Prerequisite:

**BMMB 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1996

**BMMB 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1996

**BMMB 597C Computers in Molecular Biology (3)** Apply maximum likelihood methods for data analysis and model testing on molecular biology, biochemistry and structural biology.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BMMB 597D Bioinformatics: Analyzing High Throughput Sequencing Data (2)** Introduce life scientists to level appropriate data analysis techniques via computers.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BMMB 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2001

**BMMB 598F Algorithms and Data Structures in Bioinformatics (3)** Suffix trees, hidden Markov models, de Bruijn graphs, breakpoint graphs, the Burrows-Wheeler transform, network flow, clustering.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**BMMB 600 Thesis Research (1-15)** No description.  
Effective: Spring 1996

**BMMB 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Spring 1996

**BMMB 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Teaching of biochemistry undergraduate laboratory and recitation classes under faculty supervision.  
Effective: Spring 1996

**BMMB 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Spring 1996

**BMMB 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Spring 1996

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## Bioengineering (BIOE)

**BIOE 401 Introduction to Bioengineering Research and Design** (3) Challenges and constraints of bioengineering research and design. Emphasis on immunoresponse, tissue mechanics, biological transport phenomena, and biomaterials.  
Effective: Spring 2007

Prerequisite: Concurrent: BIOE 404

**BIOE 402 Biomedical Instrumentation and Measurements** (3) Biomedical measurements, including consideration of techniques, equipment, and safety.

Effective: Spring 2008

Prerequisite:

**BIOE 403 Biomedical Instrumentation Laboratory** (1) Biomedical measurements laboratory including measurement of bioelectrical, experiments in medical imaging techniques, and use of cardiovascular and pulmonary system instrumentation.

Effective: Spring 2007

Prerequisite:

**BIOE 404 Data Analysis and Experiment Design** (1) Statistical measures of data, and selection of experiment sample size to meet criteria.

Effective: Summer 2006

Prerequisite: Concurrent: BIOE 401

**BIOE 406 Medical Imaging** (3) Physical principles and clinical applications of medical imaging methods.

Effective: Summer 2000

Prerequisite:

**BIOE 409 Biofluid Mechanics** (3) The fundamental relations in fluid mechanics and their application to biofluids including steady/unsteady flows, diseased states, devices and biorheology.

Effective: Summer 2006

Prerequisite:

**BIOE 410 Biomedical Applications of Microfluidics** (3) Study of fluid mechanics at small length scales. Low Reynolds number flow, electrokinetic flows, bioseparations in microfluidic devices.

Effective: Fall 2007

Prerequisite:

**BIOE 413 Bioengineering Transport Phenomena** (3) An integrated study of the fundamentals of mass transport processes with emphasis on the analysis of physiological systems.

Effective: Summer 2007

Prerequisite:

**BIOE 419 Artificial Organs and Prosthetic Devices** (3) Analysis of function and consideration of design concerns for biomedical implants, including prosthetic joints, electrical stimulators, and cardiovascular pumps.

Effective: Fall 2007

Prerequisite:

**BIOE 423 Reaction Kinetics of Biological Systems** (3) Chemical kinetics and reaction equilibria with applications to the analysis of physiological function and the design of synthetic organs.

Effective: Spring 2007

Prerequisite:

**BIOE 440 Clinical Correlations** (1) Engineering analysis applied to common disease states and therapies.

Effective: Summer 2000

Prerequisite:

**BIOE 443 (MATSE 403) Biomedical Materials** (3) Describe properties of materials and composites and their in vivo interactions.

Effective: Spring 2007

Prerequisite:

**BIOE 444 (IL) (MATSE 404) Surfaces and the Biological Response to Materials** (3) Focus is on special properties of surface as an important causative and mediating agent in the biological response to materials.

Effective: Summer 2007

Prerequisite:

**BIOE 445 Tissue Engineering: Concepts, Calculations and Applications** (3) Introduction to interdisciplinary tissue engineering concepts, associated biochemical and biomechanical engineering calculations, and cardiovascular, musculoskeletal, and other tissue application examples.

Effective: Spring 2011

Prerequisite:

**BIOE 450W Bioengineering Senior Design** (3) Application of engineering and physiological principles to design of artificial organs and life supportive devices.

Effective: Spring 2009

Prerequisite:

**BIOE 490 Colloquium** (1) Technical presentations related to research and industry concerns, and by students doing senior

projects.

Effective: Summer 2000

Prerequisite:

**BIOE 494H Honors Thesis** (1-3 per semester/maximum of 6) Independent study research and design, leading towards honors thesis.

Effective: Spring 2013

Prerequisite:

**BIOE 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**BIOE 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**BIOE 497D Polymers in Bioengineering** (3) A foundational course in biomedical polymer design, synthesis, characterization, and processing with applications such as devices, therapeutics, and regenerative medicine.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**BIOE 497G Drug Delivery** (3) Engineering and life science topics critical in drug delivery system design, focusing on physiological barriers, transport and drug design.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**BIOE 497K Bioengineering Mechanics and Techniques Laboratory** (3) Experimental laboratory that includes measurements related to biomechanical phenomena (e.g. tissue viscoelasticity and blood flow) and blood separation.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**BIOE 499 Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2008

**BIOE 501 (CH E 501) Bioengineering Transport Phenomena** (3) Application of the equations of mass, energy, and momentum conservation to physiological phenomena and to the design of artificial organs.

Effective: Summer 1990

**BIOE 503 (CH E 503) Fluid Mechanics of Bioengineering Systems** (3) Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

Effective: Summer 1990 Ending: Fall 2013

**BIOE 503 (CH E 503) Fluid Mechanics of Bioengineering Systems** (3) Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BIOE 505 Bioengineering Mechanics** (3) Passive and active mechanical properties of tissues, rheological materials, models of muscle contraction, pulmonary mechanics, forces in muscular- skeletal system.

Effective: Winter 1978

**BIOE 506 Medical Imaging** (3) Medical diagnostic imaging techniques, including generation and detection of ultrasound, x-ray, and nuclear radiation; instrumentation and biological effects.

Effective: Fall 1983

Prerequisite:

**BIOE 508 (MATSE 508) Biomedical Materials** (3) Properties and methods of producing metallic, ceramic, and polymeric materials used for biomedical applications.

Effective: Spring 2003

**BIOE 509 Mechanobiology** (3) This course explores the molecular bases of cell mechanics and the role of mechanics in cell biology

Effective: Summer 2013

Prerequisite:

**BIOE 510 Biomedical Applications of Microelectromechanical Systems (BioMEMS) and Bionanotechnology** (3)

Introduction to BioMEMS and Bionanotechnology. Topics include: electromechanical and chemical biosensors, microfluidics microscale separations, and surface patterning for cellular engineering.

Effective: Spring 2008

Prerequisite:

**BIOE 512 Cell and Molecular Bioengineering (3)** Graduate level cell and molecular biology course for engineers emphasizing molecular mechanisms.  
Effective: Summer 2004

**BIOE 513 Bioengineering Laboratory Techniques (3)** Laboratory techniques in cell molecular biology, protein biochemistry and cell culture with an emphasis on engineering analysis and quantification.  
Effective: Summer 2008  
Prerequisite:

**BIOE 514 Quantitative Microscopy (3)** Application of advanced microscopy to quantification of cellular and molecular function.  
Effective: Fall 2013 Future: Fall 2013

**BIOE 515 Cell Mechanics and Biophysics (3)** Advanced topics and recent developments in cellular engineering; applications of engineering science to cell biology.  
Effective: Spring 1997  
Prerequisite:

**BIOE 517 (MATSE 507) Biomaterials Surface Science (3)** Special properties of surfaces as an important causative and mediating agent in the biological response to materials.  
Effective: Spring 2003

**BIOE 519 Artificial Organs Design (3)** Basic techniques and principles of a multidiscipline approach to artificial organs design.  
Effective: Spring 1991

**BIOE 520 Biophotonics (3)** Physical and engineering underpinning of different modalities of laser microscopy and spectroscopy in biophysics, biomedical engineering, and life science applications.  
Effective: Fall 2007  
Prerequisite:

**BIOE 552 (I E 552) Mechanics of the Musculoskeletal System (3)** Structure and biomechanics of bone, cartilage, and skeletal muscle; dynamics and control of musculoskeletal system models.  
Effective: Summer 1998  
Prerequisite:

**BIOE 553 (I E 553) Engineering of Human Work (3)** Physics and physiology of humans at work; models of muscle strength, dynamic movements; neural control; physical work capacity; rest allocation.  
Effective: Summer 1985  
Prerequisite:

**BIOE 576 Bioengineering of the Cardiovascular System (3)** Experimental and analytical studies of network branching patterns, regional blood flow, rheology and mechanics of blood cells and vessels.  
Effective: Summer 1991  
Prerequisite:

**BIOE 590 Bioengineering Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1991

**BIOE 591 Bioengineering Ethics and Professional Development (1)** Problem solving methods in ethical decision making, best practices in research communication, and strategies for professional development.  
Effective: Summer 2013

**BIOE 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**BIOE 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**BIOE 597D Mechanobiology (3)** This course explores the molecular bases of cell mechanics and the role of mechanics in cell biology.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BIOE 597F Applications of Soft Lithography in Bionanotechnology (3)** Soft lithography techniques and applications in biological sciences with an emphasis on studies of mechanobiology, tissue engineering, and biochemical pathways.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**BIOE 597G Nanobiomaterials (3)** An in-depth foundation in the synthesis, fabrication, properties, and applications of

nanobiomaterials in tissue engineering, drug/gene delivery, cancer therapy, and bioimaging.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**BIOE 597K Regenerative Medicine** (3) Foundation in regenerative medicine, the integration of cell biology with biomaterials and engineering to develop strategies for regeneration of tissues.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**BIOE 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Fall 2008

**BIOE 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**BIOE 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**BIOE 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**BIOE 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Bioethics (BIOET)

BIOET 501 (PHIL 571) **Perspectives and Methods in Bioethics** (3) This course explores a variety of theories and methods in bioethics and applies them to a selection of current topics.  
Effective: Fall 2011

BIOET 502 (PHIL 572) **Perspectives in Macro-Bioethics** (3) This course explores systemic and structural issues in bioethics, and the theories and methodologies required to address them.  
Effective: Fall 2011

BIOET 503 (PHIL 573) **Ethics and the Responsible Conduct of Biomedical Research** (3) Provides an understanding of ethical issues arising in the responsible conduct of biomedical research and frameworks for critically analyzing them.  
Effective: Fall 2011

BIOET 533 **Ethical Dimensions of Renewable Energy and Sustainability Systems** (2) Examination of ethical issues relevant to research procedure, professional conduct, social and environmental impacts, and embedded values in research and practice.  
Effective: Summer 2013

BIOET 590 **Bioethics Colloquium** (1-3 per semester/maximum of 36) Continuing seminars in bioethics that consist of a series of individual presentations by faculty, students, or outside speakers.  
Effective: Fall 2011

BIOET 594 **Research Topics** (1-12 per semester/maximum of 15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2011

BIOET 595 **Internship** (1-12 per semester/maximum of 12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships related to bioethics.  
Effective: Fall 2011

BIOET 596 **Individual Studies** (1-9 per semester/maximum of 9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2011

BIOET 596A **Independent Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

BIOET 597 **Special Topics** (1-9 per semester/maximum of 9) Formal courses given infrequently to explore a topic or topics in bioethics in depth.  
Effective: Fall 2011

BIOET 598 **Special Topics** (1-9 per semester/maximum of 9) Formal courses given infrequently to explore a topic or topics in bioethics in depth.  
Effective: Fall 2011

BIOET 599 **Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Fall 2011

BIOET 600 **Thesis Research** (1-12 per semester/maximum of 99) Thesis Research in Bioethics.  
Effective: Fall 2011

BIOET 601 **Ph.D. Dissertation Full Time** (0) Full-time Ph.D. dissertation preparation.  
Effective: Fall 2011

BIOET 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Students will teach lower-level undergraduate courses in bioethics, including courses on the undergraduate minor in bioethics and medical humanities.  
Effective: Fall 2011

BIOET 603 **Foreign Academic Experience** (1-9 per semester/maximum of 18) Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.

Effective: Fall 2011

**BIOET 610 Thesis Research Off-Campus** (1-12 per semester/maximum of 99) Thesis Research, Off Campus.  
Effective: Fall 2011

**BIOET 611 Ph.D. Dissertation Part Time** (0) Part-time Ph.D. dissertation preparation.  
Effective: Fall 2011

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## Bioinformatics (BIIFM)

BIIFM 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2004

BIIFM 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 2003

BIIFM 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2003

BIIFM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2003

BIIFM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Fall 2003

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## **Biological Basis-Dis (BBD)**

BBD 716 **Biological Basis of Disease** (6) This integrated course includes topics in microbiology, immunology, pathology, pharmacology, and human genetics.

Effective: Summer 1997

Prerequisite:

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## Biological Chem-Hy (BCHEM)

BCHEM 505 **Biological Chemistry II** (2) A continuation of BCHEM 502. Emphasis on interrelations of metabolic pathways, catabolic end products, and regulation.  
Effective: Spring 2011

BCHEM 510 **Carcinogenesis and Chemoprevention** (2) Mechanisms of cancer induction by environmental carcinogens and chemoprevention by natural and synthetic agents.  
Effective: Spring 2011  
Prerequisite:

BCHEM 521 **Biochemistry: Structure/Function/Regulation of Biological Molecules** (3) The fundamentals of biochemistry in evaluating the forces that govern inter- and intra-molecular interactions are studied.  
Effective: Summer 2011  
Prerequisite:

BCHEM 522 **Molecular Genetics: Genes to Genomes** (3) This course focuses on concepts of molecular genetics and genomics, and DNA- protein interactions and their functions within macromolecular complexes.  
Effective: Summer 2011  
Prerequisite:

BCHEM 581 **Enzymology: Structure, Energetics, and Function-A. Structural Biology** (1) Structural biology: NMR spectroscopy and X-ray crystallography.  
Effective: Fall 2007

BCHEM 582 **Enzymology: Structure, Energetics, and Function-B. Practical Enzymology** (1) Practical aspects to study protein-ligand binding and substrate-enzyme reaction.  
Effective: Fall 2007

BCHEM 583 **Enzymology: Structure, Energetics, and Function-C. Mechanisms of Enzyme Reactions** (1) Molecular basis for enzyme specificity and catalysis.  
Effective: Fall 2007

BCHEM 584 **Glycobiology A: Carbohydrate Chemistry** (1) Graduate course for students interested in carbohydrates.  
Effective: Fall 2007  
Prerequisite:

BCHEM 585 **Glycobiology B: Glycoconjugates** (1) Graduate course for students interested in carbohydrates.  
Effective: Fall 2007  
Prerequisite:

BCHEM 586 **Glycobiology C: Glycans in Health and Disease** (1) Graduate course for students interested in carbohydrates.  
Effective: Fall 2007  
Prerequisite:

BCHEM 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

BCHEM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

BCHEM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

BCHEM 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

BCHEM 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

BCHEM 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

BCHEM 611 **Ph.D. Dissertation Part-Time** (0) No description.

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## Biology (BIOL)

**BIOL 400 Teaching in Biology** (1-3) This course will train biology teaching assistants to teach in the laboratory/ recitation setting with emphasis on critical thinking skills. Enrollment will be limited to students of at least fifth semester standing that have been accepted as teaching assistants for biology.

Effective: Fall 2006

Prerequisite:

**BIOL 402W Biological Experimental Design** (3) Discussion of experimental design, analysis and presentation, with a practicum providing for student design, analysis and presentation of biological experiments. Students may not take this course if they have taken BIOBD 350W.

Effective: Fall 2007

Prerequisite:

**BIOL 404 Cellular Mechanisms in Vertebrate Physiology** (3) This course considers cellular mechanisms governing physiological aspects of vertebrate cell signaling and their adaptation to particular organismal functions.

Effective: Spring 2001

Prerequisite:

**BIOL 405 Molecular Evolution** (3) Introduction to concepts and techniques of analysis of molecular sequence data from an evolutionary point of view.

Effective: Fall 1994

Prerequisite:

**BIOL 406 Symbiosis** (3) This course covers a variety of different types of symbiotic relationships between unicellular symbionts and plants, fungi, or animals.

Effective: Summer 1998

Prerequisite:

**BIOL 407 Plant Developmental Anatomy** (3) This course will examine the development of basic vascular plant anatomical structures including leaves, stems, roots, and flowers.

Effective: Fall 2005

Prerequisite:

**BIOL 408 Contributions of Women to the Biological Sciences: Past and Present** (3) A study of the contributions that women scientists have made and continue to make in the biological sciences.

Effective: Spring 2005

Prerequisite:

**BIOL 409 Biology of Aging** (3) Mechanisms of the aging process, with special reference to man. Unfavorable progressive changes in molecules, cells, systems, and organisms.

Effective: Summer 1984

Prerequisite:

**BIOL 411 Medical Embryology** (3) Develops an understanding of human reproductive physiology, embryological processes, their time frames, and the development of major human body systems. The course emphasizes clinical correlations and the medical consequences of developmental abnormalities.

Effective: Summer 1998

Prerequisite:

**BIOL 412 Ecology of Infectious Diseases** (3) This course examines how ecological processes impact upon the epidemiology of infectious diseases.

Effective: Fall 2004

Prerequisite:

**BIOL 413 Cell Signaling and Regulation** (3) Introduction to the themes of cellular signaling and regulation through critical review of primary literature.

Effective: Spring 1998

Prerequisite:

**BIOL 414 Taxonomy of Seed Plants** (3) Basic principles and procedures in the practice of angiosperm systematics.

Effective: Fall 1994

Prerequisite:

**BIOL 415 Ecotoxicology** (3) Major concepts and controversies in the interdisciplinary field of ecological toxicology; toxicity analysis, remediation, and case studies of environmental pollution.

Effective: Spring 1995

Prerequisite:

**BIOL 416 Biology of Cancer** (3) This course intends to illustrate biological basis of cancer development, and discusses aspects on prevention, detection, and treatment of cancer.

Effective: Spring 1999

Prerequisite:

**BIOL 417 Invertebrate Zoology** (4) Function and form of major invertebrate phyla.

Effective: Fall 1994

Prerequisite:

- BIOL 419 Ecological and Environmental Problem Solving** (3) Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and environmental problems.  
Effective: Spring 2004  
Prerequisite:
- BIOL 420 (GEOSC 420) Paleobotany** (3) Classification, morphology, phylogeny, and stratigraphic occurrence of fossil plants; practicum includes field trips and study of paleobotanical techniques and specimens.  
Effective: Spring 2005  
Prerequisite:
- BIOL 421 (VB SC 421) Comparative Anatomy of Vertebrates** (4) The comparative anatomy of representative vertebrate animals discussed from a descriptive and an evolutionary viewpoint.  
Effective: Spring 2008  
Prerequisite:
- BIOL 422 Advanced Genetics** (3) Chromosomal mechanism of heredity; cytoplasmic and polygenic inheritance, chemical genetics, genomics, and experimental evolution.  
Effective: Fall 2010  
Prerequisite:
- BIOL 424 Seeds of Change: The Uses of Plants** (3) Interdisciplinary approach to the biology, chemistry, history, and culture of the interactions between plants and people.  
Effective: Spring 2009  
Prerequisite:
- BIOL 425 (PPATH 425) Biology of Fungi** (4) A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to human affairs.  
Effective: Spring 2002 Ending: Fall 2013  
Prerequisite:
- BIOL 425 (PPEM 425) Biology of Fungi** (4) A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to human affairs.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:
- BIOL 426 Developmental Neurobiology** (3) Overview of basic developmental processes as they apply to the central nervous system.  
Effective: Spring 2004  
Prerequisite:
- BIOL 427 Evolution** (3) Selected topics on the evolution of life.  
Effective: Spring 1995  
Prerequisite:
- BIOL 428 Population Genetics** (3) Mathematical formulation of evolution by natural selection, genetic equilibrium under selection, mutation, migration, random drift.  
Effective: Spring 2001  
Prerequisite:
- BIOL 429 Animal Behavior** (3) Physiological mechanisms, ecological relevance, and adaptive significance of animal behavior.  
Effective: Spring 1999  
Prerequisite:
- BIOL 430 (B M B 430, ENT 430) Developmental Biology** (3) Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.  
Effective: Summer 1994  
Prerequisite:
- BIOL 431 Reproductive Biology** (3) Reproduction is essential to all life and the course will explore development, physiology, cell biology, genetic and evolutionary aspects of this area.  
Effective: Summer 2013  
Prerequisite:
- BIOL 432 Developmental Genetics** (3) An advanced course in developmental biology, focusing on the use of genetics techniques to study fundamental questions of animal development.  
Effective: Summer 1998  
Prerequisite:
- BIOL 434 Pathobiology of Emerging Infectious Disease** (3) The course will analyze the pathology, immunology, microbiology, evolutionary biology, and policy of important emerging and reemerging infectious diseases.  
Effective: Summer 2013  
Prerequisite:
- BIOL 435 Ecology of Lakes and Streams** (3-4) Physical, chemical, and biological characteristics of freshwater environments, with special emphasis on factors regulating productivity in freshwater ecosystems.  
Effective: Fall 2011  
Prerequisite:
- BIOL 436 Population Ecology and Global Climate Change** (3) Ecological responses of individuals, populations, and communities to environmental variation, with emphasis on climate change.



Effective: Spring 2004

Prerequisite:

**BIOL 437 Histology** (4) Microscopic structure of the tissue of the animal body.

Effective: Fall 1994

Prerequisite:

**BIOL 438 Theoretical Population Ecology** (3) Theoretical discussions of demographics, population and metapopulation growth models, life histories, and species interactions such as competition, predation, host-parasitoid relationships.

Effective: Fall 2007

Prerequisite:

**BIOL 439 Practical Bioinformatics** (3) Practical aspects of retrieving and analyzing biological information residing in common databases.

Effective: Spring 2004

Prerequisite:

**BIOL 441 Plant Physiology** (3) Classical and current concepts in plant constituents, mineral nutrition, water relations, respiration, photosynthesis, photoperiodism, plant hormones, growth, and development.

Effective: Spring 1995

Prerequisite:

**BIOL 443 Evo-devo: Evolution of Developmental Mechanisms** (3) How evolution of animals and plants can be traced to changes in the regulation and/or interactions of genes controlling development.

Effective: Spring 2004

Prerequisite:

**BIOL 444 Field Ecology** (3) This field course will explore the flora and fauna of the mid-Atlantic area.

Effective: Fall 2007

Prerequisite:

**BIOL 446 Physiological Ecology** (3) The physiological abilities of plants and animals to adapt to their abiotic environment.

Effective: Fall 1994

Prerequisite:

**BIOL 448 Ecology of Plant Reproduction** (3) Analysis of the ecology, evolution, and natural history of angiosperm reproduction, including pollination, fruit-set, dispersal, and relevant plant- animal interactions.

Effective: Fall 1994

Prerequisite:

**BIOL 450W Experimental Field Biology** (3-5) A practical introduction to modern experimental techniques for ecological study of terrestrial, marine, and fresh water habitats.

Effective: Fall 2007

Prerequisite:

**BIOL 459 (BIOTC 459, HORT 459) Plant Tissue Culture and Biotechnology** (3) Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

Effective: Fall 1999

Prerequisite:

**BIOL 460 (ANTH 460) Human Genetics** (3) The human genome, its variation, origins, and relation to disease and other traits.

Effective: Fall 2011

Prerequisite:

**BIOL 460H (ANTH 460H) Human Genetics** (4) Gene mapping in humans; molecular basis of genetic disease; genomic structure; immunogenetics; and genetic evidence for human evolutionary history.

Effective: Fall 2001

Prerequisite:

**BIOL 461 Contemporary Issues in Science and Medicine** (3) Current/classical issues relating to health, research, agriculture, environment, and biotechnology. Active exploration of the impact of science on society.

Effective: Spring 2003

Prerequisite:

**BIOL 463 General Ecology** (3) Illustrates science of ecology, from individual, population, and community- level perspectives, discusses applications of this science to issues of conservation of biodiversity.

Effective: Spring 2002

Prerequisite:

**BIOL 464 Sociobiology** (3) The study of the adaptive function of social behavior, the comparative analysis of social organization, and the ecology of sociality.

Effective: Summer 2012

Prerequisite:

**BIOL 467 Molecular Basis of Neurological Diseases** (3) Students taking this course will learn about neurological diseases in a biological molecular context.

Effective: Summer 2013

Prerequisite:

**BIOL 469 (BB H 469) Neurobiology** (3) Comprehensive examination of neuroanatomy and physiology designed to

integrate the principles of neurochemistry, neuroendocrinology, and molecular biology.

Effective: Spring 1995

Prerequisite:

**BIOL 470 (BB H 470) Functional and Integrative Neurosciences (3)** Neurobiological function in motivated behaviors, motor and sensory functions, learning and memory development, sexual differentiation, and pathology.

Effective: Summer 1995

Prerequisite:

**BIOL 472 Mammalian Physiology (3)** Mechanisms concerned with normal animal function, with special emphasis on humans.

Effective: Summer 2007

Prerequisite:

**BIOL 473 Laboratory in Mammalian Physiology (2)** Laboratory experiments demonstrating fundamentals in physiology.

Effective: Summer 1985

Prerequisite:

**BIOL 474 (GEOSC 474) Astrobiology (3)** In depth treatment of principles/concepts of biochemical evolution, the origin/evolution of life; evaluation of distribution of life in the universe.

Effective: Summer 2007

Prerequisite:

**BIOL 479 (AN SC 479) General Endocrinology (3)** Endocrine mechanisms regulating the morphogenesis, homeostasis, and functional integration of animals.

Effective: Fall 2009

Prerequisite:

**BIOL 482 Coastal Biology (3-4)** Marine organisms, their interactions with each other, and their relationships with several coastal habitats.

Effective: Spring 2010

Prerequisite:

**BIOL 492 Senior Seminar in Biology (1)** Discussion of selected topics from recent biological literature; reports on current research or internship experiences.

Effective: Fall 2007

Prerequisite:

**BIOL 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2010

**BIOL 495 Internship in Biology (1-12)** Practical off-campus experience in Biology under the supervision of a professional and a faculty member.

Effective: Spring 2013

**BIOL 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**BIOL 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**BIOL 497A Rainforest Ethnobotany Experiential Learning Adventure to Belize (0.5-1)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013 Ending: Summer 2013

**BIOL 497A (PHYS 497A) Networks in Life Science (3)** Introduction to network analysis and modeling techniques applied to molecular and cellular-level interaction networks.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**BIOL 497A The Biology of RNA (3)** This course will explore the biological functions that RNA plays in diverse organisms, including transcription, translation, virology, and RNA - interference.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**BIOL 497C Comparative Neuroanatomy (3)** Structural-functional organization of the central nervous system of primates and other vertebrates. Emphasis is placed on understanding the anatomical structure of the major neural systems and the evolutionary principles that guided their phylogenetic development in different vertebrate lineages.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**BIOL 497E Evolution of the Vertebrates (3)** This course covers evolution of vertebrate animals, with emphasis on adaptation and convergence within and among living representatives of each group.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**BIOL 4971 Global Climate Change: A Field Course in Panama (1)** Students must complete a field-based trip experience with the Smithsonian Tropical Research Institute in selected biological field stations throughout Panama.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**BIOL 497T Biology of Eco-Health (0.5-3)** This three-week summer session course is taught entirely in Tanzania during the first summer session at Penn State. Students will examine topics related to human health, human-environment interactions, and conservation of natural resources. In addition to lectures and discussions, this exceptional opportunity allows students to participate in guided field studies contributing to long term datasets and research projects in both pastoral and agricultural ecosystems. The course will include guest lectures by local experts in biology, conservation, and health as well as visits to research institutions, national parks and a medical clinic/lab.

Effective: Summer 2013 Ending: Summer 2013

**BIOL 498 (ENT 498) Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1993

**BIOL 498A Biology of Eco-Health (0.5-3)** This three-week summer session course is taught entirely in Tanzania during the first summer session at Penn State. Students will examine topics related to human health, human-environment interactions, and conservation of natural resources. In addition to lectures and discussions, this exceptional opportunity allows students to participate in guided field studies contributing to long term datasets and research projects in both pastoral and agricultural ecosystems. The course will include guest lectures by local experts in biology, conservation, and health as well as visits to research institutions, national parks and a medical clinic/lab.

Effective: Summer 2013 Ending: Summer 2013

**BIOL 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**BIOL 499A (IL) Tropical Field Ecology (3)** An intensive introduction to tropical biodiversity to be taught in Belize, Central America.

Effective: Summer 2005

Prerequisite:

**BIOL 505 Statistical Methods in Evolutionary Genetics (3)** Statistical methods that are used for analyzing and interpreting genetic data in molecular evolution will be discussed.

Effective: Spring 1994

Prerequisite:

**BIOL 514 Topics in Systematics and Evolution (2)** Discussion of pertinent current literature in systematic biology and evolution.

Effective: Spring 1995

**BIOL 519 Ecological and Environmental Problem Solving (4)** Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and environmental problems.

Effective: Spring 2005

Prerequisite:

**BIOL 546 Ecology of Populations (3)** Ecological responses of organisms to environmental variables (food, etc.) that determine population behavior. Demography, competition, predation, and community principles.

Effective: Summer 1991

**BIOL 571 (PHSIO 571) Animal Physiology (3)** Mammalian cardiovascular, respiratory, renal, and gastrointestinal systems.

Effective: Summer 1985

Prerequisite:

**BIOL 572 (PHSIO 572) Animal Physiology (3)** Mammalian nervous, endocrine, metabolic, and reproductive systems.

Effective: Summer 1985

Prerequisite:

**BIOL 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2005

**BIOL 591 Molecular Evolutionary Biology Seminar (1)** Continuing seminars in Molecular Evolutionary Biology consisting of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1995

**BIOL 592 Critical Evaluation of Literature in Biology (1)** Weekly readings and critiques of recent papers from primary literature are used to teach independent thinking and effective scientific communication.

Effective: Fall 2001

Prerequisite:

BIOL 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1994

BIOL 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1990

BIOL 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2001

BIOL 598A **Experiential Teaching in Biology** (2) This course will cover issues related to national reform efforts in science education, as well as our current understanding of how people learn, and research based understanding of effective pedagogy. It is intended to prepare graduate students to teach in biology courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

BIOL 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

BIOL 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

BIOL 602 **Supervised Experience in College Teaching** (1-3) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Summer 1997

BIOL 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

BIOL 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

BIOL 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2007

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## Biomedical Sci-Hy (BMS)

**BMS 501 Regulation of Cellular & Systemic Energy Metabolism** (3) Teaches biochemical and signal transduction concepts while exploring the control of bioenergetic processes.  
Effective: Fall 2007

**BMS 502 Cell and Systems Biology** (3) Explores the cellular and intracellular organization of biology, assembly of cells into tissues, and further integration into biological systems.  
Effective: Fall 2007

**BMS 503 Flow of Cellular Information** (3) Teaches concepts underlying the inheritance, transmission and translation of genetic information.  
Effective: Fall 2007

**BMS 504 Art of Scientific Communication I** (1) Introduction to scientific analysis, writing, and oral presentation using primary literature sources.  
Effective: Summer 2011  
Concurrent: BMS 501 BMS 502 BMS 503

**BMS 505 Art of Scientific Communication II** (1) Advanced topics in scientific analysis, writing, and oral presentation using primary literature sources.  
Effective: Summer 2011  
Prerequisite:

**BMS 506A Biological Basis of Human Health and Disease A** (2) Cellular, molecular, genetic, and biochemical basis of organ function pathology.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**BMS 506B Biological Basis of Human Health and Disease B** (2) Cellular, molecular, genetic, and biochemical basis of organ function pathology.  
Effective: Summer 2013  
Prerequisite:

**BMS 520 Human Integrative Physiology** (3) This course explores whole organ physiology emphasizing skeletal muscle and exercise physiology, cardiovascular, renal and urinary, respiratory, gastrointestinal, and endocrine.  
Effective: Summer 2011  
Prerequisite:

**BMS 568 Current Topics in Translational Cancer Research** (3) The course covers current topics in cancer research, with a focus on translation to the clinic.  
Effective: Summer 2013  
Prerequisite:

**BMS 571 Graduate Clinical Rotation** (1-3) This course allows graduate students at Hershey and University Park to gain experience in the clinical arena.  
Effective: Spring 2009  
Prerequisite:

**BMS 581 Molecular and Translational Approaches to Human Disease** (3) This course teaches students the scientific process used to understand the molecular bases of diseases and the development of novel therapies.  
Effective: Summer 2011  
Prerequisite:

**BMS 590 Colloquium** (1 per semester/maximum of 4) A series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 2011

**BMS 591 Biomedical Research Ethics** (1) Education in research ethics for biomedical scientists. Meets U.S. Public Health standards for education in responsible conduct of research.  
Effective: Fall 2011

**BMS 594 Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2008

**BMS 595 Internship** (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 2008

**BMS 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual

basis and which fall outside the scope of formal courses.  
Effective: Spring 2008

**BMS 596A Tutoring Foundations in Biomedical Research (1-3)** The objective of Tutoring Foundations in Biomedical Research is to provide a tutoring opportunity in the context of the course Foundations in Biomedical Research. Tutors will facilitate small groups of students in the context of experimentation or problem-based learning and will provide one on one guidance as necessary.

Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**BMS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2008

**BMS 597A Foundations of Biomedical Research (4)** The goals of Foundations of Biomedical Research are: 1) to provide experience with important laboratory, experimental, and scientific communication skills; 2) to help the formation of peer groups that will support personal and professional development in the coming years; 3) to begin developing professional and personal internships with graduate faculty members.  
Effective: Summer 2013 Ending: Summer 2013

**BMS 597A Grant Writing and Comprehensive Exam Prep (1)** This course focuses on the topics and skills necessary to write an effective, fundable grant. While the focus of this course is to inform students about grant writing skills, the course will also address tailoring a grant for special purposes such as the comprehensive exam. Topics covered include: A) components of a grant, B) the grant review process, C) generation of hypotheses and specific aims, and D) experimental design, interpretation of results and alternative approaches.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**BMS 600 Thesis Research (1-9 per semester/maximum of 36)** Laboratory work on thesis project.  
Effective: Fall 2011

**BMS 601 Thesis Preparation (0)** BMS 601 is available to full-time Ph.D.-degree candidates who have passed the comprehensive examination and met the two-semester residence requirement.  
Effective: Spring 2013

**BMS 611 Thesis Preparation (0)** BMS 611 is available to part-time Ph.D.-degree candidates who have passed the comprehensive examination and met the two-semester residence requirement.  
Effective: Spring 2013

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## Biorenewable Systems (BRS)

**BRS 411 Biobased Fiber Science** (4) Theoretical and practical aspects of structure-property relationships for biobased industrial fibers, including fiber biological and chemical constitution and fiber-water relationships.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 422 Energy Analysis in Biorenewable Systems** (3) Energy management, energy conversions, renewable energy alternatives, engineering economic analyses, national and international perspectives on energy resources.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 423 Deterioration and Protection of Bioproducts** (3) Timber, wood, and bioproduct deterioration from fungi, insects, fire; treatment of bioproducts for in-service protection.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: BRS 411

**BRS 426 Safety and Health in Agriculture and Biorenewable Industries** (3) Managing occupational safety and health in production agriculture, bioproducts and related operations.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 428 Electric Power and Instrumentation** (3) Principles and application of electric circuits for power distribution, motors, automatic controls, and instrumentation used in agricultural and biorenewable industries.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 429W Biorenewable Systems Analysis and Management** (3) Theory of systems thinking; optimization and quantitative techniques for analysis of agricultural production and other biorenewable systems.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 437 Bioproduct Marketing and Sales** (4) Business-to-business bioproduct sales and marketing fundamentals and market overview of key forest industry sectors including biorefinery value chain outputs.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 490 BioRenewable Systems Colloquium** (1) Presentations and discussions of solutions to problems within the biorenewable systems industries.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**BRS 500 (A B E 500) Research Methods** (3) Foundation course in research philosophies, methodologies, issues, policies; research quality; critical thinking and discourse; professional development; and research ethics.

Effective: Spring 2014 Future: Spring 2014

**BRS 501 Biobased Polymers** (3) The chemistry, structure-property relationships, and industrial applications of biobased polymers from plant and agricultural feedstocks.

Effective: Summer 2013

**BRS 502 Human Behavior in Management and Technology** (1) Explore the relationship between human behavior and professional activities including ethical leadership and decision-making.

Effective: Fall 2013 Future: Fall 2013

**BRS 511 Structural BioComposites** (3) Manufacture and practices related to the production of engineered biocomposites processed from lignocellulosic materials.

Effective: Summer 2013

**BRS 550 Applied Bioproducts Marketing** (3) Bioproduct marketing applications for solid and engineered wood products and biorefinery value chain output including environmental services, energy, fuels, and co-products.

Effective: Summer 2013

**BRS 551 Sustainable Business Strategies** (2) Coverage of business strategies that relate to sustainability and environmental issues.

Effective: Summer 2013

**BRS 590 Colloquium** (1-6 per semester/maximum of 12) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2013

**BRS 594 Research Topics** (1-9 per semester/maximum of 12) Supervised student activities on research projects identified

on an individual or small-group basis.  
Effective: Summer 2013

**BRS 595 Internship** (1-9 per semester/maximum of 12) Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 2013

**BRS 596 Individual Studies** (1-9 per semester/maximum of 12) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

**BRS 597 Special Topics** (1-9 per semester/maximum of 15) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2013

**BRS 598 Special Topics** (1-9 per semester/maximum of 15) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2013

**BRS 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2013

**BRS 600 Thesis Research** (1-9 per semester/maximum of 36) No description.  
Effective: Summer 2013

**BRS 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2013

**BRS 602 Supervised Experiences in College Teaching** (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in undergraduate biorenewable systems courses.  
Effective: Summer 2013

**BRS 610 Thesis Research Off Campus** (1-9 per semester/maximum of 36) No description.  
Effective: Summer 2013

**BRS 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2013

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## Business (BUS)

**BUS 500 Negotiation, Communication, Teamwork** (2) Experience-based learning approach to developing effective teams and work organizations; emphasis on developing reflective thinking and interpersonal skill sets.

Effective: Summer 2004

Prerequisite:

**BUS 501 Statistical Analysis for Business Decisions** (3) Application of statistical techniques to the formulation, analysis, interpretation, and solution of business problems.

Effective: Summer 1995

Prerequisite:

**BUS 502 Business Research Applications** (3) Critical evaluative techniques of business research.

Effective: Spring 2001

Prerequisite:

**BUS 505 Data Analysis for Business Decisions** (2) Selection and application of statistical methods, and use of business data bases, to support managerial decision-making; interpretation and presentation.

Effective: Spring 2005

Prerequisite:

**BUS 515 Business Ethics and Corporate Governance** (2) Social, legal and ethical obligations of key organizational participants; organizational structure and goals; conduct in global and multicultural contexts.

Effective: Summer 2004

Prerequisite:

**BUS 554 Master's Project** (3) Development of an original master's project in the student's professional field of interest and preparation of a paper.

Effective: Spring 1987

Prerequisite:

**BUS 555 International Business** (3) Studying theories and practices of international business activities, strategies, structures and operations of multinational companies across nations.

Effective: Fall 2000

**BUS 584 Business in a Global Society** (3) Business sector and society relations; international and cultural issues; corporate values and ethics; relationship to stakeholders; social, political, legal environments.

Effective: Spring 2012

**BUS 588 Strategic Management** (2) Analysis of current theory and practice for the formulation and implementation of organizational strategies in complex dynamic environments; capstone course.

Effective: Fall 2005

Prerequisite:

**BUS 589 Strategic Venture Planning and Innovation** (2) Development and presentation of a venture plan including product development; market research; competitive analysis; financing and capitalization; organizational structure.

Effective: Spring 2005

Prerequisite:

**BUS 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**BUS 595 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 2001

Prerequisite:

**BUS 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**BUS 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

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## Business Admin (B ADM)

B ADM 500 **Business, Government, and Society** (3) Overview and analysis of ethical, legal, political, technological, and societal impacts on business.  
Effective: Spring 2004

B ADM 501 **Costs, Competition, and Marketing Performance** (6) A project-oriented investigation into the critical principles of accounting, economics, and finance.  
Effective: Fall 2003

B ADM 502 **Demand, Operations, and Firm Performance** (6) A project-oriented investigation into the critical principles of management, marketing, and operations.  
Effective: Fall 2003

B ADM 503 **Integrated Business Analysis** (3) Overview of the statistical analyses of a variety of business problems.  
Effective: Fall 2003  
Prerequisite:

B ADM 510 **Cost Management for Decision Making and Control** (3) The study and use of accounting information for cost management, product costing, planning and controlling operations, and managerial decision making.  
Effective: Fall 2003  
Prerequisite:

B ADM 511 **Information Systems Management and Strategy** (3) Fundamental uses of IS/T and guiding principles associated with the development and management of IS/T as a strategic organizational asset.  
Effective: Fall 2003

B ADM 512 **Managing Effective Organizations** (3) Understanding the critical and changing role of management in contemporary organizations.  
Effective: Fall 2012  
Prerequisite:

B ADM 513 **Quantitative Methods for Business** (3) This course is designed to provide a systematic understanding of design, operation, and control of business processes that transform inputs into outputs.  
Effective: Fall 2012  
Prerequisite:

B ADM 514 **Strategic Planning and Business Policy** (3) Formulation of objectives and the implementation of programs to promote long- range success of the organization in a changing environment.  
Effective: Fall 2012  
Prerequisite:

B ADM 520 **Entrepreneurial Ventures** (3) The contribution of the entrepreneur to the enterprise system, supporting public policies and personal requirements for entrepreneurial success.  
Effective: Spring 2004  
Prerequisite:

B ADM 521 **Leadership Seminar** (3) Experiential problem-based seminar providing leadership opportunities and practice.  
Effective: Fall 2003  
Prerequisite:

B ADM 522 **Business Solutions** (3) Practicum experience in solving problems in real business situations.  
Effective: Fall 2003  
Prerequisite:

B ADM 523 **International Business** (3) Survey of the theory and practice of international business.  
Effective: Fall 2003  
Prerequisite:

B ADM 525 **Innovation and Change Management** (3) Analysis of innovation sources, effects on industry structure and firm resources, and how firms can manage adoption and implementation process.  
Effective: Fall 2003  
Prerequisite:

B ADM 526 **Leadership and Ethics** (3) A multiperspective review of leadership theory and research with special emphasis given to the ethical dimensions of leadership.  
Effective: Fall 2012  
Prerequisite:

B ADM 530 **Investment Theory** (3) Advanced literature pertaining to investments; special reference to the theory of random walks, stock valuation models, and portfolio management.  
Effective: Spring 2004  
Prerequisite:

B ADM 532 **Corporate Finance** (3) Application of modern corporate finance theory to corporate practice.

Effective: Fall 2003

Prerequisite:

B ADM 533 **Derivatives** (3) Applied theory of derivative instruments in hedging risk and management strategies.

Effective: Fall 2003

Prerequisite:

B ADM 550 **Global Marketing** (3) Marketing decision making from a global perspective.

Effective: Fall 2003

Prerequisite:

B ADM 551 **Marketing Research** (3) Examination of marketing research today, including research and marketing decisions, sampling and measurement, and collection and analysis of data.

Effective: Spring 2004

Prerequisite:

B ADM 552 **Service Marketing** (3) The application of marketing concepts to special needs of a service environment.

Effective: Fall 2003

Prerequisite:

B ADM 553 **Consumer Behavior** (3) Project-oriented course introducing consumer research techniques to formulate marketing strategies.

Effective: Summer 2007

Prerequisite:

B ADM 554 **Marketing Strategy** (3) An application of marketing theoretical principles from popular press publications.

Effective: Summer 2007

Prerequisite:

B ADM 562 **Financial Statement Analysis** (3) Utilizes concepts in accounting, economics, and business strategy to analyze financial statements of real companies.

Effective: Fall 2003

Prerequisite:

B ADM 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2003

B ADM 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2003

B ADM 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 2003

B ADM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2003

B ADM 596A **Determinants of Labor Productivity in a Detailed Manufacturing Industry** (1-6) Explore labor productivity in a specific detailed manufacturing industry across metro areas in the United States.

Effective: Summer 2013 Ending: Summer 2013

B ADM 597 **Special Topics** (1-9) Formal courses given on a topic or special interest subject which may be offered infrequently.

Effective: Fall 2003

B ADM 597A **International Economics** (3) Formal courses given on a topic or special interest subject which may be offered infrequently.

Effective: Summer 2013 Ending: Summer 2013

B ADM 597B **Negotiations** (3) Formal courses given on a topic or special interest subject which may be offered infrequently.

Effective: Summer 2013 Ending: Summer 2013

B ADM 597C **Business Processes** (3) Formal courses given on a topic or special interest subject which may be offered infrequently.

Effective: Summer 2013 Ending: Summer 2013

B ADM 597D **Project Management** (1-6) Formal courses given on a topic or special interest subject which may be offered

infrequently.

Effective: Summer 2013 Ending: Summer 2013

B ADM 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester

Effective: Fall 2003

B ADM 599 (IL) **Foreign Studies** (1-12 per semester, maximum of 24) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

B ADM 894 **Capstone Experience** (1-3 per semester/maximum of 3) Supervised, professionally-oriented student activities that constitute the culminating experience for the program.

Effective: Summer 2013

B ADM 895 **Internship** (1-6) Supervised, professionally-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 2013

Prerequisite:

B ADM 896 **Individual Studies** (1-6) Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2013

B ADM 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.

Effective: Spring 2013

B ADM 898 **Special Topics** (1-9) Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.

Effective: Spring 2013

B ADM 899 **Foreign Studies** (1-2 per semester/maximum of 3) Courses with a professional orientation offered in foreign countries by individuals or group instruction.

Effective: Spring 2013

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## Business Admin (BUSAD)

**BUSAD 501 Statistical Analysis for Managerial Decision Making** (3) Use of statistical methods for managerial decision making, with emphasis on problem formulation, data analysis and interpretation, and business applications.  
Effective: Summer 2006

**BUSAD 511 New Ventures 1** (3) Introduction to the issues involved in the development of new ventures within existing business organizations or from start-up.  
Effective: Spring 2005  
Prerequisite:

**BUSAD 515 Acquiring the Existing Enterprise** (3) The process of acquiring an existing company as an alternative to starting a new venture is explored.  
Effective: Spring 2005  
Prerequisite:

**BUSAD 519 (LEAD 519) Developing Creative High Performance Organizations** (3) This course focuses on how to create high performing organizations based on models provided by business, science and the arts.  
Effective: Spring 2007  
Prerequisite:

**BUSAD 522 New Ventures 2** (3) Examines the financial and legal issues that are critical in the formation, development, and management of new ventures.  
Effective: Spring 2005  
Prerequisite:

**BUSAD 523 Prices and Markets** (3) A survey of analytical concepts and techniques essential to an understanding of the business environment.  
Effective: Summer 2002  
Prerequisite:

**BUSAD 525 Quantitative Methods in Finance** (3) Study of quantitative methods used in financial and investment analysis and modeling.  
Effective: Summer 2006

**BUSAD 526 Current Issues in Corporate Finance** (3) Finance topics involving strategic financial decisions, including capital structure and cost of capital, financial forecasting, valuation, and corporate control.  
Effective: Spring 2011  
Prerequisite:

**BUSAD 527 Fixed Income Securities** (3) Analysis and valuation of fixed income securities and interest rate derivatives.  
Effective: Summer 2006  
Prerequisite:

**BUSAD 528 Mergers and Acquisitions** (3) Survey of drivers of success in M&A and develop knowledge and skills in the design and evaluation of M&A transactions.  
Effective: Fall 2011  
Prerequisite:

**BUSAD 530 Biotechnology and Health Industry Overview** (3) Organization, financing, policy, trends, problems and issues in the biotechnology, pharmaceutical, and health industries. Overview of cost, quality, access issues.  
Effective: Fall 2002

**BUSAD 534 Ethical Dimensions of Management in the Biotechnology and Health Industry** (3) Ethical managerial decision-making in biotechnology, pharmaceuticals, and health including ethical implications of technological/scientific advances, medical interventions, and business decisions.  
Effective: Summer 2002  
Prerequisite:

**BUSAD 537 Management Information Systems** (3) Information system theories and methods applied to administrative structures and management decisions in organizations.  
Effective: Summer 2006  
Prerequisite:

**BUSAD 542 Global Intercultural Management** (3) This course develops students' global cross-cultural competencies and cultural intelligence to enhance ability to manage global organizations and work interculturally.  
Effective: Summer 2009  
Prerequisite:

**BUSAD 545 Negotiation Strategies** (3) This course covers strategies and tactics for understanding conflicts, for negotiating effectively, and for dealing successfully with power in organizations.  
Effective: Spring 2003  
Prerequisite:

**BUSAD 551 Business, Ethics, and Society** (2-3) The course focuses upon the exploration and analysis of the ethical,

political, technological, social, legal and regulatory environments of business.

Effective: Fall 2011

Prerequisite:

**BUSAD 555 (LEAD 555) Full Range Leadership Development (3)** Development of behavioral skills associated with outstanding leadership of individuals, teams, and organizations through advanced information technology, experimental exercises, and case analysis.

Effective: Fall 2010

Prerequisite:

**BUSAD 556 (LEAD 556) Diversity Leadership (3)** Analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

Effective: Fall 2005

Prerequisite:

**BUSAD 558 Knowledge Management (3)** This course examines the strategic value of knowledge and how organizations can manage their knowledge assets for competitive advantage.

Effective: Summer 2008

Prerequisite:

**BUSAD 559 Career Management (3)** Provides students with a conceptual understanding of careers/career design making through an examination/discussion of the literature in career management.

Effective: Spring 2002

Prerequisite:

**BUSAD 575 High Tech Venture Development (3)** How high tech entrepreneurs and intrapreneurs design, develop, and market new information technology products (e.g., software) and services.

Effective: Spring 2002

Prerequisite:

**BUSAD 576 Ethical Issues in Information Technology (3)** Exploration of ethical issues affected by IT: privacy, free speech, computer crime, intellectual property, IT professionalism, and software product liability.

Effective: Spring 2012

Prerequisite:

**BUSAD 577 Management of Information Technology (3)** This course focuses upon the challenges of aligning IT strategy with organizational goals.

Effective: Spring 2012

Prerequisite:

**BUSAD 578 Managing Business Processes (3)** Develop and evaluate process models, performance metrics, and information flow to facilitate cross-functional business processes for 21st century organizations.

Effective: Spring 2011

Prerequisite:

**BUSAD 581 Venture Strategy, Planning and Development (3)** This is the capstone course in the New Ventures option of the MBA program. Students develop a strategic or operational plan for a new venture.

Effective: Spring 2005

Prerequisite:

**BUSAD 582 (LEAD 582) Social Entrepreneurship and Community Leadership (3)** This course will provide an opportunity for students to explore concepts of developing and leading businesses that create social value.

Effective: Fall 2011

Prerequisite:

**BUSAD 583 Future of the Biotechnology and Health Industry: Strategic Implications (3)** Strategy in biotechnology, pharmaceutical, and health industries; impact of technological innovation and economic, social, political trends, and events.

Effective: Summer 2002

Prerequisite:

**BUSAD 585 Research in Security Valuation (3)** Analysis and valuation of equity investments.

Effective: Summer 2006

Prerequisite:

**BUSAD 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Fall 2001

**BUSAD 597A Ethical Issues in the Finance Industry (3)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2013 Ending: Summer 2013

**BUSAD 802 Cornerstone of Sustainability (3)** In-depth exploration of the social, environmental, and organizational sustainability challenges facing business leaders in the 21st Century.

Effective: Summer 2012

**BUSAD 809 Triple Bottom Line Accounting (3)** In-depth exploration of the issues related to implementing measurement,

reward and reporting systems for economic, social, and environmental impacts.  
Effective: Summer 2012

**BUSAD 824 Finance and Investment for Sustainable Growth** (3) In-depth exploration of the methods of financing available for sustainable growth in developed and emerging markets.  
Effective: Summer 2012

**BUSAD 835 Commercialization of Biopharmaceuticals** (3) Review organizational processes, regulatory, and environmental issues in the development and commercialization of biopharmaceuticals in the United States and globally.  
Effective: Spring 2011  
Prerequisite:

**BUSAD 879 Sustainable Products and Service Development** (3) In-depth exploration of the creation and development of sustainable products and services.  
Effective: Summer 2012

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## Business Administration (B A)

**B A 411 Analyzing Business and Industry (3)** Prepares students to obtain an enterprise-wide view of business and industry by integrating operational and financial decisions in a team and learning environment.

Effective: Fall 2011

Prerequisite:

**B A 412H Honors Integration and Research (2-3)** The integration of the business core into a detailed financial, strategy and market analysis of actual companies selected by student teams.

Effective: Spring 2011

Prerequisite:

**B A 420 Preparation for Career Management (1)** This course emphasizes effective career planning by closely examining oneself, the business world, communication styles and strategies.

Effective: Fall 2012

Prerequisite:

**B A 421 Project Management (3)** Introduction to Project Management covering all phases of a project including proposal development, planning, execution, and closing.

Effective: Fall 2012

Prerequisite:

**B A 422W Strategic Business Planning (3)** Study of strategic planning and implementation in multi-industry, multi-cultural, and multi-national settings with emphasis on sustaining competitive advantages.

Effective: Fall 2012

Prerequisite:

**B A 462 Business Strategy (3)** Interpretation of business concept in the analysis of problems related to the successful management of a company, institution, or organization.

Effective: Spring 2008

Prerequisite:

**B A 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2008

**B A 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2008

**B A 495A Business Internship (3-6 per semester/maximum of 6)** Guided professional practicum in business consisting of 3 or 6 credits of supervised fieldwork in business.

Effective: Fall 2012

Prerequisite:

**B A 495B Undergraduate Research in Business (3-6 per semester/maximum of 6)** Guided student research in business, culminating in the presentation of the research project at a professional conference.

Effective: Fall 2012

Prerequisite:

**B A 495C Undergraduate Research in Business (3-9)** Guided student research in business administration; application of analytical or research techniques to business problems.

Effective: Spring 2003

Prerequisite:

**B A 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**B A 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**B A 497A Strategies for Enterprise Sustainability (3)** Course will provide students with an understanding of how environmental and sustainability issues are impacting business strategies and ultimately profits. Case studies and real world problems related to sustainability in operations will be analyzed. Course will review sustainability practices utilized by participants throughout the entire supply chain.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**B A 497B Sustainable Marketing Strategy for Consumers, Firms, and Societies (3)** Sustainability is a broad domain concerning the extent to which environmental, economic, and social practices are viable for current and future generations. Consumer awareness of sustainability issues has evolved from an emerging social movement to mainstream



values, and marketing strategy plays an important role in a business' ability to respond to these issues in a genuine manner. This course focuses on the role of sustainability in the marketplace and marketing strategies to effectively engage customers and stakeholders around sustainable issues.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**B A 499 (IL) Foreign Study--Business Administration (1-18)** Study in selected countries of business institutions, functions, and current business problems.

Effective: Spring 2011

Prerequisite:

**B A 500 Marketing Management (1-3)** An examination of the role of the market place in company management.

Effective: Fall 2008

**B A 501 Management (2)** Examination and application of concepts of human behavior and organization to managing people in work organizations.

Effective: Spring 2002

**B A 502 Team Process and Performance (1-3)** Development of managerial skills and techniques for diagnosing, intervening and leading effective teams.

Effective: Fall 2008

**B A 504 Ethical Leadership (2)** This course introduces students to their ethical responsibilities as business leaders.

Effective: Fall 2008

Prerequisite:

**B A 505 Negotiation Theory and Skills (1-3)** Development of managerial skills for distributive and integrative negotiations at the two-party and team levels.

Effective: Summer 2010

**B A 510 Supply Chain and Operations Management (1-3)** Introduction to the organizational processes and methods used to create and deliver goods and services.

Effective: Fall 2008

**B A 511 Financial Accounting (1-3)** Basic concepts and principles (i.e. the jargon) underlying financial accounting practices.

Effective: Fall 2008

**B A 512 Quantitative Analysis for Managerial Decision Making (2)** Construction and use of quantitative methods in business decision-making.

Effective: Summer 1995

**B A 515 Business Statistics for Contemporary Decision Making (2)** Conceptual understanding of statistics through both numerical and applied approach.

Effective: Summer 2008

**B A 517 Communication Skills for Management (1-3)** Development of communication skills required for management; audience awareness, style, individual and group presentations.

Effective: Fall 1983

Prerequisite:

**B A 521 Introduction to Managerial Accounting (2)** Cost accounting and the design of management accounting systems for planning and controlling operations, and for motivating personnel.

Effective: Fall 2001

**B A 523 IT Strategy (2)** An introduction to information technologies critical to business organizations.

Effective: Spring 2009

**B A 528 Business Simulation (1-3)** A team-based course during which students will manage a simulated firm.

Effective: Summer 2008

**B A 531 Introduction to Finance (1-3)** An examination of the techniques available to aid the financial manager in decision making.

Effective: Fall 2008

**B A 532 Global Business Environment (1)** An introduction to worldwide economic trends and economic problems with an emphasis on how businesses cope with global business problems.

Effective: Summer 2008

**B A 533 Economics for Managers (2)** An introduction to the tools of economic decision making and a consideration of firm, industry, and global economic influences on economic decision making.  
Effective: Spring 2002

**B A 535 Global Perspectives (1)** An overview of the global business environment.  
Effective: Fall 2001

**B A 536 Global Immersion (1-3)** Exploration of the opportunities and the challenges of doing business in another economic region.  
Effective: Spring 2011

**B A 545 Business, Government and International Economics (2)** Understand how macroeconomic events and policies affect the global economy and business decisions.  
Effective: Summer 2008

**B A 565 Strategic Leadership (1-3)** Presents a senior executive perspective on key opportunities and challenges faced by business leaders.  
Effective: Summer 2008

**B A 571 Strategic Management (1-3)** Analysis and application of concepts and techniques aimed at successfully developing and implementing competitive strategy in a complex business environment.  
Effective: Fall 2008

**B A 572 Introduction to Business Research (3)** An introduction to issues involved in framing, defending, and evaluating business research programs.  
Effective: Spring 2004  
Prerequisite:

**B A 574 Business Research (1-3)** A project paper, comparable in quality and scope of work to a graduate thesis, on problems of a company.  
Effective: Winter 1978  
Prerequisite:

**B A 575 Capstone Business Case (4)** A team-based project course that requires students to analyze an actual business problem from a firm or nonprofit organization.  
Effective: Summer 2008

**B A 578 Entrepreneurship (3)** Study of the development or acquisition of a business appropriate to the objectives and resources of the individual entrepreneur.  
Effective: Winter 1978

**B A 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**B A 591 Applied Communications (1)** Develop oral and written communication strategies to succeed in professional and academic contexts.  
Effective: Spring 2010  
Prerequisite:

**B A 595 Internship (1-12)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 2013

**B A 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**B A 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

**B A 597A Six Sigma Statistics (2)** Statistics course designed as an introduction to the MBA Six Sigma course.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**B A 597A Six Sigma Statistics (2)** Statistics course designed as an introduction to the MBA Six Sigma course.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**B A 597D Advanced Microeconomic Analysis (3)** Topics in advanced microeconomic analysis including competitive analysis, game theory, and mechanism design.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**B A 597E Sustainable Business Strategies (2)** Course will provide a unique view of business issues that relate to sustainability and corporate social responsibility.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**B A 599 (IL) Foreign Study--Business Administration (1-12)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

**B A 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**B A 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1983

**B A 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Fall 1999

**B A 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

**B A 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1983

**B A 850 Sustainability Driven Innovation (3)** This course explores sustainability as a business opportunity for developing innovative products and services. It will focus on consumer needs related to sustainability, willingness to pay for these needs, and the innovative processes necessary to create sustainable solutions.  
Effective: Summer 2013

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## **Business Economics (BUSEC)**

**BUSEC 502 Prices, Markets and Competitive Strategy (2)** Determination of outputs and prices in markets used by the firm; market structure and the design of competitive strategy.

Effective: Summer 2004

Prerequisite:

**BUSEC 503 Economic Environment of Business (2)** Analysis of the regulatory and global economic environment within which the firm operates and its implications for business strategy.

Effective: Summer 2004

Prerequisite:

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## Business Law (B LAW)

B LAW 424 (R M 424) **Real Estate Law** (3) Analyze contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property.

Effective: Spring 2012

Prerequisite:

B LAW 425 (R M 425) **Business and Environmental Regulation** (3) Examines the interplay between environmental regulation and commercial activities, including property interests.

Effective: Spring 2012

Prerequisite:

B LAW 441 **Business Law II: Agency, Employment and Business Structure** (3) An examination of the laws governing agency relationships, employment, and the various structures of commercial enterprises.

Effective: Fall 2011

Prerequisite:

B LAW 444 **Advanced UCC and Commercial Transactions** (3) All articles of the Uniform Commercial Code, banking relationships, debtor- creditor law, and bankruptcy law.

Effective: Fall 2011

Prerequisite:

B LAW 445 **Advanced Intellectual Property and Competition Law** (3) Copyrights, trademarks, patents, and trade secrets followed by related topics in the regulation of competition.

Effective: Fall 2011

Prerequisite:

B LAW 446 **Employment Law** (3) Examines the legal and regulatory environment of employment relationships. Topics include anti-discrimination; worker health and safety; and labor relations laws.

Effective: Summer 2012

Prerequisite:

B LAW 471 (CRIMJ 471) **Legal Rights, Duties, Liabilities of Criminal Justice Personnel** (3) Civil law issues within a justice agency and between criminal justice agencies and members of the public.

Effective: Summer 2011 Ending: Summer 2013

Prerequisite:

B LAW 473 (CRIMJ 473) **Criminal Procedure and Evidence in the Business Community** (3) Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.

Effective: Summer 2011 Ending: Summer 2013

Prerequisite:

B LAW 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2011

B LAW 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2011

B LAW 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

B LAW 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

B LAW 497A **Entertainment Law** (3) Provide students with an understanding of fundamental issues in entertainment law that arise in a business context.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

B LAW 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

B LAW 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2011

B LAW 525 **Business Law for Innovation and Competition** (2) Nature of intellectual property rights, as well as process for obtaining and enforcing them.

Effective: Summer 2011

B LAW 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

B LAW 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2011

B LAW 600 **Thesis Research** (1-15) No description.

Effective: Summer 2011

B LAW 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2011

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## **Business Logistics (B LOG)**

B LOG 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Winter 1978

B LOG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

B LOG 597 **Special Topics** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

B LOG 599 (IL) **Foreign Study--Business Logistics** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

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## **Cardiology-Hy (CAR)**

CAR 722 **Cardiology** (4.5) These areas will be studied: Symptoms and Signs; Systemic Arterial Hyper- tension; Atherosclerosis; Heart Failure; Congenital Heart Disease; Infectious, Inflammatory, and Immunologic Disease; Connective Tissue Disorders; Electrical Abnormalities; and Lipid Disorders.  
Effective: Fall 2001  
Prerequisite:

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## Cell & Molec Biol-Hy (CMBIO)

CMBIO 506 **Biological Basis of Human Health and Disease** (2) Biological basis of human health and disease by cellular, molecular, genetic, and biochemical basis of organ function pathology.  
Effective: Summer 2004 Ending: Summer 2013

CMBIO 590 **Colloquium** (1-3) Continuing seminars which consist of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 2011  
Prerequisite:

CMBIO 594 **Research topics** (1-18) Supervised student activities on research projects identified on an individual or group basis.  
Effective: Spring 2011  
Prerequisite:

CMBIO 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2007

CMBIO 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 2011  
Prerequisite:

CMBIO 600 **Thesis Research** (1-15) No description.  
Effective: Spring 2007

CMBIO 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 2007

CMBIO 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1986

CMBIO 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 2011  
Prerequisite:

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## **Cellular/Mollec Bas (CMBMP)**

**CMBMP 711 Cellular and Molecular Basis of Medical Practice (7)** This integrated course includes topics in biochemistry, physiology, pharmacology, and molecular genetics.

Effective: Summer 1997

Prerequisite:

**CMBMP 712 Cellular and Molecular Basis of Medical Practice (7)** Continuation of CMBMP 711.

Effective: Summer 1997

Prerequisite:

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## **Ceramic Science (CERSC)**

CERSC 590 **Colloquium** (1-3) Current developments in ceramic science and related fields. Required of all graduate students in ceramic science.  
Effective: Summer 1988

CERSC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

CERSC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

CERSC 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

CERSC 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Chemical Engineering (CH E)

CH E 410 **Mass Transfer Operations** (3) Introduction to principles and applications of mass transfer, with focus on the design of equilibrium stage and continuous contacting separation processes.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

CH E 410 **Mass Transfer Operations** (3) Introduction to principles and applications of mass transfer, with focus on the design of equilibrium stage and continuous contacting separation processes.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

CH E 423 **Chemical Energy Technology** (3) This course provides an overview of current and prospective chemical energy storage and conversion technologies.

Effective: Spring 2013

Prerequisite:

CH E 430 **Chemical Reaction Engineering** (3) Chemical reaction rates and equilibria, reactors, reactor design; emphasis on industrial chemical processes.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

CH E 430 **Chemical Reaction Engineering** (3) Chemical reaction rates and equilibria, reactors, reactor design; emphasis on industrial chemical processes.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

CH E 432 (F SC 432) **Petroleum Processing** (3) A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

Effective: Summer 2007

Prerequisite:

CH E 438 **Bioprocess Engineering** (3) Introduction to the biotechnology field including consideration of upstream and downstream processing of biochemicals.

Effective: Summer 2007

Prerequisite:

CH E 442 (MATSE 448) **Polymer Processing Technology** (3) Basic principles of polymer melt processing are reviewed and subsequently applied to the most important industrial processing operations.

Effective: Fall 2006

Prerequisite:

CH E 446 **Transport Phenomena** (3) Fundamental treatment of mass, heat, and momentum transfer; emphasis on transport properties and mathematical models of chemical engineering transport processes.

Effective: Spring 2006

Prerequisite:

CH E 446H **Transport Phenomena** (3) Fundamental treatment of mass, heat, and momentum transfer; emphasis on transport properties and mathematical models of chemical engineering transport processes.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

CH E 448 **Advanced Mass Transfer Operations** (3) Diffusion and mass transfer as applied to stagewise and continuous contact operations, including equipment design.

Effective: Spring 2006

Prerequisite:

CH E 449 **Bioseparations** (3) Analysis and design of separation processes for the purification of biological molecules.

Effective: Spring 2006

Prerequisite:

CH E 450 **Process Dynamics and Control** (3) Analysis of time-dependent variables in chemical process plants; reactor design and control; computer applications.

Effective: Spring 2006

Prerequisite:

CH E 452 **Chemical Process Safety** (3) This course provides an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant additents.

Effective: Spring 2007

Prerequisite:

CH E 470 **Design of Chemical Plants** (3) Lectures and practicum on methods and calculations, including economic evaluations for the design of chemical plants; formal technical report required.

Effective: Spring 2006

Prerequisite:

CH E 480M **Chemical Engineering Laboratory** (3) Data interpretation and analysis from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

Effective: Spring 2008 Ending: Summer 2013

Prerequisite:

**CH E 480M Chemical Engineering Laboratory (Honors) (3)** Data interpretation and analysis from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**CH E 480W Chemical Engineering Laboratory (3)** Data interpretation and correlation from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

**CH E 480W Chemical Engineering Laboratory (3)** Data interpretation and correlation from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**CH E 494 Research Projects in Chemical Engineering (1-6)** An original problem, including a search of the literature, experimental investigation, and preparation in formal thesis form.

Effective: Fall 2007

Prerequisite:

**CH E 494H Research Projects in Chemical Engineering (Honors) (1-6)** An original problem, including a search of the literature, experimental investigation, and preparation in formal thesis form.

Effective: Spring 2008

Prerequisite:

**CH E 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 1996

**CH E 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**CH E 497A Polymers (3)** Introduction to synthesis, structure, characterization and processing of polymers. Single molecule properties, polymer solutions, glasses, crystals and blends.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**CH E 497B Engineering Product Design (3)** Students develop skills and techniques for managing and executing engineering design projects that are applied to projects sponsored by industry.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**CH E 497B Bioremediation and Green Chemistry (3)** Application of engineering and biological principles toward remediation of hazardous wastes. Degradation and synthesis of chemicals using genetically engineered microorganisms.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CH E 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2007

**CH E 501 (BIOE 501) Bioengineering Transport Phenomena (3)** Application of the equations of mass, energy, and momentum conservation to physiological phenomena and to the design of artificial organs.

Effective: Summer 1990

**CH E 503 (BIOE 503) Fluid Mechanics of Bioengineering Systems (3)** Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

Effective: Summer 1990 Ending: Fall 2013

**CH E 503 (BIOE 503) Fluid Mechanics of Bioengineering Systems (3)** Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CH E 510 (MATSE 510) Surface Characterization of Materials (3)** Physical and chemical principles of characterization techniques widely used in materials science, chemistry and engineering.

Effective: Spring 2013

**CH E 524 Chemical Engineering, Application of Thermodynamics (3)** Elements of thermochemistry and thermodynamics of greatest importance in chemical engineering.

Effective: Fall 1983

CH E 528 **Colloidal Forces and Thermodynamics** (3) Unified treatment of formation, growth and stability of colloids based on principles of intermolecular and colloidal forces and thermodynamics.

Effective: Summer 2007

Prerequisite:

CH E 535 **Chemical Reaction Engineering** (3) Optimal design of batch and continuous chemical reactors and reactor batteries; effect of mixing on reactor operation.

Effective: Winter 1978

CH E 536 **Heterogeneous Catalysis** (3) Thermodynamics and kinetics of adsorption and reactions on solid surfaces, heat and mass transfer effects, theory and correlations in catalysis.

Effective: Summer 2007

Prerequisite:

CH E 544 **General Transport Phenomena** (3) Formulation and solution of transport problems involving momentum, heat, and mass transfer, with chemical engineering applications.

Effective: Spring 2007

Prerequisite:

CH E 545 **Transport Phenomena I** (3) Momentum transport, laminar and turbulent flow, boundary layer analysis, non-Newtonian flow, mechanical energy balance, chemical engineering applications.

Effective: Fall 1982

CH E 546 **Transport Phenomena II** (3) Heat and mass transfer, steady and unsteady state, coupling, molecular diffusion, moving boundaries, transfer coefficients, chemical engineering applications.

Effective: Fall 1982

CH E 576 (C E 576) **Environmental Transport Processes** (3) Fundamentals of chemical transport in engineered environments, such as biofilm reactors, and natural systems including aquifers and rivers.

Effective: Fall 2001

Prerequisite:

CH E 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 1988

CH E 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2004

CH E 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

CH E 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

CH E 597A **Numerical Methods in Chemical Engineering** (3) Application of numerical analysis and computational methods to the solution of differential equations of relevance to chemical engineering.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CH E 597B **Research Topics in Chemical Engineering** (1) Lecture and discussion by visiting faculty and engineers on the most recent topics in Chemical Engineering.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CH E 597B **Research Topics in Chemical Engineering** (1) Lecture and discussion by visiting faculty and engineers on the most recent topics in Chemical Engineering.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

CH E 599 **Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2007

CH E 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

CH E 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

CH E 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Opportunity for supervised and graded teaching experience for graduate students in chemical engineering.  
Effective: Fall 1983  
Prerequisite:

CH E 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

CH E 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Chemistry (CHEM)

**CHEM 400 Chemical Literature** (1) Instruction in use of the library and of the literature of chemistry.

Effective: Summer 2007

Prerequisite:

**CHEM 402 Chemistry in the Environment** (3) Chemistry of the atmosphere, natural waters, and the land surface with particular focus on human influence on processes occurring therein.

Effective: Summer 2007

Prerequisite:

**CHEM 406 (NUC E 405) Nuclear and Radiochemistry** (3) Theory of radioactive decay processes, nuclear properties and structure, nuclear reactions, interactions of radiation with matter, biological effects of radiation.

Effective: Summer 2007

Prerequisite:

**CHEM 408 Computational Chemistry** (3) Introduction to numerical and nonnumerical computer uses in physical science.

Effective: Summer 2007

Prerequisite:

**CHEM 410 Inorganic Chemistry** (3) Conceptual and descriptive aspects of nontransition elements, covering structural, thermodynamic, and kinetic features.

Effective: Summer 2007

Prerequisite:

**CHEM 412 Transition Metal Chemistry** (3) Structure and bonding of compounds containing transition metals.

Effective: Summer 2007

Prerequisite:

**CHEM 413 Chemistry of the Elements** (4) Theoretical and descriptive chemistry of the elements; laboratory synthesis and measurements in inorganic, coordination, and transition metal chemistry.

Effective: Fall 2012

Prerequisite:

**CHEM 423W Chemical Spectroscopy** (4) Modern methods and instruments of spectroscopy and their applications to problems of chemical structure and analysis.

Effective: Spring 2013

Prerequisite:

**CHEM 425 Chromatography and Electrochemistry** (3) Gas, liquid, and other forms of chromatography; important techniques of electrochemistry.

Effective: Spring 2013

Prerequisite:

**CHEM 427W (FRNSC 427W) Forensic Chemistry** (4) Analytical and instrumental methods used in the forensic sciences with special emphasis on the analysis and characterization of trace evidence.

Effective: Fall 2012

Prerequisite:

**CHEM 430 Structural Analysis of Organic Compounds** (3) Spectroscopic methods as tools in gross and detailed structural analysis and interpretation within the framework of modern theory.

Effective: Fall 2010

Prerequisite: Concurrent: CHEM 213

**CHEM 431W Organic and Inorganic Preparations** (4) Preparation, purification, and characterization of both organic and inorganic compounds by modern methods.

Effective: Fall 2010

Prerequisite:

**CHEM 432 Organic Reaction Mechanisms** (3) The study, evaluation, and discussion of the mechanisms of selected organic reactions.

Effective: Summer 2012

Prerequisite:

**CHEM 440 Instrumental Analysis** (3) General instrumental theory and methods used in common atomic and molecular analyses.

Effective: Summer 2007

Prerequisite:

**CHEM 441 Elemental Analysis and Instrumental Design Laboratory** (1) An introduction to the use of modern instruments for problems in chemical structure and analysis.

Effective: Summer 2007

Prerequisite:

**CHEM 443 Electrochemistry and Chromatography Laboratory** (1) An introduction to the use of modern instruments for problems in chemical structure and analysis.

Effective: Summer 2007

Prerequisite:



**CHEM 445 Atomic and Molecular Spectroscopy Laboratory (1)** An introduction to the use of modern instruments for problems in chemical structure and analysis.

Effective: Summer 2007

Prerequisite:

**CHEM 446 X-Ray Crystallography (3)** Theoretical and practical aspects of structure determination using x-ray diffraction, from crystal growth to structure solution.

Effective: Summer 2007

Prerequisite:

**CHEM 448 Surface Chemistry (3)** Surface chemistry, emphasizing the physical and chemical aspects of surfaces important for applications in colloids, catalysis, microelectronics and biocompatibility.

Effective: Summer 2007

Prerequisite:

**CHEM 450 Physical Chemistry - Thermodynamics (3)** Introduction to physical chemistry with primary emphasis on chemical thermodynamics and its molecular interpretation. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.)

Effective: Summer 2007

Prerequisite:

**CHEM 452 Physical Chemistry - Quantum Chemistry (3)** Introduction to physical chemistry with primary emphasis on molecular structure, spectroscopy, and chemical kinetics. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.)

Graduate credit not allowed for student majoring in BioChemistry, Chemistry, or Chemical Engineering. Effective: Summer 2007

Prerequisite:

**CHEM 457 Experimental Physical Chemistry (1-2 per semester/maximum of 2)** Laboratory experiments designed to illustrate the principles of physical chemistry and teach techniques of error analysis and the presentation of quantitative data. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.)

Graduate credit not allowed for student majoring in BioChemistry, Chemistry, or Chemical Engineering. Effective: Fall 2012

Prerequisite:

**CHEM 459W Advanced Experimental Physical Chemistry (4)** Laboratory experiments and projects for students interested in advanced study in physical chemistry.

Effective: Summer 2010

Prerequisite:

**CHEM 460 Advanced Thermodynamics (3)** Chemical thermodynamics, with applications to pure phases, solutions, and chemical reactions.

Effective: Spring 2009

Prerequisite:

**CHEM 462 Advanced Quantum Chemistry (3)** Introduction to quantum chemistry, with emphasis on atomic and molecular structure.

Effective: Summer 2007

Prerequisite:

**CHEM 464 Chemical Kinetics and Dynamics (3)** Introduction to chemical kinetics and molecular dynamics.

Effective: Spring 2009

Prerequisite:

**CHEM 466 Molecular Thermodynamics (3)** Introduction to physical chemistry with a primary emphasis on the statistical and molecular interpretation of thermodynamics.

Effective: Summer 2007

Prerequisite:

**CHEM 472 General Biochemistry I (3)** Basic structure and function of cellular components; principles of enzyme kinetics and regulation.

Effective: Summer 2007

Prerequisite:

**CHEM 474 Organic Synthesis (3)** Theory and methodology of organic synthesis applied to complex organic molecules.

Effective: Spring 2007

Prerequisite:

**CHEM 476 Biological Chemistry (3)** Fundamentals of Biochemistry for Chemists. Students cannot receive credit for both CHEM 476 and B M B 401.

Effective: Fall 2009

Prerequisite: Concurrent: CHEM 452

**CHEM 494 Chemical Research (1-10 per semester/maximum of 20)** Experimental investigation of an original research problem. Preparation of a formal thesis is optional. (Credit not allowed for graduate students in Biochemistry, Chemistry or Chemical Engineering.)

Effective: Summer 2007

**CHEM 494H Chemical Research (1-10 per semester/maximum of 20)** Experimental investigation of an original research

problem. Preparation of a formal thesis is optional. (Credit not allowed for graduate students in Biochemistry, Chemistry or Chemical Engineering.)  
Effective: Fall 2007

**CHEM 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  
Effective: Summer 2007  
Prerequisite:

**CHEM 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1988

**CHEM 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1982

**CHEM 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

**CHEM 500 Seminar in Chemistry** (1-2 per semester) No description.  
Effective: Spring 2001

**CHEM 516 Inorganic Chemistry** (3) Overview of systematic inorganic chemistry including main group, transition metal, lanthanide, and actinide chemistry.  
Effective: Spring 2013

**CHEM 517 Organometallic Chemistry** (3) Organometallic compounds and their use in catalysis and organic synthesis.  
Effective: Summer 1990

**CHEM 518 Symmetry and Spectroscopy in Inorganic Chemistry** (3 per semester) Group theoretical methods and spectroscopies of importance in modern inorganic chemistry.  
Effective: Spring 2013  
Prerequisite:

**CHEM 519 Materials Chemistry** (3) An overview of the role played by chemistry in the field of materials science.  
Effective: Fall 2012  
Prerequisite:

**CHEM 524 Electroanalytical Chemistry** (3) Electrochemical principles, techniques, and analytical applications.  
Effective: Spring 2013

**CHEM 525 (BMMB 525) Analytical Separations** (3) Fundamentals and application of modern chromatographic separations.  
Effective: Spring 2013

**CHEM 526 Spectroscopic Analysis** (3) An overview of modern instrumental techniques including FTIR, optical spectroscopy, mass spectrometry, and electron spectroscopies.  
Effective: Spring 2013

**CHEM 535 Physical Organic Chemistry** (3) Reactive intermediates, reaction kinetics and thermodynamics, solvent effects, conformational analysis, reaction mechanisms, noncovalent interactions in synthesis, and stereochemistry.  
Effective: Spring 2013  
Prerequisite:

**CHEM 536 Medicinal Chemistry** (3) Topics from classical bioorganic chemistry, modern chemical biology, and organic chemistry related to drug design and drug action.  
Effective: Spring 2013  
Prerequisite:

**CHEM 537 Organic Synthesis** (3) Organic synthesis including both classical and modern synthetic methodology as well as applications to construction of complex molecules.  
Effective: Spring 2013  
Prerequisite:

**CHEM 538 (BMMB 538) Spectroscopic Methods in Bioinorganic Chemistry** (3) Foundations in spectroscopic methods employed for the determination of the geometric and electronic structure of transition metal clusters in nature.  
Effective: Spring 2013

**CHEM 539 (BMMB 539) Biochemical Reaction Mechanisms** (3) Mechanisms of the most important biochemical reactions, with emphasis on enzyme catalysis.

Effective: Spring 2013

Prerequisite:

**CHEM 540 Biophysical Chemistry (3)** Structure of biomacromolecules, physical techniques for the study of structure and function, thermodynamic and kinetic studies of biomacromolecules in solution.

Effective: Spring 2013

Prerequisite:

**CHEM 543 (MATSE 543) Polymer Chemistry (3)** This graduate course discusses the new advances in polymer chemistry that leads to new polymeric materials with interesting structures and properties.

Effective: Spring 2005

Prerequisite:

**CHEM 544 Chemical Thermodynamics (3)** Development of thermodynamic theory, with special reference to common physical changes and chemical reactions.

Effective: Fall 1984

Prerequisite:

**CHEM 545 Statistical Thermodynamics (3)** Basic principles of statistical mechanics with application to the calculation of thermodynamic properties of gases and condensed phases.

Effective: Summer 2007

Prerequisite:

**CHEM 560 Topics in Physical Chemistry (2-6)** No description.

Effective: Fall 1983

**CHEM 563 Chemical Dynamics (3)** Molecular dynamics of chemical reaction, energy transfer, and scattering. Reaction rate theory and experiment.

Effective: Fall 1986

Prerequisite:

**CHEM 565 Quantum Chemistry I (3)** A foundation in the principles of quantum mechanics and their applications to chemistry.

Effective: Spring 2013

Prerequisite:

**CHEM 566 Quantum Chemistry II (3)** Additional techniques in quantum mechanics, with applications to problems in molecular structure and light-matter interactions.

Effective: Spring 2013

Prerequisite:

**CHEM 567 Molecular Spectroscopy (3)** Principles and applications of classical and modern spectroscopic methods.

Effective: Spring 2013

Prerequisite:

**CHEM 572 (BMMB 572) Nucleic Acids Chemistry (3)** Biophysical and biochemical approaches for studying structure-function relationships in nucleic acids.

Effective: Spring 2013

Prerequisite:

**CHEM 573 (BMMB 573) NMR Spectroscopy for Synthetic and Biological Chemistry (3)** Nuclear magnetic resonance approaches for characterizing the structure and dynamics of synthetic compounds, natural products, and biological macromolecules.

Effective: Fall 2012

Prerequisite:

**CHEM 589 Studies in Chemistry (1-9)** Theoretical research, experimental research, or a critical survey of the literature in an area of chemistry.

Effective: Winter 1978

**CHEM 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

**CHEM 597B Bioinorganic Chemistry (3)** Introduction to spectroscopic methods employed for the determination of the geometric and electronic structures of transition metals and clusters in nature.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CHEM 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

**CHEM 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 1983

**CHEM 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Teaching of chemistry

undergraduate laboratory and recitation classes with senior faculty instruction supervision.  
Effective: Fall 1983

**CHEM 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**CHEM 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Chinese (CHNS)

CHNS 401 (IL) **Level Three Chinese A** (4) Emphasis on oral proficiency through discussions of aspects of contemporary Chinese culture.

Effective: Spring 2011

Prerequisite:

CHNS 402 (IL) **Level Three Chinese B** (4) Readings in representative works of traditional and modern literature; practice in composition; study of aspects of Chinese culture.

Effective: Spring 2011

Prerequisite:

CHNS 403W **Level Four Chinese A** (4) Continuation of CHNS 402. Aims to improve students' proficiency in all four language skills, with a special emphasis on writing.

Effective: Fall 2012

Prerequisite:

CHNS 404 **Level Four Chinese B** (4) Continuation of CHNS 403W. Aims to improve students' proficiency in all four language skills through content-based language learning.

Effective: Spring 2012

Prerequisite:

CHNS 410 (IL) **Chinese Through Film** (3) This course is designed for students who finish Level Two Chinese or higher and aims to help them develop Chinese proficiency through movies.

Effective: Summer 2013

Prerequisite:

CHNS 411 (IL) **Chinese Written Characters** (3) This course aims to establish a solid foundation of students' Chinese orthography and prepare students for continuing study in subsequent Chinese courses.

Effective: Summer 2013

Prerequisite:

CHNS 421 (IL) **China Beyond China** (3) Study of modern and contemporary Chinese culture in its diversity and its intercultural contexts.

Effective: Summer 2011

Prerequisite:

CHNS 422 (IL) **Gender and Sexuality in China** (3) Study of gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China.

Effective: Summer 2011

Prerequisite:

CHNS 423 (IL) **The Warrior, the Courtesan and the Ghost in Classical Chinese Novels** (3) This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost.

Effective: Spring 2012

Prerequisite:

CHNS 424 (HIST 482) **Confucius and the Great Books of Early China** (3) This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China.

Effective: Spring 2013

CHNS 426 (IL) **The Chinese Rhetorical Tradition** (3 per semester/maximum of 6) Study of the rhetorical works in ancient China as well as multiple facets of modern Chinese rhetoric.

Effective: Summer 2011

Prerequisite: Concurrent: ENGL 471

CHNS 452 (IL) **Contemporary China: Culture and Trends** (3 per semester/maximum of 6) Survey of aspects of the contemporary Chinese-speaking world. Includes readings from Chinese newspapers, magazines, and fiction. Topics may vary each semester.

Effective: Spring 2010

Prerequisite:

CHNS 453 (IL) **Chinese Film** (3 per semester/maximum of 6) Selected films and directors representing various aspects of Chinese culture and cinema. Topics may vary each semester. Taught in Chinese.

Effective: Spring 2010

Prerequisite:

CHNS 454 (IL) **Introduction to Classical Chinese** (3 per semester/maximum of 6) Basic patterns and structures of Classical Chinese to the first millennium B.C. to the 19th century.

Effective: Spring 2010

Prerequisite:

CHNS 455 (IL) **Masterpieces of Traditional Chinese Literature** (3) Survey of traditional Chinese literature, including poetry, historical narratives, philosophical texts, and drama and novel.

Effective: Spring 2010

Prerequisite:

CHNS 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2010

CHNS 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2010

CHNS 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2010

CHNS 496A **Chinese Through Film** (3) This is a three credit course designed for students who have completed Level Two Chinese. The course aims to develop students' proficiency in all four languages skills through movies and help them transition to Level Three Chinese.  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

CHNS 496B **Chinese Written Characters** (3) This is a three credit course designed for those who have completed Level Two Chinese or the equivalent. This course aims to equip students' knowledge and skills of Chinese orthography.  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

CHNS 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2010

CHNS 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2010

CHNS 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2010

CHNS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1997

CHNS 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

CHNS 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## Civil Engineering (C E)

**C E 410W Sustainable Residential Subdivision Design** (3) Residential subdivision process; site selection; conservation and neo- traditional design; utility design and layout; best management practices for erosion and stormwater.

Effective: Fall 2001

Prerequisite:

**C E 421W Transportation Design** (3) Design of streets and highway facilities; emphasis on geometric elements, intersections and interchanges, roadway drainage, and pavement design.

Effective: Spring 2002

Prerequisite:

**C E 422 Transportation Planning** (3) Transportation systems planning, programming, and management; modeling and simulation, data collection, analysis, and forecasting.

Effective: Spring 2002

Prerequisite:

**C E 423 Traffic Operations** (3) The highway capacity manual, concepts and analyses, freeway operations, signalized and unsignalized intersections, signal coordination, traffic impact studies.

Effective: Spring 1997

Prerequisite:

**C E 432 Construction Project Management** (3) Fundamentals of project management, construction scheduling using the CPM technique, construction project preplanning, and control of quality, safety, and costs.

Effective: Fall 2007

Prerequisite:

**C E 435 Foundation Engineering** (3) Bearing capacity, settlement, and structural design of shallow foundations; lateral earth pressure; retaining and sheet-pile walls; introduction to deep foundations

Effective: Fall 2001

Prerequisite:

**C E 436 Construction Engineering Materials** (3) Design, production, application, specification, and quality control of construction materials unique to civil engineering.

Effective: Fall 2001

Prerequisite:

**C E 437 Engineering Materials for Sustainability** (3) Environmental impact of materials; life-cycle assessment; material selection to optimize performance; design, evaluation, and production of green construction materials.

Effective: Spring 2013

Prerequisite:

**C E 438W Construction Engineering Capstone Design** (3) Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling; design details: excavations, foundations, retaining walls, formwork, pavements.

Effective: Fall 2007

Prerequisite:

**C E 439W Geotechnical and Materials Engineering Design Capstone** (3) Subsurface site evaluation; integrated design of retaining walls, foundations, pavements, and materials for airports, highways, dams, or other facilities.

Effective: Spring 2013

Prerequisite:

**C E 441 Structural Design of Foundations** (3) Design of concentrically and eccentrically loaded square, rectangular, and combined footings; analysis and design of mat foundations; retaining walls; piles caps; flexible retaining design, and caissons.

Effective: Spring 2013

Prerequisite: Concurrent: C E 342

**C E 445 Advanced Structural Analysis** (3) Analysis of trusses and frame stiffness matrix method of analysis. Analysis of indeterminate beams, trusses, and frames using classical methods.

Effective: Spring 2008

Prerequisite:

**C E 447 Structural Analysis by Matrix Methods** (3) Analysis of truss and frame structures using flexibility and stiffness methods of matrix analysis. Computer applications.

Effective: Fall 1992

Prerequisite:

**C E 448W Advanced Structural Design** (3) Wind, snow, seismic, bridge loads; building design using steel, concrete, and prestressed concrete; advanced steel connections; capstone project; computer applications.

Effective: Spring 2013

Prerequisite:

**C E 449 Advanced Structural Design** (3) Special systems, frames and bracing in steel, wood and reinforced or precast concrete. Introduction to composite construction.

Effective: Spring 2008

Prerequisite:

C E 454 **Safety** (3) This course will focus on safety issues as they relate to OSHA.

Effective: Spring 2008

Prerequisite:

C E 456 **Planning and Scheduling** (3) Theory and practice used in planning and scheduling projects; defining task and resources, creating logic diagrams, and monitoring the projects.

Effective: Spring 2008

Prerequisite:

C E 458 **Construction Management II** (3) Procedures in construction organization including procurement, ethics, field supervision, legal and managerial problems, personnel, cost accounting, and construction business practices.

Effective: Spring 2008

Prerequisite:

C E 461 **Water-resource Engineering** (3) Qualitative and quantitative description of the hydrologic cycle, flood and drought frequency analysis, climate and land use change impacts, risk analysis and uncertainty, water resource management at regional, national and global scale.

Effective: Spring 2010

Prerequisite:

C E 462 **Open Channel Hydraulics** (3) Free surface flow in rivers, canals, steep chutes, stilling basins, and transitions.

Effective: Spring 2002

Prerequisite:

C E 465W **Water Resources Capstone Course** (3) Hydraulic design of river structures and open channels including supercritical and spatially varied flow; hydrologic/hydraulic computer modeling; design project.

Effective: Spring 2010

Prerequisite:

C E 472W **Environmental Engineering Capstone Design** (3) Principles and design of unit operations for water; domestic and industrial wastewater treatment; equipment selection and application.

Effective: Spring 2002

Prerequisite:

C E 475 **Water Quality Chemistry** (4) Chemistry applicable to the understanding and analysis of water quality, pollution, and treatment.

Effective: Spring 2011

Prerequisite:

C E 476 **Solid and Hazardous Wastes** (3) Characteristics and treatment of solid wastes and hazardous wastes.

Effective: Spring 2002

Prerequisite:

C E 479 **Environmental Microbiology for Engineers** (3) Intro microbiology for engineers; microbe structure, function, and diversity; environmental ecosystems; diagnostic labs.

Effective: Spring 2011

Prerequisite:

C E 488C **Capstone Project - Construction** (4) This course consists of a project either selected by the students with approval or assigned by the instructor.

Effective: Spring 2008

Prerequisite:

C E 488D **Capstone Project - Structural Design** (4) This course consists of a structural design project either selected by the students with approval or assigned by the instructor.

Effective: Spring 2008

Prerequisite:

C E 494 **Senior Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Fall 1992

C E 494H **Honors Senior Thesis** (1-6) Investigation of an original project in the area of Civil Engineering.

Effective: Summer 2006

C E 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1992

C E 496A **Ground Characterization for Geothermal Applications** (3) Basic principles of ground-sourced heat exchange systems will be discussed. Site-specific variables affecting the performance of different geothermal applications (both shallow and deep) will be explored and their effects will be characterized.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

C E 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.



Effective: Fall 1992

**C E 497A Building Information Modeling (3)** This course focuses on Building Information Modeling (BIM) implementation on the building process.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**C E 497A Construction Engineering (3)** Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling; design details; excavations, foundations, retaining walls, formwork, pavements.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C E 497B Bridge Analysis and Design I (3)** Fundamentals and practical applications pertaining to bridge superstructures will be covered. Emphasis will be on Load and Resistance Design methodology. The two primary bridge types, prestressed concrete and steel, will be discussed exclusively.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: C E 341 C E 342

**C E 497C Residential Construction Design Project (1)** NAHB competition involving site design, construction scheduling and budgeting, cash flow projections, market and risk analysis, green building, project management. Travel involved. Contact instructor.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C E 497D Engineering Materials for Sustainability (3)** Quantitative evaluation of the environmental impact of materials and products; life-cycle assessment; material selection to optimize structural performance; design, evaluation, and production of green construction materials.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C E 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2007

**C E 511 Engineering Soil Characteristics (3)** Applications of physico-chemical principles in soil engineering; soil composition; factors influencing engineering soil properties.

Effective: Fall 1992

Prerequisite:

**C E 512 Soil Mechanics II (2-5)** Evaluation of strength parameters and compressibility of soils; elastic analysis of stress and strain; techniques of forecasting foundation settlement; slope stability analysis.

Effective: Fall 1992

**C E 513 Advanced Foundation Engineering (3)** Practical applications of soil mechanics principles to geotechnical engineering problems; dewatering techniques; design of deep foundations and retaining structures.

Effective: Fall 1992

Prerequisite:

**C E 521 Transportation Networks and Systems Analysis (3)** Techniques of transportation network, user, stochastic user, and variable demand equilibrium; transportation activity system; computer simulation techniques and forecasting methods.

Effective: Fall 1992

Prerequisite:

**C E 522 Traffic Simulation and Control (3)** Simulation theory, traffic modeling using GPSS, traffic signal optimization using TEXAS, EVIPAS, PASSERII, TRANSYT-7F, TRAF-NETSIM, FRESIM and CORFLO.

Effective: Summer 1997

Prerequisite:

**C E 523 Analysis of Transportation Demand (3)** Theories of travel behavior, least squares and maximum likelihood, estimation methods, continuous dependent variable models, utility maximization, discrete econometric techniques.

Effective: Fall 1992

Prerequisite:

**C E 524 Advanced Problems in Civil Engineering Materials (2-6)** Study in the literature and by laboratory investigation of selected topics on field-controlled civil engineering materials.

Effective: Summer 2011

**C E 525 Traffic Flow Theory (3)** Microscopic and macroscopic traffic flow characteristics; traffic stream models; shockwaves and queuing for traffic operations.

Effective: Spring 1997

Prerequisite:

**C E 526 Highway and Street Design (3)** Technical analysis of the design elements of roadways, alignment, cross-section features, and intersection and interchange design considerations.

Effective: Spring 1994

Prerequisite:

**C E 527 Roadside Design and Management (3)** Roadside safety and design, safety management, pavement management, lighting, signs, signals, and markings, clear zone, guiderail, impact attenuators.  
Effective: Spring 1996  
Prerequisite:

**C E 528 Transportation Safety Analysis (3)** Issues and methods in transportation safety analysis; factors contributing to crashes; crash causation; modeling accident occurrence; identifying sites for treatment.  
Effective: Spring 2005  
Prerequisite:

**C E 531 Legal Aspects of Engineering and Construction (3)** Basic legal doctrines, contractual relationships between parties, analysis of construction contract clauses, contract performance, and professional practice problems.  
Effective: Fall 2001  
Prerequisite:

**C E 533 Construction Productivity Analysis and Performance Evaluation (3)** Construction productivity concepts and models; productivity measurement, control, and forecasting; analysis of factors affecting productivity; methods improvement techniques.  
Effective: Fall 1992  
Prerequisite:

**C E 539 Approximate Methods of Structural Analysis (3)** Structural analysis through the application of initial-value methods, Newmark's method, Fourier series, finite difference techniques, and work and energy procedures.  
Effective: Fall 1992  
Prerequisite:

**C E 540 Statically Indeterminate Structures (3)** Analysis of statically indeterminate straight/curved beams, grids, 2D/3D frames, arches, cables, and shells using classical and modern techniques.  
Effective: Spring 2005

**C E 541 Structural Analysis (3)** Theory of various finite elements as applied to civil engineering structures. Term paper required.  
Effective: Fall 1992  
Prerequisite:

**C E 542 (A E 542) Building Enclosure Science and Design (3)** The building enclosure: nature, importance, loadings; building science: control of heat, moisture, air, hygrothermal analysis; design: walls, windows, roofs, joints.  
Effective: Summer 2002

**C E 543 Prestressed Concrete Behavior and Design (3)** Design and behavior of prestressed concrete structures: materials and systems losses, flexure, shear, bond, deflections, partial prestressing, continuous beams.  
Effective: Summer 2003  
Prerequisite:

**C E 544 Design of Reinforced Concrete Structures (3)** Advanced topics in design of reinforced concrete structures. Torsion and shear; beam moment-curvature; two-way slab systems; slender columns; strut- and-tie methodology.  
Effective: Spring 2007

**C E 545 Metal Structure Behavior and Design (3)** Design philosophies and basis; seismic loading; fatigue; bending, column, plate, and beam-column stability; tapered members; torsion; connections; bracing; frame stability.  
Effective: Spring 2007

**C E 546 Reinforced Concrete Slabs (3)** Behavior, analysis, and design of floor systems; elastic, ACI Code method, yield line theory; two-way, flat slab, flat plate.  
Effective: Fall 1992  
Prerequisite:

**C E 548 Structural Design for Dynamic Loads (3)** Dynamic behavior of structural systems of one and more degrees of freedom; earthquake, blast-resistant analysis, and design of structures.  
Effective: Spring 2008  
Prerequisite:

**C E 549 Bridge Engineering I (3)** Engineering of modern steel and concrete bridge structures; loading; analysis; design.  
Effective: Spring 2000  
Prerequisite:

**C E 550 Engineering Construction Management (3)** Management fundamentals for construction contracting; organization, project planning, scheduling and control, bonding and insurance, labor legislation and regulation, cost and control.  
Effective: Fall 1992  
Prerequisite:

**C E 551 Random Processes in Hydrologic Systems (3)** Hydrologic systems analysis, simulation; design using probability, time series and dynamical systems; formulating models, parameter estimation, environmental impact, resource assessment.  
Effective: Summer 1996

Prerequisite:

**C E 552 Coastal and Nearshore Processes (3)** Hydrodynamics of the near-shore environment, including waves, currents, and storm surges. Coastal response, sediment transport, engineering structures.

Effective: Summer 2004

Prerequisite:

**C E 555 Groundwater Hydrology: Analysis and Modeling (3)** Introduction to groundwater resource analysis, model formulation, simulation, and design of water resource systems using symbolic and numerical methods.

Effective: Spring 1996

Prerequisite:

**C E 561 Surface Hydrology (3)** Quantification of the processes that govern the movement and storage of water near the land-surface including precipitation, evapotranspiration, and runoff.

Effective: Spring 2005

**C E 563 Systems Optimization Using Evolutionary Algorithms (3)** Comprehensive introduction to genetic and evolutionary computation: genetic algorithms, evolutionary strategies, multi-objective optimization, parallelization approaches, and fitness approximation.

Effective: Spring 2005

**C E 564 Sediment Transport in Alluvial Streams (3)** River flow, river channel formation, the physical characteristics of rivers, responses of rivers to natural and human-made changes.

Effective: Spring 2005

Prerequisite:

**C E 566 Uncertainty and Reliability in Civil Engineering (3)** Introduction to probabilistic modeling, simulation, uncertainty analysis, and reliability estimates applied to civil engineering.

Effective: Spring 2005

**C E 567 River Engineering (3)** Introduction to river mechanics and fluvial geomorphology applied to problems of sediment transport and channel morphology.

Effective: Fall 1999

**C E 570 Environmental Aquatic Chemistry (3)** Speciation, reactivity, and distribution of contaminants in water, with emphasis in inorganic chemicals.

Effective: Fall 1992

Prerequisite:

**C E 571 Physical-Chemical Treatment Processes (3)** The theory of physical-chemical processes used in the treatment of potable water and municipal and industrial wastewaters.

Effective: Fall 1992

Prerequisite:

**C E 572 Biological Treatment Processes (3)** The theory and application of biological processes to treat organic wastes, including wastewater, solid residuals, and toxic priority pollutants.

Effective: Summer 2011

Prerequisite:

**C E 573 Environmental Organic Chemistry (3)** Theory, measurement, and estimation of the characteristics and environmental transformations of hazardous materials.

Effective: Spring 2000

Prerequisite:

**C E 574 Laboratory Analyses in Water Quality Control (3)** Experiments illustrating current chemical and biochemical methods of water and waste treatment and analytical methods used in research and control.

Effective: Fall 1992

Prerequisite:

**C E 575 Industrial Waste Management (3)** Surveys and analysis, pollution prevention, regulatory requirements, treatment and disposal of liquid, gaseous and solid residues.

Effective: Spring 1997

Prerequisite:

**C E 576 (CH E 576) Environmental Transport Processes (3)** Fundamentals of chemical transport in engineered environments, such as biofilm reactors, and natural systems including aquifers and rivers.

Effective: Fall 2001

Prerequisite:

**C E 577 Treatment Plant Design (1-6)** Design of works for the treatment of water and wastewater for municipalities and industries.

Effective: Fall 1992

Prerequisite:

**C E 578 Groundwater Remediation (3)** Application of fundamental physical/chemical/biological processes in natural and engineered systems for remediation of contaminated soil and groundwater.

Effective: Summer 2011

Prerequisite:

**C E 579 Environmental Pollution Microbiology (3)** Fundamentals of microorganisms in water and wastewater treatment; indicators of pollution; activities of microorganisms in polluted waters, including biogeochemical cycles.  
Effective: Summer 2011

**C E 580 Hydrodynamic Mixing Processes (3)** Physical mixing processes in rivers, estuaries, lakes, and oceans. Analytic methods and computational modeling.  
Effective: Spring 2005

**C E 581 Pavement Management and Rehabilitation (3)** Techniques of network and project level pavement management, field evaluation methods and equipment, maintenance and rehabilitation strategies, overlay design procedures.  
Effective: Fall 1992  
Prerequisite:

**C E 582 Pavement Design and Analysis (3)** Viscoelastic analysis; non-linear analysis; fatigue and permanent deformation; back-calculation of layer moduli; mechanistic-empirical design methods.  
Effective: Summer 1998

**C E 583 Bituminous Materials and Mixtures (3)** Composition, physical behavior, production, and performance of bituminous materials and mixtures.  
Effective: Spring 1998

**C E 584 Concrete Materials and Properties (3)** Study of concrete properties and associated variables, prediction models, testing, preventative measures, pozzolans, admixtures.  
Effective: Spring 1997  
Prerequisite:

**C E 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 2012

**C E 591 Environmental Engineering Seminar (1)** Seminar topics selected by faculty and students based on research interests on topics related to environmental engineering and science.  
Effective: Spring 2005

**C E 592 Environmental Engineering & Science Topics (1)** Current topics in environmental engineering and science.  
Effective: Spring 2005

**C E 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1992

**C E 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Fall 1992

**C E 597A Alternative Transportation Approaches (3)** This course will familiarize students with alternative methods and practices to analyze, plan, design, and operate transportation demand and transportation capacity.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C E 597A Geotechnical and Materials Engineering Seminar (1)** Graduate student seminar with topical discussions on Geotechnical and Materials Engineering.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C E 597B Experimental Methods in Geotechnical and Materials Engineering (3)** Application of advanced experimental techniques for characterization of soil, concrete, and other civil engineering materials. Includes lectures and laboratory exercises.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C E 597B Public Transportation Systems (3)** Planning and analysis of various public transportation systems, including: point to point, corridors, networks; fixed route vs. demand responsive systems; vehicle operations and fleet management.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C E 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1996

**C E 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2008

**C E 600 Thesis Research** (1-15) No description.  
Effective: Fall 1992

**C E 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1992

**C E 603 Foreign Academic Experience** (1-9 per semester/maximum of 18) Foreign study and/or research constituting progress towards the degree at a foreign university.  
Effective: Fall 2011

**C E 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1992

**C E 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1992

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## Classics and Ancient Mediterranean Studies (CAMS)

CAMS 400W **Comparative Study of the Ancient Mediterranean World** (3) Comparative study of ancient Mediterranean civilizations.

Effective: Spring 2001

Prerequisite:

CAMS 405 (IL) **Law & Economy in the Ancient Near East** (3) This course is an overview of the legal and economic texts and institutions in the Ancient Near East.

Effective: Spring 2009

Prerequisite:

CAMS 410 **Classical Epic** (3) Homer, Hellenistic Epic, and Vergil; influences on later epic.

Effective: Spring 1998

CAMS 411W **Classical Drama** (3) Masterpieces of Greek tragedy (Aeschylus, Sophocles, Euripides) and comedy (Aristophanes, Menander); their influence on Roman writers.

Effective: Spring 2001

CAMS 420 **Introductory Targumic Aramaic** (3) Fundamentals of Aramaic grammar, syntax, and vocabulary.

Effective: Spring 2007

CAMS 440W **Studies in Classical and Ancient Mediterranean Archaeology** (3-6) Selected topics in the literary sources and material evidence for classical and ancient Mediterranean society.

Effective: Summer 2000

Prerequisite:

CAMS 442 (IL) (KINES 442) **Sport in Ancient Greece and Rome** (3) An examination of the continuity of sport in Greek and Roman societies.

Effective: Spring 2008

Prerequisite:

CAMS 470 (IL) **Languages and Cultures of the Ancient Near East** (3) This course is an overview of the languages and cultures that populated the Ancient Near East.

Effective: Spring 2009

Prerequisite:

CAMS 471 **Sumerian** (3) Introduction to the Sumerian language and the cuneiform writing system.

Effective: Spring 2009

Prerequisite:

CAMS 472 **Akkadian** (3) Introduction to the Akkadian language (Babylonian & Assyrian) and the cuneiform writing system.

Effective: Spring 2009

Prerequisite:

CAMS 480 (J ST 480) **Greeks and Persians** (3) Development and achievements of the Achaemenid kingdom; relationships between Persians and Greeks.

Effective: Spring 2001

Prerequisite:

CAMS 481 (IL) **Introduction to Middle Egyptian & Hieroglyphics** (3) An introduction to the language and script of Ancient Egypt, familiarizing the student with grammar, syntax and lexicon.

Effective: Summer 2012

Prerequisite:

CAMS 490 **Ancient Mediterranean Languages** (3-6) Variable topic study of an ancient language of the Mediterranean basin and related areas, other than Greek, Latin, or Hebrew.

Effective: Summer 2011

Prerequisite:

CAMS 492 **Intermediate Field Methods** (3-6) On-site experience in archaeological fieldwork in the ancient Mediterranean region.

Effective: Spring 2000

Prerequisite:

CAMS 493 **Intermediate Field Analysis** (3-6) On-site experience in archaeological analysis in the ancient Mediterranean region.

Effective: Spring 2000

Prerequisite:

CAMS 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1997

**CAMS 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2001

**CAMS 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  
Effective: Summer 1999

**CAMS 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 1996

**CAMS 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1997

**CAMS 497A Heresy on the Nile: Akhenaten & Tutankhamun** (3) This seminar is designed to introduce the student to the Amarna Age in Egypt (ca. 1400-1340 BC) and the origins and nature of the earliest iconoclastic Monotheism and expressionist art to appear anywhere on earth. The student will be exposed to a variety of evidence drawn from disparate disciplines: linguistic, philological, art historical, archaeological, forensic and shown how they combine in laying out new lines of inquiry.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CAMS 497A (J ST 497A) Paul the Apostle** (3) Intensive study, in historical, literary, and religious contexts, of the life and writings of one of the founders of Christianity. Considerable attention will be focused on the impact of Paul and his writings on the evolution of early Christianity.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CAMS 497H Shakespeare and the Classics** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CAMS 497H Environmental Thought in the Ancient Mediterranean World** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CAMS 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

**CAMS 501 Comparative Greek and Latin Grammar** (3) The evolution of the phonological, morphological, syntactic and lexical structures of Greek and Latin from Proto-Indo-European.  
Effective: Summer 2011  
Prerequisite:

**CAMS 503 Seminar on Ancient Mediterranean Languages** (3 per semester, maximum of 6) An in-depth examination of the ancient languages of the Mediterranean basin, including Indo-European and non-Indo-European languages.  
Effective: Summer 2011  
Prerequisite:

**CAMS 504 Topography of Ancient Rome** (3) Lectures and readings on physical development of the ancient city of Rome from earliest habitation to time of later empire.  
Effective: Spring 2007

**CAMS 520 Advanced Sumerian** (3) Advanced study of Sumerian grammar and cuneiform writing through the reading of Sumerian literary texts.  
Effective: Summer 2009

**CAMS 521 Advanced Akkadian** (3) Advanced study of Akkadian grammar and the cuneiform script through the reading of texts in various dialects.  
Effective: Summer 2009

**CAMS 522 Comparative Semitics** (3) Overview of the Semitic language family and introduction to its comparative linguistic study.  
Effective: Summer 2009

**CAMS 592 Proseminar** (3) Introduction to the history, research methods, historiography of modern scholarship on ancient Mediterranean studies.  
Effective: Summer 2008

CAMS 593 **Research Seminar** (3-6) Significant research experience in the fields represented by CAMS; guided supervision in the preparation of a scholarly article.

Effective: Summer 2008

Prerequisite:

CAMS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1997

CAMS 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Fall 2001

CAMS 599 (IL) **Foreign Studies** (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

CAMS 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Spring 2002

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## **Clinical Lrng Compet (CLC)**

**CLC 712 Clinical Learning Competencies I** (3) This course will begin to develop the medical students' basic clinical reasoning methods, self-learning concepts and the development of clinical competencies.

Effective: Fall 2008

Prerequisite: Concurrent: Cellular and Molecular Basis of Medical Practice Biological Basis of Disease

**CLC 721 Clinical Learning and Competencies II** (8) This course will continue the development of medical students' basic clinical reasoning methods, self-learning concepts and development of clinical competencies that were provided in CLC 721.

Effective: Fall 2008

Prerequisite: Concurrent: HEM 721 CAR 722 PLM 726 REN 728 GI 729

**CLC 722 Clinical Learning and Competencies III** (5) This course will continue the development of medical students' basic clinical reasoning methods, self-learning concepts and development of clinical competencies that were provided in CLC 721.

Effective: Fall 2008

Prerequisite: Concurrent: NBS 725 MSC 727 DERM 720 REP 730 END 731 FCM 723 Behavioral Influences on Health

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## Co-Curricular Activ (COCUR)

COCUR 900 **Moot Court Board** (1 per semester/maximum of 6) See Handbook for Description.  
Effective: Fall 2009

COCUR 901A **Member Arbitration L Rev** (1 per semester/maximum of 6) See handbook for description.  
Effective: Spring 2011

COCUR 901E **Member Environmental Law Review** (1 per semester/maximum of 6) See handbook for description.  
Effective: Fall 2009

COCUR 901I **Member Journal of Law and International Affairs** (1 per semester/maximum of 6) See handbook for description.  
Effective: Fall 2011

COCUR 901P **Member Penn State Law Review** (1 per semester/ maximum of 6) See handbook for description.  
Effective: Fall 2009

COCUR 902A **Editor Arbitration Law Review** (2 per semester/maximum of 6) See handbook for description.  
Effective: Spring 2011

COCUR 902E **Editor Environmental Law Review** (2 per semester/maximum of 8) See handbook for description.  
Effective: Fall 2009

COCUR 902I **Editor Journal of Law and International Affairs** (2 per semester/maximum of 4) See handbook for description.  
Effective: Fall 2011

COCUR 902P **Editor Penn State Law Review** (2 per semester/maximum of 8) See handbook for description.  
Effective: Fall 2009

COCUR 995A **Penn State Law Review** (2) See Handbook for description.  
Effective: Spring 2004

COCUR 995B **Penn State International Law Review** (2) See Handbook for description.  
Effective: Spring 2007

COCUR 995C **Penn State Environmental Law Review** (2) See Handbook for description.  
Effective: Fall 1998  
Prerequisite:

COCUR 995D **Appellate Moot Court Board** (2) See Handbook for description.  
Effective: Fall 1998

COCUR 995E **Trial Advocacy Board** (1 per semester/maximum of 6) See Handbook for description.  
Effective: Spring 2011

COCUR 995F **Law Journal Editing** (2) See Handbook for description.  
Effective: Summer 2000  
Prerequisite:

COCUR 995G **Law Journal Membership** (1 per semester/maximum of 99) See Handbook for description.  
Effective: Spring 2003  
Prerequisite:

COCUR 997 **Special Topics** (1-2 per semester/maximum of 2) Special topics.  
Effective: Fall 2013 Future: Fall 2013

COCUR 997A **Willem C. Vis International Commercial Arbitration Moot Court Team** (1) Willem C. Vis International Commercial Arbitration Moot Court Team.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

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## College Student Affs (CSA)

CSA 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2009

CSA 501 **Introduction to Student Affairs** (3) An introduction to student affairs in higher education with consideration of various functional areas of the profession.  
Effective: Spring 2004

CSA 502 **Organization and Administration in Student Affairs** (3) Formulation of policies as guides to the student personnel service programs; integration of program elements; research; current problems and trends.  
Effective: Spring 2004

CSA 503 **Student Development in College Environments** (3) This course covers the knowledge and methods of human development theories and their applications in college settings.  
Effective: Fall 2003

CSA 504 **Research and Assessment in Student Affairs** (3) This course provides the basic knowledge and skills necessary to plan, design, implement, and evaluation assessment programs in student affairs.  
Effective: Fall 2003

CSA 505 **Capstone Seminar** (2) This seminar provides advanced students an opportunity to apply concepts from previous course work to current issues facing student affairs.  
Effective: Summer 2004

CSA 506 **Campus Environments** (3) Examination of theoretical concepts and empirical findings that describe the college environment and explain its impact on students and staff.  
Effective: Summer 2009

CSA 507 **Social Justice Issues in Higher Education** (3) Exploration of diverse student population, their different experiences, and the value university communities place on these differences.  
Effective: Fall 2010

CSA 594 **Research Topics** (1-9) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2005

CSA 595 **Internship** (1-9) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 2005

CSA 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2005

CSA 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2005

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## Communication (COMMU)

COMMU 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

COMMU 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1987

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## Communication Arts and Sciences (CAS)

CAS 402 **Speech and Human Behavior** (3) General semantics, thought, and human behavior; not offered at University Park campus.

Effective: Spring 2003

CAS 403 **Interpersonal Communication Theory and Research** (3) Examining behavior within interpersonal encounters, with emphasis on both theoretical/applied explanations for how and why people act during such interactions.

Effective: Spring 2003

Prerequisite:

CAS 404 **Conflict Resolution and Negotiation** (3) Theories and strategies important for conceptualizing, developing, and managing conflict negotiation, mediation, and third-party intervention.

Effective: Spring 2003

Prerequisite:

CAS 405 **Family Communication Theory and Research** (3) Explores the nature and functions of communication in family life; emphasis on meaning, patterns, and styles of family communication.

Effective: Summer 2002

Prerequisite:

CAS 406H **Honors Course in Communication Arts and Sciences** (3) Individual study and seminar in selected areas or issues of speech communication.

Effective: Spring 2003

Prerequisite:

CAS 410W **Mother-Daughter Communication** (3) Explores the mother-daughter relationship with an emphasis on understanding mother-daughter communication.

Effective: Summer 2010

Prerequisite:

CAS 411 **Rhetorical Criticism** (3) Principles of rhetorical criticism examined through analysis of selected texts and critics.

Effective: Spring 2003

Prerequisite:

CAS 415 **Rhetoric of Film and Television** (3) Rhetorical analysis of the artistic forms and cultural structures of film and television; intensive study of selected examples.

Effective: Spring 2003

Prerequisite:

CAS 420 **Rhetorical Theory** (3) Ancient, medieval, Renaissance, Enlightenment, and contemporary theories of rhetoric.

Effective: Spring 2003

Prerequisite:

CAS 421 **Communication and Aging** (3) Concentrates on the pivotal role that communication plays in the social process of aging.

Effective: Summer 2007

Prerequisite:

CAS 422 (US) (AF AM 422) **Contemporary African American Communication** (3) A focused study on the continuities between African and African American culture and communication.

Effective: Spring 2013

Prerequisite:

CAS 426W **Communication Ethics** (3) Ethical issues in public and private communication; role of communication in expressing and realizing individual and social values.

Effective: Spring 2003

Prerequisite:

CAS 438 **Rhetoric of Documentary** (3) Rhetorical analysis of the documentary in film, television, and other media; historical and critical analysis of functions and form.

Effective: Spring 2003

Prerequisite:

CAS 450W **Group Communication Theory and Research** (3) Selected theories of problem solving through group discussion emphasizing participation and leadership.

Effective: Spring 2003

Prerequisite:

CAS 452 **Organizational Communication Theory and Research** (3) Explores the nature and functions of communication in organizations; emphasis on concepts, tools, and skills for effective management of communication.

Effective: Spring 2003

Prerequisite:

CAS 452W **Organizational Communication Theory and Research** (3) Explores the nature and functions of communication in organizations; emphasis on writing and exploring concepts, tools, and skills for effective management of communication.

Effective: Spring 2004

Prerequisite:

**CAS 453 Health Communication Theory and Research (3)** Principles of communication about health across the lifespan and within health-care contexts.

Effective: Spring 2006

Prerequisite:

**CAS 455 (US) (WMNST 455) Gender Roles in Communication (3)** Explores the literature on gender research in the discipline of human communication.

Effective: Summer 2005

Prerequisite:

**CAS 460H Introduction to Honors Thesis (3)** This course will guide students through steps that result in Honors Thesis Proposal.

Effective: Summer 2013

Prerequisite:

**CAS 470 Nonverbal Communication (3)** Examining ways nonverbal messages, such as gestures, posture, vocal intonation, and facial expressions, affect us on a daily basis.

Effective: Spring 2003

Prerequisite:

**CAS 471 (US;IL) Intercultural Communication Theory and Research (3)** Intercultural and cross-cultural communication research theory and practice as applied within and across national boundaries.

Effective: Summer 2005

Prerequisite:

**CAS 475 Studies in Public Address (3)** History and criticism of public discourse; intensive analysis of selected public addresses and social movements.

Effective: Spring 2003

Prerequisite:

**CAS 478 Contemporary American Political Rhetoric (3)** Analysis of selected speeches, debates, and persuasive campaigns and movements in recent American political history.

Effective: Spring 2003

Prerequisite:

**CAS 480 Group Performance of Literature (3)** Applying storytelling skills and performance theory to the group presentation of literature; criticism of literature through group presentations.

Effective: Spring 2003

Prerequisite:

**CAS 483 Communication and Information Technology II (3)** Theory and application of interactive internet-based communication and information management; for students who want a Liberal Arts approach.

Effective: Fall 2003

Prerequisite:

**CAS 494 Research Topics (1-12)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2003

Prerequisite:

**CAS 494H Research Topics (1-12)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Summer 2008

Prerequisite:

**CAS 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2003

Prerequisite:

**CAS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2002

**CAS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2002

**CAS 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2002

**CAS 499 (IL) Foreign Studies (1-9)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**CAS 500 Historical Public Address** (3 per semester, maximum of 9) Special topics in American public address, 1765-1900; emphasis on rhetoric of revolution, reform, and reaction.  
Effective: Spring 2003

**CAS 503 Rhetorical Criticism** (3 per semester/maximum of 6) An advanced seminar in the history, theory, methods, and practice of rhetorical criticism.  
Effective: Spring 2003  
Prerequisite:

**CAS 504 Contemporary Public Address** (3 per semester, maximum of 9) Special topics in recent history of American public address, including speeches, debates, persuasive campaigns, and social movements in America 1900-present.  
Effective: Summer 2002

**CAS 505 Historical Development of Rhetorical Theory** (3 per semester/maximum of 9) Study of one or more periods of rhetorical theory from Greek antiquity to 1900.  
Effective: Spring 2005  
Prerequisite:

**CAS 506 Contemporary Rhetorical Theory** (3 per semester/maximum of 6) A study of rhetorical theory from 1930 to the present, focusing on semantic, political, sociological, symbolic, and philosophical perspectives.  
Effective: Spring 2005  
Prerequisite:

**CAS 507 Issues in Rhetorical Theory** (3 per semester, maximum of 6) Theoretical, analytical, philosophical, and critical problems in human communication, with application of humanistic and social scientific research framework.  
Effective: Fall 2003  
Prerequisite:

**CAS 515 Rhetoric and Media** (3 per semester, maximum of 9) Seminar in the application of rhetorical theory and criticism to television, film, and other media.  
Effective: Spring 2003

**CAS 530 Political Communication and Media** (3) Study of rhetorical and communicative dimensions of contemporary political communication with particular attention to electronic media.  
Effective: Spring 2004

**CAS 550 Social Influence** (3 per semester/maximum of 6) Theory and devices of persuasion; analysis of persuasive discourse.  
Effective: Spring 2003  
Prerequisite:

**CAS 553 (PHP 553) Disaster Communication** (3) This seminar provides students with a comprehensive understanding of the multifaceted nature of disaster communication across phases of a disaster.  
Effective: Spring 2012

**CAS 554 Small Group Communication** (3 per semester/maximum of 6) Communication variables in small groups. Experimental research and innovations in communication in vocational, therapeutic, and educational groups.  
Effective: Fall 2003

**CAS 555 Interpersonal Communication** (3 per semester/maximum of 6) Investigation of the communicative management of ongoing relationships; examination of how communication both creates and responds to exigencies of friendship.  
Effective: Spring 2003  
Prerequisite:

**CAS 556 Relational Communication** (3) Examines theories and research focused on understanding communication in intimate (or potentially intimate) relationships.  
Effective: Spring 2003  
Prerequisite:

**CAS 557 Health Communication** (3) Provides experience in making decisions about planning, implementing, and evaluating communication in community-based health campaigns to achieve health promotion/education.  
Effective: Summer 2002  
Prerequisite:

**CAS 558 Family Communication** (3) Examines theories and research focused on understanding communication in family contexts.  
Effective: Spring 2003  
Prerequisite:

**CAS 559 Lifespan Communication** (3) How various communication processes such as language skills, interpersonal relationship definition and management, social support change cross the lifespan.  
Effective: Spring 2003  
Prerequisite:



**CAS 560 Communication Theory (3)** This course introduces graduate students to the philosophical underpinnings of communication research and develops skills in theory construction.

Effective: Summer 2002

Prerequisite:

**CAS 561 Quantitative Research Methods (3)** Introduces graduate students to principles, issues, and design considerations underlying social scientific methodology; material is applied to communication research.

Effective: Summer 2002

Prerequisite:

**CAS 562 Qualitative Research Methods (3)** Qualitative approaches to investigating human experience using tools such as interviewing and observation.

Effective: Spring 2008

**CAS 581 (APLNG 581) Discourse Analysis (3)** Overview of theories and approaches to the analysis of spoken and/or written discourse.

Effective: Spring 2004

**CAS 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 2004

**CAS 594 Research Topics (1-12)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Spring 2004

Prerequisite:

**CAS 595 Internship (1-9)** Supervised off-campus, nongroup instruction.

Effective: Spring 2004

Prerequisite:

**CAS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2004

**CAS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Fall 2002

**CAS 597A Interpersonal Communication and Well-Being (3)** Interpersonal communication, especially communication with close relationship partners, has significant implications for personal well-being. Interpersonal communication partners can be a considerable source of stress through interactions that may involve conflict, hurtful comments, or verbally aggressive messages. Interpersonal communication partners can also attenuate stress through interactions that accomplish problem solving and convey affiliation and support. Within this broad framework, this course examines social scientific research linking interpersonal communication to well-being.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CAS 597B Interpersonal Communication and Well-Being (3)** Interpersonal communication, especially communication with close relationship partners, has significant implications for personal well-being. Interpersonal communication partners can be a considerable source of stress through interactions that may involve conflict, hurtful comments, or verbally aggressive messages. Interpersonal communication partners can also attenuate stress through interactions that accomplish problem solving and convey affiliation and support. Within this broad framework, this course examines social scientific research linking interpersonal communication to well-being.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CAS 600 Thesis Research (1-15)** No description.

Effective: Spring 2004

**CAS 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Spring 2004

**CAS 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Students enrolled will, under supervision, teach SPCOM 100--introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

Effective: Spring 2004

**CAS 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Spring 2004

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CAS 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 2004

CAS 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 2004

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## **Communication Disorders (CMDIS)**

**CMDIS 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1992

**CMDIS 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1992

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## Communication Sciences and Disorders (CSD)

**CSD 433 Aural Rehabilitation** (3) Methods for improving receptive skills of persons with hearing impairments; clinical observation and practice.

Effective: Fall 2003

Prerequisite:

**CSD 442 Introduction to Disorders of Articulation and Phonology** (3) Etiology, diagnosis, and treatment of articulation disorders.

Effective: Fall 2010

Prerequisite:

**CSD 444 Introduction to Organic Disorders of Speech and Language** (3) Etiology, diagnosis, and principles of treatment of stuttering, and of speech- language disorders having organic bases.

Effective: Fall 2010

Prerequisite:

**CSD 451 An Introduction to Augmentative and Alternative Communication** (3) Examination of assessment and intervention issues in augmentative and alternative communication techniques with persons with severe communication disorders.

Effective: Fall 2010

Prerequisite:

**CSD 459W Principles of Clinical Management in Communication Disorders** (3) Survey of principles and practices for diagnosing, interviewing, counseling, treating, reporting, and programming in Communication Disorders.

Effective: Fall 2010

Prerequisite:

**CSD 462 (US;IL) Clinical Bases of Language Disorders** (3) Description of pathological language and cognitive development, and principles of assessment and remediation among individuals with communication disorders.

Effective: Fall 2010

Prerequisite:

**CSD 494H Senior Honors Thesis** (1-6) Independent study related to a student's interests directed by a faculty supervisor and culminating in the production of a thesis.

Effective: Spring 2006

Prerequisite:

**CSD 495A Speech Therapy Practicum** (1-6) Demonstration and practice in examination, diagnosis, and treatment of speech problems.

Effective: Spring 2013

Prerequisite:

**CSD 495B Audiology Practicum** (1-5) Demonstration and practice in examination, diagnosis, and treatment of hearing impairment problems.

Effective: Spring 2013

Prerequisite:

**CSD 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2003

**CSD 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2003

**CSD 500 Research Methods in Communication Sciences and Disorders** (3) Methodology necessary for understanding and conducting research in communication disorders.

Effective: Spring 2004

Prerequisite:

**CSD 520 Physiologic and Acoustic Issues in Speech Science** (3) Seminar in the physiologic and acoustic aspect of normal and disordered speech production.

Effective: Spring 2004

Prerequisite:

**CSD 540 Phonological Disabilities** (3) Speech-sound production disorders in children and adults; methods of examination, diagnosis, and treatment.

Effective: Spring 2006

Prerequisite:

**CSD 541 The Voice and Its Disorders** (3) Physical, physiological, and psychological bases of voice production; causes, nature, and symptoms of its disorders; current clinical methods in voice improvement.

Effective: Spring 2006

Prerequisite:

CSD 542 **Stuttering** (3) Modern theories of causes of disorders of rhythm; methods of examination, diagnosis, and treatment.

Effective: Spring 2004

Prerequisite:

CSD 545 **Neuromotor Disorders of Speech** (3) Etiology and symptomatology of dysarthric and apraxic speech: diagnosis, treatment, and the team rehabilitative program approach to these disorders.

Effective: Spring 2006

Prerequisite:

CSD 546 **Language Disorders in Adults** (3) Nature, etiology, diagnosis, and management of language disorders in adults.

Effective: Spring 2004

Prerequisite:

CSD 547 **Language Disorders in Children** (3) Nature, etiologies, diagnosis, and management of language disorders in children.

Effective: Spring 2006

Prerequisite:

CSD 548 **Dysphagia** (3) Understanding the process of the swallowing mechanism and the management and treatment of swallowing disorders.

Effective: Summer 2006

Prerequisite:

CSD 549 **Speech-Language Pathologists in the Schools** (3) Topics concerning service delivery in the school setting; legislation related to service delivery, special education enrollment, collaboration, caseload management, special populations.

Effective: Summer 2006

CSD 550 **Seminar in Communication Sciences and Disorders** (1-6) Advanced study of special problems and new developments in communication sciences and disorders.

Effective: Spring 2006

CSD 551 **Assessment and Intervention in Augmentative and Alternative Communication** (3) Research results in augmentative and alternative communication (AAC); implications for assessment, prescription of AAC systems, and intervention planning in AAC.

Effective: Spring 2006

CSD 595A **Speech/Language Intervention** (1-3) Instruction in and application of therapy procedures, including a weekly class and direct therapeutic intervention with individuals across the lifespan.

Effective: Spring 2006

CSD 595C **Speech/Language Therapy Externship** (7-15) Full-time clinical experience in speech/language intervention and assessment procedures at an off-campus site.

Effective: Spring 2006

Prerequisite:

CSD 595E **Audiology Practicum** (1-5) No description.

Effective: Spring 2012

CSD 595G **Speech/Language Diagnostics Practicum** (1-2) Instruction in and application of assessment procedures, including pre- and post-evaluation meetings and direct assessment with individuals across the lifespan.

Effective: Spring 2006

CSD 595I **Speech Pathology Mini-Placement** (1-6) Part-time clinical experience in speech/language intervention and assessment procedures at an off-campus site.

Effective: Spring 2006

CSD 595J **Audiology Third Site** (1-2) Internship course.

Effective: Spring 2004

CSD 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2004

CSD 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2003

CSD 597A **Dysarthrias and Apraxia of Speech and Other Motor Speech Disorders** (2) Introduce students to dysarthrias and apraxia of speech and other motor speech disorders. Focus on the etiologies and nature of the dysarthrias and

apraxia.

Effective: Summer 2013 Ending: Summer 2013

**CSD 597B Academic and Clinical Aspects of Motor Speech Disorders (1)** Integrate academic/clinical aspects of motor speech disorders. Supplement to Neuromotor Disorders to discuss advantages/disadvantages of acoustic/ perceptual measures.

Effective: Summer 2013 Ending: Summer 2013

**CSD 597C Issues and Phonological Assessment and Intervention (2)** This seminar will introduce students to the principles of phonological processing. Students will learn to assess clients with disordered phonological processes. Intervention strategies using evidence based practices will be reviewed.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSD 597D AAC Research and Clinical Issues (1-5)** This seminar will focus on augmentative and alternative (AAC) research and clinical issues for speech-language pathologists.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSD 597E Craniofacial Anomalies-Cleft Lip and Cleft Palate (1)** This seminar will introduce students to the etiology, assessment and treatment of craniofacial anomalies. Special focus on treatment of resonance disorders associated with cleft lip and cleft palate.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSD 600 Thesis Research (1-15)** No description.

Effective: Spring 2005

**CSD 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Spring 2005

**CSD 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** No description.

Effective: Spring 2005

Prerequisite:

**CSD 603 Foreign Academic Experience (1-12 per semester/maximum of 12)** For students who are enrolled in a foreign university, or foreign study and/or research and constituting progress towards the degree.

Effective: Spring 2013

Last Import from UCM: July 13, 2013 3:00 AM

## Communications (COMM)

COMM 401 **Mass Media in History** (3) Relationship of news media to social, economic, and political developments in the Western world.  
Effective: Fall 1986

COMM 402 **International Reporting** (3) International Reporting is an advanced level course in the College of Communications designed to give student journalists experience in reporting the news in a foreign country.  
Effective: Summer 2011  
Prerequisite:

COMM 403 **Law of Mass Communications** (3) Nature and theories of law; the Supreme Court and press freedom; legal problems of the mass media.  
Effective: Fall 1986

COMM 403H **Law of Mass Communications** (3) Nature and theories of law; the Supreme Court and press freedom; legal problems of the mass media.  
Effective: Spring 2006

COMM 405 **Political Economy of Communications** (3) Structure and functions of American and other mass communications systems and their relationship to political and economic systems.  
Effective: Spring 2011  
Prerequisite:

COMM 405H **Political Economy of Communications** (3) Structure and functions of American and other mass communications systems and their relationship to political and economic systems.  
Effective: Spring 2011  
Prerequisite:

COMM 406 **Electronic News Gathering and Editing** (3) Intermediate level skills in creating and editing television news packages.  
Effective: Spring 2008  
Prerequisite:

COMM 407A **Media and Government** (3) This course examines the relationship between politics, governance, and news media, and provides a foundation for understanding media's role in public policy.  
Effective: Summer 2012  
Prerequisite:

COMM 407B **Perspectives on American Journalism** (3) The course examines a number of current issues and topics surrounding journalism including: ethics, state of the industry, and news vs. entertainment.  
Effective: Summer 2012  
Prerequisite:

COMM 407C **Media and World Politics** (3) COMM 407C helps to make sense of the impact of media, public opinion and non-state actors shaping foreign policy.  
Effective: Spring 2013  
Prerequisite:

COMM 408 (S T S 408) **Cultural Foundations of Communications** (3) Examination of oral, scribal, print, industrial, and electronic cultures; analysis of impact of technology on communications and social structure.  
Effective: Spring 2009  
Prerequisite:

COMM 409 **News Media Ethics** (3) Ethical problems in the practice of journalism; principal public criticisms of news media; case study approach.  
Effective: Fall 2006

COMM 409H **News Media Ethics** (3) Ethical problems in the practice of journalism; principal public criticisms of news media; case study approach.  
Effective: Fall 2006

COMM 410 (IL) **International Mass Communications** (3) The role of international media in communication among and between nations and people. Complement to COMM 419.  
Effective: Spring 2009 Ending: Fall 2013  
Prerequisite:

COMM 410 (IL) **International Mass Communications** (3) The role of international media in communication among and between nations and peoples.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

COMM 411 **Cultural Aspects of the Mass Media** (3) The mass media as creators and critics of mass culture in American

life; relationships between the media and mass culture.

Effective: Spring 2009

Prerequisite:

**COMM 411H Cultural Aspects of the Mass Media** (3) The mass media as creators and critics of mass culture in American life; relationships between the media and mass culture.

Effective: Spring 2009

Prerequisite:

**COMM 412 Sports, Media and Society** (3) Sport and media relationship in American culture.

Effective: Summer 2006

**COMM 413 The Mass Media and the Public** (3) Nature of mass communications, relationships between mass media and public, media influences on opinion; social pressures on the media.

Effective: Spring 2009

Prerequisite:

**COMM 413W The Mass Media and the Public** (3) Social-level and political theories of the relationships between media and public; media influences on public opinion; social pressure on the media; political communications.

Effective: Spring 2011

Prerequisite:

**COMM 414 Media Management** (3) Theoretical bases and practical approaches for management and administration of communications projects, organizations, and resources.

Effective: Spring 2008

Prerequisite:

**COMM 415 Advanced Photography for Communications** (3) Advanced applications in documentary photography emphasizing the narrative qualities of imagery, and utilizing digital technologies.

Effective: Fall 2010

Prerequisite:

**COMM 417 Ethics and Regulation in Advertising and Public Relations** (3) Ethical issues in practice of advertising and public relations; legal and regulatory issues; case studies.

Effective: Spring 2007

Prerequisite:

**COMM 418 Media Effects: Theory and Research** (3) Investigation of social and psychological effects of media messages and technologies via theories and empirical evidence pertaining to processes of effects.

Effective: Spring 2007

Prerequisite:

**COMM 419 (US;IL) World Media Systems** (3) Comparative study of modern media systems of mass communications in selected foreign countries.

Effective: Spring 2009 Ending: Fall 2013

Prerequisite:

**COMM 419 (US;IL) World Media Systems** (3) Comparative study of modern mass systems and the evolution and structure of specific countries' systems.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**COMM 419H (US;IL) World Media Systems** (3) Comparative study of modern media systems of mass communications in selected foreign countries.

Effective: Spring 2009

Prerequisite:

**COMM 420 Research Methods in Advertising and Public Relations** (3) Primary and secondary research methods used in the development of solutions to advertising and public relations problems.

Effective: Summer 2002

Prerequisite:

**COMM 421W Advertising Creative Strategies** (3) Planning, designing, writing advertisements; introduction to graphics and production techniques and processes; layout and copywriting practice and critiques.

Effective: Spring 2004

Prerequisite:

**COMM 422 Advertising Media Planning** (3) Analysis, selection, and scheduling of advertising media; examination of algorithms, technologies, and software used in media planning.

Effective: Fall 1986

Prerequisite:

**COMM 424 Advertising Campaigns** (3) Advertising campaign problems from the viewpoint of the national advertiser and advertising agency; production of a complete advertising campaign.

Effective: Spring 2007

Prerequisite:

**COMM 425 Advanced Advertising Campaigns** (3) An academic option for student AAF members who will develop an integrated advertising campaign to be presented in District competition.

Effective: Spring 2013



Prerequisite:

**COMM 426 International and Intercultural Strategic Communication (3)** Advertising and public relations in the international and intercultural arenas; multicultural strategic communications strategies.

Effective: Summer 2006

Prerequisite:

**COMM 427 Client/Agency Relations (3)** Building and maintaining client/agency relationships in advertising, public relations and direct response agency business functions.

Effective: Summer 2006

Prerequisite:

**COMM 428A Principles of Strategic Communications (3)** Principles of Strategic Communications provides an overview of the various media and communications methods that comprise modern integrated marketing campaigns.

Effective: Summer 2012

Prerequisite: Concurrent: COMM 260W

**COMM 428B Strategic Communications Law (3)** Analysis of laws and regulations affecting online advertising and strategic communications.

Effective: Summer 2012

Prerequisite:

**COMM 428C Strategic Communications in a Global Environment (3)** Strategic Communications in a Global Environment will provide students with a framework for applying public relations and advertising tools across media platforms and across cultures.

Effective: Summer 2012

Prerequisite:

**COMM 428D Research & Analytics (3)** This course covers online research methods for strategic communication, including web analytics, online surveys, online interviews, and content analysis.

Effective: Summer 2012

Prerequisite:

**COMM 428E Social Media Strategies (3)** This course covers social media theory, tools and best practices to prepare students for current and future use of social media.

Effective: Summer 2012

Prerequisite:

**COMM 430 Mass Media and Politics (3)** Study of mass media as institutions and the effects of the mass media on politics, public policy, and citizens.

Effective: Spring 2008

Prerequisite:

**COMM 433 Film History for Filmmakers II: The Development of the Cinema from 1960 to the Present (3)** History of the art, industry, economics, culture, and technology of cinema from 1960 to the present.

Effective: Summer 2010

Prerequisite:

**COMM 436 Advanced Audio Production (3)** Advanced concepts and techniques of audio production in analog and digital formats with hands-on experience in recording, mixing and editing.

Effective: Spring 2008

Prerequisite:

**COMM 437 Advanced Documentary Production (3 per semester/maximum of 6)** Advanced exploration of documentary production techniques and aesthetics through the completion of a short video project.

Effective: Spring 2011

Prerequisite:

**COMM 438 Advanced Narrative Production (3 per semester/maximum of 6)** Advanced exploration of narrative production techniques and aesthetics through the completion of a short film or video project.

Effective: Spring 2011

Prerequisite:

**COMM 439 Advanced Alternative Production (3 per semester/maximum of 6)** Advanced exploration in experimental and animation forms through the production of a film or video project.

Effective: Spring 2011

Prerequisite:

**COMM 440 Advanced Cinematography and Lighting Techniques (3)** Advanced exploration in camera, lighting, audio, and color-grading techniques, emphasizing technical skills as well as aesthetics.

Effective: Spring 2011

Prerequisite:

**COMM 441 Advanced Graphic Design for Communications (3)** Theory and practice designing graphic visual communication in commercial, non-commercial, and fine art formats for print and on-line media.

Effective: Spring 2011

Prerequisite:

**COMM 443 Producing Workshop (3)** This course will immerse students in the language and practice of producing film and video projects.

Effective: Spring 2011

Prerequisite:

**COMM 444 Advanced Post-Production Techniques (3)** This course offers intensive practical experience in editing, motion graphics and sound mixing techniques, emphasizing both technical skills and aesthetics.

Effective: Summer 2010

Prerequisite:

**COMM 445 Directing Workshop (3)** An advanced aesthetic and skill production course in directing for the screen.

Effective: Spring 2011

Prerequisite:

**COMM 446 Writing for the Screen II (3)** An advanced course in screenwriting that further develops elements of storytelling technique.

Effective: Spring 1994

Prerequisite:

**COMM 448 Advanced Group Production I (3)** A two semester advanced production course emphasizing intensive collaborative film-video production from script through post-production.

Effective: Spring 2011

Prerequisite:

**COMM 449 Advanced Group Production II (3)** Continuation of advanced production course emphasizing intensive collaborative film-video production from script through post-production.

Effective: Spring 2011

Prerequisite:

**COMM 451 Topics in American Film (3 per semester, maximum of 6)** Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

Effective: Summer 1989 Ending: Summer 2013

Prerequisite:

**COMM 451 (AM ST 451) Topics in American Film (3 per semester, maximum of 6)** Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**COMM 452 Topics in International Cinema (3 per semester, maximum of 6)** Critical and historical studies of topics in non-American film. Analysis of theory, direction, cinematography, editing, and screenwriting.

Effective: Summer 1989

Prerequisite:

**COMM 453 (IL) (CMLIT 453) Narrative Theory: Film and Literature (3)** Comparative study of the aesthetics and techniques of film and literature; close analyses of masters of each art form.

Effective: Fall 2006

Prerequisite:

**COMM 454 Documentary in Film and Television (3 per semester, maximum of 6)** Study of representative films from various documentary movements, examining form, technique, trends, and audience objectives.

Effective: Spring 2001

Prerequisite:

**COMM 455 Advanced Film Theory and Criticism (3 per semester, maximum of 6)** Close examination of classic and contemporary film theory and critical perspectives.

Effective: Summer 1989

Prerequisite:

**COMM 456 Media Criticism and Theory (3)** Critical and theoretical approaches to the analysis of media and communication.

Effective: Spring 2008

Prerequisite:

**COMM 457 Media Audiences and Contexts (3)** Survey of the ways media attempt to influence audience reception and how audiences hold sway over media content.

Effective: Spring 2008

Prerequisite:

**COMM 458 Media Law and Ethics (3)** The study and practice of key issues in media law and ethics, including libel law, conflict of interest, truth in advertising.

Effective: Spring 2008

Prerequisite:

**COMM 459 Cultural Effects of Interactive and Online Media (3)** Study of the global social impact and rhetorical limitations of converging media, emphasizing cross-cultural media influences.

Effective: Spring 2008

Prerequisite:

**COMM 460W Reporting Methods (3)** Techniques in reporting news and trends at the local, regional, and county levels. Emphasis on both deadline and interpretive reporting.

Effective: Fall 1990

Prerequisite:

COMM 461 **Magazine Writing** (3 per semester/maximum of 6) Students will learn about idea conception, writing, and editing of magazine stories.

Effective: Spring 2013

Prerequisite:

COMM 462 **Feature Writing** (3) Reporting and writing the human interest article for newspapers and magazines.

Effective: Spring 2008

Prerequisite:

COMM 463 **Newspaper Design** (3) This course will cover newspaper design. Students will learn to solve design problems, edit photos, and work with industry software.

Effective: Spring 2009

Prerequisite:

COMM 464W **Editorial, Opinion and Commentary Writing** (3) Introduces techniques of editorial, opinion and commentary writing.

Effective: Spring 2008

Prerequisite:

COMM 465 **Television Reporting** (3) Television news reporting and production.

Effective: Spring 2008

Prerequisite:

COMM 466 **Public Affairs Broadcasting** (3) Producing radio and television magazine programs featuring individually-produced mini-documentaries and public affairs interviews.

Effective: Summer 1990

Prerequisite:

COMM 467 **News Editing and Evaluation** (3) Concepts and procedures involved in processing news for various news media, but with emphasis on print media editing.

Effective: Spring 2001

Prerequisite:

COMM 468 **Graphic Applications in Print Communications** (3) Issues, concepts, and practice identified with contemporary design strategies for print journalism, advertising, and public relations.

Effective: Summer 1988

Prerequisite:

COMM 469 **Photography for the Mass Media** (3) Development of an informed and critical approach to photocommunication; individual and team projects, seminars, and critiques.

Effective: Fall 1986

Prerequisite:

COMM 470A **Convergent Media News Service: Newspaper Production** (3) Practicum emphasizing newsgathering and reporting for newspaper and for additional media formats.

Effective: Summer 2002

Prerequisite:

COMM 470B **Convergent Media News Service: TV** (3) Practicum emphasizing television news package production for periodic campus news program and for additional media formats.

Effective: Summer 2002

Prerequisite:

COMM 470C **Convergent Media News Service: Radio and Online Publications** (3) Practicum emphasizing streaming radio news package production or production of news pieces for online publications and for additional media formats.

Effective: Fall 2008

Prerequisite:

COMM 471 **Public Relations Media and Methods** (3) Analyzing media and audiences for public relations purposes; planning, designing, and writing public relations communications; press relations and publicity methods.

Effective: Spring 2004

Prerequisite:

COMM 472 **Public Relations Event Planning** (3) Effective planning, organization, implementation and evaluation of events planning.

Effective: Spring 2008

Prerequisite:

COMM 473 **Public Relations Campaigns** (3) Case studies and problems in publicity and public relations in industry, government, and institutions.

Effective: Spring 2012

Prerequisite:

COMM 474 **Depth Reporting** (3) Exploration of strategies for developing indepth newspaper or magazine articles, with an emphasis on gathering information and long-form writing.

Effective: Spring 2004

Prerequisite:

COMM 475 **Issues for Newsroom Managers** (3) Newspaper and television management, the state of the industry and topics that prospective employees should know about.

Effective: Spring 2004

Prerequisite:

COMM 476 **Sports Writing** (3) Techniques in sports reporting and writing for newspapers and magazines.

Effective: Summer 2005

Prerequisite:

COMM 477 **Sports Broadcasting** (3) Techniques of sports broadcasting for radio and television.

Effective: Summer 2005

Prerequisite:

COMM 478 **Sports Information** (3) Techniques of effective media relations used in a sports information office.

Effective: Summer 2005

Prerequisite:

COMM 479 **Telecommunication Economics** (3) Economic, regulatory/business issues in the design/operation of large-scale telecommunication networks such as telephone, cable, wireless, and computer networks.

Effective: Fall 2011

Prerequisite:

COMM 480 **Television News** (6) Produce a weekly television newscast.

Effective: Fall 2011

Prerequisite:

COMM 481 **Advanced Multimedia Production** (3) Advanced work in multimedia production using web authoring, video editing, audio editing, image editing and animation software.

Effective: Fall 2010

Prerequisite:

COMM 482 **Advanced Communication Workshop** (4) Conceptualization, planning, and execution of a visual product on a selected topic utilizing an intensive group project-oriented laboratory approach.

Effective: Spring 2008

Prerequisite:

COMM 483 **Wireless Communications Industry** (3) A broad examination of the wireless phone industry including its development, current structure and future.

Effective: Spring 2011

Prerequisite:

COMM 484 **Emerging Telecommunications Technologies** (3) Overview of technology of electronic media and related societal issues.

Effective: Spring 1992

Prerequisite:

COMM 484H **Emerging Telecommunications Technologies** (3) Overview of technology of electronic media and related societal issues.

Effective: Spring 2005

Prerequisite:

COMM 485 **Analysis of Broadcast-Cable Policy** (3) Analysis of current policy issues in Broadcast/Cable. Standards and methods for evaluating telecomm policy processes and outcomes.

Effective: Fall 2001

Prerequisite:

COMM 486 **Telecommunications Ethics** (3) Drawing on normative theory and political philosophy, this course explores problems in ethics and social responsibility in telecommunications.

Effective: Summer 2011

Prerequisite:

COMM 487 **Advanced Telecommunications Management and Leadership** (3) Strategic management, leadership and ethics issues including marketing, financing, entrepreneurship, and innovation.

Effective: Fall 2011

Prerequisite:

COMM 488 **Writers' Seminar** (3) Workshop designed for advanced students interested in professional writing, involving extensive mutual and self-criticism.

Effective: Spring 2008

Prerequisite:

COMM 489W **Media and Information Industries** (3) The structure, conduct and performance of firms and industries in the electronic media and information sectors.

Effective: Spring 2004

Prerequisite:

COMM 490 **Issues in Electronic Commerce: Policy and Implementation** (3) Analysis of policy, strategic issues, and implications raised by the rapid growth of electronic commerce over the Internet.

Effective: Fall 2001

Prerequisite:

COMM 490A **Convergent Media Seminar** (3) This seminar examines media convergence issues, trends, and effects on society through discussions, presentations, and creation of a capstone project.

Effective: Summer 2002

Prerequisite:

**COMM 491 International Telecommunications and Trade Policy (3)** Development in the law, policy, and business of international telecommunications; emphasis on multilateral forums--International Telecommunications Union and World Trade Organization.

Effective: Fall 2001

Prerequisite:

**COMM 492 Internet Law and Policy (3)** Development in the law, policy, and business of Internet-mediated communications and commerce; emphasis on impact on existing legal, regulatory, and economic models.

Effective: Fall 2001

Prerequisite:

**COMM 493 Entrepreneurship in the Information Age: Senior Seminar (3)** Provides students with knowledge/tools to take their innovation/technology idea through the business planning, capital, and operations budgeting processes.

Effective: Fall 2001

Prerequisite:

**COMM 494 Research Project Courses (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1994

**COMM 494H Research Project Courses (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**COMM 495 Internship (1-3 per semester/maximum of 6)** Supervised practicum with newspapers, broadcasting stations, public relations, and advertising agencies.

Effective: Spring 2008

Prerequisite:

**COMM 495A Internship (1-6 per semester/maximum of 6)** Supervised practicum with newspapers, broadcasting stations, public relations, and advertising agencies.

Effective: Spring 2008

Prerequisite:

**COMM 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1986

**COMM 496H Honors Independent Studies (1-6)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**COMM 496H Honors Independent Studies (1-6)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**COMM 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1986

**COMM 497A Entrepreneurial Journalism (3)** Students will learn how digital innovation is changing the practice, culture and business models of journalism, how new journalists can thrive in this new environment and what skills and abilities will be key success factors. Students should have senior standing to enroll.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**COMM 497B International Documentary Production (3)** UP classroom work will consist of research and proposal of a short personal observation film. Students will shoot their film during an 8 day trip to England. Project will be edited upon return, and shown at final screening June 5.

Effective: Summer 2013 Ending: Summer 2013

**COMM 497C Social Media for Public Relations (3)** This course will explore social media technologies and how to effectively use social media to communicate strategic public relations messages.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**COMM 497E (PL SC 497E) Role of the Media in the Israeli-Palestinian Conflict (3)** This course examines the role of framing and selective reporting in broadcast, digital, and print media in affecting perceptions of the Israeli- Palestinian Conflict.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

COMM 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 2001

COMM 498A **In the Game** (3) Produce half-hour sports magazine style how to air on College HD channel and Web. Students will produce, report, anchor and direct the show. Registration by application.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

COMM 498A **In the Game** (3) Produce half-hour sports magazine style show to air on College HD channel and Web. Students will produce, report, anchor and direct the show. Registration by application.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

COMM 498B **Wireless Devices and Global Markets** (3) Wireless Devices and Global Markets is a new course that examines the market for wireless devices, from Android smartphones to iPhones and iPads. Students will learn about next generation smartphones and get to develop a unique product design concept.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

COMM 498B **Wireless Devices and Global Markets** (3) Wireless Devices and Global Markets is a new course that examines the market for wireless devices, from Android smartphones to iPhones and iPads. Students will learn about next generation smartphones and get to develop a unique product design concept.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

COMM 498C **Contemporary Constitutional Problems** (3) This course examines current topics in constitutional law, focusing on a wide range of issues, including the scope of privacy on your Twitter and Facebook accounts, increased pressure on Hollywood to curb violence in film, television and video games, whether the Second Amendment would permit a ban on assault weapons, and the constitutionality of California's Proposition 8 and the Defense of Marriage Act.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

COMM 499 (IL) **Foreign Study--Mass Communications** (1-12) Study of mass communication systems and practices in selected foreign countries.  
Effective: Summer 2005  
Prerequisite:

COMM 501 **Proseminar in Mass Communications** (3 per semester/maximum of 99) Overview of paradigms in mass communications research  
Effective: Spring 2003  
Prerequisite:

COMM 502 **Pedagogy in Communications** (3) The purpose of this seminar is to train doctoral students to teach in the communications discipline at the college/university level.  
Effective: Spring 2004

COMM 504 **Seminar in the History of Mass Communication** (3) No description.  
Effective: Fall 1986

COMM 505 **International Communication Problems** (3) Legal and communications problems of the international flow of news and opinion; international press codes.  
Effective: Fall 1986

COMM 506 **Introduction to Mass Communications Research** (3) The scientific method; survey of basic concepts of theoretical and empirical research; variety of methodology; criteria for adequate research.  
Effective: Fall 1986

COMM 507 **News Media and Public Opinion** (3) Problems in the function, techniques, and responsibilities of press, radio, and television in forming and interpreting opinion.  
Effective: Fall 1986

COMM 508 **The Literature of Journalism** (3) No description.  
Effective: Fall 1986

COMM 510 **Comparative Theories of Press Systems** (3) Institutional structure and normative functions of press systems in modern societies, as shaped by prevailing world view and social organization.  
Effective: Fall 1986

COMM 511 **Mass Communications Research Methods II** (3) Problems of bibliographical research; evaluation of sources and materials in mass communications history, biography, structure, ethics, and other areas.  
Effective: Fall 1986  
Prerequisite:

**COMM 512 Government and Mass Communications** (3) Problems of freedom of information; governmental efforts to control mass communication agencies; government news coverage; public information agencies.  
Effective: Fall 1986

**COMM 513 Constitutional Problems of the News Media** (3) Problems involving conflict between guarantees of press freedom in the First and Fourteenth Amendments and rights and privileges of others.  
Effective: Fall 1986

**COMM 514 Political Economy of Communications** (3) Structure and functions of United States and global media systems and their relationship to political and economic systems.  
Effective: Fall 2003

**COMM 515 MA Proseminar in Mass Communications** (3) An introduction to graduate studies for MA students in Media Studies and Telecommunications Studies.  
Effective: Fall 2003  
Prerequisite:

**COMM 516 Introduction to Data Analysis in Communications** (3) To understand and be able to use data analysis techniques common to research in communications.  
Effective: Spring 2004  
Prerequisite:

**COMM 517 Psychological Aspects of Communication Technology** (3) Investigation of psychological aspects of human-computer interaction (HCI) and computer-mediated communication (CMC).  
Effective: Spring 2007  
Prerequisite:

**COMM 518 Media Effects** (3) Advanced study of the effects of media messages and technologies via theories and empirical evidence pertaining to processes of effects.  
Effective: Spring 2005  
Prerequisite:

**COMM 520 Seminar in Advertising Problems** (3) No description.  
Effective: Fall 1986

**COMM 521 Advertising Perspectives** (3) An overview of advertising in industrial societies including institutional issues; socio-demographic issues; public policy issues; and ethical issues.  
Effective: Spring 1992

**COMM 522 Social and Cultural Aspects of Advertising** (3) Analysis of advertising from a cultural/literary perspective; emphasis on semiotic and hermeneutic analysis; advertising as social communication.  
Effective: Spring 1992

**COMM 550 Film Theory and Criticism** (3) Studies in traditional and contemporary film theory and criticism.  
Effective: Spring 2005

**COMM 553 Special Problems in Film and TV** (1-3) No description.  
Effective: Fall 1986

**COMM 580 Seminar in Telecommunications** (3) Study of the historical and contemporary issues and problems in telecommunications.  
Effective: Fall 1986

**COMM 582 Ethics and Emerging Communications Technology** (3) Identification and analysis of ethical issues raised by electronic communications technologies.  
Effective: Spring 2004

**COMM 583 Seminar on United States Telecommunications Policy** (3) Examination of the United States telecommunications policy process and current issues.  
Effective: Spring 2004

**COMM 584 International Telecommunications and Trade Policy** (3) An interdisciplinary perspective that investigates contemporary debates and ongoing or anticipated conflicts in international telecommunications and trade policy.  
Effective: Fall 2000

**COMM 585 Media & Telecommunications Industries** (3) Study the structure and performance of media, telecommunications and information industries applying principles and ideas from microeconomics, finance and communications.

Effective: Spring 2005

**COMM 587 Internet Law and Policy (3)** Examination of legal, policy and business developments in Internet-mediated communications emphasizing the impact on existing regulatory and economic models.  
Effective: Summer 2003

**COMM 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**COMM 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 2000

**COMM 594A Telecommunications Studies Masters Paper (3)** A significant research paper completed under the direction of a faculty adviser.  
Effective: Spring 2002  
Prerequisite:

**COMM 594B Research Project Apprenticeship (1-3 per semester, maximum of 3)** Provides opportunities for doctoral students to enhance their knowledge of comparative research methods by working on established faculty research projects.  
Effective: Spring 2002  
Prerequisite:

**COMM 595 Internship (1-18)** Supervised off-campus, non-group instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 2000

**COMM 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1986

**COMM 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**COMM 597A Human Interaction in Social Media (3)** This course marshals both qualitative and quantitative studies of human interaction on social media, investigating how human interaction is being deeply shaped by social media use. The course will thus focus on three generalizations: (1) how social media influence human interaction with others, (2) how social media influence information processing, (3) how to use semantic analysis software such as Tropes, AntConc, General Inquirer to analyze information flows on various social media platforms. (All the software will be provided by the instructor.) Students preferring qualitative studies may find this course beneficial in learning computer-aided content analysis and more.  
Effective: Summer 2013 Ending: Summer 2013

**COMM 597A International Strategic Communications (3)** The class will use a media effects framework to explore the influence of culture and national values on persuasive communication. Relevant theories and illustrative case studies will be discussed in the context of strategic communication focused on issues like the environment, public health, brand promotion, charitable donations, etc.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**COMM 597A Media and Culture (3)** This course will examine the ongoing effort to theorize the complex relationship between media and culture during the 20th Century and into our own. We will begin with seminal thinkers like Adorno and Benjamin who framed the debate, and work our way toward contemporary theorists like Zizek and Ranciere who have continued to problematize how different forms of media exert their forces on individuals and the cultures in which they live.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**COMM 597B Advanced Data Analysis in Communications (3)** An examination of advanced data analytic techniques in communications, with an emphasis on applied understanding and hands-on application of data-analysis software.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**COMM 597D Ethnography in Communication Research (3)** This course is designed to provide students with a working knowledge of the intellectual history and major concepts, premises, theoretical approaches, analytical techniques and methodologies germane to the study of ethnography as a form of qualitative research. Concurrently, the students will engage the praxis of fieldwork during the course, allowing us to personally/collectively explore what it means to define/investigate/understand "the Field" in all its permutations and consider ethnographic engagement as it occurs across its wider contemporary spectrum ranging from traditional approaches to evolving methodologies related to understanding emerging communications technologies. Finally, the challenges, perspectives, roles, and ethical



implications related to the "research" will be a central motif.  
Effective: Summer 2013 Ending: Summer 2013

**COMM 597E Feminist Media Studies (3)** We will examine classic and contemporary debates that span the histories, methodologies, and texts central to feminist media criticism. We will also explore the political, historical, economic, cultural, and academic struggles that such debates contributed to and were shaped by as the field of feminist media studies became an established discipline.  
Effective: Summer 2013 Ending: Summer 2013

**COMM 600 Thesis Research (1-15)** No description.  
Effective: Fall 1986

**COMM 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1990

**COMM 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Teaching or assisting in School of Communication courses by graduate students with previous news-editorial, advertising, and broadcasting experience.  
Effective: Fall 1986

**COMM 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1986

**COMM 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1990

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## Communications-CI (COMMS)

COMMS 438 **Magazine Editing** (3) Study and practice of the editing and design of magazines and newsletters.  
Effective: Spring 2008

COMMS 500 **Communications and Cultural Theory** (3) This course is designed to provide students a broad background in communications and cultural theory.  
Effective: Summer 2011

COMMS 503 **Research Methods in Communications** (3) This course prepares students to conduct research in communications using both qualitative and quantitative research methods.  
Effective: Summer 2011

COMMS 519 **Communication Technology and Culture in History** (3) An advanced study of various interpretive approaches and methodological tools that are central to the analysis of cultural artifacts.  
Effective: Summer 2011

COMMS 525 **Advanced Writer's Seminar** (3-9 per semester/maximum of 9) This course supports the development of advanced writing projects in a range of different genres.  
Effective: Summer 2011

COMMS 555 **Media Discourse Analysis** (3) This course provides students with advanced theoretical approaches and methodological tools to analyze a variety of media discourses.  
Effective: Summer 2011

COMMS 560 **Seminar on Global Culture and Communication** (3) This course explores the globalization of communication and communication technologies within a broad political, economic and cultural context.  
Effective: Summer 2011

COMMS 568 **Media Production Workshop** (3-9 per semester/maximum of 9) This course prepares students for the creation of advanced media projects in traditional and digital media.  
Effective: Summer 2011

COMMS 580 **Communications Master's Project** (3-6 per semester/maximum of 6) An original master's paper or creative production with critical paper.  
Effective: Summer 2011  
Prerequisite:

COMMS 600 **Thesis Research** (1-15 per semester/maximum of 99) No description.  
Effective: Fall 2010

COMMS 610 **Thesis Research** (1-15 per semester/maximum of 99) No description.  
Effective: Fall 2010

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## Community Psychology (CMPSY)

CMPSY 500 **Theories and Issues in Community Psychology** (3) Contemporary issues in community psychology will be discussed within the framework of its development from clinical and social psychology.  
Effective: Spring 1997

CMPSY 510 **Change Processes** (3) Social change as it takes place within institutions and communities.  
Effective: Spring 1997

CMPSY 511 **Social Impacts on Psychological Functioning** (3) Psychological functioning, as it is affected by social contexts.  
Effective: Fall 1996  
Prerequisite:

CMPSY 519 **Research Methods I** (3) In-depth examination of research methods utilized by community psychologists and social change activists; course followed by CMPSY 520.  
Effective: Fall 1999  
Prerequisite:

CMPSY 520 **Research Methods II** (3) In-depth examination of research methods utilized by community psychologists and social change activists. (Continuation of CMPSY 519).  
Effective: Summer 2000  
Prerequisite:

CMPSY 521 **Roles and Methods in Community Psychology** (3) Advanced course entailing the development of Master's Projects with both fieldwork and research; each student writes a formal proposal.  
Effective: Spring 1997  
Prerequisite:

CMPSY 522 **Practicum** (3-6) Fieldwork implementing planned change.  
Effective: Fall 1996  
Prerequisite:

CMPSY 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 1996

CMPSY 594 **Research** (3-6) Supervised research on a master's paper.  
Effective: Spring 1997  
Prerequisite:

CMPSY 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1996

CMPSY 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1997

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## Community S P & D (CSP D)

CSP D 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

CSP D 596 (H P A 596) **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1987

CSP D 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

CSP D 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

CSP D 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised and graded teaching experience in undergraduate Community Development, Health Planning and Administration, and Law Enforcement and Corrections courses.  
Effective: Fall 1983  
Prerequisite:

CSP D 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

CSP D 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Community and Economic Development (CEDEV)

CEDEV 430 **Principles of Local Economic Development** (3) Concepts, strategies, and techniques of local economic analysis, planning, and development; case studies and decision-making exercises.

Effective: Summer 2013

Prerequisite:

CEDEV 452 **Community Structure, Processes and Capacity** (3) Social organization, processes and change in communities; use of sociological principles in analysis of community problems and development.

Effective: Spring 2012

Prerequisite:

CEDEV 500 **Community and Economic Development: Theory and Practice** (3) Understanding theories, concepts, and frameworks of community and economic development and community decision-making models in application to community development practice and issues.

Effective: Summer 2013

CEDEV 505 (AEE 505, R SOC 505) **Leadership Development** (3) Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

Effective: Summer 2013

CEDEV 509 **Population, Land Use, and Municipal Finance** (3) Understanding the interaction of population characteristics, land use, municipal funds, and taxation in a locality and how they impact the operation and management of government jurisdictions.

Effective: Summer 2013

Prerequisite:

CEDEV 516 (R SOC 516) **Change in Rural Society** (3) Social change in rural society, emphasizing prediction and control of the change process; even years.

Effective: Summer 2013

Prerequisite:

CEDEV 517 (R SOC 517) **International Rural Social Change** (3) Implications of planned change for international rural societies, considering basic structural constraints, known institutional linkages, and potential synergetic consequences.

Effective: Summer 2013

Prerequisite:

CEDEV 533 (AEREC 533) **Rural Development Research Methods and Topics** (3) Advanced theories and methods for rural economic development research.

Effective: Summer 2013

Prerequisite:

CEDEV 560 **Regional Development: Principles, Policy, and Practice** (3) Regional growth and development, focusing on challenges to theory, policy, and practice, emphasizing change in metropolitan, micropolitan, and rural areas.

Effective: Summer 2013

Prerequisite:

CEDEV 567 **Resilient Communities and Environments** (3) Understanding connections between communities and surrounding ecosystems; exploration of management techniques for building adaptive, resilient, and sustainable communities and environments.

Effective: Summer 2013

Prerequisite:

CEDEV 575 **Methods and Techniques for Community and Economic Development** (3) Understanding and applying methods and hands-on experience with techniques used in community and economic development. Lab.

Effective: Summer 2013

Prerequisite:

CEDEV 576 **Applications and Practices for Community and Economic Development** (1-6) Consideration of community and economic development applications in communities and practices of public and private organizations and agencies.

Effective: Summer 2013

Prerequisite:

CEDEV 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 2013

CEDEV 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

CEDEV 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2013

**CEDEV 597C Research Application and Practice (3)** Course outlines the steps for students to apply CEDEV theories and methods to a topic in writing their Master's paper.  
Effective: Summer 2013 Ending: Summer 2013

**CEDEV 597C Research Application & Practice (3)** Course outlines the steps for students to apply CEDEV theories and methods to a topic in writing their Master's paper.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CEDEV 599 (IL) Foreign Studies (1-12, maximum of 24)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2013

**CEDEV 602 Supervised Experience in College Teaching (1-3)** Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Summer 2013

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## Comparative Literature (CMLIT)

CMLIT 400Y (US;IL) **Senior Seminar in Literary Criticism and Theory** (3) Discussions of theories of literature, of literary criticism, and particularly of the distinct methods of comparative study; individual projects.

Effective: Spring 2006

Prerequisite:

CMLIT 401Y (IL) **The Western Literary Heritage I** (3) Major literary movements and authors in the literature of the Western world from the beginnings through the early Renaissance.

Effective: Spring 2006

Prerequisite:

CMLIT 402Y (US;IL) **The Western Literary Heritage II** (3) Major literary movements and authors in the literature of the Western world from the late Renaissance to the present time.

Effective: Spring 2006

Prerequisite:

CMLIT 403 (US) (LTNST 403) **Latino/a Literature and Culture** (3) Literary and other forms of cultural expression (film, music, art, and theater) are compared across different Latina/o communities.

Effective: Spring 2011

Prerequisite:

CMLIT 404 (IL) (ASIA 404) **Topics in Asian Literature** (3) Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan.

Effective: Spring 2011

Prerequisite:

CMLIT 404Y (IL) (ASIA 404Y) **Topics in Studies of Asian Literature** (3) Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan, taught with focus on written analysis and interpretation.

Effective: Summer 2013

Prerequisite:

CMLIT 405 (US;IL) **Inter-American Literature** (3) This course examines the development of literature in Canada, the United States, Spanish America, the Caribbean area, and Brazil.

Effective: Spring 2006

Prerequisite:

CMLIT 406 (IL) **Women and World Literature** (3) Literature written by women, especially women from non-Western cultures; the spectrum of genres in which women writers have excelled.

Effective: Spring 2006

Prerequisite:

CMLIT 408 (IL) **Heroic Literature** (3) Traditional heroes, their traits and adventures; typical themes and examples chosen from the epics and sagas of world literature.

Effective: Spring 2006

Prerequisite:

CMLIT 410 (IL) **Literary Translation: Theory and Practice** (3) Emphasizing literary translation, a study of the theoretical and practical problems encountered in the processes of translation, transmission, and interpretation.

Effective: Spring 2011

Prerequisite:

CMLIT 415 (GH;US;IL) **World Graphic Novels** (3) Critical analyses of form, genre, medium, and discourse of the graphic novel and its historical precedents in an international and comparative context.

Effective: Summer 2010

Prerequisite:

CMLIT 422 (IL) **African Drama** (3) Traditional and popular drama forms; modern anglophone and francophone drama; nationalism and social criticism in contemporary African drama.

Effective: Spring 2006

CMLIT 423 (IL) **African Novel** (3) From traditional oral narratives to modern autobiographical, historical, satirical, sociological, and allegorical forms; novelist as social critic.

Effective: Spring 2006

CMLIT 429 (ENGL 429) **New Media and Literature** (3) New media literary genres; critical discussion of creative works in digital media.

Effective: Summer 2010

CMLIT 430 (IL) **Global Modernisms** (3) A comparative investigation of global Modernisms, with an emphasis on the relations between modernism, modernity, and modernization.

Effective: Summer 2010

Prerequisite:

CMLIT 435 (IL) **Cultures of Globalization** (3) Cultural and literary effects of the process of globalization, with an emphasis

on world literatures and transnationalism.

Effective: Summer 2010

Prerequisite:

CMLIT 438 (IL) **Fantastic Worlds: International and Comparative Perspectives** (3) A comparative, international study of fantastic worlds in literature and visual culture.

Effective: Summer 2010

Prerequisite:

CMLIT 443 (US;IL) **Transatlantic Literature** (3 per semester/maximum of 6) Comparative literary and cultural relations across the Atlantic Ocean; may include Europe, Africa, the Americas, and/or the Caribbean.

Effective: Spring 2011

Prerequisite:

CMLIT 446 (IL) **Postcolonial Literature and Culture** (3) Postcolonial literature and theory in a comparative and international context.

Effective: Summer 2010

Prerequisite:

CMLIT 448 (IL) **Literary Cultures of Buddhism** (3) Comparative exploration of various Buddhist literary cultures, from the classical Indian subcontinent to modern movements like the Beats and dalit writing.

Effective: Summer 2010

Prerequisite:

CMLIT 449 (IL) **Literary Cultures of Islam** (3) Comparative discussion of the literary cultures of Islam from the seventh century to the present.

Effective: Summer 2010

Prerequisite:

CMLIT 453 (IL) (COMM 453) **Narrative Theory: Film and Literature** (3) Comparative study of the aesthetics and techniques of film and literature; close analyses of masters of each art form.

Effective: Fall 2006

Prerequisite:

CMLIT 455 (IL) **Ethics, Justice, and Rights in World Literature** (3) Concepts of ethics, justice, and rights, appearing in world literature and/or film.

Effective: Summer 2010

Prerequisite:

CMLIT 459 **Topics in Theory** (3) Selected topics in this history of theory and literary criticism within a global, comparative context.

Effective: Summer 2010

Prerequisite:

CMLIT 470 (IL) **The Modern Novel** (3) Major novels of Joyce, Proust, Kafka, Thomas Mann, Nabokov, and others; their contributions to the art of the novel.

Effective: Spring 2011

Prerequisite:

CMLIT 471 (IL) **Poetry and Poetics** (3) Theoretical and practical concepts in the comparative, global history of poetry and/or poetics.

Effective: Summer 2010

Prerequisite:

CMLIT 480 (IL) **The International Folktale** (3) Traditional tales from various parts of the world: their origin, characteristics, forms; their transmission as oral narrative and written literature.

Effective: Spring 2006

Prerequisite:

CMLIT 486 (IL) **Tragedy** (3) Development of tragic drama and its relationship to social background and philosophical theory.

Effective: Spring 2006

CMLIT 487 (IL) **Comedy** (3) Development of comic drama and its relationship to social background and philosophical theory.

Effective: Spring 2006

CMLIT 488 (IL) (ENGL 488) **Modern Continental Drama** (3) From Ibsen to the drama of today: Strindberg, Chekhov, Hauptmann, Pirandello, Ionesco, Beckett, Genet, and others.

Effective: Spring 2006

Prerequisite:

CMLIT 489 (IL) **Contemporary World Fiction** (3) A survey of developments in contemporary world fiction in translation.

Effective: Spring 2012

Prerequisite:

CMLIT 490 **Video Game Studies** (3) A comparative look at the nature and history of video games as cultural artifacts, from Pong to online role-playing.

Effective: Summer 2010



Prerequisite:

CMLIT 491 (IL) **Literary Adaptation: International and Comparative Perspectives** (3) A comparative, international study of adaptations between literature and other media (film, theater, photography, music).

Effective: Summer 2010

Prerequisite:

CMLIT 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1995

CMLIT 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

CMLIT 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1995

CMLIT 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 1995

CMLIT 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 1995

CMLIT 499 (IL) **Foreign Study--Comparative Literature** (3-6) Advanced courses offered on comparative literary topics as part of a foreign-study program.

Effective: Summer 2005

Prerequisite:

CMLIT 501 **Comparative Method in Literary Studies** (1-6 per semester/maximum of 6) Bibliography, research methods, and studies in comparative literature.

Effective: Spring 2012

CMLIT 502 **Comparative Criticism I: Classical to Neoclassical** (1-3 per semester/maximum of 3) Issues in literary criticism from Plato and Aristotle to the mid-eighteenth century.

Effective: Spring 2012

CMLIT 503 **Comparative Criticism II: Romantic to Contemporary** (1-3 per semester/maximum of 3) Principles and theories of literary criticism from eighteenth- and nineteenth- century beginnings to twentieth-century expansion and application.

Effective: Spring 2012

CMLIT 504 **Studies in Literary Genres** (3-6) The concept of genre and the evolution of genre theory; application to a specific genre, e.g., the lyric or the novel.

Effective: Summer 1995

CMLIT 505 **Studies in Literary Periods and Movements** (3-6) Comparative approaches to cohesive units within literary history, e.g., the Renaissance, the Enlightenment, Romanticism, Surrealism.

Effective: Summer 1995

CMLIT 506 **Studies in Literary Themes and Motifs** (3-6) Comparative approaches to recurrent literary themes and motifs; application to a specific example, e.g., literary Utopias or the Faust theme.

Effective: Summer 1995

CMLIT 507 **Comparative Poetics** (3 per semester/maximum of 6) Theoretical and practical concepts in the comparative, global history of poetry and/or poetics.

Effective: Summer 2010

CMLIT 508 **Global Visual Culture** (3-6 per semester/maximum of 6) Comparative study of transnational forms of visual cultural production; e.g. new media, cinema, television, public culture.

Effective: Fall 2011

CMLIT 509 **Comparative Modernisms** (3-6 per semester/maximum of 6) Aesthetic and historical development of Modernism in diverse cultures.

Effective: Fall 2011

**CMLIT 510 Theory and Practice of Translation** (3) Theories of translation and interpretation; importance of translation in literary transmission; application of theoretical concepts to individual translation projects.

Effective: Summer 1995

Prerequisite:

**CMLIT 521 Comparative Seminar in Inter-American Literatures** (1-12) Comparative topics presenting literary works of the Americas--North America, South America, and the Caribbean--from early to present times.

Effective: Summer 2000

**CMLIT 522 Comparative Seminar in Asian Literatures** (1-12) Comparative topics presenting literary works of Asia, from the origins of literature in Asia to the present time.

Effective: Summer 2000

**CMLIT 523 Comparative Seminar in African Literatures** (1-12) Comparative topics presenting literary works of Africa, from the origins of literature in Africa to the present time.

Effective: Summer 2000

**CMLIT 543 Literary Relations** (3 per semester/maximum of 6) Mutual influences among specific literatures and cultures; for example, German-American, French-American, Inter-American, or East-West literary relations.

Effective: Summer 1995

**CMLIT 570 Forces in Contemporary Literature** (3-6) Intellectual currents and experimental forms in contemporary world literature.

Effective: Summer 1995

**CMLIT 580 Contemporary Literary Theory** (3) Major issues in contemporary literary theory and their significance for criticism, with emphasis on continental European theorists and their influence.

Effective: Summer 1995

**CMLIT 589 (FR 589, GER 589, SPAN 589) Technology in Foreign Language Education: An Overview** (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)

Effective: Spring 2004

**CMLIT 590 Colloquium** (1-3) Continuing seminars which consist of a series of lectures by faculty, students or outside speakers.

Effective: Summer 1995

**CMLIT 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1995

**CMLIT 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1995

**CMLIT 599 (IL) Foreign Study--Comparative Literature** (1-12) Graduate-level courses offered on comparative literary topics as part of a foreign-study experience approved by the program head.

Effective: Summer 2005

Prerequisite:

**CMLIT 600 Thesis Research** (1-15) No description.

Effective: Summer 1995

**CMLIT 601 Ph.D. Dissertation Full Time** (0) No description.

Effective: Summer 1995

**CMLIT 602 Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Supervision of teaching; consideration of instructional aims and objectives, methods of lecturing and leading discussions, evaluation of student work.

Effective: Summer 1995

**CMLIT 603 Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Spring 2000

CMLIT 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1995

CMLIT 611 **PH.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1995

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## Comparative Med-Hy (C MED)

C MED 501 **Biology and Care of Laboratory Animals** (3) Presentation of the anatomic and physiologic characteristics of the commonly used laboratory animal species and their relation to biomedical research.  
Effective: Fall 1984

C MED 503 **Laboratory Animal Genetics** (3) Genetic principles applied to laboratory animals used for investigations of diseases that may be controlled or influenced by genetic factors.  
Effective: Fall 1984

C MED 507 **Techniques of Laboratory Animal Experimentation** (3) Techniques of drug administration, infusion, and collection of body fluids and materials; gnotobiology; use of radioisotopes and bioinstrumentation.  
Effective: Fall 1984

C MED 515 **Experimental Surgery of Laboratory Animals** (3) Surgical techniques, including nephrectomy and Goldblatt clamp, bladder and gastric pouches, bile duct cannulation, intraventricular operation, cardiac and cerebrovascular catheterization.  
Effective: Winter 1978

C MED 530 **Diseases of Laboratory Animals I** (3) Physiological and pathological expressions of both infectious and metabolic- degenerative diseases of rodents, with emphasis on diagnostic and control methods.  
Effective: Winter 1978

C MED 531 **Diseases of Laboratory Animals II** (3) Physiological and pathological expressions of both infectious and metabolic- degenerative diseases of nonhuman primates and other species of animals.  
Effective: Winter 1978

C MED 535 **Comparative Pathology** (3) Comparative pathologic characteristics of infectious and metabolic diseases of animals and man.  
Effective: Fall 1983

C MED 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

C MED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

C MED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

C MED 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

C MED 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## Comparative and International Education (CI ED)

CI ED 401 (IL) (EDTHP 401) **Introduction to Comparative Education** (3) Origins, nature, scope, basic literature, and methodology of comparative education. Study of sample topics.

Effective: Fall 2007

Prerequisite:

CI ED 440 (EDTHP 440) **Introduction to Philosophy of Education** (3) Introduction to the examination of educational theory and practice from philosophical perspectives, classical and contemporary.

Effective: Spring 2013

Prerequisite:

CI ED 444 (WL ED 444) **Language, Culture and the Classroom: Issues for Practitioners** (3) Critical understanding of cultural linguistic diversity to facilitate the inclusion of English Language Learners in a globalized classroom.

Effective: Fall 2007

Prerequisite:

CI ED 457 (AGECO 457) **Principles of Integrated Pest Management** (3) Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester and graduate students.

Effective: Spring 2010 Ending: Fall 2013

Prerequisite:

CI ED 457 (AGECO 457) **Principles of Integrated Pest Management** (3) Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester and graduate students.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

CI ED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1998

CI ED 497B **Humphrey Seminar** (3) The Humphrey Seminar is a two-semester sequence planned to bring a group focus to the various elements of the Humphrey program. The seminar is intended to ensure that you, the Humphrey Fellows, have an adequate understanding of the U.S. higher education environment and institutions, and that you have the opportunity to explore issues in professional areas that maybe of interest to you. The seminar is also a forum in which you learn from each other. In the first semester, you will be expected to make a presentation on your country for the benefit of the other Fellows and community members at large. Four Information Sharing Sessions (ISS) and Movie Nights are also organized during each semester where you will be asked to share your professional development experiences with your colleagues or discuss cultural or professional issues and trends.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CI ED 500 **Comparative Education Proseminar I** (3) Methods of comparative education and case studies of governance and administration; first of two part sequence.

Effective: Spring 1995

CI ED 503 (EDTHP 507, HI ED 503) **Ethnicity, National Identity, and Education** (3) Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.

Effective: Summer 1995

CI ED 504 **Perspectives in African Education** (3) Educational systems in selected african countries are examined with respect to colonial history, social, political, and cultural factors.

Effective: Spring 2012

CI ED 508 (ADTED 508) **Globalization and Lifelong Learning** (3) Examination of globalization discourses and their relationships, implications and impacts on lifelong learning processes and contexts.

Effective: Summer 2004

CI ED 509 (ADTED 509) **Language, Literacy, Identity, and Culture in a Global Context** (3) Examines the relationship between issues of language, identity, and culture for adult learners in an increasingly global context.

Effective: Spring 2004

Prerequisite:

CI ED 516 (EDTHP 516) **Education and Demographic Change in the United States and Abroad** (3) Interrelationship between schooling and employment, marriage, fertility, and migration. Focus comparatively on the United States and developing countries.

Effective: Spring 1998

CI ED 534 (EDTHP 534, SOC 534) **Childhood and Education in Sociological and International Comparative Perspective**

(3) The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.  
Effective: Spring 2013

CI ED 541 (EDTHP 541) **Contemporary Philosophies of Education** (3) Educational theory and practice in relation to contemporary movements in philosophy.  
Effective: Spring 2008

CI ED 542 (LL ED 542) **Issues in Literacy Education** (3) Discussion of philosophical, sociological, historical, and curricular issues in literacy education.  
Effective: Spring 1997

CI ED 553 (HI ED 553, SOC 553, EDTHP 553) **Educational Mobility in Comparative Perspective** (3) Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America.  
Effective: Spring 2003

CI ED 555 (EDPSY 555) **Validity of Assessment Results** (3) Concepts, issues, and methods of validation of educational and psychological assessment including models and approaches to validation, bias, and utility.  
Effective: Spring 2008  
Prerequisite:

CI ED 564 (ADTED 564) **Social and Cultural Contexts of Learning and Work** (3) Examines the relationship between learning and work with special attention given to how certain forms of learning are legitimized.  
Effective: Summer 2004  
Prerequisite:

CI ED 570 (ADTED 570) **Comparative and International Adult Education** (3) Critical and comparative analysis of adult education theory and practice outside North America, including international agency involvement.  
Effective: Spring 1995  
Prerequisite:

CI ED 571 (HI ED 571) **Comparative Higher Education** (3) Comparative methods of studying structural variations in systems of higher education in principal industrialized nations and other selected countries.  
Effective: Spring 1995

CI ED 572 (ADTED 572) **Policy Studies in Lifelong Learning** (3) Examine lifelong learning policies and the relationship between lifelong learning issues and problems, policy development, policy actors and institutional structures.  
Effective: Summer 2004  
Prerequisite:

CI ED 587 (E C E 587) **Curriculum, Culture, and Child Development** (3) Examines human development and cultural factors in planning, designing, and implementing curriculum and instruction in early childhood and childhood education.  
Effective: Spring 2012  
Prerequisite:

CI ED 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1995

CI ED 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 1995

CI ED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1995

CI ED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1995

CI ED 597A (ADTED 597A) **Concept Mapping in Cross-Cultural (Comparative) Research in Education** (3) This course will explore concept maps as analytical tools for research in cross-cultural and comparative contexts.  
Effective: Summer 2013 Ending: Summer 2013

CI ED 597A (ADTED 597C) **Multicultural Education in Schools and the Workplace** (3) Describes multicultural education as "an educational reform movement designed to increase educational equity for all students from diverse racial and ethnic groups, gender groups, exceptional students, and students from each social-class group."  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CI ED 597B (EDTHP 597B) **Research in Comparative Education** (3) This course introduces large-scale international assessment databases and demonstrates how to use these data to conduct comparative education research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

CI ED 597C **Politics, Language, and Pedagogy: Applying Paulo Freire Today** (3) This course examines the tenets, critiques, and application of Paulo Freire's educational philosophy in diverse international settings.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CI ED 597F (EDTHP 597F) **Issues and Trends in Early Childhood Education** (3) This course explores historical and contemporary examples of downward schooling expansion in the US and other nations.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CI ED 845 (AYFCE 845) **Intergenerational Programs and Practices** (3) Background, intervention strategies, and issues related to developing intergenerational programs and practices aimed at addressing vital social and community issues.  
Effective: Fall 2011

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## **Complement Alter Medic (CAM)**

CAM 742 **Herbal and Natural Products as Therapeutics** (5) This course will assess safety, efficacy, and applicability of natural products as therapeutic options for management of common medical conditions.

Effective: Fall 2008

Prerequisite:

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## Computer Science (CMPSC)

**CMPSC 402 UNIX and C (3)** UNIX OS including file system, utilities, and shell scripting; C programming, including I/O, pointers, arrays, dynamic memory, macros, and libraries.

Effective: Fall 2010

Prerequisite:

**CMPSC 412 Data Structures Lab (1.5)** Programming with common data structures; recursion; stacks, queues, dictionaries, priority queues; string searching and manipulation; sorting; trees; combinatorics.

Effective: Spring 2013

Concurrent: CMPSC 462 or CMPSC 465

**CMPSC 413 Algorithms Lab (1.5)** Programming with common algorithm design techniques; divide and conquer, greedy method, dynamic programming, and tree and graph traversals.

Effective: Summer 2013

Concurrent: CMPSC 463

**CMPSC 421 Net-centric Computing (3)** This course introduces JavaScript and AJAX for creating Rich Internet Applications, and XML for client-server communication and Web Services.

Effective: Spring 2011

Prerequisite:

**CMPSC 425 Advanced Object-Oriented Programming (3)** Advanced object-oriented programming paradigm, exception handling, application programming interface, secure programming, network programming, threads and synchronization.

Effective: Spring 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 426 Object-oriented Design (3)** Object-oriented analysis and design; design patterns such as creational, structural, and behavioral patterns; UML; and unified process.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 426 Object-oriented Design (3)** Object-oriented analysis and design; design patterns such as creational, structural, and behavioral patterns; UML; and unified process.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 428 Programming in Ada (3)** Structured program design using Ada; strong typing, data abstraction, packages, subprograms, separate compilation, visibility, exceptions, generic units.

Effective: Fall 2010

Prerequisite:

**CMPSC 430 Database Design (3)** Relational database model, query languages, integrity, reliability, normal forms for design.

Effective: Fall 2010

Prerequisite:

**CMPSC 431W Database Management Systems (3)** Database system concepts: file organizations and retrieval algorithms; the three data models (relational, hierarchical, and network) and their database implementations.

Effective: Spring 2008 Ending: Summer 2013

Prerequisite:

**CMPSC 431W Database Management Systems (3)** Topics include: conceptual data modeling, relational data model, relational query languages, schema normalization, database/Internet applications, and database system issues.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**CMPSC 436 Communications and Networking (3)** Data transmission, basic signaling, data encoding, error control, communication protocols, security, network topologies, routing, switching, internetworking, emerging high speed networks.

Effective: Spring 2008

Prerequisite:

**CMPSC 438 Computer Network Architecture and Programming (3)** Network architectures, communication protocols, internetworking, network security, client-server computing, web application development, programming with APIs.

Effective: Spring 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 438 Computer Network Architecture and Programming (3)** Network architectures, communication protocols, internetworking, network security, client-server computing, web application development, programming with APIs.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 441 Artificial Intelligence (3)** Problem solving, search techniques including local search and genetic algorithms, knowledge representation, planning, learning, and neural networks.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 441 Artificial Intelligence (3)** Problem solving, search techniques including local search and genetic algorithms, knowledge representation, planning, learning, and neural networks.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 442 Artificial Intelligence (3)** Introduction to the theory, research paradigms, implementation techniques, and philosophies of artificial intelligence.

Effective: Spring 2008

Prerequisite: Concurrent: CMPSC 465

**CMPSC 443 Introduction to Computer and Network Security (3)** Introduction to theory and practice of computer security with an emphasis on Internet and operating system applications.

Effective: Spring 2008

Prerequisite:

**CMPSC 444 Secure Programming (3)** Secure software design principles/practice, common threats, applied cryptography, trust management, input validation, OS-/programming language- specific issues, software validation.

Effective: Spring 2013 Ending: Fall 2013

Prerequisite: Concurrent: CMPSC 430 or CMPSC 431 or CMPSC 421W

**CMPSC 444 Secure Programming (3)** Secure software design principles/practice, common threats, applied cryptography, trust management, input validation, OS-/programming language- specific issues, software validation.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: CMPSC 430 or CMPSC 431 or CMPSC 421W

**CMPSC 448 Machine Learning and Algorithmic AI (3)** Evaluation and use of machine learning models; algorithmic elements of artificial intelligence.

Effective: Spring 2013

Prerequisite:

**CMPSC 450 Concurrent Scientific Programming (3)** Problems of synchronization, concurrent execution, and their solution techniques. Design and implementation of concurrent software in a distributed system.

Effective: Spring 2008

Prerequisite:

**CMPSC 451 (MATH 451) Numerical Computations (3)** Algorithms for interpolation, approximation, integration, nonlinear equations, linear systems, fast FOURIER transform, and differential equations emphasizing computational properties and implementation. Students may take only one course for credit from CSE/MATH 451 and CSE/MATH 455.

Effective: Spring 2008

Prerequisite:

**CMPSC 452 Numerical Analysis (3)** Algorithm efficiency and accuracy, function interpolation and polynomial approximation, numerical differentiation and integration, initial-value problems, and approximation of eigenvalues.

Effective: Fall 2010

Prerequisite:

**CMPSC 455 (MATH 455) Introduction to Numerical Analysis I (3)** Floating point computation, numerical rootfinding, interpolation, numerical quadrature, direct methods for linear systems. Students may take only one course for credit from CMPSC (MATH) 451 and CMPSC (MATH) 455.

Effective: Spring 2008

Prerequisite:

**CMPSC 456 (MATH 456) Introduction to Numerical Analysis II (3)** Polynomials and piecewise polynomial approximation; matrix least square problems; numerical solution of eigenvalue problems; numerical solutions of ordinary differential equations.

Effective: Spring 2008

Prerequisite:

**CMPSC 457 Computer Graphics Algorithms (3)** Graphics systems/hardware, color models, transformations, projections, clipping, hidden line/surface removal, aliasing, parametric curves/surfaces, 3D modeling animation.

Effective: Fall 2010

Prerequisite:

**CMPSC 458 Fundamentals of Computer Graphics (3)** Fundamentals of computer graphics: input/output devices, transformation, projection, clipping, hidden line/surface elimination.

Effective: Spring 2008

Prerequisite:

**CMPSC 459 Scientific Visualization (3)** Visualization techniques for data analysis and presentation. Applying visualization and perceptual theory. Using extending platform independent visualization software.

Effective: Spring 2008

Prerequisite:

**CMPSC 460 Principles of Programming Languages (3)** Design and implementation of high level programming languages and survey of language paradigms including imperative, functional, and object-oriented programming.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 460 Principles of Programming Languages (3)** Design and implementation of high level programming languages and survey of language paradigms including imperative, functional, and object-oriented programming.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: CMPSC 469

**CMPSC 461 Programming Language Concepts (3)** Fundamental concepts of programming language design, specifications, and implementation; programming language paradigms and features; program verification.

Effective: Spring 2008

Prerequisite:

**CMPSC 462 Data Structures (3)** In-depth theoretical study of data structures such as balanced trees, hash tables, priority queues, B-trees, binomial heaps, and Fibonacci heaps.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite: Concurrent: MATH 315

**CMPSC 462 Data Structures (3)** In-depth theoretical study of data structures such as balanced trees, hash tables, priority queues, B-trees, binomial heaps, and Fibonacci heaps.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 463 Design and Analysis of Algorithms (3)** Recurrences, algorithms design techniques, searching, sorting, selection, graph algorithms, NP-completeness, approximation algorithms, local optimization algorithms.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite: Concurrent: MATH 414 or STAT 301

**CMPSC 463 Design and Analysis of Algorithms (3)** Recurrences, algorithms design techniques, searching, sorting, selection, graph algorithms, NP-completeness, approximation algorithms, local optimization algorithms.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: MATH 414 or STAT 301

**CMPSC 464 Introduction to the Theory of Computation (3)** Computability/Complexity: finite automata, regular & context-free languages, Turing machines, Church-Turing Thesis, undecidability, reducibility, completeness, time/space complexity, P versus NP.

Effective: Fall 2009

Prerequisite:

**CMPSC 465 Data Structures and Algorithms (3)** Fundamental concepts of computer science: data structures, analysis of algorithms, recursion, trees, sets, graphs, sorting.

Effective: Fall 2012

Prerequisite:

**CMPSC 467 (MATH 467) Factorization and Primality Testing (3)** Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

Effective: Spring 2008

Prerequisite:

**CMPSC 469 Formal Languages with Applications (3)** Regular, context free, recursive, and recursively enumerable languages; associated machine models; applications.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 469 Formal Languages with Applications (3)** Regular, context free, recursive, and recursively enumerable languages; associated machine models; applications.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 470 Compiler Construction (3)** Compiler design and implementation; scanning, parsing, semantic analysis, optimization (including static analysis), code generation, garbage collection, and error detection.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 470 Compiler Construction (3)** Compiler design and implementation; scanning, parsing, semantic analysis, optimization (including static analysis), code generation, garbage collection, and error detection.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 471 Introduction to Compiler Construction (3)** Design and implementation of compilers; lexical analysis, parsing, semantic actions, optimization, and code generation.

Effective: Spring 2008

Prerequisite:

**CMPSC 472 Operating System Concepts (3)** Theoretical and practical issues of operating systems design and implementation, process management, concurrent programming, memory management, scheduling, I/O, and security.

Effective: Fall 2010

Prerequisite:

**CMPSC 473 Operating Systems Design & Construction (3)** Design and implementation of computer operating systems; management of various system resources: processes, memory, processors, files, input/output devices.

Effective: Spring 2008

Prerequisite:

**CMPSC 474 Operating System & Systems Programming (3)** Operating Systems overview and principles; processes and signals; concurrency and synchronization; memory and file management; client-server computing; scripts;

systems-programming.

Effective: Spring 2008

Prerequisite:

**CMPSC 475 Applications Programming (3)** Development of software for devices including smart phones, tablets, handheld units, and other general purpose computing platforms.

Effective: Spring 2013 Ending: Fall 2013

Prerequisite:

**CMPSC 475 Applications Programming (3)** Development of software for devices including smart phones, tablets, handheld units, and other general purpose computing platforms.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 479 Language Translation (3)** Design and implementation of compilers, lexical analysis, syntax/semantic analysis, optimization, and code generation.

Effective: Spring 2008

Prerequisite:

**CMPSC 483W Software Design Methods (3)** Applications of scientific knowledge and methods in the design and construction of computer software using engineering concepts.

Effective: Spring 2008

Prerequisite:

**CMPSC 484 Computer Science Senior Project I (2)** Computer science capstone project with documentation emphasis.

Effective: Spring 2008

Prerequisite:

**CMPSC 485W Computer Science Senior Project II (3)** Computer science capstone project with documentation emphasis.

Effective: Spring 2008

Prerequisite:

**CMPSC 487W Software Engineering and Design (3)** Software development process, life cycle; requirements analysis, specification, design, prototyping, testing, project management, and documentation.

Effective: Fall 2010 Ending: Fall 2013

Prerequisite:

**CMPSC 487W Software Engineering and Design (3)** Software development process, life cycle; requirements analysis, specification, design, prototyping, testing, project management, and documentation.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 488 Computer Science Project (3)** Project design and implementation with an emphasis on team work, documentation, and the employment and integration of computer science concepts.

Effective: Summer 2013

Prerequisite:

**CMPSC 494H Senior Honors Thesis (1-6)** Supervised Honors thesis research in computer science and engineering.

Effective: Spring 2008

Prerequisite:

**CMPSC 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experience, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

**CMPSC 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2008

**CMPSC 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2008

**CMPSC 497A Natural Language Processing (3)** English language processing, information extraction, word sense disambiguation, spelling correction, grammar checking, pattern matching, speech recognition.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**CMPSC 497A Software Testing (3)** Software testing principles/practices, functional testing, structural testing, unit testing, mutation testing, system testing, test Automation.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**CMPSC 497B HTML5 and Web Game Programming (3)** Explores HTML5 programming techniques, including Canvas Element, Javascript integration, game engines using HTML5/Javascript, and integration with various social media API's.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CMPSC 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2008

**CMPSC 498F Introduction to Bioinformatics** (3) This course will introduce an undergraduate audience to the biological problems and computational solutions that motivate current applications in computational biology. Topics will be organized around three main themes: 1) Genomes, including assembly and annotation of genomic sequences; 2) Evolution, including sequence comparison, reconstructing evolutionary relationships, and detecting disease associated traits; and 3) Function, including analysis of functional genomics experimental assays and characterizing regulatory relationships between genes. By the end of the course, students will have gained a broad overview of the types of biological problems which bioinformatics methods aim to solve, will know which algorithmic and machine-learning approaches are suitable for solving each problem, and will have a detailed understanding of how each computational method works.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CMPSC 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

**CMPSC 598 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest; several different topics may be taught in one year or semester.  
Effective: Summer 1993

**CMPSC 600 Thesis Research** (1-15) No description.  
Effective: Fall 1995

**CMPSC 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1995

**CMPSC 602 Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Teaching of computer science undergraduate sections with senior faculty instruction supervision.  
Effective: Fall 1989  
Prerequisite:

**CMPSC 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**CMPSC 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Computer Science and Engineering (CSE)

**CSE 511 Operating Systems Design** (3) Concurrent programming; design of I/O subsystem, memory management, and user interface; kernel design; deadlocks, protection and security; case studies.

Effective: Spring 2008

Prerequisite:

**CSE 513 Distributed Systems** (3) Protocol hierarchies; routing and flow control algorithms; distributed operating systems; communication and synchronization mechanisms; resource allocation problems.

Effective: Spring 2009

Prerequisite:

**CSE 514 Computer Networks** (3) Network subsystems, ARPANET, SNA, DECNET, network protocols (physical databank, network, transport, sessions, presentation, application), routing and congestion control, network optimization.

Effective: Spring 2011

Prerequisite:

**CSE 515 (E E 565) Reliable Data Communications** (3) Discussion of problems and solutions for ensuring reliable and efficient communication over wired and wireless links and data networks.

Effective: Spring 2008

Prerequisite:

**CSE 516 Mobile Networking** (3) Algorithms, systems and design of mobile telecommunication voice and data networks.

Effective: Fall 2010

**CSE 517 Performance Evaluation** (3) Tools and techniques for PE, Analytical and Simulation models, evaluation of multiprocessors, multicomputer and LANs, scheduling policies, case studies.

Effective: Fall 1995

**CSE 520 Science of Computer Programming** (4) Weakest preconditions, nondeterminism, terminating constructs, formal derivation of some often used algorithms, correctness of programs, formal specification of large systems.

Effective: Spring 2008

Prerequisite:

**CSE 521 Compiler Construction** (3) Design and implementation of compilers.

Effective: Spring 2001

**CSE 522 Semantics of Programming Languages** (3) Operational, axiomatic, and denotational semantics of programming languages; fixpoint theory of computation, verification of recursive programs; goto statements and continuations.

Effective: Spring 2008

Prerequisite:

**CSE 530 Fundamentals of Computer Architecture** (3) Advances in computer architecture, Pipelining, parallelism, and multiprocessing.

Effective: Spring 2008

Prerequisite:

**CSE 531 Parallel Processors and Processing** (3) Parallel processor organization; basic algorithms suitable for such systems; parallel sorting and interconnection networks; applications and discussion of specific processors.

Effective: Fall 1995

Prerequisite:

**CSE 532 Multiprocessor Architecture** (3) Fundamental structures of multiprocessors; interprocess communications, system deadlocks and protection, scheduling strategies, and parallel algorithms; example multiprocessor systems.

Effective: Fall 1995

Prerequisite:

**CSE 536 Fault Tolerant Systems** (3) Attributes of fault-tolerant systems and their definitions; realability and availability techniques; maintainability and testing techniques; practice of reliable system design.

Effective: Fall 1995

Prerequisite:

**CSE 537 Interconnection Networks in Highly Parallel Computers** (3) Study and comparative analysis of various classes of interconnection networks; routing problem; fault tolerance issue; performance evaluation; VLSI implementation.

Effective: Summer 1997

Prerequisite:

**CSE 539 Topics in Computer Architecture** (3) Study of current advanced issues in design, implementation and applications of complex computer systems.

Effective: Fall 1995

Prerequisite:

**CSE 541 Database Systems I** (3) Data models and relational database design; database integrity and concurrency control; distributed database design and concurrency control; query optimization.

Effective: Spring 2008

Prerequisite:

**CSE 542 Database Systems II** (3) Important in-depth issues relating to data engineering such as distributed databases, information management for engineering design, data models.

Effective: Spring 1996

Prerequisite:

**CSE 543 Computer Security** (3) Specification and design of secure systems; security models, architectural issues, verification and validation, and applications in secure database management systems.

Effective: Spring 2008

Prerequisite:

**CSE 544 System Security** (3) Review current research in computer and operating system security.

Effective: Summer 2008

Prerequisite:

**CSE 545 Network Security** (3) Advanced methods and technologies for network security.

Effective: Summer 2008

Prerequisite:

**CSE 546 Cryptography** (3) Introduction to the theory and techniques of modern cryptography, with emphasis on rigorous analysis and mathematical foundations.

Effective: Fall 2008

Prerequisite:

**CSE 550 (MATH 550) Numerical Linear Algebra** (3) Solution of linear systems, sparse matrix techniques, linear least squares, singular value decomposition, numerical computation of eigenvalues and eigenvectors.

Effective: Spring 2008

Prerequisite:

**CSE 551 (MATH 551) Numerical Solution of Ordinary Differential Equations** (3) Methods for initial value and boundary value problems. Convergence and stability analysis, automatic error control, stiff systems, boundary value problems.

Effective: Spring 2008

Prerequisite:

**CSE 552 (MATH 552) Numerical Solution of Partial Differential Equations** (3) Finite difference methods for elliptic, parabolic, and hyperbolic differential equations; solutions techniques for discretized systems; finite element methods for elliptic problems.

Effective: Spring 2008

Prerequisite:

**CSE 553 (MATH 553) Introduction to Approximation Theory** (3) Interpolation; remainder theory; approximation of functions; error analysis; orthogonal polynomials; approximation of linear functionals; functional analysis applied to numerical analysis.

Effective: Fall 1995

Prerequisite:

**CSE 554 (E E 564) Error Correcting Codes for Computers and Communication** (3) Block, cyclic, and convolutional codes. Circuits and algorithms for decoding. Application to reliable communication and fault-tolerant computing.

Effective: Spring 2008

Prerequisite:

**CSE 555 (MATH 555) Numerical Optimization Techniques** (3) Unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar's algorithm, global optimization, parallelism in optimization.

Effective: Spring 2008

Prerequisite:

**CSE 556 (MATH 556) Finite Element Methods** (3) Sobolev spaces, variational formulations of boundary value problems; piecewise polynomial approximation theory, convergence and stability, special methods and applications.

Effective: Fall 1995

Prerequisite:

**CSE 557 Concurrent Matrix Computation** (3) This course discusses matrix computations on architectures that exploit concurrency. It will draw upon recent research in the field.

Effective: Spring 2008

Prerequisite:

**CSE 560 Theory of Graphs and Networks** (3) Theory and applications of graphs, including structure of graphs, network analysis, and algorithms for computer solution of graph-theoretic problems.

Effective: Spring 1996

Prerequisite:

**CSE 562 Probabilistic Algorithms** (3) Design and analysis of probabilistic algorithms, reliability problems, probabilistic complexity classes, lower bounds.

Effective: Fall 1995

Prerequisite:

**CSE 563 Parallel Algorithms** (3) Computational aspects of VLSI: synthesis/analysis of efficient parallel and distributed algorithms; computational structures; models of parallel computers and their interrelationships.

Effective: Fall 1995

Prerequisite:

**CSE 564 Complexity of Combinatorial Problems** (3) NP-completeness theory; approximation and heuristic techniques; discrete scheduling; additional complexity classes.

Effective: Fall 1995

Prerequisite:

**CSE 565 Algorithm Design and Analysis** (4) An introduction to algorithmic design and analysis.

Effective: Fall 2012

Prerequisite: Concurrent: CMPSC 464

**CSE 572 Microprocessors and Systems Design** (3) Contemporary design issues in microprocessors, including advanced features and system integration issues.

Effective: Spring 2008

Prerequisite:

**CSE 575 Architecture of Arithmetic Processors** (3) Algorithms and techniques for designing arithmetic processors; conventional algorithms and processor design; high-speed algorithms and resulting architectural structures.

Effective: Spring 2013

Prerequisite:

**CSE 577 VLSI Systems Design** (3) Engineering design of large-scale integrated circuits, systems, and applications; study of advanced design techniques, architectures, and CAD methodologies.

Effective: Spring 2013

Prerequisite:

**CSE 578 VLSI Computer-Aided Design Tools** (3) VLSI circuit design tools: placement, routing, extraction, design rule checking, graphic editors, simulation, verification, minimization, silicon compilation, test pattern generation.

Effective: Spring 2013

Prerequisite:

**CSE 579 Topics in Computer Hardware Design** (3) Computer hardware design; emerging technologies in hardware design; new challenges for nano-scale VLSI design.

Effective: Fall 2012

Prerequisite:

**CSE 583 (E E 552) Pattern Recognition--Principles and Applications** (3) Decision-theoretic classification, discriminant functions, pattern processing and feature selection, syntactic pattern recognition, shape analysis and recognition.

Effective: Spring 2008

**CSE 585 (E E 555) Digital Image Processing II** (3) Advanced treatment of image processing techniques; image restoration, image segmentation, texture, and mathematical morphology.

Effective: Spring 2008

Prerequisite:

**CSE 586 (E E 554) Topics in Computer Vision** (3) Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications.

Effective: Spring 2008

Prerequisite:

**CSE 588 (MATH 588) Complexity in Computer Algebra** (3) Complexity of integer multiplication, polynomial multiplication, fast Fourier transform, division, and calculating the greatest common divisor of polynomials.

Effective: Spring 2008

Prerequisite:

**CSE 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1997

**CSE 591 Research Experience in Computer Science and Engineering** (1) Research experience for new doctoral students in computer science and engineering. Research is performed in conjunction with another 500-level CSE course.

Effective: Spring 1998

Concurrent: enrollment in another 500-level CSE course

**CSE 594 Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1997

**CSE 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1996

**CSE 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 1996



**CSE 597C Machine Learning (1.5)** Machine learning is a subfield of AI that studies how computer system can learn from data.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSE 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1996

**CSE 598A Machine Learning Seminar (1.5)** This is a seminar for discussing the latest trends and research in machine learning. Students are expected to present at least one paper on machine learning.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSE 598B Concepts in Game Theory (1)** Game theory, applications to computer/communication networking, network-access games (network neutrality debate), games modeling social networks.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSE 598C Theory Seminar (1.5)** Recent advances in various areas of theoretical computer science: algorithms, complexity theory, combinatorics, cryptography, quantum computing, computational learning theory.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CSE 599 Foreign Studies (1-2 per semester/maximum of 4)** Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2008

**CSE 600 Thesis Research (1-15)** No description.  
Effective: Spring 1995

**CSE 601 Ph.d. Dissertation Full-Time (0)** No description.  
Effective: Spring 1995

**CSE 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Spring 1995

**CSE 610 Thesis Research Off-Campus (1-15)** No description.  
Effective: Spring 1995

**CSE 611 Ph.d. Dissertation Part-Time (0)** No description.  
Effective: Spring 1995

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## Computer Science-CI (COMP)

COMP 505 **Theory of Computation** (3) Topics in discrete mathematics, discrete probability, first order logic and models of computation.

Effective: Spring 2013

Prerequisite:

COMP 511 **Design and Analysis of Algorithms** (3) Amortized analysis, graph algorithms, NP-complete problems, approximation algorithms, parallel algorithms.

Effective: Spring 2013

Prerequisite:

COMP 512 **Advanced Operating Systems** (3) A study of the principles and practice of distributed system design, including communication, synchronization, processes, file systems, and memory management.

Effective: Spring 2008

Prerequisite:

COMP 513 **Formal Methods for Software Engineering** (3) Object-oriented software development, formal specification techniques and related CASE tools, software re-use, verification and validation, transformational development.

Effective: Spring 2008

Prerequisite:

COMP 516 **Advanced Programming Languages** (3) Programming paradigms and styles, object-oriented programming, formal semantics, programming language design.

Effective: Spring 2008

Prerequisite:

COMP 517 **Computer Security** (3) Introduction to the area of computer security and current issues associated with computer security.

Effective: Spring 2007

Prerequisite:

COMP 519 **Advanced Topics in Database Management Systems** (3) Concurrency control, crash recovery, query processing, semantic data models, advanced file access, distributed database systems, performance, case studies, advanced applications.

Effective: Spring 2008

Prerequisite:

COMP 520 **Artificial Intelligence** (3) Problem solving, knowledge representation, language understanding, perception, learning, artificial neural networks.

Effective: Spring 2013

Prerequisite:

COMP 524 **Evolutionary Computation** (3) Topics in evolutionary algorithms and genetic algorithms.

Effective: Spring 1998

Prerequisite:

COMP 545 **Computer Architecture** (3) Cache, pipelining, memory design, interconnection networks, multiprocessor systems.

Effective: Spring 2008

Prerequisite:

COMP 580 **Master's Project** (3 per semester/maximum of 6) Research into a specific computer science problem, development of a scholarly written paper, and oral defense of the work.

Effective: Spring 1998

Prerequisite:

COMP 594 **Master's Studies** (3) Presentation of various research techniques, in-depth study of a specific computer science problem, development of a written paper or project, and an oral defense.

Effective: Fall 2003

Prerequisite:

COMP 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1997

COMP 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1997

COMP 597A **Natural Language Processing** (3) English language processing, information extraction, word sense disambiguation, spelling correction, grammar checking, pattern matching, speech recognition.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

COMP 597A **Software Testing** (3) Software testing principles/practices, functional testing, structural testing, unit testing,

mutation testing, system testing, test Automation.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

COMP 600 **Thesis Research** (1-6) Research into a specific computer science problem, development of a scholarly written paper, and an oral defense.

Effective: Fall 2003

Prerequisite:

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## Constl Law/Civil Rgt (CL&CR)

**CL&CR 956 Civil Liberties Litigation** (3) This course examines the protection of individual rights afforded by the Constitution by analyzing litigation involving violations of individual rights by the government and its officers. The principal substantive areas addressed are prisoners' rights, police misconduct, and political surveillance. In the process of examining the substantive civil rights issues, the course will analyze advanced concepts of civil procedure, constitutional law, federal jurisdiction, and trial practice.  
Effective: Summer 2011

**CL&CR 957 The Constitutional Law of Religion** (3) This course examines current constitutional doctrine concerning religion under the First Amendment to the Constitution. The focus will be on the essential cases and principles of the Free Exercise and Establishment Clauses of the First Amendment. These cases and principles are organized along three thematic lines: (1) the regulation of religions activity (free exercise and neutrality, governmental interests, legislative accommodation), (2) the funding of religions activity (establishment and neutrality, governmental support of religious institutions), and (3) the treatment of religion in government's culture shaping activities (public schools, school curriculum, religious speech). The course ends with a discussion of the definition of "religion" for purposes of federal constitutional law.  
Effective: Summer 2011

**CL&CR 963 Constitutional Law II** (3) This course studies the development of equal protection law under the 5th and 14th Amendments, the state action issue, and the free exercise and establishment clauses of the 1st amendment.  
Effective: Fall 2009

**CL&CR 965 First Amendment-Free Speech** (3) This course examines the history, values and function of free expression, advocacy of illegal action, expression that provokes a hostile audience reaction, defamation, commercial advertising, obscenity, hate speech and pornography, expression in public places, symbolic speech, campaign finance laws, and speech in restricted environments.  
Effective: Fall 2012

**CL&CR 976 Advanced Torts** (3) This course focuses on torts not involving physical injury, such as misrepresentation, defamation, invasion of privacy, interference with business relations, and misuse of legal procedure. These subjects are not ordinarily covered in the four-hour Torts course required in the first year, but have become burgeoning areas of potential liability due to the emergence of electronic communications. An effort will be made to integrate substantive doctrine and practice implications with legal, economic, political and social theory.  
Effective: Summer 2011

**CL&CR 997 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2008

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## Core Courses (CORE)

**CORE 900 Civil Procedure** (4) Civil Procedure concerns the rules and principles that govern the litigation of a civil case. The course addresses systemic issues related to how and where a lawsuit is filed including: personal and subject matter jurisdiction; venue; the notice required once a lawsuit has been filed; and which substantive law-- state or federal--should apply in federal court. The course also familiarizes the student with the stages of a lawsuit including: pleading; structuring the lawsuit; discovery; termination of a lawsuit without trial; trial; and actions that may be taken after a jury verdict or bench trial. Although reference is made to state laws, the course concentrates on the Federal Rules of Civil Procedure.

Effective: Summer 1999

**CORE 902 Elements of Law** (3) Elements of Law orients students to legal research and reasoning through caselaw, statutory interpretation, and legal history, processes, and institutions. The course covers topics across many substantive areas of law, and addresses legal methodology as it arises in the legal profession.

Effective: Summer 2011

**CORE 903 Constitutional Law I** (3) This course examines the roles of the executive, legislative, and judicial branches in determining limits of national and state powers and protection of the individual and civil rights provided in the United States Constitution.

Effective: Fall 2009

**CORE 905 Contracts** (4) Contracts is concerned with the formation of contracts. The traditional offer and acceptance are analyzed in light of problems presented by modern bargaining techniques. Voidability of contracts formed by fraud, mistake, illegality, and unconscionable advantage is also stressed. The performance of contracts and the parol evidence rule are discussed.

Effective: Summer 1999

**CORE 907 Criminal Procedure** (3) The Criminal Procedure course explores the interface between the criminal justice system and the United States Constitution. The course examines constitutional limits on police investigation and interrogation as well as the circumstances under which indigent defendants are guaranteed the assistance of counsel. In addition to introducing students to constitutional analysis, the course previews the ethical dimensions of defending persons accused of crime. The class also views a trial during the criminal term at the Court of Common Pleas.

Effective: Summer 2011 Ending: Summer 2013

**CORE 907 Criminal Procedure** (3) Criminal Procedure explores part of the interface between the criminal justice system and the United States Constitution. It introduces students to constitutional analysis by examining key provisions of the Fourth, Fifth, Sixth, and Fourteenth Amendments as they apply to police investigation and interrogation as well as the circumstances under which indigent defendants are guaranteed the assistance of counsel.

Effective: Fall 2013 Future: Fall 2013

**CORE 910 Criminal Law** (3) This course deals with what is called substantive criminal law, i.e. crimes. Numerous crimes such as homicide, theft, and conspiracy are examined, and defenses such as self-defense and insanity are scrutinized. A primary focus of the course is the utilization and interpretation of criminal statutes.

Effective: Fall 2006

**CORE 912 Legal Analysis, Research and Writing I** (2) The Legal Analysis, Research & Writing (LARW) course is designed to teach each student to think, write, and speak like a lawyer. Students must learn to solve clients problems by using effective research techniques, accurate and in-depth legal analysis, and clear and concise written and oral communication. These skills will improve only with practice. Therefore, the LARW course uses a problem-solving approach through which students will represent a fictional client and provide those clients with legal advice. Through this approach, students will learn essential skills of successful lawyers, including researching legal authorities, applying the law to a client's situation, and communicating that analysis in writing and verbally.

Effective: Summer 2011

**CORE 914 Legal Analysis, Research and Writing II** (2) LARW II continues to build on the skills learned in LARW I. Students continue to analyze clients' problems using various sources of legal authority, to use additional research sources, and to further refine their writing style. However, LARW II focuses on persuasive writing, so students will learn to draft documents that are submitted to a court called "briefs" or "memoranda of law." Students also will learn to present an oral argument to a court. LARW II continues to implement the problem-solving approach to teach persuasive writing, and students continue to receive individualized feedback throughout the course.

Effective: Summer 2011

Prerequisite:

**CORE 920 Property** (4) This course introduces the basic concepts and principles in the law of property. Topics include: acquisition and allocation of property rights; restrictions on owners' rights to use, limit access to, and sell or dispose of their property; and the relationships among multiple owners of rights in the same property. The emphasis is on real property, although the course also addresses intellectual property and other types of personal property.

Effective: Summer 1999

CORE 925 **Torts** (4) Tort law seeks to remedy civil wrongs that result in harm to person or property. The class will focus on basic concepts such as the international torts, negligence, strict liability, and products liability.  
Effective: Summer 1999

CORE 934 **Professional Responsibility** (3) Through the use of hypothetical situations, this course attempts to generate student sensitivity to ethical problems faced by lawyers in various kinds of practice. The ABA Model Rules of Professional Conduct and the older Code of Professional Responsibility are the basic tools, but discussion centers as well on case law, ABA opinions and standards, statutes, and the dictates of conscience. Discipline and professional malpractice are also treated.  
Effective: Fall 2011

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## Corp & Comm Law (CCLAW)

**CCLAW 952 Secured Transactions (3)** This course deals with the creation, enforcement, and priorities of personal property security interests under Article 9 of the Uniform Commercial Code and related statutes. It addresses: (a) encumbrances on consumer, commercial, and industrial goods, (b) inventory and receivables financing for manufacturers, distributors, and dealers, and (c) personal property agricultural financing. Relevant provisions of other articles of the UCC and other state and federal statutes are integrated into the course as required.  
Effective: Fall 2008

**CCLAW 954 Nonprofit Organizations (3)** This course provides an overview of laws and policies that affect that nonprofit sector, a vital component of national and international economics. It covers alternative organizational structures, including the creation and operation of a nonprofit corporation under U.S. laws. The course examines the status, rights and fiduciary obligations of directors and members. The course introduces tax laws applicable to nonprofit organizations, including the importance of obtaining and maintaining tax exempt status, public charity or private foundation status, and the taxable status of "unrelated business income." The course looks at the laws governing charitable giving.  
Effective: Spring 2012

**CCLAW 955 Agency, Partnerships, and Limited Liability Entities (3)** This course surveys the law of unincorporated business entities. The agency law part of the course will focus on agents' powers and responsibilities, liabilities of principals for acts of agents, and termination of the agency relationship. The partnership law part of the course will cover the fiduciary obligations of partners, partners' management and property rights, and partnership dissolutions. The final part of the course will examine the "new" limited liability entities now provided for by the law of all states; with emphasis on the formation, organization, and dissolution of limited liability companies. Although not a prerequisite, this course is strongly recommended for students planning to enroll in Corporations.  
Effective: Fall 2011

**CCLAW 956 Agricultural Law (3)** This course will introduce students to the range of current and emerging issues that confront agricultural producers, agri-business firms, and other segments of that broader sector of the economy referred to as the "food industry." The course will address a variety of issues including the history and objectives of agricultural policy, land use planning for agricultural activities, resource use and allocation, industrialization in the agricultural sector, intergenerational transfers of farm businesses, international trade, and ethical issues that confront practitioners.  
Effective: Summer 2011

**CCLAW 957 Banking Regulation (2)** This course will focus on banks as financial intermediaries and compare them to both the securities and insurance industries. The dual banking system of state and federal regulation will be explored as to bank formation, supervision and regulation. The course will explore the ownership and control issues affecting banks and the supervision and regulation of bank holding companies and their subsidiaries engaged in nontraditional banking activities. The causes of the financial crisis of 2007-2009, together with the reaction of financial institutions, the states, the U.S. Congress and the regulators to the crisis, will also be examined. The course will include an assessment of the deposit insurance system and the problems associated with troubled and failed banks. The course will emphasize the potential administrative enforcement, civil and criminal exposure of both regulated entities and individuals involved within those industries.  
Effective: Fall 2012

**CCLAW 958 Business Planning for Small Business Enterprises (3)** Selected practical problems involving the planning of business transactions, with emphasis upon the small business enterprise, are examined. Topics include: organization of close corporations, partnerships and LLCs; employee compensation; sexual harassment and discrimination issues; executive hiring negotiations; and raising capital through the sale of securities. This course is strongly suggested for anyone who plans on representing businesses.  
Effective: Spring 2012  
Prerequisite:

**CCLAW 959 Business Reorganizations (3)** This course is a study of the law governing the reorganization of businesses under chapter 11 and related provisions of the U.S. bankruptcy code. It includes such topics as prepetition planning, the filing of a business reorganization case (either voluntary or involuntary), jurisdiction and venue, the automatic stay and "adequate protection," the bankruptcy estate, "first day" orders, use of cash collateral, postpetition financing, wage payment orders, rights of utilities, reclamation rights, executory contracts, employment and payment of professionals, professional responsibility in the bankruptcy context, creditors' (and other) committees, chapter 11 trustees and examiners, substantive consolidation, chapter 11 plans and disclosure statements, plan confirmation, claims objections, avoidance actions, coordination of international insolvency cases.  
Effective: Summer 2012  
Prerequisite:

**CCLAW 960 Consumer Protection (2)** This course will deal with federal and state statutes and regulations that primarily protect the consumer. Federal laws covered in detail are the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, the Consumer Credit Protection Act, and federal tax lien statutes. State laws on false and misleading advertisements and full disclosure will be examined, along with state procedures for attachments in the enforcement of money judgments.  
Effective: Summer 2011

**CCLAW 961 Bankruptcy (3)** The rights, duties, and remedies of both debtor and creditor are examined. The course covers the collection process, enforcement of money judgments and insolvency proceedings. Federal bankruptcy law is emphasized.  
Effective: Fall 2009

**CCLAW 963 Corporations (3)** This course primarily addresses organization and operation of commercial organizations in the Anglo-American community. Preliminarily, sole proprietorships and partnerships are considered, after which corporations-for-profit are emphasized with some attention to business trusts and non-profit corporations. In the corporate context, duties of promoters, directors, officers, and other insiders are considered. Availability in the U.S. of the derivative action is treated in terms of both unincorporated and corporate forms of organization. Also treated are the basics of securities regulation at the federal and state levels in the U.S. and the provincial level in Canada.  
Effective: Spring 2003

**CCLAW 964 Business Planning for Mergers and Acquisitions I (3)** This course first focuses on various topics that are important in M&A transactions involving both closely-held corporations, including directors duties, shareholder voting and dissenters' rights, basic issues under the Federal securities laws, fundamentals of Federal income taxation and accounting, use of modern valuation techniques, including DCF and CAPM, in M&A, and basic issues in antitrust and pre-merger notification. The course then turns to an analysis of various forms of negotiated acquisition, including acquisitions of stock and assets of closely-held corporations and acquisitions of publicly-held corporations in negotiated transactions. The course is based on the first half of Thompson, Business Planning for Mergers and Acquisitions: Corporate, Securities, Tax, Antitrust, International, and Related Aspects (2008).  
Effective: Fall 2012  
Prerequisite:

**CCLAW 965 Business Planning for Mergers and Acquisitions II (3)** This course builds on the topics covered in Business Planning for Mergers and Acquisition I, and is based on the second half of Thompson, Business Planning for Mergers and Acquisitions: Corporate, Securities, Tax, Antitrust, International, and Related Aspects (2008). The course starts with an examination of leveraged buyouts, and then focuses on the drafting of various types of acquisition agreements. The course then looks at proxy contests and then turns to hostile takeovers and going private transactions regulated by the Williams Act provisions of the Securities Exchange Act of 1934. The course then looks at special topics in M&A, including spinoffs, international M&A, bank acquisitions, acquisitions of public utilities, bankruptcy acquisitions, joint ventures and ethics issues in M&A.  
Effective: Spring 2012  
Prerequisite:

**CCLAW 966 Financial Accounting (2)** Students will acquire a basic understanding of the concepts and principles of financial accounting practice, confidence analyzing common forms of financial data (e.g., 10K or annual reports), competence to communicate effectively with accountants, awareness of the uses and limits of financial accounting data in decision-making, and perspective necessary to understand how an event affects a firm's financial statements.  
Effective: Fall 2012

**CCLAW 969 Insurance Law (3)** A study of special legal principles applicable to insurance contracts is undertaken with an examination of the insurance industry and insurance marketing, the identity of persons and interests protected, the nature and selection of risks, the rights and duties of the contracting parties, and the enforcement of claims.  
Effective: Spring 2009

**CCLAW 971 International Business Transactions (3)** This course concentrates on private business transactions that cross national boundaries. It is a practical "hands on" course that involves the student in actual contract drafting and interpretation, negotiation of business transactions and resolution of international commercial disputes.  
Effective: Fall 2011 Ending: Summer 2013

**CCLAW 971 International Business Transactions (3)** This course considers private business transactions that cross national boundaries. Topics include formation and enforcement of commercial agreements, forms of international transactions (e.g., agencies, distributorships, licensing agreements, franchising, and foreign subsidiaries), government regulation, electronic commerce, international and cross-cultural business negotiation and techniques for resolution of international business disputes (e.g., judicial procedure, arbitration, mediation).  
Effective: Fall 2013 Future: Fall 2013

**CCLAW 973 International Trade Law (3)** Coverage of the principal laws that govern business transactions across international borders.  
Effective: Fall 2005

**CCLAW 978 Payment Systems and Financial Transactions (3)** Payment Systems and Financial Transactions is a general overview of the law of negotiable instruments (e.g., checks) and other mechanisms for making payments, including credit cards, debit cards, ACH payments, and wire transfers. The course also will cover credit enhancement systems such as guaranties and letters of credit. The course will address both uniform state law (UCC Articles 3, 4, 4A, and 5), and applicable federal statutes and regulations (such as the Expedited Funds Availability Act, the Truth-in-Lending Act, and the Electronic Fund Transfer Act).  
Effective: Fall 2012



**CCLAW 982 Products Liability** (2) This course incorporates and expands the concepts derived from the basic Torts, Contracts, and Uniform Commercial Code coverage of products liability. Emphasis will be on the substantive and procedural law of contract, negligence, and strict liability developed by courts and administrative tribunals. Proposals for legislative reforms will also be studied.  
Effective: Fall 1998

**CCLAW 984 Sales** (3) Article Two of the Uniform Commercial Code is an integrated body of statutory law that prescribes the rights and obligations of parties involved in transactions in goods. Although we will review general principles of contract law and contrast them with the approach adopted in Article Two, this course emphasizes the special techniques of statutory construction utilized in interpreting a code as opposed to an isolated statute. Classroom discussion is devoted almost exclusively to developing analyses of written problems distributed to the students in advance of the class. The problems require students to fashion arguments based on the statutory language. The problems also require students to develop an understanding of the legal and commercial context based on the assigned readings, and then to interpret the statutory language in light of the context.  
Effective: Summer 2011

**CCLAW 986 Federal Securities Regulation** (3) This course is intended to provide an overview of the federal securities laws. Securities regulation plays a crucial role in many different fields of business law, and every lawyer should have at least a basic knowledge of its general principles. The course focuses on issues such as the offering of securities, civil liabilities connected with the sale and purchase of financial instruments, insider trading, proxy voting and M&As, takeovers, stock exchanges and brokers/dealers regulation. Specific attention is devoted to securities litigation aspects, including class actions.  
Effective: Fall 2011  
Prerequisite:

**CCLAW 991 Antitrust** (3) This course is principally an examination of antitrust law and policy in the U.S. as evolved through prosecutions by the U.S. Department of Justice and the Federal Trade Commission. There is brief coverage of: (a) European Union and Canadian competition laws plus evolving proposals for supranational norms; and (b) leading market regulatory schemes such as those affecting marketing of foods, drugs, textiles, toxic substances, securities, and consumer products. In the antitrust area, commercial conduct alleged to violate price fixing, market allocation, tying, exclusive dealing, asset acquisition, and price discrimination norms are considered at length with some attention to state antitrust law.  
Effective: Spring 2001

**CCLAW 993 Merger Finance and Economics** (2) The purposes of the course are to provide the student with (1) a fundamental understanding of the finance and economics of the M&A marketplace, and (2) the basic skills needed to succeed in various professional capacities in the M&A marketplace, such as investment banker, management consultant, strategic planner, and lawyer.  
Effective: Spring 2010

**CCLAW 994 Telecommunications Law and Regulation** (3) This course will examine and debate a series of legal and regulatory issues raised by spectrum management, broadcasting, cable television, common carrier, Internet, resource allocation, and technology planning topics.  
Effective: Spring 2012

**CCLAW 997 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 2007

**CCLAW 997A Financial Accounting** (2) You'll learn why financial accounting is a system for measuring and communicating the outcomes of business activities to parties outside the firm. The purposes of this course are to: 1) provide you with a basic understanding of the concepts and principles (i.e. the jargon) underlying financial accounting practices. 2) make you comfortable with financial data (in particular, opening a 10K or annual report) 3) enable you to have a conversation with your company's accountants 4) make you aware of the care that must be taken when using financial accounting data as a course of information for making decisions 5) provide you with the technical tools and references to analyze how a particular transaction affects a firm's financial statements.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CCLAW 997A Corporate Governance Transactions** (3) Corporate Governance Transactions will provide students with an intensive examination of Delaware corporate governance law as applied to corporate merger and asset acquisition strategy and transactions.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**CCLAW 997B Commercial Litigation** (2) Using basic antitrust law as a foundation, this course will explore the myriad procedural, tactical, and strategic issues that arise in the prosecution of defense of modern "big case" commercial litigation. After covering the basic antitrust concepts, the course will follow a major case through its principal phases, from drafting the compliant and answer to discovery of expert witnesses, to preparing and presenting summary judgement motions, to working with jury consultants, to settlement efforts, to trial preparation and presentation.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CCLAW 997B Multinational Corporations** (3) This course will introduce students to the multinational corporation as object and source of law and legal regulation, and the role of multinational corporations in world affairs. Globalization is central to the study of the regulatory and policy framework of multinational corporations, and their relationships with states and other non-state actors. With the deepening of the framework and legal structures of globalization, multinational corporations have been transformed from a mere object of law making, like individuals, to organizations that themselves now create law and legal structures. Additionally, the framework within which multinational corporations now serve as both objects and sources of law has expanded from relations only with the domestic legal orders to states to deep association with governance structures at the international level, including those of both public and private entities. Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CCLAW 997C Operational Issues for Small Business Enterprises** (3) Selected practical problems involving the operations of the small business enterprise and its owners are examined. Topics include: Legally hiring and firing employees; employee privacy; governmental intervention and compliance; handling governmental agency issues (IRS, SEC, DoL, etc.); business expansion; cessation of a business; business divorce and family business planning and transition. The course will provide practical experience for students who wish to become transactional attorneys through business problems designed to allow them to identify relevant issues and draft documents resolving those issues. Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

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## Counseling Psychology (CNPSY)

CNPSY 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2011

CNPSY 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2011

CNPSY 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2011

CNPSY 502 (CN ED 502) **Advanced Counseling Theory and Method** (3) Assessment, intervention, and evaluation procedures for counseling problems frequently encountered in school, college, and rehabilitation settings.  
Effective: Summer 2011  
Prerequisite:

CNPSY 515 **Family Systems Therapy: Theory, Research and Practice** (3) Examines theory, research, and interventions grounded in family systems framework (e.g., Bowenian, Structural Strategic, etc.) from a psychological perspective.  
Effective: Summer 2011  
Prerequisite:

CNPSY 554 (CN ED 554) **Cross-Cultural Counseling** (3) Examines theory, research, and models of counseling relationships between counselors and clients of different racial and sociocultural backgrounds.  
Effective: Summer 2011  
Prerequisite:

CNPSY 555 (CN ED 555) **Career Counseling** (3) The examination of historical, legislative, and current models of career counseling and the development of pertinent individual and group techniques.  
Effective: Summer 2011  
Prerequisite:

CNPSY 582 (CN ED 582) **Advanced Group Psychotherapy** (3) Study of group psychotherapy and interventions, with an experiential component. Available only to majors in CN ED and CNPSY.  
Effective: Summer 2011

CNPSY 589 (CN ED 589) **Seminar on Counseling Supervision** (1) Study of research about and theoretical models of clinical supervision of counselors; includes preparation for a practicum in counseling supervision.  
Effective: Summer 2011 Ending: Fall 2013  
Prerequisite:

CNPSY 589 **Seminar on Counseling Supervision** (1) Study of research about and theoretical models of clinical supervision of counselors; includes preparation for a practicum in counseling supervision.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

CNPSY 594 **Research in Counseling** (2-6) The design, implementation, and evaluation of counseling research projects.  
Effective: Summer 2011

CNPSY 595A **Counseling Psychology Practicum** (1-3 per semester, maximum of 12) Practice in the application of counseling psychology principles and methods to cases counseled under supervision; case conferences.  
Effective: Summer 2011  
Prerequisite:

CNPSY 595D (CN ED 595D) **Supervision of Counselors** (3-9) Practical experience in supervising and evaluating work of counselors.  
Effective: Summer 2011  
Prerequisite:

CNPSY 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2011

CNPSY 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2011

CNPSY 600 **THESIS RESEARCH** (1-15) NO DESCRIPTION.  
Effective: Summer 2011

CNPSY 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2011

CNPSY 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description available.  
Effective: Summer 2011

CNPSY 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2011

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## Counselor Education (CN ED)

**CN ED 401 Foundations of Chemical Dependency Counseling (3)** An overview of diagnosis and assessment, models for chemical dependency prevention, counseling, and recovery; contexts of chemical dependency treatment.

Effective: Summer 2011

Prerequisite:

**CN ED 404 Group Procedures in Guidance and Counseling (3)** The nature and functioning of groups in educational and agency settings. Provides prospective counselors with experience in the group process.

Effective: Summer 2011

Prerequisite:

**CN ED 416 Interpersonal Relationships and Alcohol and Other Drugs (AOD) Dependency (3)** This course examines families with chemically dependent members, dynamics, appropriate interventions, and treatment.

Effective: Summer 2011

Prerequisite:

**CN ED 420 Chemical Dependency: Youth at Risk (3)** Study of youth who are at-risk of developing chemical dependency including the characteristics and factors related to chemical dependency.

Effective: Summer 2011

Prerequisite:

**CN ED 421 Counseling Strategies for Preventing Chemical Dependency (3)** Examines helping professional's role in primary and secondary prevention of substance abuse, and related problems like delinquency, suicide, and pregnancy.

Effective: Summer 2011

Prerequisite:

**CN ED 422 Foundations of Addictions Counseling (3)** Study of the fundamental principles of counseling individuals with a wide variety of addictions.

Effective: Summer 2011

Prerequisite:

**CN ED 423 Student Assistance Programs (3)** Exploration of early stages of adolescent "at-risk" behavior and skills for student assessment and intervention within schools and communities.

Effective: Summer 2011

Prerequisite:

**CN ED 424 (WF ED 424) Facilitating Career Development (3)** This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work.

Effective: Summer 2012

Prerequisite:

**CN ED 430 Couples and Family Counseling (3)** The theory and practice of counseling with couples and families emphasizing family development and major intervention approaches.

Effective: Summer 2011

Prerequisite:

**CN ED 431 Counseling and Teaching Youth at Risk (3)** This course is focused on how to counsel and/or teach youth at risk for a variety of social, emotions, and educational problems.

Effective: Summer 2011

Prerequisite:

**CN ED 432 Ethical, Legal, and Professional Issues in Counseling (3)** Examination of the current ethical and legal issues related to professional counselors and counseling.

Effective: Summer 2011

Prerequisite:

**CN ED 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

**CN ED 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

**CN ED 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

**CN ED 500 Introduction to Counseling and Development (3)** Introduces students to the profession of counseling and to the major models of human growth and development.

Effective: Summer 2011

**CN ED 501 Counseling Theory and Method (3)** Survey of psychodynamic, humanistic, behavioral and

cognitive-behavioral approaches to counseling individuals.  
Effective: Summer 2011

CN ED 502 (CNPSY 502) **Advanced Counseling Theory and Method** (3) Assessment, intervention, and evaluation procedures for counseling problems frequently encountered in school, college, and rehabilitation settings.  
Effective: Summer 2011  
Prerequisite:

CN ED 503 **Guidance Services in Elementary Education** (3) Guidance services to elementary school students; guidance opportunities for elementary teachers and principals.  
Effective: Summer 2011

CN ED 504 **Guidance Services in Secondary Education** (3) Nature and scope of guidance in secondary schools--services, models, and strategies; the counselor as an agent of change.  
Effective: Summer 2011

CN ED 505 **Foundations of Career Development and Counseling Information** (3) Accelerating change in economic, psychological, social, educational influences upon counselees. Utilization of information systems in effecting counselee change.  
Effective: Summer 2011

CN ED 506 **Individual Counseling Procedures** (3) Training in listening, responding, challenging skills, and action-oriented techniques for individual counseling.  
Effective: Summer 2011  
Prerequisite:

CN ED 507 **Multicultural Counseling: Foundations** (3) Provide foundational information that controverts, complements and extends traditional psychology and counseling theory and practice.  
Effective: Summer 2011

CN ED 508 **Organization and Administration of Pupil Services** (3) Principles, organization, personnel, functions, integration with school programs, evaluation.  
Effective: Summer 2011  
Prerequisite:

CN ED 509 **Introduction to Rehabilitation Counseling** (3) Provides information about rehabilitation history, legislation, philosophy, and agencies, as well as an overview of a variety of disabling conditions.  
Effective: Summer 2011

CN ED 516 **Helping Skills for Student Affairs Professionals** (3) Develop beginning content knowledge and skills related to practice of active listening, attending, and referral necessary for student affairs work.  
Effective: Summer 2011  
Prerequisite: Concurrent: CN ED 501

CN ED 523 **Counseling Children** (3) Provides school and clinic approaches for school counselors and others mental health professionals to help children with developmental problems.  
Effective: Summer 2011

CN ED 524 **Counseling Adolescents** (3) Provides approaches for school counselors and others working with a variety of adolescent obstacles and developmental needs  
Effective: Summer 2011

CN ED 525 **Applied Testing in Counseling** (3) Using counseling assessments effectively and ethically in applied settings, with an emphasis on test analysis and evaluation of psychometric properties.  
Effective: Summer 2011  
Prerequisite:

CN ED 526 **Research in Counselor Education** (3) Evaluating counselor education research from scientist-practitioner perspective; emphasis on how to develop and use research with an applied focus.  
Effective: Summer 2011

CN ED 530 **Family Counseling: Theory and Practice** (3) Conceptualization and application of family counseling frameworks to EC-12 school settings are learned in this course.  
Effective: Summer 2011  
Prerequisite:

CN ED 531 **Grief and Loss Counseling** (3) Course focus is on counseling people with a variety of grief and loss issues.  
Effective: Spring 2013

CN ED 532 **Diagnosis Counseling** (3) Course examines elements of counseling diagnosis, including identification and assessment of symptoms and behaviors in determining appropriate diagnoses.

Effective: Fall 2012

CN ED 542 **Dual Diagnosis** (3) Examines issues related to diagnosis and treatment of individuals who have both a mental disorder and a substance abuse disorder.  
Effective: Summer 2011

CN ED 554 (CNPSY 554) **Multicultural Counseling** (3) Examines theory, research, and models of counseling relationships between counselors and clients of different racial and sociocultural backgrounds.  
Effective: Summer 2011  
Prerequisite:

CN ED 555 (CNPSY 555) **Career Counseling** (3) The examination of historical, legislative, and current models of career counseling and the development of pertinent individual and group techniques.  
Effective: Summer 2011  
Prerequisite:

CN ED 560 **Psychosocial Aspects of Disability** (3) Psychological models of reaction to disability and social consequences in adulthood; generalizations to other life crises; implications for counselor interventions.  
Effective: Summer 2011  
Prerequisite:

CN ED 561 **Job Development and Employment of Persons with Disabilities** (3) Assessing client readiness for work, job-seeking skills training, job placement strategies, modifications to the worksite, methods for employer development.  
Effective: Summer 2011  
Prerequisite:

CN ED 580 **Foundations: History and Trends in Counselor Education** (3) Overview of the foundations and issues relevant to the counseling profession and counselor education. Course available only to majors in CN ED.  
Effective: Summer 2011

CN ED 581 **Professional Issues in Counselor Education** (3) Forum for doctoral students to examine and analyze issues relevant for counselor educators. Available only to majors in CN ED.  
Effective: Summer 2011  
Prerequisite:

CN ED 582 (CNPSY 582) **Advanced Group Psychotherapy** (3) Study of group psychotherapy and interventions, with an experiential component. Available only to majors in CN ED and CNPSY.  
Effective: Summer 2011

CN ED 589 (CNPSY 589) **Seminar on Counseling Supervision** (1) Study of research about and theoretical models of clinical supervision of counselors; includes preparation for a practicum in counseling supervision.  
Effective: Summer 2011 Ending: Summer 2013  
Prerequisite:

CN ED 589 **Seminar on Counseling Supervision** (3) Study research and theoretical models of clinical supervision of counselors. Includes experiential supervision component as preparation for counseling supervision practicum.  
Effective: Fall 2013 Future: Fall 2013

CN ED 594A **Research Topics** (3) The design, implementation, and evaluation of counseling research projects.  
Effective: Summer 2013

CN ED 595A **Counseling Practicum** (1-6) Practice in the application of guidance principles and methods to cases counseled under supervision; case conferences; seminar in guidance techniques.  
Effective: Summer 2011  
Prerequisite:

CN ED 595B **Supervised Practicum in Rehabilitation Counseling** (1-6) Application of principles and techniques of rehabilitation counseling to cases involving people with disabilities.  
Effective: Summer 2011  
Prerequisite:

CN ED 595C **Professional Experience in Rehabilitation Counseling** (1-15) Supervised internship, with responsibility for a regular case load.  
Effective: Summer 2011  
Prerequisite:

CN ED 595D (CNPSY 595D) **Supervision of Counselors** (3-9) Practical experience in supervising and evaluating work of counselors.  
Effective: Summer 2011  
Prerequisite:

CN ED 595E **Elementary School Counseling Internship and Seminar** (1-3 PER SEMESTER/MAXIMUM OF 6) Off-campus, supervised internships in elementary school settings with supplementary related topics, discussion, and skills training in on-campus seminars.  
Effective: Summer 2011

Prerequisite:

CN ED 595F **Secondary School Counseling Internship and Seminar** (1-3 PER SEMESTER/MAXIMUM OF 6) Off-campus, supervised internships in secondary school settings with supplementary related topics, discussion, and skills training seminars.

Effective: Summer 2011

Prerequisite:

CN ED 595G **Student Personnel Internship and Integrative Seminar** (1-6 per semester/maximum of 9) Off-campus, supervised internships in postsecondary/related college student personnel settings with pertinent topics, discussion; skills training seminars on campus.

Effective: Summer 2011 Ending: Summer 2013

Prerequisite:

CN ED 595G **Counseling Internship and Integrative Seminar** (3-6 per semester/maximum of 12) Off-campus, supervised internships in counseling settings with pertinent topics, discussion; skills training seminars on campus.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

CN ED 595I **Counselor Education Doctoral Teaching Internship** (3) Practical experience in undergraduate and graduate level teaching under supervision. Available only to CN ED doctoral students.

Effective: Summer 2011

Prerequisite:

CN ED 595K **Counselor Education Doctoral Counseling Internship** (3) Supervised internship, with responsibility for a regular counseling caseload. Available only to CN ED doctoral Students.

Effective: Summer 2011

Prerequisite:

CN ED 595P **Counselor Education Doctoral Counseling Practicum** (3) Practice in the application of counselor education principles and methods to cases counseled under supervision; case conferences. Available only to CN ED doctoral students.

Effective: Summer 2011

CN ED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

CN ED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2011

CN ED 600 **Thesis Research** (1-15) No description.

Effective: Summer 2011

CN ED 601 **Thesis Preparation** No description.

Effective: Summer 2011

CN ED 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Teaching of counselor education laboratory, clinical practice, and recitation classes under senior faculty supervision.

Effective: Summer 2011

CN ED 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2011

CN ED 840 **Trends and Issues in Addiction Counseling** (3) This course provides an overview of current professional and ethical issues facing the addictions field.

Effective: Summer 2011

CN ED 843 (S PSY 843) **Prevention Strategies and Programming** (3) Addresses prevention program development, implementation, and evaluation, along with theoretical and empirical underpinnings, ethical and multicultural issues related to prevention.

Effective: Summer 2011

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## **Cp-Legal Services (FPLSC)**

FPLSC 995 **Field-Placement Clinic: Legal Services** (2-3) See Student Handbook.  
Effective: Fall 2003

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## Crime, Law & Justice (CLJ)

**CLJ 500 Introduction to Graduate Studies in Crime, Law, and Justice** (1) An overview of professional activities of scholars of Crime, Law, and Justice and of Penn State's program in this field.  
Effective: Summer 2002

**CLJ 501 Criminal Justice Organizations and Institutions** (3) Organizations and institutions involved in the formulation and implementation of criminal justice policy in complex social and organizational environments.  
Effective: Spring 1997

**CLJ 512 (SOC 512) Criminological Theories** (3) Survey of theoretical and substantive issues in deviance and criminology, with emphasis on critical review of theories.  
Effective: Fall 2005

**CLJ 515 (SOC 515) Research Methods in Criminology and Deviance** (3) Review of methodological issues; design and conduct of research; analysis and interpretation of findings; ethical and policy issues.  
Effective: Spring 1996

**CLJ 558 Victimization** (3) This course discusses the individual- and community-level correlates, causes, consequences, and policy implications of criminal victimization.  
Effective: Summer 2007

**CLJ 591 (SOC 591) Teaching Sociology/Crime, Law, and Justice** (1) Preparation for teaching sociology and/or crime, law, and justice at the college level.  
Effective: Fall 2000

**CLJ 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1997

**CLJ 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1997

**CLJ 597E (SOC 597E) Sentencing and Corrections** (3) The course takes a sociological and criminological view of sentencing and corrections, through classic and contemporary theory and empirical research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**CLJ 600 Thesis Research** (1-15) No description.  
Effective: Spring 1997

**CLJ 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1997

**CLJ 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Spring 1997

**CLJ 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1997

**CLJ 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1997

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## Criminal Justice (CRIMJ)

CRIMJ 406 (SOC 406, CRIM 406) **Sociology of Deviance** (3) Theory and research concerning behaviors and lifestyles viewed as significant departures from a group's normative expectations.

Effective: Spring 2008  
Prerequisite:

CRIMJ 407 (US) (CRIM 407) **Victimology** (3) This course will explore the legal, emotional, and social responses to the process of victimization by offenders and third parties.

Effective: Spring 2008

CRIMJ 408 **Police Administration** (3) Principles of administration as they relate to a police organization; and policy development.

Effective: Spring 2008  
Prerequisite:

CRIMJ 410 **The Pennsylvania Court System** (3) Tracing the steps of criminal cases through the investigative stage, arrest, trial, sentencing and appellate review in Pennsylvania.

Effective: Spring 2004  
Prerequisite:

CRIMJ 412 (SOC 412, CRIM 412) **Crime, Social Control, and the Legal System** (3) Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

Effective: Spring 2008  
Prerequisite:

CRIMJ 413 (CRIM 413, SOC 413) **Advanced Criminological Theory** (3) This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories.

Effective: Spring 2008  
Prerequisite:

CRIMJ 414 (SOC 414, CRIM 414) **Criminal Careers and the Organization of Crime** (3) Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and lifestyles; policy implications.

Effective: Spring 2008  
Prerequisite:

CRIMJ 415 (PUBPL 415) **Drug Control Policy in Comparative Perspective** (3) Examines the history of drug control policy in the United States; comparisons and contrasts with other countries' experiences.

Effective: Summer 2004  
Prerequisite:

CRIMJ 420 **Criminal Law and Procedure** (3) Common law and statutory crimes; constitutional rights of accused persons, liability of criminal justice professionals.

Effective: Spring 2008  
Prerequisite:

CRIMJ 421 (CRIM 421) **Violent Crime in the United States** (3) The impact of violent crime on victims, their families, and communities; the police process as it relates to violent crime.

Effective: Spring 2008  
Prerequisite:

CRIMJ 422 (CRIM 422) **Victimization** (3) Examines the history, how victimization is measured/studied in social sciences, public policy implications of victimization movement in U.S.

Effective: Spring 2008  
Prerequisite:

CRIMJ 423 (US) (WMNST 423, CRIM 423) **Sexual and Domestic Violence** (3) Legal, sociological, and psychological perspectives on sexual and domestic violence.

Effective: Spring 2008  
Prerequisite:

CRIMJ 424 (CRIM 424) **Drugs and Crime** (3) Analysis of international narcotics trafficking in the twentieth century.

Effective: Spring 2008  
Prerequisite:

CRIMJ 424W **Drugs and Crime** (3) Analysis of international narcotics trafficking in the twentieth century.

Effective: Spring 2008  
Prerequisite:

CRIMJ 425 (CRIM 425) **Organized Crime** (3) This course examines organized crime in terms of historical antecedents, structure, related theories, and policy issues.

Effective: Spring 2008  
Prerequisite:

CRIMJ 426 **Special Offender Types** (3-6) Study of special offender types; relationships with criminal justice system (drug abuse, victimless crime, white collar crime considered different semesters).

Effective: Spring 2008  
Prerequisite:

**CRIMJ 430 Alternatives to Incarceration (3)** Control and treatment of offenders in the community, probation and parole organizations, diversion programs, innovative sentences, supervision techniques.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 431 Offender and Prisoner Rights (3)** The identification of correctional problems and the setting of objectives as reflective of court rulings, legislative change, and administrative law.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 432 (CRIM 432) Crime and the American Court System (3)** This course examines the American court system including structure and the way courts process offenders with special focus on sentencing.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 435 Border Security (3)** This course provides knowledge about government organizations charged with American border security, guiding laws and policies.

Effective: Summer 2011  
Prerequisite:

**CRIMJ 439 (PL SC 439) The Politics of Terrorism (3)** Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 441 (US) (CRIM 441) The Juvenile Justice System (3)** Historical and contemporary view of the juvenile justice system. Focus on analyzing components of the system, their interactions, processing, and handling of youths.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 441W The Juvenile Justice System (3)** Historical and contemporary view of the juvenile justice system. Focus on analyzing components of the system, their interactions, processing, and handling of youths.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 450W Senior Seminar (3 per semester/maximum of 6)** Capstone course exploring past, current and future developments in criminal justice.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 451 (US) (CRIM 451) Race, Crime, and Justice (3)** This course focuses on the significance of race, class, and ethnicity to criminal justice processing and criminal offending.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 453 (US) (WMNST 453, CRIM 453) Women and the Criminal Justice System (3)** This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system.

Effective: Spring 2013  
Prerequisite:

**CRIMJ 460 History and Function of Criminal Justice Components (3)** Historical development of criminal justice system components (police, courts, corrections) related to formulation and function of the state.

Effective: Spring 2008

**CRIMJ 462 Comparative Criminal Justice Systems (3)** A comparison of American and selected foreign justice systems to illustrate the variety of possible responses to crime.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 465 Ethics in Criminal Justice (3)** Ethical behavior in the criminal justice system.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 467 (SOC 467, CRIM 467) Law and Society (3)** Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 469 (HIST 469) Drugs and Drug Policy in the United States (3)** Examines the history and dimensions of drug use and analyzes the impact of drug policy.

Effective: Spring 2008  
Prerequisite:

**CRIMJ 471 (B LAW 471) Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3)** Civil law issues within a justice agency and between criminal justice agencies and members of the public.

Effective: Spring 2008 Ending: Summer 2013  
Prerequisite:

**CRIMJ 471 Legal Rights, Duties, Liabilities of Criminal Justice Personnel** (3) Civil law issues within a justice agency and between criminal justice agencies and members of the public.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**CRIMJ 473 (B LAW 473) Criminal Procedure and Evidence in the Business Community** (3) Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.  
Effective: Spring 2008 Ending: Summer 2013  
Prerequisite:

**CRIMJ 473 Criminal Procedure and Evidence in the Business Community** (3) Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**CRIMJ 482 (CRIM 482) Seminar, Criminal Justice Agency Administration** (3) Relates organizational and public policy management approaches to police, courts, and correctional institutions.  
Effective: Spring 2008  
Prerequisite:

**CRIMJ 489W Victimology: Predatory Crime** (3) This course uses medical, social scientific and legal research to study the complexities of predatory crime.  
Effective: Spring 2004  
Prerequisite:

**CRIMJ 494 Research Topics** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2002

**CRIMJ 494H Research Topics** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

**CRIMJ 495 Internship in Criminal Justice** (3-12) Experience with a criminal justice agency coordinated through readings and discussion.  
Effective: Spring 2008  
Prerequisite:

**CRIMJ 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 1987

**CRIMJ 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1987

**CRIMJ 497A Problem Solving Courts** (3) This course provides students with an understanding and appreciation of the procedures, functioning and criteria that govern these new tribunals by examining the operation of drug, mental health, veterans, DUI, and reentry courts. It also analyzes whether such courts adequately address the needs of the offender, safeguard the constitutional rights of the accused, and protect the safety and security of the community.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CRIMJ 497B The Death Penalty in America Course** (3) This course provides an historical overview of US death penalty practices. Justifications for and against the death penalty are considered. Additionally, pertinent court cases and contemporary issues are examined. Current trends in death penalty legislation and practice are also emphasized.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CRIMJ 497C Issues in Law Enforcement** (3) This course will examine several contemporary issues of relevance to law enforcement professionals. Students who are seeking a career in law enforcement would benefit from discussion and understanding of four key areas of concern facing law enforcement professionals on a daily basis. The course will provide both instruction and application of key concepts covered through lecture.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CRIMJ 497D Constitutional Law** (3) Using case studies and scholarly publications, this upper level course examines the Bill of Rights from criminal justice and civil rights perspectives. In addition to a midterm and final exam, each student will complete a comprehensive analysis of one of the first ten Amendments to the Constitution and lead class discussion on that Amendment using the Socratic method. This class is discussion-intensive.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**CRIMJ 499 (IL) Foreign Studies** (6) Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2008

- CRIMJ 500 Advanced Criminological Theory (3)** This course reviews and critiques the major theories of crime causation.  
Effective: Summer 2002  
Prerequisite:
- CRIMJ 501 Quantitative Methods for Criminal Justice (3)** Advanced research methodology for criminal justice and criminology.  
Effective: Summer 2002  
Concurrent: CRIMJ 503
- CRIMJ 502 Public Policy and the Criminal Justice System (3)** This course studies the concepts and methods of political and legal activity within the criminal justice system and their impact on society.  
Effective: Summer 2002  
Prerequisite:
- CRIMJ 503 Advanced Statistics in Criminal Justice (3)** Advanced statistics in criminal justice and criminology.  
Effective: Summer 2002  
Concurrent: CRIMJ 501
- CRIMJ 504 Criminal Justice Organization and Management (3)** The course will be a broad overview of the structure and management of criminal justice organizations.  
Effective: Summer 2002  
Prerequisite:
- CRIMJ 563 Concepts and Practices in Police Administration (3)** Discusses application of police research and management principles to the contemporary policing context.  
Effective: Spring 2006  
Prerequisite:
- CRIMJ 564 Administrative and Legal Aspects of Corrections (3)** This course addresses historical and contemporary correctional policy, accountability, and possible remedial alternatives.  
Effective: Spring 2006  
Prerequisite:
- CRIMJ 565 Courts in the Criminal Justice System (3)** An analysis of the function and role of the courts and the personnel involved in the American criminal justice system.  
Effective: Spring 2006  
Prerequisite:
- CRIMJ 567 Juvenile Justice: Issues and Practice (3)** The systematic application of the juvenile justice system and issues related to juvenile delinquency and constitutional law.  
Effective: Summer 2002  
Prerequisite:
- CRIMJ 568 Qualitative Methods for Criminal Justice (3)** This course examines the many facets of qualitative research methodology.  
Effective: Fall 2002  
Prerequisite:
- CRIMJ 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2002
- CRIMJ 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 2002
- CRIMJ 595 Internship (1-18)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 2006  
Prerequisite:
- CRIMJ 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2002
- CRIMJ 600 Thesis Research (1-15)** No description.  
Effective: Summer 2002
- CRIMJ 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Summer 2002

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## Criminal Law (CRIML)

**CRIML 952 Federal Criminal Practice (2)** This course is an in-depth examination of all stages of a federal criminal prosecution, commencing with the decision to charge, and continuing through trial and sentencing. Subjects will include the Bail Reform Act of 1984, investigative techniques, motions to suppress, immunity, privileges, trial techniques, and the Federal Sentencing Guidelines. Strategic decisions involving pre-trial proceedings, trials, and sentencings will be addressed via presentations by experienced judges, practitioners, and other participants in the process. The goal of the course is to provide students with practical advice and insightful tips regarding every aspect of federal criminal litigation.  
Effective: Summer 2013

**CRIML 953 Advanced Criminal Procedure (3)** This course examines the constitutional, statutory and rule-based issues that arise in the formal processing of a criminal case. Subject include the decision to charge, prosecutorial discretion, grand jury and preliminary hearing, joinder and severance, bail and pretrial release, discovery, plea bargaining and guilty pleas, speedy trial, jury composition and selection, pre-trial publicity, confrontation, cross-examination and the privilege against self-incrimination.  
Effective: Fall 2012

**CRIML 970 International Criminal Law (3)** A study of the principles, history, procedures and substance of international criminal law.  
Effective: Summer 2005

**CRIML 972 Criminal Procedure (3)** The Criminal Procedure course explores the interface between the criminal justice system and the United States Constitution. The course examines constitutional limits on police investigation and interrogation as well as the circumstances under which indigent defendants are guaranteed the assistance of counsel. In addition to introducing students to constitutional analysis, the course previews the ethical dimensions of defending persons accused of crime. The class also views a trial during the criminal term at the Court of Common Pleas.  
Effective: Fall 2006 Ending: Summer 2013

**CRIML 974 Juvenile Law (2)** This course examines the legal position of the child in society and the extent to which the child may be legally controlled by parent(s) or state. Subject matters include the right of the child to control reproductive decision-making, child support and paternity issues, child pornography and minors' access to pornography, child abuse and neglect, foster care, termination of parental rights, adoption, medical treatment of juveniles, and medical experimentation on juveniles. The course also examines the delinquency jurisdiction of juvenile court, the constitutional protections afforded the child accused of criminal activity, adjudications of delinquency, punishment or placement of the child in the dispositional phase of juvenile proceedings, and treatment of the child as an adult offender.  
Effective: Spring 2012

**CRIML 981 Pennsylvania Criminal Law Practice (2)** This course is a step-by-step analysis of the procedure, planning, tactics, and strategy in defending and prosecuting a criminal case in Pennsylvania from pre-arrest through appeal. Special emphasis is placed on all aspects of the procedure and law relating to the suppression of evidence.  
Effective: Fall 1998

**CRIML 984 Post-Conviction Process (3)** This is a study of guilty pleas and sentencing alternatives, post-conviction remedies, parole, probation, commutation, and pardon. The course will also examine the law of corrections and prisoners' rights.  
Effective: Spring 2013

**CRIML 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2008

**CRIML 998 White-Collar Crime (3)** This course will cover the substantive law and procedures of major white-collar crimes, including conspiracy, fraud, the Racketeer Influenced and Corrupt Organizations law (RICO), money laundering, public corruption, and economic crimes. It will also examine their civil counterparts and civil and administrative consequences and analyze the theory and policies of these hybrid criminal statutes. Finally, the class will learn and practice skills associated with white-collar crime cases, for example, investigative techniques, negotiation, and development of effective theories of the case.  
Effective: Fall 1998

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## Criminology (CRIM)

CRIM 406 (CRIMJ 406, SOC 406) **Sociology of Deviance** (3) Theory and research concerning behaviors and lifestyles viewed as significant departures from a group's normative expectations.

Effective: Spring 2008

Prerequisite:

CRIM 407 (CRIMJ 407) **Victimology** (3) This course will explore the legal, emotional, and social responses to the process of victimization by offenders and third parties.

Effective: Spring 2008

CRIM 412 (CRIMJ 412) **Crime, Social Control, and the Legal System** (3) Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

Effective: Spring 2008

Prerequisite:

CRIM 413 (CRIMJ 413, SOC 413) **Advanced Criminological Theory** (3) This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories.

Effective: Spring 2008

Prerequisite:

CRIM 414 (CRIMJ 414, CRIM 414) **Criminal Careers and the Organization of Crime** (3) Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and lifestyles; policy implications.

Effective: Spring 2008

Prerequisite:

CRIM 421 (CRIMJ 421) **Violent Crime** (3) Examines the nature and causes of violence. Several theoretical perspectives are reviewed including biological, psychological, social, and cultural.

Effective: Spring 2008

Prerequisite:

CRIM 422 (CRIMJ 422) **Victimization** (3) Examines the history, how victimization is measured/studied in social sciences, public policy implications of victimization movement in U.S.

Effective: Spring 2008

Prerequisite:

CRIM 423 (US) (CRIMJ 423, WMNST 423) **Sexual and Domestic Violence** (3) Legal, sociological, and psychological perspectives on sexual and domestic violence.

Effective: Spring 2013

Prerequisite:

CRIM 424 (CRIMJ 424) **Drugs and Crime** (3) Analysis of international narcotics trafficking in the twentieth century.

Effective: Spring 2013

Prerequisite:

CRIM 425 (CRIMJ 425) **Organized Crime** (3) This course examines organized crime in terms of historical antecedents, structure, related theories, and policy issues.

Effective: Spring 2008

Prerequisite:

CRIM 429 **Seminar in Criminal Behavior** (3-4 per semester/maximum of 7) This course explores the study of the application of criminological theories to our understanding of various forms of criminal behavior.

Effective: Spring 2008

Prerequisite:

CRIM 430 **American Correctional System** (3) Study of corrections from probation, intermediate punishment, adult and juvenile correctional institutions to parole.

Effective: Spring 2008

Prerequisite:

CRIM 432 (CRIMJ 432) **Crime and the American Court System** (3) This course examines the American court system including structure and the way courts process offenders with special focus on sentencing.

Effective: Spring 2008

Prerequisite:

CRIM 433 **Sentencing** (3) This course studies sentencing from prosecutorial charging decisions through revocation of probation, and the complex goals and responsibilities at sentencing.

Effective: Spring 2008

Prerequisite:

CRIM 435 **Policing in America** (3) This course will focus on current, historical, theoretical, and research issues surrounding law enforcement in the United States.

Effective: Spring 2008

Prerequisite:

CRIM 441 (US) (CRIMJ 441) **Delinquency and Juvenile Justice** (3) Course examines delinquency and the juvenile justice



system including delinquency's nature, causes, and prevention and the processing of juveniles.

Effective: Spring 2008

Prerequisite:

CRIM 451 (US) (CRIMJ 451) **Race, Crime, and Justice** (3) This course focuses on the significance of race, class, and ethnicity to criminal justice processing and criminal offending.

Effective: Spring 2008

Prerequisite:

CRIM 453 (US) (CRIMJ 453, WMNST 453) **Women and the Criminal Justice System** (3) This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system.

Effective: Spring 2013

Prerequisite:

CRIM 467 (CRIMJ 467, SOC 467) **Law and Society** (3) Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials.

Effective: Spring 2008

Prerequisite:

CRIM 469 **Seminar in the Law** (3-4 per semester/maximum of 7) The focus of this seminar is the law such as the laws of sentencing, appellate course decisions and their impact.

Effective: Spring 2008

Prerequisite:

CRIM 480H **Research Topics in Crime, Law, and Justice** (1) Students are exposed to a variety of research topics related to crime, law, and justice.

Effective: Spring 2008

Prerequisite:

CRIM 481H **Information Literacy in Crime, Law, and Justice** (1) Students are exposed to a variety of information sources related to crime, law, and justice.

Effective: Spring 2008

Prerequisite:

CRIM 482 (CRIMJ 482) **Seminar, Criminal Justice Agency Administration** (3) Relates organizational and public policy management approaches to police, courts, and correctional institutions.

Effective: Spring 2008

Prerequisite:

CRIM 490 **Crime Policy** (3) This course focuses on criminal justice policy and the factors that influence policy development and implementation.

Effective: Spring 2008

Prerequisite:

CRIM 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2008

CRIM 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 2008

CRIM 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2008

CRIM 497A (SOC 497A) **Communities and Crime** (3) Students will critically assess theory and empirical research on the effects of neighborhood structure and social organization on crime.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

CRIM 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Spring 2008

CRIM 805 (HLS 805) **Violence, Threats, Terror, and Insurgency** (3) This course provides an overview of the domestic and global issues related to homeland security.

Effective: Summer 2010

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## Curriculum and Instruction (C I)

**C I 400 Introduction to Research Literature** (3) Introduction to research literature and methodology; stress on interpretation, sources, and research reporting.

Effective: Fall 1981

Prerequisite:

**C I 405 (EDLDR 405) Strategies in Classroom Management** (3) Managing and coping with disruptive student behavior in instructional settings so that they support the teaching/learning process.

Effective: Fall 2008

Prerequisite:

**C I 412W Secondary Teaching** (3) Study of the teacher's responsibilities, steps in planning instruction, and various strategies for implementing and assessing teaching.

Effective: Spring 2007

Prerequisite:

**C I 494H Research Techniques in Curriculum and Instruction** (1-3) Examination, application, assessment, and presentation of research modes and techniques in Curriculum and Instruction. Limited to University scholars in the College of Education.

Effective: Spring 1988

Prerequisite:

**C I 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Fall 2001

Prerequisite:

**C I 495A Clinical Application of Instruction--Early Childhood Education** (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

Effective: Spring 1997 Ending: Fall 2013

Prerequisite: Concurrent: regular professional methods courses in area of certification.

**C I 495A Clinical Application of Instruction--PK--4** (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: regular professional methods courses in area of certification.

**C I 495B Clinical Application of Instruction--Elementary and Kindergarten Education** (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

Effective: Spring 1997 Ending: Fall 2013

Prerequisite: Concurrent: MTHED 420 SCIED 458 SS ED 430W

**C I 495B Clinical Application of Instruction--Middle Level Education** (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: MTHED 420 SCIED 458 SS ED 430W

**C I 495C Clinical Application of Instruction--Secondary Education** (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

Effective: Spring 1997

Prerequisite: Concurrent: C I 412 and special methods course(s) in area of certification

**C I 495D Practicum in Student Teaching--Elementary and Kindergarten Education** (12) Full-time classroom instruction in early childhood and elementary education. Students supervised by University personnel and practicing teachers. No concurrent courses other than C I 495F permitted.

Effective: Spring 1997 Ending: Fall 2013

Prerequisite:

**C I 495D Practicum in Student Teaching--Childhood and Early Adolescent Education** (12) Full-time classroom instruction in early childhood and elementary education. Students supervised by University personnel and practicing teachers. No concurrent courses other than C I 495F permitted.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**C I 495E Practicum in Student Teaching--Secondary Education** (15) Full-time classroom instruction in secondary education. Students supervised by university personnel and practicing teachers. No concurrent courses permitted.

Effective: Spring 1997

Prerequisite:

**C I 495F Professional Development Practicum** (3) Instruction concurrent with student teaching practicum. Students focus on the solution of instructional problems identified at the practicum site.

Effective: Spring 1997

Prerequisite: Concurrent: C I 495D

**C I 495G Practicum in Student Teaching - Secondary Education** (9) Full-time professional development internship in secondary English education. Students supervised by University personnel and practicing teachers.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**C I 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**C I 496A Clinical Experience** (6) A clinical experience offered for a specific group of MEd science students.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**C I 497B CEAED Disciplinary Inquiry Block** (12) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 497B CEAED Discipline Inquiry Block** (12) Course serves as block until CEAED students are registered by Department for appropriate section of MTHED 420, SCIED 458, SS ED 430W and C I 495A.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C I 497C IUG and Honors Thesis Workshop** (3) Workshop offering support for students writing theses in the Reading/SPLED IUG as well as honors theses in any education major.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 497E Teaching Reading and Writing to English Language Learners** (3) The course focuses on conceptually and pedagogically effective ways to teach reading and writing for English language learners in the US.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**C I 500 Multiple and Mixed Methods in Curriculum Inquiry** (3) Multiple and mixed methods of inquiry to investigate problems in the practice of curriculum and instruction.

Effective: Summer 2007

**C I 501 Teaching as Inquiry** (3) Course guides teachers to develop systematic inquires into effective teaching and learning.

Effective: Summer 1998

**C I 502 Qualitative Research in Curriculum and Instruction I** (3) Presentation of theoretical and practical issues related to designing and proposing qualitative research concerning curriculum, teaching and/or learning.

Effective: Summer 1998

Prerequisite:

**C I 503 Qualitative Research in Curriculum and Instruction II** (3) Considers forms of qualitative data, data analyses, procedures to generate data relationships, interpretation, and presentation of data.

Effective: Summer 1998

Prerequisite:

**C I 534 Historical Research in the Curriculum** (3) The course addresses the practice of historical research in curriculum, borrowing from the techniques of historians, journalists, and educators.

Effective: Spring 1999

**C I 550 Overview of Contemporary School Curriculum** (3) Current school programs and options and their impact on pupils; problems in introducing new content into the curriculum.

Effective: Fall 1981

Prerequisite:

**C I 577 (LL ED 577) Multicultural Issues in Literacy Education** (3) Explores research questions, and theoretical frameworks, and analyzes multicultural issues in popular media in the context of American schools.

Effective: Spring 1997

Prerequisite:

**C I 580 (LL ED 580) Media Literacy, Language, and Literacy in Schools (3)** Theories of media literacy, issues of non-print technology in language and literacy.  
Effective: Spring 1997  
Prerequisite:

**C I 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**C I 595 Internship in Curriculum, Supervision, or Instruction (1-6)** Internship in schools or other educational settings under supervision of graduate faculty in student's area of specialization.  
Effective: Spring 1987  
Prerequisite:

**C I 596 Individual Studies (1-9)** Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**C I 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered frequently.  
Effective: Spring 1987

**C I 597A Reforming Public Schools (3)** This course will examine the public school reform movement and critique the idea of "failing schools."  
Effective: Summer 2013 Ending: Summer 2013

**C I 597A Key Issues in English Language Learners Teacher Education (3)** The course examines key issues of preparing teachers for teaching English language learners.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 597A The Place of Place(s) in Learning and Teaching (3)** Interdisciplinary study of place(s), focused on how place and places shape and are shaped by living, learning, and teaching.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C I 597B Vygotsky and Education (3)** Examination of educational practices to promote learning and development that are rooted in Vygotskian theoretical principles.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 597B Children's Books and Toys as Objects and Texts (3)** This course examines historical and contemporary children's materials (books, toys, games) through theoretical lens such as book history, material culture and media studies.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C I 597C Girls' Culture and Popular Cultures Created for and by Girls (3)** This participatory seminar uses a historical approach to girlhood cultures to explore educational implications in different popular cultures created for and by girls.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 597C Differentiated Curriculum in Secondary Schools (3)** Curricular theory and design of literacy activities for students with varying abilities and needs mainstreamed in inclusive classroom settings.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C I 597D Foundations of New Literacy Studies (3)** Course traces the emergence of NLS (theoretical, sociological, historical and cultural roots) through its contemporary contributions to qualitative research and theory.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 597D Judith Butler, Gender and Education (3)** In-depth reading of the works of Judith Butler and their applications in the analysis of education.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C I 597E Narrative Approaches to Educational Research (3)** Utilizes interdisciplinary readings and student inquiry to construct a sense of affordances and constraints of narrative approaches to educational research.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**C I 597I Theories of Childhood (3)** Explore highly variable ways that childhood has been constructed and enacted across multiple cultures and throughout history.  
Effective: Summer 2013 Ending: Summer 2013

**C I 597I Theories of Childhood (3)** Explore highly variable ways that childhood has been constructed and enacted across multiple cultures and throughout history.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**C I 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2005

**C I 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**C I 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1983

**C I 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Teaching experience in Curriculum and Instruction undergraduate faculty supervision.  
Effective: Fall 1983  
Prerequisite:

**C I 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2000

**C I 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

**C I 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1983

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## Curriculum and Supervision (C & S)

**C & S 470 Workshop in Selected Studies in Curriculum** (1-6) Intensive work on selected current problems in curriculum.  
Effective: Winter 1978  
Prerequisite:

**C & S 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1992

**C & S 551 (EDLDR 551) Curriculum Design: Theory and Practice** (3) The analysis and use of the foundations which underlie models of curriculum design.  
Effective: Spring 2011  
Prerequisite:

**C & S 553 (EDLDR 553) Issues in Curriculum** (3 per semester/maximum of 6) In-depth study of issues and trends in the understanding and practice of curriculum.  
Effective: Spring 2011  
Prerequisite:

**C & S 555 Development of Teacher Education Programs** (3) Study of the components and design of teacher education programs within the constraints of institutional, professional, and legal contexts.  
Effective: Spring 2012  
Prerequisite:

**C & S 557 (EDLDR 557) Seminar in Curriculum Research** (3) Analysis of particular curriculum studies, methods and paradigms, and the general status of current research in the general curriculum field.  
Effective: Spring 2011  
Prerequisite:

**C & S 558 Standard Works in Curriculum and Instruction** (3) Study of significant empirical, historical, evaluative, philosophical, and critical works having an impact on curriculum and instruction practice.  
Effective: Spring 2012  
Prerequisite:

**C & S 560 (EDLDR 560) Principles of Instructional Supervision** (3) Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.  
Effective: Spring 2011  
Prerequisite:

**C & S 562 (EDLDR 562) Methods of Classroom Supervision and Coaching** (3) Strategies and techniques for supervision/coaching of instruction intended to enhance teacher reflection, self-direction, and autonomy.  
Effective: Spring 2011  
Prerequisite:

**C & S 563 (EDLDR 563) Designing Staff Development Programs** (3) Designing, implementing, and evaluating effective staff development programs for personnel in educational settings.  
Effective: Spring 2011  
Prerequisite:

**C & S 564 Supervision Theory** (3) Critical analysis of alternative theories of instructional supervision and in-depth examination of trends and issues in supervision.  
Effective: Spring 2012  
Prerequisite:

**C & S 576 (EDPSY 576) Research Methods in Teacher Education** (3) A basis in theory, findings from research, research design, and methodologies related to teacher education.  
Effective: Spring 2013

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## Demography (DEMOG)

DEMOG 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 1987

DEMOG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1987

DEMOG 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 1987

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## Dermatology (DERM)

DERM 720 **Dermatology** (3) Interdisciplinary - Medical Education Course

Effective: Spring 2008

Prerequisite:

DERM 732 **Dermatology Elective** (5) Designed to provide students with an extensive, in-depth exposure to clinical dermatology; involved in the evaluation and management of patients in dermatology clinics.

Effective: Fall 2003

Prerequisite:

DERM 740 **Dermatology/Pathology Elective** (5) Intended for students pursuing a career in dermatology or pathology; involves the study of the pathology of cutaneous disorders. The elective complements what is learned in dermatology and pathology rotations.

Effective: Summer 2009

Prerequisite:

DERM 796 **Dermatology Individual Studies** (5) This course provides an opportunity for senior medical students to pursue individual dermatology research projects with a supervising faculty dermatologist.

Effective: Fall 2008

Prerequisite:

DERM 796A **Dermatology Individual Studies for 3rd Year Students** (2.5) Dermatology Individual Studies for 3rd Year Students.

Effective: Spring 2009

DERM 797 **Dermatology Special Topics** (5) Dermatology Special Topics.

Effective: Spring 2010

Prerequisite:

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## **E-Business (EBIZ)**

EBIZ 543 (MKTG 543) **e-Marketing** (2) Using the Internet and related technologies to enhance and transform marketing functions and processes.

Effective: Spring 2012

EBIZ 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 2002

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## Early Childhood Education (E C E)

**E C E 451 Instruction in Early Childhood Education Derived from Development Theories** (3) Curriculum and instruction for early childhood education; program practice with pluralistic theoretical foundations for early childhood education.  
Effective: Spring 2007 Ending: Fall 2013

Prerequisite:

**E C E 451 Instruction in Early Childhood Education Derived from Development Theories** (3) Curriculum and instruction for early childhood education; program practice with pluralistic theoretical foundations for early childhood education.  
Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**E C E 452 Approaches to Contemporary Early Childhood Education Programs** (3) Description and analysis of early childhood programs; cycles, trends, progressions in early childhood education.

Effective: Spring 1992

Prerequisite:

**E C E 453 parent Involvement in Home, Center, and Classroom Instruction** (2-3) Parent involvement, programs, and methodologies that strengthen bonds between home and community for educators of children.

Effective: Spring 1992

Prerequisite:

**E C E 454 (HD FS 454) Development and Administration of Child Service Programs** (3) Planning, administering, and evaluating child service programs at several administrative levels using methods from relevant disciplines.

Effective: Spring 1992

Prerequisite:

**E C E 479 The Young Child's Play as Educative Processes** (3) Young child's play as educative processes and uses of materials in curricular settings are examined.

Effective: Spring 2007

Prerequisite:

**E C E 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1991

**E C E 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1991

**E C E 497A Environmental Design for Diverse Learners in Early Childhood Education** (3) This course introduces students to planning, designing, building and facilitating learning for diverse learners using child-centered environmental designs and activities.

Effective: Summer 2013 Ending: Summer 2013

**E C E 497B Multimodal Learning and Literacy in Early Childhood** (3) This course explores the processes of visual, auditory and embodied ways of knowing as a foundation for children's meaning making.

Effective: Summer 2013 Ending: Summer 2013

**E C E 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 1992

**E C E 572 Issues and Trends in Early Childhood Education** (3 per semester/maximum of 9) Research, experimental programs, and emerging trends in early childhood education; relationships between educational experiences and later intellectual and emotional development.

Effective: Spring 1992

Prerequisite:

**E C E 580 Young Multilingual/Multicultural Learners** (3) Multilingual/multicultural dimensions of young learners; language, cultural- ethnic social milieu and family, school, community, religious impacts, and acculturation philosophies.

Effective: Summer 1993

Prerequisite:

**E C E 587 (CI ED 587) Curriculum, Culture, and Child Development** (3) Examines human development and cultural factors in planning, designing, and implementing curriculum and instruction in early childhood and childhood education.

Effective: Spring 2012

Prerequisite:

**E C E 588 Educational Role of the Family** (3) Parent-child-teacher relationships, cognitive socialization, and academic attainments; proximal/distal variables: family structure, history, processes, content, community, culture.

Effective: Summer 1992

Prerequisite:

E C E 589 **Play and Early Childhood Education** (3) Developmental significance of play, processes, and development; role of the adult in child's play; educational practices.

Effective: Spring 2007

Prerequisite:

E C E 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1995

E C E 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1991

E C E 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1991

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## **Early Start Program (ESPRG)**

ESPRG 997 **Special Topics** (0.5) Early Start Program Course.  
Effective: Summer 2008

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## Earth Sciences (EARTH)

**EARTH 400 Earth Sciences Seminar** (3) Interdisciplinary study of environmental problems in the earth sciences.  
Effective: Spring 2001  
Prerequisite:

**EARTH 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  
Effective: Spring 2001  
Prerequisite:

**EARTH 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**EARTH 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**EARTH 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1992

**EARTH 501 Contemporary Controversies in the Earth Sciences** (3) Exploration of current areas of research in the Earth Sciences.  
Effective: Summer 2008

**EARTH 520 Plate Tectonics and People: Foundations of Solid Earth Science** (3) Solid Earth geophysics and geological hazards presented within the grand unifying theory of plate tectonics.  
Effective: Summer 2008

**EARTH 530 Earth Surface Processes in the Critical Zone** (3) Introduction to Earth surface processes including weathering and soils, geomorphology, erosion and sedimentation, hydrogeology, low-temperature geochemistry and Earth systems.  
Effective: Summer 2008

**EARTH 540 Essentials of Oceanography for Educators** (3) Chemical and physical principles of the oceans and their interaction with the biosphere, atmosphere and the solid Earth.  
Effective: Summer 2008

**EARTH 591 Individual Studies: Research Project** (3) Development of a capstone project, supervised on an individual basis outside the scope of formal courses.  
Effective: Summer 2008  
Prerequisite:

**EARTH 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1994

**EARTH 597A Plate Tectonics Workshop** (2) This course is designed to develop both practical and conceptual knowledge of plate tectonics as well as to promote innovative approaches to teaching earth science.  
Effective: Summer 2013 Ending: Summer 2013

**EARTH 597B Astronomy** (2) This course engages teachers in innovative approaches to teaching solar system phenomena, while learning new astronomy themselves.  
Effective: Summer 2013 Ending: Summer 2013

**EARTH 597C Energy** (2) This course highlights the human use of energy beginning with the controlled use of fire up to modern power production methods and associated consequences.  
Effective: Summer 2013 Ending: Summer 2013

**EARTH 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**EARTH 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## Earth and Mineral Sciences (EM SC)

EM SC 420 (SOC 420, S T S 420) **Energy and Modern Society** (3) Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.  
Effective: Fall 1986

EM SC 440 **Science Diving** (4) Advanced scuba diving skills applied to underwater research.  
Effective: Spring 2012  
Prerequisite:

EM SC 441 **Advanced Science Diving** (4) Advanced scuba diving skills applied to underwater data collection and research.  
Effective: Summer 2011  
Prerequisite:

EM SC 470W **Undergraduate Collaborative Research in Earth and Materials Sciences** (1-6 per semester/maximum of 6) Interdisciplinary research seminar involving students in the process of discovery, writing, and debate on issues of broad interest to Earth and Materials Sciences.  
Effective: Spring 2013

EM SC 494 **Research Project Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 1994

EM SC 494H **Research Project Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

EM SC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2003

EM SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 1992

EM SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

EM SC 602 **Supervised Experience in College Teaching** (2-3) Students enrolled will lead discussion sections, grade papers and examinations, give an occasional lecture, and assist instructors in planning survey level courses.  
Effective: Fall 2004

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## Ecology (ECLGY)

ECLGY 510 **Classical Ecology** (2) Classical Ecology.  
Effective: Fall 2008

ECLGY 515 **Advances in Ecology** (3) Advances in Ecology.  
Effective: Spring 2013

ECLGY 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 2005

ECLGY 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2004

ECLGY 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

ECLGY 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

ECLGY 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

ECLGY 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## **Economics (ECNMS)**

ECNMS 510 **Managerial Economics** (3) Economic analysis of demand for the firm's output and production costs; implications of various market structures; government regulation.

Effective: Summer 1995

Prerequisite:

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## Economics (ECON)

**ECON 400M Honors Seminar in Economics** (3-12) Readings, discussion, and oral and written reports on selected topics in economics.

Effective: Spring 1993

Prerequisite:

**ECON 401 History of Economic Thought** (3) Survey of economic ideas from Greco-Roman times to the present.

Effective: Spring 2001

Prerequisite:

**ECON 402 Decision Making and Strategy in Economics** (3) Development and application of the tools for decision making under uncertainty and for game theoretic analysis of economic problems.

Effective: Spring 2007

Prerequisite:

**ECON 403 The Economics of Arts and Entertainment** (3) Supply and demand of creative goods and services; industry structures; role of information; policy issues.

Effective: Spring 2013

Prerequisite:

**ECON 404W Current Economic Issues** (3) An analytical survey of significant problems of current economic policy and the application of economic analysis to important social issues.

Effective: Spring 1993

Prerequisite:

**ECON 406 The Economics of Social Conflict** (3) Economic theory of the resolution of social conflicts: social choice theory, voting, noncooperative games, voluntary trade, and allocation by force.

Effective: Spring 2013

Prerequisite:

**ECON 406W The Economics of Social Conflict** (3) Economic theory of the resolution of social conflicts: social choice theory, voting, noncooperative games, voluntary trade, and allocation by force.

Effective: Summer 2008

Prerequisite:

**ECON 407 (COMM 407) Political Economy** (3) Applications of the tools of game theory to analyze topics in collective decision making.

Effective: Spring 2013

Prerequisite:

**ECON 407W Political Economy** (3) Applications of the tools of game theory to analyze topics in collective decision making.

Effective: Summer 2008

Prerequisite:

**ECON 408 Intellectual Property** (3) A comparative and cost-benefit analysis of intellectual property that examines patents, copyrights, governmental supported research, and prizes.

Effective: Spring 2013

Prerequisite:

**ECON 408W Intellectual Property** (3) A comparative and cost-benefit analysis of intellectual property that examines patents, copyrights, government supported research, and prizes.

Effective: Summer 2008

Prerequisite:

**ECON 409 Economics of Terrorism** (3) Terrorism throughout history; economic causes, costs, sources, and consequences.

Effective: Spring 2013

Prerequisite:

**ECON 409W Economics of Terrorism** (3) Terrorism throughout history; economic causes, costs, sources, and consequences.

Effective: Summer 2008

Prerequisite:

**ECON 410 Economics of Labor Markets** (3) Economic analysis of the employment relationship from the microeconomic perspective, with emphasis on current labor-market problems and public policy issues.

Effective: Spring 2011

Prerequisite:

**ECON 411 Behavioral Economics** (3) Topics in behavioral economics; selected games; evolutionary models of social behavior, herding, overconfidence.

Effective: Spring 2013

Prerequisite:

**ECON 411W Behavioral Economics** (3) Topics in behavioral economics; selected games; evolutionary models of social behavior; culture and social behavior; herding; overconfidence.

Effective: Summer 2008

Prerequisite:

**ECON 412 Labor Economics and Labor Markets: Theory, Evidence, and Policy (3)** Advanced topics in labor economics: theory, empirical evidence, and policy.

Effective: Spring 2009

Prerequisite:

**ECON 413 Economic Growth and the Challenges of World Poverty (3)** Challenges imposed by poverty; growth; growth rates; microfinance; foreign aid.

Effective: Spring 2013

Prerequisite:

**ECON 413W Economic Growth and the Challenge of World Poverty (3)** Economic prosperity in historical perspective; recent successes (East Asia, China, India); ongoing challenges (the bottom billion; sub-Saharan Africa).

Effective: Summer 2008

Prerequisite:

**ECON 414 The Economic Way of Looking at Life (3)** Economics/life according to Gary Becker: criminal behavior; economics of the family (marriage, divorce, intrahousehold resource allocation, bequests), policy issues.

Effective: Spring 2013

Prerequisite:

**ECON 415 The Economics of Global Climate Change (3)** Evidence on climate change; economic models of the environment and market failure; cost-benefit analysis of policy options; carbon markets.

Effective: Spring 2013

Prerequisite:

**ECON 415W The Economics of Global Climate Change (3)** Evidence on climate change; economic models of the environment and market failure; cost-benefit analysis of policy options; carbon markets.

Effective: Summer 2008

Prerequisite:

**ECON 417 The Economics of Uncertainty (3)** Uncertainty and Risk as related to finance, insurance, health, labor, industrial organization, and macroeconomics.

Effective: Spring 2013

Prerequisite:

**ECON 417W The Economics of Uncertainty (3)** Uncertainty is examined in contracts, with an emphasis on limited liability. Asymmetric information and economic puzzles are also considered.

Effective: Summer 2008

Prerequisite:

**ECON 418 A Comparative and Cost-Benefit Analysis of State Government Activities (3)** This course examines federalism with a particular focus on the activities undertaken by the state of Pennsylvania.

Effective: Spring 2013

Prerequisite:

**ECON 418W A Comparative and Cost-Benefit Analysis of State Government Activities (3)** This course examines federalism with a particular focus on the activities undertaken by the state of Pennsylvania.

Effective: Summer 2008

Prerequisite:

**ECON 421 Analysis of Economic Data (3)** Economic analysis of data: sources, variable definitions, miscodings, missing observations, censoring and truncation, applications.

Effective: Summer 2008

Prerequisite:

**ECON 422 Applying Monetary Theory and Monetary History (3)** Monetary history is examined. Special attention is paid to commodity-based systems, private money, and government monopolies on currency.

Effective: Spring 2013

Prerequisite:

**ECON 422W Applying Monetary Theory to Monetary History (3)** Monetary history is examined. Special attention is paid to commodity-based systems, private money, and government monopolies on currency.

Effective: Summer 2008

Prerequisite:

**ECON 424 Income Distribution (3)** Inequality and poverty in the United States, measurement problems, determinants of inequality, arguments for and against equality, impact of redistributive policies.

Effective: Fall 1992

Prerequisite:

**ECON 425 Economics of Public Expenditures (3)** Analytic and policy aspects of public expenditure decisions; applications from areas of contemporary public interest.

Effective: Summer 1992

Prerequisite:

**ECON 427 Economics of Energy and Energy Security (3)** Energy economics studies topics related to the supply, energy markets, and environmental impacts of energy use.

Effective: Spring 2013

Prerequisite:

**ECON 428 Environmental Economics (3)** Environmental pollution, the market economy, and optimal resource allocation; alternative control procedures; levels of environmental protection and public policy.

Effective: Summer 1992

Prerequisite:

**ECON 429 Public Finance and Fiscal Policy (3)** Analysis of public revenue and expenditure structure primarily at the federal level; federalism; fiscal policy and public debt.

Effective: Fall 1983

Prerequisite:

**ECON 430 Regional Economic Analysis (3)** Analysis of personal and industrial location decisions, regional economic growth, migration patterns, and regional policy; emphasis on tools and techniques.

Effective: Spring 2011

Prerequisite:

**ECON 432 Urban Economics (3)** Theories and methods for economic analysis of such urban problems as housing, segregation, government services, and transportation.

Effective: Summer 1992

Prerequisite:

**ECON 433 Advanced International Trade Theory and Policy (3)** Causes/consequences of trade; effects of tariffs and quotas; strategic trade policy; political economy of trade restrictions and other topics.

Effective: Summer 1992

Prerequisite:

**ECON 434 International Finance and Open Economy Macroeconomics (3)** Trade balance movements, exchange rate determination; monetary and fiscal policies in open economies; international policy coordination; the world monetary system.

Effective: Spring 1992

Prerequisite:

**ECON 436 Economics of Discrimination (3)** Analysis of the economic characteristics of women and minorities; with examination of race and sex discrimination and related government policies.

Effective: Spring 2013

Prerequisite:

**ECON 436W (US) Economics of Discrimination (3)** Analysis of the economic characteristics of women and minorities, with examination of race and sex discrimination and related government policies.

Effective: Fall 2007

Prerequisite:

**ECON 437 Multinationals and the Globalization of Production (3)** Globalization entails many dimensions: trade, migration, FDI, offshoring, cross-border licensing of technologies.

Effective: Spring 2013

Prerequisite:

**ECON 437W Multinationals and the Globalization of Production (3)** This course will focus on trade, multinationals and offshoring, and explore their implications for the U.S. and developing countries.

Effective: Summer 2008

Prerequisite:

**ECON 438 Winners and Losers from Globalization (3)** Globalization, US, International, Trade, Finance, Growth, Labor, Industrial Organization, Political Economics.

Effective: Spring 2013

Prerequisite:

**ECON 438W Winners and Losers from Globalization (3)** The economic effects of globalization on individuals, governments, nation- states and business.

Effective: Summer 2008

Prerequisite:

**ECON 439 Economics of Technology Diffusion (3)** Technology Diffusion: Globalization, productivity measurement, intellectual property.

Effective: Summer 2008

Prerequisite:

**ECON 442 Managerial Economics (3)** Application of economic theory to managerial decision making; risk, uncertainty; models and statistical techniques.

Effective: Spring 2011

Prerequisite:

**ECON 443 Economics of Law and Regulation (3)** An economic analysis of property rights, contractual arrangements, illegal activities, and regulation; competitive problems due to externalities and market failure.

Effective: Summer 1992

Prerequisite:

**ECON 444 Economics of the Corporation (3)** Coordination and incentive issues within a corporation. Topics include employment contracts, performance incentives and pricing of financial assets.

Effective: Summer 1997

Prerequisite:

ECON 445 (H P A 445) **Health Economics** (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

Effective: Spring 1994

Prerequisite:

ECON 445W (H P A 445W) **Health Economics** (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

Effective: Spring 2008

Prerequisite:

ECON 446 **Economics of Industry Evolution** (3) Dynamics of industry evolution; empirical evidence and theoretical modeling of firm entry, growth, and exit; entrepreneurship; investment and strategic behavior.

Effective: Spring 2013

Prerequisite:

ECON 446W **Economics of Industry Evolution** (3) Dynamics of industry evolution; empirical evidence and theoretical modeling of firm entry, growth, and exit; entrepreneurship; investment and strategic behavior.

Effective: Summer 2008

Prerequisite:

ECON 447 **Economics of Sports** (3) Topics in sports; demand, owners, ticket resale, leagues, markets, efficiency, antitrust, discrimination, collegiate sports.

Effective: Spring 2013

Prerequisite:

ECON 447W **Economics of Sports** (3) Examination of economic issues pertaining to professional and collegiate sports, including analysis of industrial organization, labor markets, and local economies.

Effective: Spring 2009

Prerequisite:

ECON 448 **Economics of Auctions and Procurements** (3) Theoretical and empirical analyses of auctions and procurements; different modeling environments; econometric analysis of auction and procurement data.

Effective: Spring 2013

Prerequisite:

ECON 448W **Economics of Auctions and Procurements** (3) Theoretical and empirical analyses of auctions and procurements; different modeling environments; econometric analysis of auction and procurement data.

Effective: Summer 2008

Prerequisite:

ECON 449 **Economics of Collusion** (3) Collusion, Bidding Rings, Antitrust, Price Fixing, Incentives, Law

Effective: Spring 2013

Prerequisite:

ECON 449W **Economics of Collusion** (3) Theoretical and empirical analysis of collusion among firms, case studies of cartel behavior, bidding behavior at auctions and procurements.

Effective: Spring 2008

Prerequisite:

ECON 450 **The Business Cycle** (3) Measurement and theories of the business cycle; stabilization policies; forecasting.

Effective: Summer 1992

Prerequisite:

ECON 451 **Monetary Theory and Policy** (3) Monetary and income theory; monetary and fiscal policy.

Effective: Winter 1978

Prerequisite:

ECON 452 **Economics of the Financial Crisis** (3) This course studies the economics of financial crises with special emphasis on 2008.

Effective: Spring 2013

Prerequisite:

ECON 452W **Financial Crises** (3) Examination of causes and consequences of financial crises; asset pricing theory, market efficiency, speculative bubbles; policy considerations.

Effective: Summer 2008

Prerequisite:

ECON 454 **Economics of Mergers** (3) Economic analysis of horizontal and vertical mergers; econometric issues in measurement of unilateral and coordinated effects; policy issues.

Effective: Summer 2008

Prerequisite:

ECON 455 **Economics of the Internet** (3) Economics of the Internet; electronic commerce and network economics; pricing issues; intellectual property.

Effective: Spring 2013

Prerequisite:

ECON 455W **Economics of the Internet** (3) Economics of the Internet; electronic commerce and network economics; pricing issues; intellectual property.

Effective: Summer 2008

Prerequisite:

**ECON 457 Economics of Organizations (3)** Consumers, Firms, Utility Maximization, Profit Function, Equilibrium, Firm Distribution.

Effective: Spring 2013

Prerequisite:

**ECON 457W Economics of Organizations (3)** An advanced course in the economics of organizations. The focus is on coordination, incentives, contracts, and information in corporations.

Effective: Summer 2008

Prerequisite:

**ECON 460 Issues in Sports Economics (3)** Economic analysis of professional and collegiate sports: organization, input and output markets, the public sector, decision-making, and public policy.

Effective: Summer 2013

Prerequisite:

**ECON 463 (IL) Economic Demography (3)** Microeconomics of demographic behavior; interrelationships between demographic and economic factors, in developing and industrialized economies; economic welfare and policy implications.

Effective: Spring 2006

Prerequisite:

**ECON 463W Economic Demography (3)** Microeconomics of demographic behavior; interrelationships between demographic and economic factors, in developing and industrialized economies; economic welfare and policy implications.

Effective: Summer 2008

Prerequisite:

**ECON 465 Cross Sectional Econometrics (3)** Econometrics, simultaneous equations, discrete choice, sample selection.

Effective: Spring 2013

Prerequisite:

**ECON 465W Cross Sectional Econometrics (3)** Discrete choice models, censored and truncated regression models, longitudinal models, applications.

Effective: Summer 2008

Prerequisite:

**ECON 466 Panel Data Models (3)** Random and fixed effects, endogeneity, balanced and unbalanced panels, censoring of spells, differences in differences, applications.

Effective: Spring 2013

Prerequisite:

**ECON 466W Panel Data Models (3)** Random and fixed effects, endogeneity, balanced and unbalanced panels, censoring of spells, differences in differences, applications.

Effective: Summer 2008

Prerequisite:

**ECON 470 (IL) International Trade and Finance (3)** Economic analysis of why nations trade, barriers to trade, the international monetary system, and macroeconomic policy in an open economy.

Effective: Spring 2011

Prerequisite:

**ECON 471 Growth and Development (3)** Problems of capital formation, institutional considerations, theories of economic growth.

Effective: Summer 2011

Prerequisite:

**ECON 472 Transition to Market Economies (3)** Economics of transition to a market economy; problems of former Soviet-type economies; privatization, stabilization, and institutional change.

Effective: Fall 2005

Prerequisite:

**ECON 473 (IL) China in the Global Economy: History, Culture, and Society (3)** Analysis of China's role in the global economy and the impact on U.S. as well as global business and society.

Effective: Spring 2011

Prerequisite:

**ECON 475 Migration and Development (3)** Human Capital Approach to Migration; Economics of Family Migration; Evidence: Micro and Macro Perspectives; Migration Policies.

Effective: Spring 2013

Prerequisite:

**ECON 475W Migration and Development (3)** Human Capital Approach to Migration; Economics of Family Migration; Evidence: Micro and Macro Perspectives; Migration Policies.

Effective: Summer 2008

Prerequisite:

**ECON 476 The Economics of Fertility in the Developing World (3)** Demand for children, supply of children, and costs of fertility regulation; fertility transition; public policies to affect fertility.

Effective: Spring 2013

Prerequisite:

**ECON 476W The Economics of Fertility in the Developing World** (3) Demand for children, supply of children, and costs of fertility regulation; fertility transition; public policies to affect fertility.

Effective: Summer 2008

Prerequisite:

**ECON 477 Labor Markets in Developing Countries** (3) Labor demand and supply in developing countries; urban and rural labor markets, modern and informal sectors; policy issues.

Effective: Summer 2008

Prerequisite:

**ECON 478 Incomplete Markets** (3) Rural land markets, fragmented credit markets, risk and insurance, human capital and labor markets, innovation and technology spillovers, coordination failures.

Effective: Summer 2008

Prerequisite:

**ECON 479 Economics of Matching** (3) Economic application of matching to employment, marriage, organ markets, and medical residents.

Effective: Spring 2013

Prerequisite:

**ECON 479W Economics of Matching** (3) Economic application of matching to employment, marriage, organ markets, and medical residents.

Effective: Summer 2008

Prerequisite:

**ECON 480 Mathematical Economics** (3) Mathematical techniques employed in economic analysis; formal development of economic relationships.

Effective: Summer 1992

Prerequisite:

**ECON 481 Business Forecasting Techniques** (3) A survey of contemporary business forecasting techniques, with emphasis on smoothing, decomposition, and regression techniques.

Effective: Spring 2008

Prerequisite:

**ECON 483 Economic Forecasting** (3) Forecasting time series, using linear regression models and econometric software; useful forecasting models; financial and seasonal time series; trends.

Effective: Summer 2008

Prerequisite:

**ECON 485 Econometric Techniques** (3) Applying statistical techniques to test and explain economic relationships; integration of economic theory with observed economic phenomena.

Effective: Spring 2011

Prerequisite:

**ECON 489M Honors Thesis** (1-6) No description.

Effective: Spring 1993

Prerequisite:

**ECON 490 Introduction to Econometrics** (3) Use of simple and multiple regression models in measuring and testing economic relationships. Problems including multicollinearity, heteroskedasticity, and serial correlation.

Effective: Summer 2000

Prerequisite:

**ECON 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**ECON 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**ECON 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 1995

Prerequisite:

**ECON 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**ECON 496A Readings in Economics** (1-6) Readings and discussion of five books on economics with short writing assignment.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**ECON 496B Economic Value of Athletic Departments to Division Universities (1-6)** Addresses the economic value of athletic departments to division one universities.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ECON 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**ECON 499 (IL) Foreign Study--Economics (2-6)** Study in selected countries of economic institutions and current economic problems.  
Effective: Spring 2011  
Prerequisite:

**ECON 500 Introduction to Mathematical Economics (3)** Mathematical Economics: Applications of Mathematical Techniques to Economics.  
Effective: Spring 1990

**ECON 501 Econometrics (3)** Econometrics: Applications of Statistical Techniques to Economics  
Effective: Summer 1989

**ECON 502 Microeconomic Analysis (3)** Economic behavior under pure and imperfect competition; price and output determination in product markets; prices and employment in factor markets.  
Effective: Winter 1978

**ECON 503 Macroeconomic Analysis (3)** National income accounts; determination of income, employment, interest rates, and the price level; stabilization policy.  
Effective: Winter 1978

**ECON 507 International Trade (3-6)** Theory of international trade and investment; effect of commercial policy on trade and income distribution; multinational corporations and international trade.  
Effective: Spring 1993

**ECON 510 Econometrics I (3)** General linear model, multicollinearity, specification error, autocorrelation, heteroskedasticity, restricted least squares, functional form, dummy variables, limited dependent variables.  
Effective: Fall 2003  
Prerequisite:

**ECON 511 Econometrics II (3)** Stochastic regressors, distributed lag models, pooling cross-section and time-series data, simultaneous equation models.  
Effective: Fall 2003  
Prerequisite:

**ECON 512A Empirical Methods in Economics I (1)** The course will provide a foundation for students in the computational methods used to numerically solve and simulate economic models and program econometric estimators.  
Effective: Spring 2013  
Prerequisite:

**ECON 512B Empirical Methods in Economics II (2)** The course will provide continued exposure to the computational methods used to numerically solve and simulate economic models and program econometric estimators.  
Effective: Fall 2012  
Prerequisite:

**ECON 515 Labor Economics I (3)** Labor supply and income maintenance; human capital, job search and training; labor demand, minimum wage, and discrimination.  
Effective: Fall 1983

**ECON 516 Labor Economics II (3)** Earnings differentials, unemployment, and related policy. Institutional aspects of labor economics, including dual labor markets, collective bargaining, and unionism.  
Effective: Fall 1983

**ECON 517 Open Economy Macroeconomics and International Finance (3-6)** The balance of payments, portfolio allocation, monetary and fiscal policy in an open economy, exchange rate regimes, selected policy issues.  
Effective: Spring 1993

**ECON 521 Advanced Microeconomic Theory (3-6)** Theory of consumer behavior; theory of the firm; price determination in product and factor markets; introduction to welfare economics.  
Effective: Fall 1983

**ECON 522 Advanced Macroeconomic Theory (3-6)** Measurement of income; theories of consumption, investment, and



money holdings; static determination of income and employment; introduction to dynamic analysis.  
Effective: Winter 1978

**ECON 529 Public Finance** (3-6) Effects of taxes, expenditures, debt on allocation, employment, distribution; cost-benefit analysis; collective decision mechanisms; fiscal federalism; current fiscal policy problems.  
Effective: Fall 1983

**ECON 534 Game Theory** (3) Foundations of current research in game theory.  
Effective: Summer 2006  
Prerequisite:

**ECON 543 Industrial Organization and Public Policy** (3-6) The structure of American industry; performance and behavior; public policies toward business.  
Effective: Summer 1980

**ECON 558 Development of Monetary Theory** (3) Classical and neoclassical quantity theories of money and contemporary criticism; Keynesian monetary theory and its critics.  
Effective: Fall 1983

**ECON 559 Current Monetary Theory and Policy** (3) Post-Keynesian reformulation of quantity and Keynesian theories of money; liquidity and general equilibrium approaches; current issues in theory and policy.  
Effective: Fall 1983

**ECON 570 Development Economics** (3-6) Resources and institutions; quantitative measures; theories of economic growth in developing areas; developmental policies.  
Effective: Summer 1997

**ECON 589 Seminar in Econometric Theory** (3) Theories and methods relevant to the application of statistical methods to economics.  
Effective: Fall 2003  
Prerequisite:

**ECON 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**ECON 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**ECON 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**ECON 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**ECON 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**ECON 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## **Economics-Behrend (ECNS)**

ECNS 596 **INDIVIDUAL STUDIES** (1-9) CREATIVE PROJECTS, INCLUDING NONTHESIS RESEARCH, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.

Effective: Spring 1987

ECNS 597 **SPECIAL TOPICS** (1-9) FORMAL COURSES GIVEN ON A TOPICAL OR SPECIAL INTEREST SUBJECT WHICH MAY BE OFFERED INFREQUENTLY; SEVERAL DIFFERENT TOPICS MAY BE TAUGHT IN ONE YEAR OR SEMESTER.

Effective: Spring 1987

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## Educ Leadership Prog (EDLDR)

EDLDR 405 (C I 405) **Strategies in Classroom Management** (3) Managing and coping with disruptive student behavior in instructional settings so that they support the teaching/learning process.

Effective: Fall 2008

Prerequisite:

EDLDR 409 **Leadership Studies in Popular Film** (3) In-depth analysis of leadership dynamics revealed in popular film. Focus on cinematic depictions of theory and practical application of leadership.

Effective: Spring 2012

Prerequisite:

EDLDR 476 **The Teacher and the Law** (3) An introduction to education law as it affects the teacher.

Effective: Fall 2004

Prerequisite:

EDLDR 480 **Introduction to Educational Leadership** (3) Development of educational leadership. Relationships among local, state, and federal agencies. Introduction to current concepts and theories.

Effective: Fall 2004

Prerequisite:

EDLDR 485 **Principal as Instructional Leader** (3) Knowledge and skills principals need to lead instructional design and implementation.

Effective: Fall 2004

Prerequisite:

EDLDR 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2012

EDLDR 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2012

EDLDR 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2004

EDLDR 528 **Educational Politics in the United States** (3) Social and institutional forces which shape the public school system and determine national, state, and local educational policy and politics.

Effective: Fall 2004

EDLDR 530 **Leadership for Inclusive Education** (3) In-depth analysis and discussion of the school leaders's role in creating and sustaining an inclusive learning environment for all.

Effective: Spring 2012

EDLDR 531 **Leadership and Diversity** (3) This course examines what it means to lead educational organizations in an increasingly diverse society.

Effective: Spring 2012

EDLDR 533 **The Politics of Local School Districts** (3) Theory and practice of the politics and governance of local school districts; issues and methods in studying political decision making.

Effective: Fall 2004

EDLDR 535 **Interagency Relations in Education** (3) This course examines historical and contemporary relationships between schools and other service agencies interacting with the education of American youth.

Effective: Spring 2012

EDLDR 536 **Federal Role in Education** (3) This course examines the Federal role in education, emphasizing relationships between the Federal government and states, tribes and schools.

Effective: Spring 2012

EDLDR 540 **Technology Applications in Educational Leadership** (3) Development and use of information technology applications to analyze common problems faced by educational administrators.

Effective: Spring 2008

EDLDR 549 **School District Improvement and Systemic Change** (3) This course focuses on understanding and leading systemic district improvement efforts.

Effective: Spring 2012

Prerequisite:

**EDLDR 551 (C & S 551) Curriculum Design: Theory and Practice (3)** The analysis and use of the foundations which underlie models of curriculum design.

Effective: Spring 2012

Prerequisite:

**EDLDR 553 (C & S 553) Issues in Curriculum (3 per semester/maximum of 6)** In-depth study of issues and trends in the understanding and practice of curriculum.

Effective: Spring 2012

Prerequisite:

**EDLDR 557 (C & S 557) Seminar in Curriculum Research (3)** Analysis of particular curriculum studies, methods and paradigms, and the general status of current research in the general curriculum field.

Effective: Spring 2012

Prerequisite:

**EDLDR 559 School Improvement (3)** The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.

Effective: Spring 2012

**EDLDR 560 (C & S 560) Principles of Instructional Supervision (3)** Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.

Effective: Spring 2012

Prerequisite:

**EDLDR 562 (C & S 562) Methods of Classroom Supervision and Coaching (3)** Strategies and techniques for supervision/coaching of instruction intended to enhance teacher reflection, self-direction, and autonomy.

Effective: Spring 2012

Prerequisite:

**EDLDR 563 (C & S 563) Designing Staff Development Programs (3)** Designing, implementing, and evaluating effective staff development programs for personnel in educational settings.

Effective: Spring 2012

Prerequisite:

**EDLDR 565 Personnel Management and Contract Administration (3)** Practice and theory of personnel supervision at the central office and building level, including contract administration and grievance handling.

Effective: Fall 2004

Prerequisite:

**EDLDR 567 Organizational Supervision (3)** Principles and practices of supervision in schools related to instructional and support personnel.

Effective: Fall 2004

Prerequisite:

**EDLDR 568 The Principalship (3)** Principles and practices of administration of elementary and secondary schools.

Effective: Fall 2004

**EDLDR 569 Decision Making in Educational Organizations (3)** Decision making in organizational and environmental contexts; case studies of administrative problems; application of decision making models.

Effective: Fall 2004

Prerequisite:

**EDLDR 573 Public School Finance (3)** Financing of public education, including values underlying system, revenue sources and taxation, school funding formulas, equity, and school finance reform.

Effective: Fall 2004

Prerequisite:

**EDLDR 575 Ethics in Educational Leadership (3)** Course explores the moral and ethical dimensions of the work of educational leaders.

Effective: Spring 2012

**EDLDR 576 The Law and Education (3)** Legal bases for education; rights and responsibilities of school board members, administrators, teachers, students, and parents; due process.

Effective: Fall 2004

Prerequisite:

**EDLDR 577 Law and Ethics in Education (3)** Course focuses on legal and ethical dimensions issues for educational leaders and their impact on best interests of the students.

Effective: Spring 2012

**EDLDR 578 Schools as Organizations (3)** Intraorganizational relationships; administration and the school in its organizational and environmental contexts.

Effective: Fall 2004

Prerequisite:

**EDLDR 579 Financial Management for Schools (3)** Financial management concepts and techniques for educators: district and school level budgeting process, hands-on budget preparation workshop, and budget management.  
Effective: Spring 2008  
Prerequisite:

**EDLDR 580 The Use of Theory in Educational Administration (3)** Critical analysis of current theories; problem finding and hypothesis formulation.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 581 Field Research in Educational Leadership (3)** Field study and qualitative methods in research on educational organizations.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 583 Current Administrative Practice (3)** Practice oriented skills and experiences facilitating effective administration.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 584 Evaluation in Educational Organizations (3)** Naturalistic and empirical evaluation methods and procedures for educational organizations.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 585 (EDTHP 585, HI ED 585) Research Design: Implications for Decisions in Higher Education (3)** A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 586 (EDTHP 586, HI ED 586) Qualitative Methods in Educational Research (3)** Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques.  
Effective: Fall 2004

**EDLDR 587 (EDTHP 587, HI ED 587) Education Policy and Politics (3)** The political economy and bureaucratic politics of educational organizations, with special attention to the policy making, implementation, and evaluation processes.  
Effective: Fall 2004

**EDLDR 588 (EDTHP 588, HI ED 588) Qualitative Methods in Educational Research II (3)** Advanced study of methods involved in executing and analyzing qualitative research in education.  
Effective: Spring 2012  
Prerequisite:

**EDLDR 589 Mixed Methods in Educational and Social Scientific Research (3)** This course considers the epistemological and paradigmatic implications of mixed methods research within educational and other social scientific research contexts.  
Effective: Spring 2012

**EDLDR 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 2012

**EDLDR 594 Seminar in School Law (3)** Research in substantive issues in school law.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 595 Internship (1-15)** Guided experience in a school or other educational organization in which the student is not regularly employed, under supervision of a graduate faculty member.  
Effective: Fall 2004  
Prerequisite:

**EDLDR 595A Principal Internship (3)** Required field experience for students in order to receive their principal certificate from the PA Dept. of Education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**EDLDR 595B Superintendent Internship (3)** Required field experience for students seeking their letter of eligibility certificate from the PA Dept. of Education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**EDLDR 596 Individual Studies (1-9)** Creative projects including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2012

**EDLDR 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered

infrequently.

Effective: Spring 2012

**EDLDR 597A (EDTHP 597A) A Critical Examination of Education Data Use of Pundits, Policymakers, and Politicians (3)** Students will learn how to identify correct and incorrect education data, how to use data, ask the right questions and effectively communicate critiques and rejoinders to incorrect data use.  
Effective: Summer 2013 Ending: Summer 2013

**EDLDR 597A Pro-seminar in Educational Leadership (3)** Introduce new EDLDR graduate students to the field of educational research and graduate studies at Penn State; to offer some preliminary discussions about the disciplinary and methodological traditions within educational research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDLDR 597B Letter of Eligibility Seminar (3)** This course will focus on the position of superintendent of schools as chief executive officer for the board of school directors and the educational leader of the school district.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDLDR 597C (EDTHP 597C, HI ED 597C) Foundations of Educational Research (3)** This course is designed to begin a reading of the history and philosophies of education research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDLDR 597E (EDTHP 597E, HI ED 597E) Reviewing and Editing for Educational Policy Journals (3)** This course introduces advanced doctoral students to the major journals in Education Policy and provides a systematic introduction to reviewing and editing policy journals in the field of education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDLDR 597F (HI ED 597F, EDTHP 597F) Race, Law and Education: Six U.S. Supreme Court Cases (3)** This class is designed to introduce students to the legal standards used to examine "race-conscious" policies intended to address racial/ethnic inequities in K-12 and higher education. We will consider the justifications educators have presented to support these policies, which justifications have been convincing to the Court, and how these justifications intersect across K-12 and higher education. We will also focus on how social science research has informed the legal developments in these cases. Over the course, we will cover six landmark U.S. Supreme Court cases on race and education, including *Brown v. Board of Education* (1954), the Court's most recent decision on K-12 voluntary desegregation policies, *Parents Involved in Community Schools v. Seattle School District No 1* (2007), and the Court's forthcoming opinion on affirmative action in higher education, *Fisher v. University of Texas* (2013).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDLDR 600 Thesis Research (1-15)** No description.  
Effective: Fall 2004

**EDLDR 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 2004

**EDLDR 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 2004

**EDLDR 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 2004

**EDLDR 801 Introduction to Teacher Leadership (3)** This course focuses on understanding teacher leadership and its function with the school system.  
Effective: Spring 2012

**EDLDR 802 How Schools Work (3)** Course focuses on understanding schools as learning organizations and how teacher leadership works in such organizations.  
Effective: Spring 2012

**EDLDR 894A Capstone Inquiry Project (3)** Completion and public presentation of an inquiry project reflecting an understanding of the five leadership strands.  
Effective: Spring 2012  
Prerequisite:

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## Education (EDUC)

**EDUC 400 Diversity and Cultural Awareness Practices in the K-12 Classroom** (3) This course addresses diversity, cultural awareness and sensitivity about cultures, concepts and methods in society, communities and educational settings.  
Effective: Summer 2008

**EDUC 401 Early Childhood Education** (3) Organization, methodology, and materials for nursery school and kindergarten programs.  
Effective: Winter 1981

**EDUC 402 Language Development, Self-Expression, and Literature in Early Childhood Education** (3) Examining the development of language and self-expression in young children, and the role of children's literature in facilitating development.  
Effective: Winter 1981

**EDUC 403 Curriculum for Early Childhood** (3) Examining early childhood programs and methodology, focusing on areas of social studies, mathematics, and science.  
Effective: Winter 1981

**EDUC 404 Young Children's Behavior: Observation and Evaluation** (3) Observation, recording and evaluation of student behaviors, and the use of prescription techniques for early childhood students with special needs.  
Effective: Winter 1981

**EDUC 408 Administration of Early Childhood Education Programs** (3) The role of the early childhood administrator as it relates to regulations, staffing, management, funding and curriculum.  
Effective: Winter 1981  
Prerequisite:

**EDUC 410 The Child and Social Institutions** (3) The effects of the family on a child's development, especially in the infancy and preschool years.  
Effective: Winter 1981

**EDUC 412 Early Literacy Intervention I** (3) Participants will better understand factors affecting early reading behavior through diagnostic techniques, observation techniques, and literacy intervention strategies.  
Effective: Summer 1996  
Prerequisite:

**EDUC 415 Teaching Secondary Social Studies** (3) Study of the objectives, content, methods, and evaluation of procedures of social studies. Students design units and lesson plans.  
Effective: Spring 2011  
Prerequisite:

**EDUC 416 Teaching Secondary English and the Humanities** (3) Study of the objectives, content, and methods of English and humanities courses.  
Effective: Spring 2011  
Prerequisite:

**EDUC 417 Teaching Secondary Mathematics** (3) Study of the objectives, content, methods, and evaluation procedures of mathematics.  
Effective: Spring 2011  
Prerequisite:

**EDUC 418 Positive Classroom Climate for Positive Attitudes About Learning** (3) Participants will learn strategies for creating classroom climates which encourage positive attitudes toward learning while preventing and correcting student misbehavior.  
Effective: Summer 1995  
Prerequisite:

**EDUC 421 Children's Literature** (3) Knowledge of literature appropriate for elementary school children and utilization of literature-related activities in teaching reading.  
Effective: Spring 2001  
Prerequisite:

**EDUC 422 Literature for Children and Adolescents** (3) Literature for children and adolescents, approaches for using such literature in the school curriculum.  
Effective: Fall 2008

**EDUC 425 Literacy Assessment** (3) This course emphasizes alternative literacy measures focusing on portfolio assessment and performance assessments.  
Effective: Spring 1997

Prerequisite:

**EDUC 432 Children's Literature in Teaching Writing (3)** Introduction to introduces methods for transferring writing skills and literary devices from literature to student writing in all subject areas.  
Effective: Summer 2008

**EDUC 435 Addressing the Needs of Special Learners (1)** An examination of attitudes toward, barriers experienced by, and special needs of special learners in the schools.  
Effective: Spring 2001  
Prerequisite:

**EDUC 436 Inclusion Practices in Education (3)** The educational, social, and political foundations for inclusion practices in public education.  
Effective: Summer 1995  
Prerequisite:

**EDUC 440 Educational Statistics and Measurements (3)** Descriptive statistics, correlation, reliability, validity, scaling techniques, and introduction to item analysis.  
Effective: Winter 1981

**EDUC 450 Current Topics in Education (1-15)** No description.  
Effective: Fall 1983

**EDUC 452 Teaching Writing (3)** Techniques for teaching the writing process, kindergarten through grade 12, including writing in content areas; workshop format.  
Effective: Fall 1983

**EDUC 458 Behavior Management Strategies for Inclusive Classrooms (3)** Provides knowledge and skills essential for designing positive learning environments in secondary classrooms with the inclusion of exceptional learners.  
Effective: Summer 2009  
Prerequisite:

**EDUC 459 Strategies for Effective Teaching in Inclusive Classrooms (3)** Course examines effective strategies for accommodating and adapting instruction for exceptional learners in secondary classrooms.  
Effective: Fall 2012  
Prerequisite:

**EDUC 460 Field Study in Ecology (4)** Study and analysis of the ecology of various regions of the world. May be repeated for credit.  
Effective: Summer 1995  
Prerequisite:

**EDUC 462 Computers for Classroom Teachers (3)** An introduction: microcomputers and their educational applications.  
Effective: Spring 2001  
Prerequisite:

**EDUC 463 The Internet and K-12 Education (3)** Relates educational theory and practice to applications of the Internet, applying content from educational foundations, curriculum, and research.  
Effective: Spring 2003  
Prerequisite:

**EDUC 464 Technology and the Learning Process (3)** Evaluates the relationship between technology-based resources and learning theories through design, implementation, and evaluation of online instructional modules.  
Effective: Spring 2003  
Prerequisite:

**EDUC 465 Serving Culturally and Linguistically Diverse (CLD) Learners (3)** The course provides teachers with knowledge, understandings, and skills to engage culturally and linguistically diverse (CLD) students in mainstream classrooms.  
Effective: Spring 2009

**EDUC 466 Foundations of Teaching English as a Second Language (3)** Overview of various legal, historical, and socio-cultural implications of teaching and learning English as a Second Language.  
Effective: Summer 2006  
Prerequisite:

**EDUC 467 English Language Structure for English as a Second Language Teachers (3)** An in-depth study and review of general linguistic concepts and their application to ESL pedagogy.  
Effective: Summer 2006  
Prerequisite:

**EDUC 468 Language Acquisition for English as a Second Language Teachers (3)** Study of the theory, research, and processes involved in first and second language development, acquisition, and assessment.  
Effective: Summer 2006  
Prerequisite:



**EDUC 469 Teaching Methods and Assessment of English as a Second Language (3)** Integration of theory, research, and practice about ESL curriculum, instructional methods, assessment, and literacy development.

Effective: Summer 2006

Prerequisite:

**EDUC 470W Higher-Order Thinking for Educators (3)** Presentation of strategies, techniques, and principles of higher-order thinking which are grounded in relevant research and practice will be presented.

Effective: Fall 2006

Prerequisite:

**EDUC 471 Best Practices in Literacy (3)** An application of best literacy practices to classroom instruction and assessment of reading, writing, listening, and speaking.

Effective: Spring 2003

Prerequisite:

**EDUC 472 Teaching Reading Through the Content Areas (3)** Designed to enable teachers of content areas to improve the reading/study skills needed by their students.

Effective: Winter 1981

**EDUC 475 ESL Leadership, Research and Advocacy (3)** Teachers will develop their skills as instructional leaders and researchers by conducting school-based action research projects.

Effective: Summer 2010

Prerequisite:

**EDUC 477 Teaching Struggling Readers and Writers (3)** A comprehensive overview of learning problems and effective strategies for teaching K-12 students who have difficulties reading and writing.

Effective: Spring 2008

**EDUC 478 Secondary Transition for Students with Disabilities (3)** Process and procedures for successful transition of secondary students with disabilities.

Effective: Summer 2013

Prerequisite:

**EDUC 484 School Law for Teachers (3)** This course will focus on increasing teacher awareness of law and how it impacts on daily performance and job security.

Effective: Summer 1995

Prerequisite:

**EDUC 490 Student Teaching (1-12)** Observation and teaching in selected elementary or secondary schools under direction of cooperating classroom teachers and University supervisors. Regular seminars. GPA 3.0 or higher. Passing scores on required Praxis I tests.

Effective: Fall 2003

Prerequisite:

**EDUC 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1994

**EDUC 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**EDUC 495 Internship (1-15)** Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.

Effective: Fall 1983

Prerequisite:

**EDUC 495A Junior Field Experience (1)** Second semester juniors assigned to a suburban elementary school for the purpose of actively participating in classroom activities.

Effective: Summer 2003

Prerequisite:

**EDUC 495B Senior Field Experience (1)** First semester seniors assigned to an urban elementary school for the purpose of actively participating in classroom activities.

Effective: Summer 2003

Prerequisite:

**EDUC 495C Early Childhood Field Experience (1)** First semester seniors assigned to an urban elementary school for the purpose of actively participating in an early childhood classroom.

Effective: Summer 2003

Prerequisite:

**EDUC 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Fall 1983

**EDUC 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 1983

**EDUC 497A American History for the Classroom (3)** An examination of the history of American history education and instructional strategies to engage K-12 students today.  
Effective: Summer 2013 Ending: Summer 2013

**EDUC 497A American History for the Classroom (3)** An examination of the history of American history education and instructional strategies to engage K-12 students today.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDUC 497B Technology and Personalized Learning (3)** This institute will connect teachers to significant developments and changes that are underway in education.  
Effective: Summer 2013 Ending: Summer 2013

**EDUC 497B Teacher Action Research (2)** Action Research Implementation focuses on developing an action plan to determine the impact of students' practices on student performance; it includes guided practice, peer review and individual meetings with the instructor.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDUC 497C Special Topics in Education with Embedded Study Abroad to Brazil (1-3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2013 Ending: Summer 2013

**EDUC 497D The Essential Role of Writing in Contemporary K-12 Classrooms (3)** This course requires student engagement, reflection, analysis, and application of concepts to maximize effective teaching in writing, assessment, and collaboration.  
Effective: Summer 2013 Ending: Summer 2013

**EDUC 497E International Field Experience: Germany (0.5-3.0)** This course is intended to: develop student perceptions on education, provide pre-service teachers with opportunities to participate in culturally diverse classrooms, and engage in political dialogue regarding education in Germany.  
Effective: Summer 2013 Ending: Summer 2013

**EDUC 497F Using a Writer's Notebook to Empower Writers (3)** Introduces the effective use of a writer's notebook as a valuable tool for students to use prior to drafting. The course will explore the endless possibilities of using a writer's notebook to strengthen and broaden both student writing and classroom instruction.  
Effective: Summer 2013 Ending: Summer 2013

**EDUC 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1995

**EDUC 499 (IL) Foreign Studies (1-12)** Study of educational topics in a country other than the United States.  
Effective: Summer 2007  
Prerequisite:

**EDUC 500 Professional Learning Communities (3)** Defines elements of effective learning communities and explores educators' roles as consumers and creators of research, theory, and best practices.  
Effective: Spring 2008  
Prerequisite:

**EDUC 501 History of American Education (3)** An examination of the rise and transformation of American public schools from pre-colonial America to the present.  
Effective: Spring 1998  
Prerequisite:

**EDUC 503 Cultural and Ethnic Groups Education (3)** Approaches to teaching in an environment of differing cultures and ethnic groups.  
Effective: Spring 1998  
Prerequisite:

**EDUC 505 Curriculum Foundations (3)** Provides a comprehensive overview of the philosophical, historical, psychological, and social foundations that affect the school curriculum.  
Effective: Spring 2010  
Prerequisite:

**EDUC 506 Curriculum Development and Instructional Design (3)** Examination of theory, issues, problems, organization, and application of instructional design in planning and developing a curriculum.  
Effective: Fall 2008

Prerequisite:

**EDUC 508 Teaching Gifted Students in Heterogeneous Groups (3)** This course is designed to help regular classroom teachers to meet the needs of gifted students in a heterogeneous classroom.

Effective: Summer 1997

Prerequisite:

**EDUC 520 Learning Theory for the Classroom (3)** An application of learning theories from psychological, sociological, and physiological disciplines to educational settings for children and adolescents.

Effective: Spring 2011

Prerequisite:

**EDUC 539 Educational Assessment (3)** This course will prepare students with the knowledge and skills necessary to monitor, assess, and report student achievement.

Effective: Fall 2008

Prerequisite:

**EDUC 560 Classroom Management (3)** Analysis of teaching styles, classroom behavior and interaction, organization and correlation of classroom activities and subject areas. (Requires practical application in an actual teaching situation.)

Effective: Winter 1981

**EDUC 561 Psychology of Reading (3)** Examination of the theoretical bases for reading which have direct practical implication for teaching reading.

Effective: Fall 2008

Prerequisite:

**EDUC 562 Diagnostic Evaluation of Reading Problems (3)** Utilization of formal and informal instruments and techniques appropriate in analyzing reading disabilities, grade K through 12; includes practicum.

Effective: Spring 2009

Prerequisite:

**EDUC 563 Methods in Teaching Reading (3)** Development of advanced diagnostic and instructional techniques for teaching reading, with emphasis on individual and small group instruction.

Effective: Fall 2008

Prerequisite:

**EDUC 564 Reading Clinic (6)** Culminating course for the M.Ed. degree in literacy education requiring demonstration of competency in working with children possessing reading problems.

Effective: Fall 2008

Prerequisite:

**EDUC 565 Literacy and Leadership (3)** Principles of supervision, organization, management, and evaluation of literacy programs will be presented.

Effective: Spring 2009

Prerequisite:

**EDUC 571 Great Teachers (3)** Study of one or more great teachers, e.g., Socrates, Comenius, Locke, Rousseau, Pestalozzi, Herbart, Froebel, Dewey, Kilpatrick.

Effective: Winter 1981

**EDUC 572 Comparative Education: World Perspectives (3)** An evaluative comparison of American education with Western and non-Western educational systems.

Effective: Winter 1981

**EDUC 582 (HLHED 582) Spirituality and Culture in Health and Education Professions (3)** This course focuses on the cultural aspects of spirituality and its place in the health and education professions.

Effective: Summer 2009

**EDUC 583 Problems in Teaching: Selected Subject Areas (3)** An analysis of a teaching problem with review of research literature to seek solutions to that problem.

Effective: Fall 1983

**EDUC 584 Analysis of Research: Selected Topics (3)** A review and analysis of research in a specified area.

Effective: Fall 1983

Prerequisite:

**EDUC 586 Educational Research Designs (3)** Focuses on methods of research in educational settings to help participants become informed consumers of the educational research literature.

Effective: Fall 2008

Prerequisite:

**EDUC 587 Master's Project (3)** The development of an original master's project (paper, essay, production, practicum) supervised and judged by an appropriate faculty committee.

Effective: Fall 1983

EDUC 589 **Problems in Urban Education** (3) Independent study of selected topics related to urban education.  
Effective: Fall 1983

EDUC 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

EDUC 591 **Education Seminar** (1-6) The capstone seminar course for the M.Ed. degree requiring an appropriate scholarly term paper.  
Effective: Spring 2011  
Prerequisite:

EDUC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

EDUC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

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## Educational Psychology (EDPSY)

**EDPSY 400 Introduction to Statistics in Educational Research** (3) The foundations of statistical techniques used in educational research; distributions, central tendency, variability, correlation, regression, probability, sampling, hypothesis testing.

Effective: Summer 2011

**EDPSY 406 Applied Statistical Inference for the Behavioral Sciences** (3) Common techniques (parametric) covered through two-factor analysis of variance (independent samples); hypothesis testing, confidence interval, power, robustness; MINITAB frequently used.

Effective: Summer 2011

Prerequisite:

**EDPSY 408 (SPLED 408) Meeting Instructional Needs of English Language Learners with Special Needs** (3) The course content and activities focus on instruction and assessment for English Language Learners with special needs.

Effective: Summer 2011

Prerequisite:

**EDPSY 421 Learning Processes in Relation to Educational Practices** (3) An introduction to the empirical study of variables and conditions that influence school learning.

Effective: Summer 2011

Prerequisite:

**EDPSY 450 (PSYCH 404) Principles of Measurement** (3) Scale transformation, norms, standardization, validation procedures, estimation of reliability.

Effective: Summer 2011

Prerequisite:

**EDPSY 475 Introduction to Educational Research** (3) Scientific method; classes of variables in educational research; the measurement of classroom behavior; survey, predictive, and experimental studies.

Effective: Summer 2011

Prerequisite:

**EDPSY 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

**EDPSY 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

**EDPSY 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

**EDPSY 505 Statistical Applications in Educational Research** (3) Statistical techniques for education research including multiple regression, one-way, two-way, and repeated measures ANOVA. Use computer software for statistical analyses.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**EDPSY 506 Advanced Techniques for Analyzing Educational Experiments** (3) Analytical and experimental control considerations for designs involving nested and/or crossed subjects. Analysis of variance and multiple comparisons via computers.

Effective: Summer 2011

Prerequisite:

**EDPSY 507 Multivariate Procedures in Educational Research** (3) Introduction to matrix algebra, computer programming, multiple regression analysis, multiple and canonical correlation, multiple discriminant analysis, classification procedures, factor analysis.

Effective: Summer 2011

Prerequisite:

**EDPSY 512 Group Processes in the Classroom** (3) Basic concepts and perspectives in the study of group processes; instructional group interaction; analysis of classroom behavior.

Effective: Summer 2011

**EDPSY 513 Individual and Group Differences** (3) Description, causes, and interpretation of individual variation over the life-span, with application to school and institutional practices.

Effective: Summer 2011

Prerequisite:

**EDPSY 521 Learning and Cognition: Educational Applications** (3) This course focuses on understanding human learning

and thinking through examining learning theories and research related to educational psychology.

Effective: Spring 2013

Prerequisite:

**EDPSY 523 Concept Learning and Problem Solving (3-4)** Theoretical-empirical trends in concept learning, problem solving, and creativity related to instructional psychology.

Effective: Summer 2011 Ending: Fall 2013

Prerequisite:

**EDPSY 523 Concept Learning and Problem Solving (3-4)** Theoretical-empirical trends in concept learning, problem solving, and creativity related to instructional psychology.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**EDPSY 524 Theories of Learning and Instruction (3)** Study of major classical theories of learning and recent developments in learning and instructional theory.

Effective: Summer 2011 Ending: Fall 2013

Prerequisite:

**EDPSY 524 Theories of Learning and Instruction (3)** Study of major classical theories of learning and recent developments in learning and instructional theory.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**EDPSY 526 The Psychology of Reading (3)** Psychological principles underlying the process of reading and comprehending, with application to instruction.

Effective: Spring 2012 Ending: Fall 2013

Prerequisite:

**EDPSY 526 The Psychology of Reading (3)** Psychological principles underlying the process of reading and comprehending, with application to instruction.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**EDPSY 527 Psychology of Adults as Learners (3)** Psychological principles related to learning by adults, with application to instruction and other educational practices.

Effective: Summer 2011 Ending: Fall 2013

Prerequisite:

**EDPSY 527 Psychology of Adults as Learners (3)** Psychological principles related to learning by adults, with application to instruction and other educational practices.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**EDPSY 528 Instructional Psychology (3)** Application to instructional design of current developments in research on human development, information processing, learning strategies, memory structures, instructional processes.

Effective: Summer 2011 Ending: Fall 2013

Prerequisite:

**EDPSY 528 Instructional Psychology (3)** Application to instructional design of current developments in research on human development, information processing, learning strategies, memory structures, instructional processes.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**EDPSY 530 Achievement Motivation (3)** Within a seminar format, this course addresses both theoretical and empirical approaches to motivation and other related affective constructs.

Effective: Summer 2011

Prerequisite:

**EDPSY 550 Design and Construction of Psychological Measures (3)** Lecture-practicum involving planning, construction, administration, and analysis of a psychological test; lectures stress construct validity, item analysis, and predictive validity.

Effective: Summer 2011

Prerequisite:

**EDPSY 554 Theories of Psychological Measurement (3)** Basic true-score and error models; their extensions to test reliability and test validity; problems of item analysis and weighting.

Effective: Summer 2011

Prerequisite:

**EDPSY 555 (CI ED 555) Validity of Assessment Results (3)** Concepts, issues, and methods of validation of educational and psychological assessment including models and approaches to validation, bias, and utility.

Effective: Summer 2011

Prerequisite:

**EDPSY 556 Foundations and Applications of Item Response Theory (3)** Unidimensional models for dichotomously scored and polytomously scored items and their applications in instrument/test development.

Effective: Summer 2011

Prerequisite:

**EDPSY 557 Hierarchical Linear Modeling in Educational Research (3)** Statistical techniques for the analysis of multilevel data such as in nested designs or hierarchical data.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**EDPSY 558 Foundations and Applications of Structural Equation Modeling (3)** Model specification, identification, estimation, evaluation, and modification for measurement models, path models, and full structural models.

Effective: Summer 2012

Prerequisite:

**EDPSY 560 Contemporary Issues in the Evaluation of Educational Programs (3)** Practical and theoretical issues in the planning, execution, and interpretation of program evaluations.

Effective: Summer 2011

Prerequisite:

**EDPSY 575 Seminar in Educational Psychology (1-6)** A seminar dealing with specific topics in educational psychology. Open to advanced students in the behavioral sciences.

Effective: Summer 2011

**EDPSY 576 (C & S 576) Research Methods in Teacher Education (3)** A basis in theory, findings from research, research design, and methodologies related to teacher education.

Effective: Spring 2013

**EDPSY 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

**EDPSY 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2011

**EDPSY 597A Data Analysis Workshop (3)** This course is designed for students with a desire to increase their conceptual understanding of basic statistics and their proficiency with analytical techniques. This course will be held in a computer lab and the primary statistical analysis package used will be SPSS.

Effective: Summer 2013 Ending: Summer 2013

**EDPSY 600 Thesis Research (1-15)** No description.

Effective: Summer 2011

**EDPSY 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Summer 2011

**EDPSY 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Teaching of Educational Psychology classes under senior faculty supervision.

Effective: Summer 2011

**EDPSY 610 Thesis Research Off Campus (1-15)** No description.

Effective: Summer 2011

**EDPSY 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Summer 2011

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## Educational Technology (EDTEC)

**EDTEC 400 Introduction to Instructional Technology for Educators (1-3)** Use of microcomputers, video, and other media in education; models use technologies including video, audio, print, computer, and telephone.

Effective: Fall 2005

Prerequisite:

**EDTEC 440 Educational Technology Integration (3)** Technology integration in educational settings.

Effective: Fall 2008

Prerequisite:

**EDTEC 448 Using the Internet in the Classroom (3)** This course introduces students to methods and models of using the Internet effectively in their classroom.

Effective: Fall 2005

Prerequisite:

**EDTEC 449 Using Video in the Classroom (3)** Skills and knowledge needed to direct the use of video technologies in educational settings.

Effective: Fall 2011

Prerequisite:

**EDTEC 461 Designing Computer Networks for Education (3)** Applying fundamental concepts of computer networking to design effective networks for educational purposes.

Effective: Spring 2013

Prerequisite:

**EDTEC 462 Coordinating Technology Use in Education (3)** Skills and knowledge needed to direct the use of learning technologies in educational settings.

Effective: Spring 2013

Prerequisite:

**EDTEC 467 Emerging Web Technologies and Learning (3)** This course examines emerging Web technologies and explores their application to learning and education.

Effective: Spring 2013

Prerequisite:

**EDTEC 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2010

**EDTEC 561 Measuring the Impact of Technology on Learning (3)** Prepares teachers to evaluate the effects of technology use.

Effective: Summer 2005

Prerequisite:

**EDTEC 566 Computers as Learning Tools (3)** Amplifying thinking or organizing mental functions with computers.

Effective: Fall 2006

Prerequisite:

**EDTEC 594 Research Topics (1-9)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2010

Prerequisite:

**EDTEC 595 Internship (1-9)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships.

Effective: Summer 2010

**EDTEC 596 Independent Studies (1-9)** Creative projects, including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2010

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## Educational Theory and Policy (EDTHP)

EDTHP 401 (IL) (CI ED 401) **Introduction to Comparative Education** (3) Origins, nature, scope, basic literature, and methodology of comparative education. Study of sample topics.

Effective: Fall 2007

Prerequisite:

EDTHP 411 (US) **Ethnic Minorities and Schools in the United States** (3) Analysis of the social and cultural factors which affect educational outcomes among minority pupils, especially Blacks, Hispanics, and Indians.

Effective: Spring 2006

EDTHP 412 (WMNST 412) **Education and the Status of Women** (3) An examination of the relationship of education to the status of women in American society.

Effective: Spring 2005

EDTHP 416 (US) (SOC 416) **Sociology of Education** (3) The theoretical, conceptual, and descriptive contributions of sociology to education.

Effective: Spring 2006

EDTHP 420 **Education and Public Policy** (3) Focus on the development and analysis of education policy, and policy's influence on schools.

Effective: Fall 2011

Prerequisite:

EDTHP 427 **Intelligence and Educational Policy** (3) This course explores the concept of intelligence and its assessment from historical, psychological, educational and policy perspectives.

Effective: Spring 2006

Prerequisite:

EDTHP 430 **History of Education in the United States** (3) American educational ideas and practice critically examined in terms of their historical development and contemporary significance.

Effective: Summer 1995

EDTHP 434H **Honors Teaching Experience in Leadership Jumpstart** (1) Guided instruction and practical experience for teaching assistants to the Honors Leadership Jumpstart course (EDTHP 234H).

Effective: Fall 2006

Prerequisite:

EDTHP 440 (CI ED 440) **Introduction to Philosophy of Education** (3) Introduction to the examination of educational theory and practice from philosophical perspectives, classical and contemporary.

Effective: Spring 2013

Prerequisite:

EDTHP 441 **Education, Schooling, and Values** (3) Studies in education and schooling as problems in value; axiological problems and positions; examination of practical applications, including moral education.

Effective: Summer 1995

EDTHP 496 **Individual Studies** (1-18) Creative projects supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1995

EDTHP 497 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1995

EDTHP 497A **Gender Issues in Education and Family** (3) This course focuses on the role of gender in families, communities and the educational system in American society.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDTHP 497A **Gender Issues in Education and Family** (3) Education Theory and Policy 497A helps students explore the relationship between gender, education, and families. Students examine issues such as gender role development and families, gay, lesbian, and transgender children and families, educational access, gender bias, sexual harassment, gender and children's literature, the impact of the media on gender role development, and strategies for teaching boys and girls in elementary classrooms.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

EDTHP 498 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1995

**EDTHP 500 Proseminar in Educational Theory and Policy (3)** An introduction to disciplinary and interdisciplinary studies in educational theory and policy.

Effective: Spring 2002

**EDTHP 507 (CI ED 503, HI ED 503) Ethnicity, National Identity, and Education (3)** Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.

Effective: Summer 1995

**EDTHP 516 (CI ED 516) Education and Demographic Change in the United State and Abroad (3)** Interrelationship between schooling and employment, marriage, fertility, and migration. Focus comparatively on the United States and developing countries.

Effective: Spring 1998

**EDTHP 518 Analysis of U. S. Educational Policy (3)** The interaction between educational theory and social structure, focusing on the role of practicing intellectuals in contemporary institutional settings.

Effective: Summer 1995

**EDTHP 520 Perspectives on Contemporary School Reform (3)** Examination of contemporary U.S. school reform, with a focus on contrasting theoretical perspectives and the application of policy analysis principles.

Effective: Spring 2006

**EDTHP 523 Interpreting and Analyzing Quantitative Studies in Education Policy (3)** Effective reading of academic articles in educational policy based on quantitative methods.

Effective: Summer 2013

Prerequisite:

**EDTHP 525 Alternative Assessment of National Educational and Health Policies (3)** Overview of alternative research strategies in education, nursing and health education studies used to study impact of national policies.

Effective: Spring 2006

**EDTHP 527 Testing and Educational Equity (3)** This course considers testing, the reasons that policymakers have widely adopted testing, and implications of testing for educational equity.

Effective: Spring 2006

**EDTHP 533 Social History and Education Policy (3)** Historical study of social dimensions in the formation of education policy.

Effective: Summer 1995

**EDTHP 534 (SOC 534, CI ED 534) Childhood and Education in Sociological and International Comparative Perspective (3)** The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.

Effective: Spring 2013

**EDTHP 536 Studies in Educational Thought (3)** Studies in the historical development of educational theory.

Effective: Summer 1995

**EDTHP 538 (SOC 538) Sociology of Education (3)** Provides students with an overview of dominant sociological theoretical perspectives on schools, schooling, and education in modern society.

Effective: Spring 2008

**EDTHP 541 (CI ED 541) Contemporary Philosophies of Education (3)** Educational theory and practice in relation to contemporary movements in philosophy.

Effective: Spring 2008

**EDTHP 553 (SOC 553, CI ED 553, HI ED 553) Educational Mobility in Comparative Perspective (3)** Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America.

Effective: Spring 2003

**EDTHP 557 (HI ED 557, SOC 557) Sociology of Higher Education (3)** Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis.

Effective: Fall 2000

Prerequisite:

**EDTHP 580 Improving Educational Writing (3)** Focus on components of high quality academic writing for educational

research, with a special emphasis on improving the writing process.  
Effective: Summer 2009

EDTHP 585 (HI ED 585, EDLDR 585) **Research Design: Implications for Decisions in Higher Education** (3) A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.  
Effective: Fall 2004  
Prerequisite:

EDTHP 586 (EDLDR 586, HI ED 586) **Qualitative Methods in Educational Research** (3) Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques.  
Effective: Fall 2004

EDTHP 587 (HI ED 587, EDLDR 587) **Education Policy and Politics** (3) The political economy and bureaucratic politics of educational organizations, with special attention to the policy-making, implementation, and evaluation process.  
Effective: Fall 2004

EDTHP 588 (EDLDR 588, HI ED 588) **Qualitative Methods in Educational Research II** (3) Advanced study of methods involved in executing and analyzing qualitative research in education.  
Effective: Summer 2007  
Prerequisite:

EDTHP 596 **Individual Studies** (1-9) Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1995

EDTHP 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 1995

EDTHP 597A (EDLDR 597A) **Examination of Data Use of Pundits, Policymakers and Politicians** (3) This course will use incorrect data to teach students how to identify correct and incorrect data. How to communicate data with others.  
Effective: Summer 2013 Ending: Summer 2013

EDTHP 597A **Quantitative Studies in Education** (3) Reviews existing quantitative studies in education with the emphasis on methods used, theoretical and practical implications.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDTHP 597B (CI ED 597B) **Research in Comparative Education** (3) This course introduces large-scale international assessment databases and demonstrates how to use these data to conduct comparative education research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

EDTHP 597C (EDLDR 597C, HI ED 597C) **Foundations of Research** (3) This course is designed to begin a reading of the history and philosophies of education research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDTHP 597D (HI ED 597D) **Data Analysis for Education Research** (3) This course bridges theoretical statistics coursework and practical research with real, large-scale datasets.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDTHP 597E (EDLDR 597E, HI ED 597E) **Reviewing and Editing for Education Policy Journals** (3) This course introduces advanced doctoral students to the major journals in the field of education policy and provides a systematic introduction to reviewing and editing policy journals in the field of education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDTHP 597E **Civil Rights and Education** (3) This course will examine civil rights policies and educational equity in the United States from the perspectives of law, social science, and testing policy.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

EDTHP 597F (HI ED 597F, EDLDR 597F) **Race, Law and Education: Six U.S. Supreme Court Cases** (3) This class is designed to introduce students to the legal standards used to examine "race-conscious" policies intended to address racial/ethnic inequities in K-12 and higher education. We will consider the justifications educators have presented to support these policies, which justifications have been convincing to the Court, and how these justifications intersect across K-12 and higher education. We will also focus on how social science research has informed the legal developments in these cases. Over the course, we will cover six landmark U.S. Supreme Court cases on race and education, including *Brown v. Board of Education* (1954), the Court's most recent decision on K-12 voluntary desegregation policies, *Parents Involved in Community Schools v. Seattle School District No 1* (2007), and the Court's forthcoming opinion on affirmative action in higher education, *Fisher v. University of Texas* (2013).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDTHP 600 **Thesis Research** (1-15) No description.  
Effective: Summer 1995

EDTHP 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 1995

EDTHP 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) This class enables doctoral students to gain experience in college teaching under the supervision of a course instructor.  
Effective: Fall 2012

EDTHP 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2002

EDTHP 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1995

EDTHP 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1995

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## Electrical Engineering (E E)

**E E 400 Engineering Design Concepts** (3) Engineering design and modelling, engineering economy, project planning, capstone project selection, and technical communication skills.

Effective: Spring 2008

Prerequisite:

**E E 401 Electrical Design Projects** (3) Group design projects in the areas of electronics and electrical/computer systems.

Effective: Spring 2008

Prerequisite:

**E E 403M Senior Project Design** (3) Project designs of electrical engineering systems, encompassing various subdisciplines within Electrical Engineering, with an emphasis on technical communications skills.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite: Concurrent: ENGL 202C

**E E 403M Senior Project Design** (3) Project designs of electrical engineering systems, encompassing various subdisciplines within Electrical Engineering, with an emphasis on technical communications skills.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: ENGL 202C

**E E 403W Senior Project Design** (3) Project designs of electrical engineering systems, encompassing various subdisciplines within Electrical Engineering, with an emphasis on technical communications skills.

Effective: Spring 2008

Prerequisite: Concurrent: ENGL 202C

**E E 405 Capstone Proposal Preparation** (1) Performing the initial research needed for the capstone course, and the preparation of the written project proposal.

Effective: Fall 2012

Prerequisite:

**E E 406W Electrical Engineering Capstone Design** (3) Project designs of analog and digital systems, interfacing, and relevant electronic circuits, with an emphasis on technical communications skills.

Effective: Fall 2012

Prerequisite:

**E E 410 Linear Electronic Design** (3) Linear circuit design via integrated circuit processes; A/D converters, switched capacitor filters, phase lock loops, multipliers, and voltage- controlled oscillators.

Effective: Spring 2008

Prerequisite:

**E E 413 Power Electronics** (3) Switch-mode electrical power converters. Electrical characteristics and thermal limits of semiconductor switches.

Effective: Fall 2012

Prerequisite:

**E E 416 (CMPEN 416) Digital Integrated Circuits** (3) Analyses and design of digital integrated circuit building blocks, including logic gates, flip-flops, memory elements, analog switches, multiplexers, and converters.

Effective: Spring 2008

Prerequisite:

**E E 417 (CMPEN 417) Digital Design Using Field Programmable Devices** (3) Field programmable device architectures and technologies; rapid prototyping using top down design techniques; quick response systems.

Effective: Spring 2008

Prerequisite:

**E E 420 Electro-optics: Principles and Devices** (3) Spatially linear system and transform; diffraction theory, partial coherence theory, optical image detection, storage and display, holography.

Effective: Spring 1997

Prerequisite:

**E E 421 Optical Fiber Communications** (3) Operational principles of optical components, including sources, fibers and detectors, and the whole systems in optical fiber communications.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**E E 421 Optical Fiber Communications** (3) Operational principles of optical components, including sources, fibers and detectors, and the whole systems in optical fiber communications.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**E E 422 Optical Engineering Laboratory** (3) Hands-on experience covering areas of optical transforms, electro-optics devices, signal processing, fiber optics transmission, and holography.

Effective: Fall 1993

Prerequisite:

**E E 424 Principles and Applications of Lasers** (3) Principles of lasers--generation, propagation, detection and modulation; applications in fiber optics communication, remote sensing, holography, optical switching and processing.

Effective: Spring 2008

Prerequisite:

**E E 430 Principles of Electromagnetic Fields (3)** Laws of electrodynamics, boundary value problems, relativistic effects, waves in dielectrics and ferrites, diffraction and equivalence theorems.

Effective: Spring 2008

Prerequisite:

**E E 432 UHF and Microwave Engineering (3)** Transmission line and wave guide characteristics and components; design of UHF-microwave amplifiers, oscillators, and filters; measurement techniques; design projects.

Effective: Spring 1998 Ending: Summer 2013

Prerequisite:

**E E 432 RF and Microwave Engineering (3)** Transmission line and waveguide characteristics and components; design of RF and microwave amplifiers, oscillators, and filters; measurement techniques; design projects.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**E E 438 Antenna Engineering (3)** Radiation from small antennas, linear antenna characteristics, arrays of antennas, impedance concepts and measurements, multifrequency antennas, and aperture antennas.

Effective: Spring 2001

Prerequisite:

**E E 439 Radiowave Propagation in Communications (3)** Radiowave propagation in mobile, terrestrial, and satellite communications; applications at microwave and lower frequencies.

Effective: Spring 2008

Prerequisite:

**E E 441 Semiconductor Integrated Circuit Technology (3)** An overview of fundamentals of processes involved in silicon integrated circuit fabrication through class lectures and hands-on laboratory.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**E E 441 Semiconductor Integrated Circuit Technology (3)** An overview of fundamentals of processes involved in silicon integrated circuit fabrication through class lectures and hands-on laboratory.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**E E 442 Solid State Devices (3)** The physics of semiconductors as related to the characteristics and design of solid state electronic devices.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**E E 442 Solid State Devices (3)** The physics of semiconductors as related to the characteristics and design of solid state electronic devices.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**E E 450 Signal and Image Processing (3)** Linear system analysis in one-dimension and two-dimensions, emphasis on filtering; multi-dimensional signal analysis; image enhancement and reconstruction; computer simulation applications.

Effective: Spring 2008

Prerequisite:

**E E 453 Fundamentals of Digital Signal Processing (3)** Design of FIR and IIR filters; DFT and its computation via FFT; applications of DFT; filter implementation; finite arithmetic effects.

Effective: Spring 2008

Prerequisite:

**E E 454 (CMPEN 454) Fundamentals of Computer Vision (3)** Introduction to topics such as image formation, segmentation, feature extraction, shape recovery, object recognition, and dynamic scene analysis.

Effective: Spring 2008

Prerequisite:

**E E 455 (CMPEN 455) An Introduction to Digital Image Processing (3)** Overview of digital image processing techniques and their applications; image sampling, enhancement, restoration, and analysis; computer projects.

Effective: Spring 2008

Prerequisite:

**E E 456 (E SC 456, EGEE 456) Introduction to Neural Networks (3)** Artificial Neural Networks as a solving tool for difficult problems for which conventional methods are not applicable.

Effective: Spring 2008

Prerequisite:

**E E 458 Digital Image Processing and Computer Vision (3)** Principles of DSP and computer vision, including sensing preprocessing, segmentation, description, recognition, and interpretation.

Effective: Spring 2008

Prerequisite:

**E E 460 Communication Systems II (3)** Probability fundamentals, digital/analog modulation/demodulation, system noise analysis, SNR and BER calculations, optimal receiver design concepts, introductory information theory.

Effective: Spring 2008

## Prerequisite:

E E 461 **Communications I** (4) Element of analog and digital communication systems, AM, FM, and digital modulation techniques, receivers, transmitters, and transmission systems, noise.

Effective: Spring 2008

## Prerequisite:

E E 471 (AERSP 490, NUC E 490) **Introduction to Plasmas** (3) Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

Effective: Spring 2008

## Prerequisite:

E E 472 (AERSP 492) **Space Astronomy and Introduction to Space Science** (3) The physical nature of the objects in the solar system; the earth's atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

Effective: Spring 2008

## Prerequisite:

E E 474 **Satellite Communications Systems** (3) Overview of satellite communications systems, principles, space platforms, orbital mechanics, up/down links and link budgets, modulation techniques.

Effective: Spring 2008

## Prerequisite:

E E 477 (METEO 477) **Fundamentals of Remote Sensing Systems** (3) The review of fundamental physical properties leads into discussions of various techniques, including imaging, spectroscopy, radiometry, and active sensing.

Effective: Spring 2008

## Prerequisite:

E E 480 **Linear Systems: Time Domain and Transform Analysis** (3) Signals and systems representations, classifications, and analysis using; Difference and Differential equations, Laplace transform, z-transform, Fourier series, FT, FFT, DFT.

Effective: Spring 2008

## Prerequisite:

E E 481 **Control Systems** (4) Classical/modern approaches to system analysis/design; time/frequency domain modeling, stability, response, optimization, and compensation.

Effective: Spring 2008

## Prerequisite:

E E 482 **Introduction to Digital Control Systems** (3) Sampling and hold operations; A/D and D/A conversions; modeling of digital systems; response evaluation; stability; basis of digital control; examples.

Effective: Spring 2008

## Prerequisite:

E E 483 **Introduction to Automation and Robotics Systems** (3) Introduction to robotics systems with emphasis on robotic motion and control, and robotic components such as actuators and sensors.

Effective: Summer 2008

## Prerequisite:

E E 484 **Control System Design** (3) Analysis and design of automatic control systems using time, frequency domain and state variable methods.

Effective: Spring 2008

## Prerequisite:

E E 485 **Energy Systems and Conversion** (3) Overview of energy alternatives available, and study of theory of operation and models of major energy conversion devices.

Effective: Spring 2008

## Prerequisite:

E E 487 **Electric Machinery and Drives** (3) Analysis of variable-speed drives comprised of AC electric machines, power converters, and control systems.

Effective: Summer 2007

## Prerequisite:

E E 488 **Power Systems Analysis I** (3) Fundamentals, power transformers, transmission lines, power flow, fault calculations, power system controls.

Effective: Spring 2008

## Prerequisite:

E E 489 **Power Systems Analysis II** (3) Symmetrical components, unbalanced networks, unsymmetrical faults, unbalanced operation of rotating machines, transient transmission line modeling, system protection.

Effective: Spring 2008

## Prerequisite:

E E 494 **Senior Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Fall 1993

E E 494H **Senior Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Spring 2008

E E 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or

internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

**E E 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1993

**E E 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1993

**E E 497A Introduction to Signal Integrity for Interconnects (3)** Transmission lines and reflections, lossy lines, rise time, material properties, cross talk in transmission lines. Time and frequency domain measurements, jitter.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**E E 497B Electronics Design with ICs (3)** Applications of analog and digital integrated circuits in addition to introductory analog and digital communication techniques using specialty ICs.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**E E 497B Probability and Random Processes for Electrical Engineers (3)** Probability elective for EE students with applications in information theory, signal detection, control systems, and circuit analysis.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**E E 497E Space Systems Engineering Seminar (1)** Seminar overviewing the systems engineering approach to space systems as applied to practical space systems.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**E E 497E Software-Defined Radio (3)** Software-defined Radio (SDR) combines elements of communication systems and digital signal processing to create a software-based communication system.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**E E 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2007

**E E 500 Colloquium (1)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 2008

**E E 510 Linear Integrated Circuits (3)** Design of monolithic, thin-film, and hybrid linear integrated circuits; D.C., video, tuned, r.f., and microwave applications. Emphasis on reliability.

Effective: Spring 2008

Prerequisite:

**E E 520 Electro Optics--Systems and Computing (3)** Synthetic aperture radar, spatial light modulators, optical interconnection, optical computing, neural networks, and medical optics imaging.

Effective: Summer 1997

Prerequisite:

**E E 521 Fiber Optics and Integrated Optics (3)** Theories and applications of linear and nonlinear optical phenomena in optical fibers and integrated optical devices.

Effective: Spring 2008

Prerequisite:

**E E 522 Electro-Optics Laboratory (3)** Basic concepts and fundamentals of light diffraction, optical signal processing, and holography.

Effective: Fall 1993

Prerequisite:

**E E 524 Lasers and Optical Electronics (3)** Study of several advanced nonlinear optical phenomena, laser propagation, optical and optoelectronic devices, principles, and applications.

Effective: Spring 2008

Prerequisite:

**E E 526 Nonlinear Optical Materials (3)** Mechanisms of polarization nonlinearity, nonlinear optical processes and analyses, optoelectronic materials and their device application.

Effective: Spring 2012

Prerequisite:

**E E 531 Engineering Electromagnetics (3)** Electromagnetic field theory fundamentals with application to transmission lines, waveguides, cavities, antennas, radar, and radio propagation.

Effective: Spring 2008



Prerequisite:

E E 534 **Conformal Antennas** (3) Introduction to advanced analysis and design techniques as well as applications for conformal antennas mounted on planar and curved surfaces.

Effective: Spring 2008

Prerequisite:

E E 535 **Boundary Value Methods of Electromagnetics** (3) Theory and application of boundary value problems in engineering electromagnetics; topics include microwave and optical waveguides, radiation, and scattering.

Effective: Spring 2008

Prerequisite:

E E 537 **Numerical and Asymptotic Methods of Electromagnetics** (3) Finite difference time domain, geometric theory of diffraction and method of moments applied to antennas and scattering.

Effective: Summer 1995

E E 538 **Antenna Engineering** (3) In-depth studies of synthesis methods, aperture sources, broadband antennas, and signal-processing arrays.

Effective: Fall 1993

Prerequisite:

E E 541 **Manufacturing Methods in Microelectronics** (3) Methods, tools, and materials used to process advanced silicon integrated circuits.

Effective: Spring 2008

Prerequisite:

E E 542 **Semiconductor Devices** (3) Characteristics and limitations of bipolar transistors, diodes, transit time, and bulk-effect devices.

Effective: Spring 2008

Prerequisite:

E E 543 **Ferroelectric Devices** (3) Theoretical background of ferroelectric devices, practical materials, device designs, drive/control techniques, and typical applications.

Effective: Summer 2009

E E 544 **Micromechatronics** (3) Theoretical background of solid state actuators, practical materials, device designs, drive/control techniques and typical applications.

Effective: Summer 2009

E E 546 **Field-Effect Devices** (3) The physical background, characteristics, and limitations of surface field-effect and junction field-effect devices and related structures.

Effective: Spring 2008

Prerequisite:

E E 547 **Dielectric Devices** (3) Applications of insulator physics and devices based on insulator properties.

Effective: Spring 2008

Prerequisite:

E E 549 **Acoustic Wave Devices** (3) Examines materials commonly used for acoustic wave devices, fundamentals of acoustic waves and resonance modes, and characteristics of these devices.

Effective: Fall 2008

Prerequisite:

E E 550 (M E 550) **Foundations of Engineering Systems Analysis** (3) Analytical methods are developed using the vector space approach for solving control and estimation problems; examples from different engineering applications.

Effective: Fall 2012

Prerequisite:

E E 551 **Wavelets, Filter Banks, and Multi-resolution Analysis** (3) Gram-Schmidt orthogonalization and orthonormal bases, filter banks, orthogonal wavelets and multiresolution analysis, fast wavelet transforms, various applications.

Effective: Spring 2008

Prerequisite:

E E 552 (CSE 583) **Pattern Recognition--Principles and Applications** (3) Principles and applications decision-theoretic classification, discriminant functions, pattern processing and feature selection, syntactic pattern recognition, shape analysis and recognition.

Effective: Spring 2008

E E 553 **Topics in Digital Signal Processing** (3) Parametric modeling, spectral estimation, efficient transforms and convolution algorithms, multirate processing, and selected applications involving non-linear and time-variant filters.

Effective: Fall 1993

Prerequisite:

E E 554 (CSE 586) **Topics in Computer Vision** (3) Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications.

Effective: Spring 2008

Prerequisite:

**E E 555 (CSE 585) Digital Image Processing II (3)** Advanced treatment of image processing techniques; image restoration, image segmentation, texture, and mathematical morphology.

Effective: Spring 2008

Prerequisite:

**E E 556 Graphs, Algorithms, and Neural Networks (3)** Examine neural networks by exploiting graph theory for offering alternate solutions to classical problems in signal processing and control.

Effective: Spring 1996

**E E 557 Multidimensional Signal Processing (3)** Multidimensional sampling, weak causality, recursibility, multidimensional transforms, stability, global and local state-space models, multidimensional filters, and multidimensional spectrum estimation.

Effective: Fall 1993

Prerequisite:

**E E 560 Probability, Random Variables, and Stochastic Processes (3)** Review of probability theory and random variables; mathematical description of random signals; linear system response; Wiener, Kalman, and other filtering.

Effective: Spring 2008

Prerequisite:

**E E 561 Information Theory (3)** Mathematical measurement of information; information transfer in discrete systems; redundancy, efficiency, and channel capacity; encoding systems.

Effective: Spring 2008

Prerequisite:

**E E 562 Detection and Estimation Theory (3)** Detection decision theory, Bayes and Neyman-Pearson criteria, optimal receivers, classical estimation theory, signal-noise representations, optimum linear signal parameters estimation.

Effective: Summer 2000

Prerequisite:

**E E 564 (CSE 554) Error Correcting Codes for Computers and Communication (3)** Block, cyclic and convolutional codes; circuits and algorithms for decoding; application to reliable communication and fault-tolerant computing.

Effective: Spring 2008

Prerequisite:

**E E 565 (CSE 515) Reliable Data Communications (3)** Discussion of problems and solutions for ensuring reliable and efficient communication over wired and wireless links and data networks.

Effective: Spring 2008

Prerequisite:

**E E 567 Wireless and Mobile Communications (3)** Development of key wireless networks systems analysis and design tools utilizing telecommunications principles; current and emerging mobile wireless techniques.

Effective: Spring 2008

Prerequisite:

**E E 568 Digital Communications I (3)** Linear and nonlinear digital modulation techniques; performance in additive Gaussian noise channel; continuous phase modulation; carrier acquisition and recovery.

Effective: Spring 2008

Prerequisite: Concurrent: E E 560

**E E 569 Digital Communications II (3)** Baseband pulse transmission; baseband systems optimization; bandlimited channels performance in ISI; equalization; MLSE and ISI; fading channels; diversity; CDMA.

Effective: Spring 2008

Prerequisite:

**E E 573 Constitution of the Ionosphere (3)** Properties of neutral and ionized atmosphere above 60 km; photochemical processes; solar, meteoric perturbations of the ionosphere; large-scale movements in ionization.

Effective: Spring 2008

**E E 574 Propagation Through Random Media (3)** RF/optical wave propagation through turbulent, turbid, and heterogeneous media (atmosphere/ionosphere/sea). Impacts and mitigation discussed for various scenarios.

Effective: Spring 2008

Prerequisite:

**E E 576 Inversion Techniques in Remote Sensing (3)** Introduce skills to address a wide variety of inverse problems such as found in atmospheric sensing, geosciences, and acoustics.

Effective: Spring 2008

Prerequisite:

**E E 579 Microwave Radar Remote Sensing (3)** Scientific and engineering principles of microwave radar remote sensing of land, sea, and the atmosphere.

Effective: Spring 2008

Prerequisite:

**E E 580 Linear Control Systems (3)** Continuous and discrete-time linear control systems; state variable models; analytical design for deterministic and random inputs; time-varying systems stability.

Effective: Spring 2008

Prerequisite:

**E E 581 Optimal Control (3)** Variational methods in control system design; classical calculus of variations, dynamic programming, maximum principle; optimal digital control systems; state estimation.  
Effective: Spring 2008  
Prerequisite:

**E E 582 Adaptive and Learning Systems (3)** Adaptive and learning control systems; system identification; performance indices; gradient, stochastic approximation, controlled random search methods; introduction to pattern recognition.  
Effective: Spring 2008  
Prerequisite:

**E E 584 (M E 558) Robust Control Theory (3)** Fundamentals of Robust Control Theory with emphasis on stability, performance analysis, and design.  
Effective: Spring 2008  
Prerequisite:

**E E 587 (M E 559) Nonlinear Control and Stability (3)** Design of nonlinear automatic control systems; phase-plane methods; describing functions; optimum switched systems; Liapunov stability; special topics in stability.  
Effective: Spring 2008  
Prerequisite:

**E E 588 Power System Control and Operation (3)** Steady-state and dynamic model of synchronous machines, excitation systems, unit commitment, control of generation, optimal power flow.  
Effective: Spring 2008  
Prerequisite:

**E E 594 Research Projects (1-3)** Supervision of individual research projects leading to M.S. or M.Eng. papers. Written and oral reports are required.  
Effective: Summer 1998

**E E 596 Individual Studies (1-9)** Creative projects including non-thesis research which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1993

**E E 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 1993

**E E 597A Nanophotonics and Plasmonics (3)** Surface plasmon polaritons (SPPs); SPP excitation; photonic crystals; metamaterials; near-field optics; cavity quantum electrodynamics; microcavities.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**E E 597A Compound Semiconductors (3)** III-V and SiGe compound semiconductor devices with emphasis on HBTs and HEMTs.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**E E 597B Adaptive Signal Processing (3)** Theory, design, implementation of adaptive digital filters. Applications include echo and noise cancellation, channel equalization, speech analysis and adaptive beamforming.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**E E 597B Current Issues in Geophysical Radar Scattering (3)** Current issues in geophysical radar scattering.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**E E 597C Emerging Topics in Networked Systems (3)** Social networking; wireless energy harvesting networks; information security; network information theory.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**E E 597D Smart Grid System Evaluation and Modeling (3)** The Smart Grid System Evaluation and Modeling course will examine the emerging architecture of the grid with the goal of understanding the role of communication systems and information technology. The limits of long established analysis tools such as power flow, voltage stability, congestion management, contingency analysis, economic dispatch, angle-based stability, security assessment, etc. will be studied. The course will discuss new ideas for adapting these computation tools to the smart grid environment.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**E E 597E Processing and Characterization of Semiconductor Surfaces (3)** Processing and characterization of semiconductor surfaces and interfaces that form a foundation of semiconductor electronic and photonic devices.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**E E 599 Foreign Studies (1-2 per semester/maximum of 4)** Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2008

E E 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1993

E E 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1993

E E 602 **Supervised Experience in College Teaching** (3 per semester/maximum of 6) College Teaching Experience  
Effective: Summer 2012

E E 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1993

E E 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1993

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## **Elments Of Clin Res (ELCLR)**

ELCLR 700 **Elements of Clinical Research** (3) This interactive course covers the fundamentals of clinical research, logistic and ethical issues, manuscript and grant writing, and presentation training.

Effective: Fall 1999

Prerequisite:

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## **Emergency Med-Hy (EMED)**

**EMED 740 Emergency Medicine Ultrasound (5)** This course provides hands-on exposure to bedside ultrasound image acquisition and interpretation in the Emergency Department.

Effective: Spring 2010

Prerequisite:

**EMED 752 Emergency Medicine Acting Internship (5)** Supervised experience in the management of acute medical and surgical conditions in the emergency care unit.

Effective: Fall 2008

Prerequisite:

**EMED 754 Toxicology Elective (5)** Toxicology admissions and consults; weekly two-hour conferences; poison center sign-out rounds; exposure to the most common toxicologic poisonings; research opportunities.

Effective: Spring 2002

Prerequisite:

**EMED 756 Emergency Medicine Elective for Third Year Students (2.5)** Introduction for the 3rd year medical student to various aspects of Emergency Medicine.

Effective: Summer 2009

Prerequisite:

**EMED 796 Emergency Medicine Independent Studies (5)** Emergency Medicine Independent Studies

Effective: Fall 2008

Prerequisite:

**EMED 797 Emergency Medicine Special Topics (5)** Emergency Medicine Special Topics

Effective: Fall 2008

Prerequisite:

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## **Endocrinology-Hy (END)**

END 731 **Endocrinology** (3) These areas will be studied: Pituitary Disease; Thyroid Disease; Hyper- thyroidism; Sexual Development; disorders of Calcium and Phosphorous; Adrenal Disease; Diabetes Mellitus; Hypoglycemia; and Normal and Abnormal Growth.

Effective: Fall 2001

Prerequisite:

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## Energy and Geo-Environmental Engineering (EGEE)

EGEE 401 **Energy in a Changing World** (3) Energy is in transition, with increased international energy demand and increasing environmental pressures. Energy transitions, approaches, and outcomes are addressed.

Effective: Spring 2008

Prerequisite:

EGEE 411 **Energy Science and Engineering Lab** (3) A comprehensive introduction to classic and modern laboratory skills and experimentation of relevance to energy science and engineering practice.

Effective: Spring 2008

Prerequisite:

EGEE 412 **Green Engineering & Environmental Compliance** (3) Material and energy flows as they relate to industrial systems, environmental concerns, pollution prevention, and the development of clean technologies.

Effective: Summer 2007

Prerequisite:

EGEE 420 **Hydrogen and Fuel Cells** (3) Course will cover the fundamental principles of electrochemical engineering, hydrogen production and storage, and the design and application of the main types of fuel cells.

Effective: Fall 2009

Prerequisite:

EGEE 430 (M E 430) **Introduction to Combustion** (3) Concepts related to laminar and turbulent premixed and nonpremixed combustion with applications to propulsion and stationary systems.

Effective: Fall 2009

Prerequisite:

EGEE 433 **Physical Processes in Energy Engineering** (3) Introduces fluid flow, heat transfer, phase equilibrium and mass transport phenomena in energy separation processes.

Effective: Summer 2007

Prerequisite:

EGEE 436 **Modern Thermodynamics for Energy Systems** (3) Thermodynamics of external fields, theory of stability and fluctuations, irreversible and non-linear thermodynamics, and bifurcation theory and their applications in energy and environmental processes are discussed.

Effective: Fall 2009

Prerequisite:

EGEE 437 **Design of Solar Energy Conversion Systems** (3) A review of fundamental concepts in solar energy conversion including photovoltaic (PV) and solar thermal conversion systems.

Effective: Spring 2010

Prerequisite:

EGEE 438 **Wind and Hydropower Energy Conversion** (3) Principles of sustainability and renewable energy conversion with emphasis on wind and hydrokinetic energy resources.

Effective: Spring 2012

Prerequisite:

EGEE 441 **Electrochemical Engineering Fundamentals** (3) Course covers fundamental principles of electrochemistry, including electrochemical thermodynamics, kinetics, catalysis, and corrosion and focuses on applications such as fuel cells, batteries, and photovoltaics. Each application covers: principles of method, criteria determining performance, present state of development, and advantages/disadvantages. Laboratory demonstration of the performance (current-voltage) measurements of an electrochemical converter is scheduled in this course.

Effective: Fall 2012

Prerequisite:

EGEE 451 **Energy Conversion Processes** (3) Emphasizes processes for conversion of fossil fuels, nuclear and biomass to other fuel forms as transportation fuels and electricity.

Effective: Summer 2007

Prerequisite:

EGEE 455 **Materials for Energy Applications** (3) Overview of key principles and technologies for materials relevant to energy applications, including membranes, catalysis, supercapacitors, adsorbents, and semi-conductors.

Effective: Summer 2007

Prerequisite:

EGEE 456 (E SC 456, E E 456) **Introduction to Neural Networks** (3) Artificial Neural Networks as a solving tool for difficult problems for which conventional methods are not applicable.

Effective: Spring 2008

Prerequisite:

EGEE 464W **Energy Design Project** (3) A team and capstone design project on an industrial energy-related problem.

Effective: Spring 2008

Prerequisite:

EGEE 470 **Air Pollutants from Combustion Sources** (3) Generation of pollutants in combustion chambers; reduction by combustion control; pre- and post-combustion treatment of fuels and effluents.



Effective: Fall 2009

Prerequisite:

**EGEE 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1999

**EGEE 494A Research Project (2)** Supervised research on a selected topic of energy science and engineering and preparation of written and oral presentation of the research results.

Effective: Summer 2007

Prerequisite:

**EGEE 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**EGEE 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 1999

**EGEE 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 1999

**EGEE 496A Independent Study (3)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**EGEE 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1999

**EGEE 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1999

**EGEE 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**EGEE 500 Engineering Physics of Energy and Geo-Environmental Systems (3)** Momentum, heat and mass transport phenomena in fluids and solids, including phase equilibria.

Effective: Spring 2005

Prerequisite:

**EGEE 510 Engineering Chemistry of Energy and Geo-Environmental Systems (3)** Chemical and electrochemical equilibria, surface and interfacial phenomena and chemical kinetics, in natural and engineered systems.

Effective: Spring 2005

Prerequisite:

**EGEE 520 Mathematical Modeling of Energy and Geo-Environmental Systems (3)** Physical and reactive chemical modeling, model formulation and solution, validation and verification.

Effective: Spring 2005

Prerequisite:

**EGEE 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1999

**EGEE 595 Internship (1-18)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 1999

**EGEE 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1999

**EGEE 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1999

EGEE 597A **Advanced Electrochemical Engineering** (3) This course is for graduate students who would like to improve their skills and knowledge in electrochemical engineering and methods.  
Effective: Summer 2013 Ending: Summer 2013

EGEE 597C (MATSE 597C) **Nanoscale Energy and Environmental Engineering** (3) The course will cover the synthesis, characterization and applications of nanomaterials to energy generation, storage, conversion, conservation, control and environmental engineering. Selected topics in nanomaterial toxicity and production/process/product economics will be included.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EGEE 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1999

EGEE 599 (IL) **Foreign Studies** (1-2 per semester, maximum of 24) Full-time graduate-level foreign study at overseas.  
Effective: Summer 2005

EGEE 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2005

EGEE 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Summer 2004

EGEE 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Fall 2006

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## Energy and Mineral Engineering (EME)

EME 407 **Electrochemical Energy Storage** (3) Electrochemical concepts in energy storage devices, cell construction and materials involved in batteries and capacitors, electrochemical testing methods and applications.

Effective: Spring 2012

Prerequisite:

EME 432 (GEOG 432) **Energy Policy** (3) Analysis, formulation, implementation, and impacts of energy-related policies, regulations, and initiatives.

Effective: Summer 2010

Prerequisite:

EME 444 **Global Energy Enterprise** (3) Industry perspective on the resources, technologies, engineering approaches and externalities involved in satisfying worldwide energy demand profitably and sustainably.

Effective: Summer 2010

Prerequisite:

EME 460 **Geo-resource Evaluation and Investment Analysis** (3) The course covers engineering evaluation of geo-resources, present value and rate of return analysis, mineral property and reserve estimation, and cost estimation and engineering economy concepts applied to geo-resources including energy and minerals.

Effective: Spring 2011

Prerequisite:

EME 466 **Energy and Sustainability in Society** (3) Capstone course in energy technology and policy options for reduced-carbon communities. Covering agent/stakeholder relations, sustainability, communication and public engagement.

Effective: Summer 2010

Prerequisite:

EME 500 **Energy and Mineral Project Investment Evaluation** (3) Emphasizes enterprise level cost review, estimation, and prediction methodology and investment evaluation as a means for project engineering management.

Effective: Spring 2009

EME 504 **Foundations in Sustainability Systems** (3) Theoretical background of sustainability issues and studies of sustainability systems.

Effective: Summer 2013

EME 510 **Health and Safety Engineering** (3) Develop the ability to use scientific and engineering principles to evaluate and control health and safety hazards in the workplace.

Effective: Spring 2009

EME 525 **Theory and Practice of Policy Analysis for Engineers** (3) The course provides a broad introduction to analytical methods commonly used in science, technology, and energy policy analysis.

Effective: Summer 2008

EME 570 (MATSE 570) **Catalytic Materials** (3) Preparation and characterization of solid catalytic materials and the relationships between their surface, defect, and electronic properties and catalytic activity.

Effective: Summer 2008

Prerequisite:

EME 580 **Interdisciplinary Team Project in EME Systems** (3) Problem-based, integrative, and collaborative learning to solve interdisciplinary problems on energy and mineral systems based on engineering and business principles.

Effective: Fall 2012

Prerequisite:

EME 581 **Research and Geostatistics Methods** (3) Presents methods essential for the conduct and analysis of scientific research and spatial characterization in energy and mineral engineering disciplines.

Effective: Summer 2012

EME 590 (F SC 590, MNG 590, P N G 590) **Colloquium** (1-3) Continuing seminars that consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

Effective: Spring 2009

EME 600 **Thesis Research** (1-12) Thesis research culminating into the doctoral degree in Energy and Mineral Engineering.

Effective: Summer 2008

EME 601 **Thesis Preparation** (0) Thesis research after successful comprehensive exam culminating into the doctoral degree in Energy and Mineral Engineering.

Effective: Summer 2008

**EME 801 Energy Markets, Policy, and Regulation (3)** Structure and function of energy markets; existing and emerging environmental regulations; decision-making by energy companies.  
Effective: Summer 2013

**EME 802 Renewable and Sustainable Energy Systems (3)** An overview of renewable energy technologies and sustainable energy system analysis.  
Effective: Summer 2013

**EME 803 Applied Energy Policy (3)** Provides in-depth exploration of energy policy development, implementation, and assessment at multiple governmental and corporate scales with emphasis on energy markets.  
Effective: Summer 2013

**EME 805 Renewable Energy and Nonmarket Enterprise (3)** Industry perspective on the resources, technologies, engineering approaches and externalities involved in deploying renewable energy businesses profitably and sustainably.  
Effective: Summer 2013

**EME 807 Technologies for Sustainability Systems (3)** This course examines strategies and applications of sustainable technologies in manufacturing, energy, water, transportation, food, and building systems.  
Effective: Summer 2013

**EME 810 Solar Resource Assessment and Economics (3)** Methods, economic criteria, and meteorological background for assessing the solar resource with respect to solar energy conversion technologies.  
Effective: Summer 2013

**EME 811 Solar Thermal Energy for Utilities and Industry (3)** Applications of solar thermal energy (STE) including district heating/cooling (buildings), industrial process heating, fuel synthesis, desalination, and materials processing.  
Effective: Summer 2013  
Prerequisite:

**EME 812 Utility Solar Power and Concentration (3)** Technical and theoretical background for utility scale solar energy conversion technologies to generate electric power.  
Effective: Summer 2013  
Prerequisite:

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## Energy, Environmental, and Mineral Economics (ENNEC)

ENNEC 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 2002

Prerequisite:

ENNEC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2002

ENNEC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2001

ENNEC 499 (IL) **Foreign Study--Mineral Industries** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

ENNEC 540 **Economic Analysis of Energy Markets** (3) This course uses economic analysis to explain the history of world energy and its regulation since 1945.

Effective: Spring 2002

Prerequisite:

ENNEC 541 **Economics of Energy and the Environment** (3) Economic analysis of topics such as global warming, alternative energy sources and new technologies, and resources and sustainable development.

Effective: Spring 2002

Prerequisite:

ENNEC 560 **Mineral and Energy Finance I** (3) Introduction to theory of finance and application of financial tools to commodity market analysis. Emphasis on mineral and energy markets.

Effective: Spring 2002

Prerequisite:

ENNEC 590 (I H S 590) **Colloquium** (1-3) Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

Effective: Spring 2009

ENNEC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2002

ENNEC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 2002

ENNEC 600 **Thesis Research** (1-15) No description.

Effective: Spring 2002

ENNEC 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Spring 2002

ENNEC 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised and graded teaching experience.

Effective: Spring 2002

ENNEC 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Spring 2002

ENNEC 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Spring 2002

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## Engineering (ENGR)

ENGR 407 **Technology-Based Entrepreneurship** (3) Technology innovation coupled with business planning and development.

Effective: Spring 2011

Prerequisite:

ENGR 408 (US) **Leadership Principles** (2) An introduction to an exploration of theories and principles of leadership, supplemented by presentations given by industry and government leaders.

Effective: Spring 2006

ENGR 409 (US) **Leadership in Organizations** (3) Development of leadership skills essential for engineers to guide colleagues or an organization in a productive direction.

Effective: Spring 2006

ENGR 411 **Entrepreneurship Business Basics** (3) Three critical entrepreneurship skills are covered for non-business majors: business finance, intellectual property, and marketing.

Effective: Summer 2002

Prerequisite:

ENGR 415 **Technology Launch for Entrepreneurs** (3) Development of a technology-based product or service that includes creative ideation, concept evaluation, market and sales analysis, prototyping, and manufacturing with potential for commercialization.

Effective: Summer 2013

Prerequisite:

ENGR 421 **Materials Properties Measurements II** (4) Materials powder characterization, compaction and densification techniques, density measurements, micro structural evaluation, thermal and electrical properties of materials.

Effective: Summer 2010

Prerequisite:

ENGR 425 (IST 425, MGMT 425) **New Venture Creation** (3) Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors.

Effective: Spring 2011

Prerequisite:

ENGR 426 (IST 426, MGMT 426) **Invention Commercialization** (3) Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology.

Effective: Spring 2011

Prerequisite:

ENGR 450 **Materials Design and Applications** (3) Engineering design considerations for materials selection, organization of property trends of materials families, materials design strategies and property compatibility.

Effective: Summer 2010

Prerequisite:

ENGR 451 **Social Entrepreneurship** (3) Students develop business models and implementation strategies for social ventures in diverse world regions.

Effective: Summer 2013

Prerequisite:

ENGR 455 **Humanitarian Engineering and Social Entrepreneurship Reflection and Research Dissemination** (3) This post-fieldwork course focuses on reflection on ethical issues and grassroots diplomacy challenges, and workshops on research dissemination.

Effective: Summer 2013

Prerequisite:

ENGR 490W **Senior Design I** (1) Analysis of environmental impacts on a design, designing products for the global environment and discussion on engineering ethics and professionalism.

Effective: Fall 2012

Prerequisite:

ENGR 491W **Senior Design II** (3) Capstone of research projects from conception to prototype through industry sponsored collaboration on common technical interests between faculty and student.

Effective: Summer 2010

Prerequisite:

ENGR 493 **Individual Leadership Experience** (1) Approved individual project or internship for students to practice the leadership skills developed in the Engineering Leadership Development Minor.

Effective: Fall 2007

Prerequisite:

ENGR 494 **Research Project Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1994

**ENGR 494H Research Project Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

**ENGR 495 Engineering Co-Op Work Experience III** (1-3) A supervised work experience where the student is employed in an engineering position in industry or government. (To be offered only for SA/Un grading.)  
Effective: Fall 1987  
Prerequisite:

**ENGR 495A Engineering Cooperative Education** (1-3 per semester) A supervised work experience in research, industry or government relevant to a student's major.  
Effective: Summer 2003  
Prerequisite:

**ENGR 495I (IL) Engineering International Cooperative Education** (1-3 per semester) A supervised work experience in research, industry or government relevant to a student's major.  
Effective: Spring 2006  
Prerequisite:

**ENGR 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 1993

**ENGR 496A International Experience-Hungary** (0.5) Independent study in Engineering Leadership Topics.  
Effective: Summer 2013 Ending: Summer 2013

**ENGR 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1988

**ENGR 497A Global Trends: Strategic Analysis and Systems Thinking for Leadership** (3) The course will use a systems thinking approach to understand the strategic implications of global trends for leadership.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENGR 497C Global Engineering Teams Seminar** (1) Preparation for a career in international engineering enterprise. Prerequisite for students traveling internationally with the Engineering Leadership Development Program. Students must earn a B or better in this class to qualify for travel.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**ENGR 497F (SCIED 497F) Fundamentals of Science, Technology, and Engineering** (3) A course focusing on physics content, engineering design principles, and elementary science education pedagogy.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENGR 497G Project Management for Professionals** (3) This practical course for professionals covers essential concepts and skills needed to make effective contributions and have an impact on the successful accomplishment of projects.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENGR 497I Seminar for Teaching Interns** (0.5) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENGR 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2007

**ENGR 594 Master's Paper Research** (1-3) Investigation of a specific engineering problem and development of a scholarly written report in partial fulfillment of requirements for a master's degree in engineering.  
Effective: Fall 1985

**ENGR 595 Engineering Internship** (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 2011

**ENGR 595A Engineering Internship** (1 per semester/maximum of 4) A supervised work experience in a professionally relevant position in research, industry, or government.  
Effective: Spring 2005

**ENGR 595I International Engineering Internship** (0.5 per semester/maximum of 4) A supervised work experience in a professionally relevant position in research, industry, government or service sector.  
Effective: Fall 2012

**ENGR 596 Independent Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2011

**ENGR 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1993

**ENGR 598 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2011

**ENGR 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2008

**ENGR 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**ENGR 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Opportunity for supervised and graded experience for graduate students in the College of Engineering.  
Effective: Fall 1983

**ENGR 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**ENGR 888 Seminar for Engineering Teaching Assistants** (1) Study of recently established knowledge and methodologies as applied to practice. Significant interaction among students and with instructor is expected.  
Effective: Fall 2009

**ENGR 897 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2008

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## Engineering Design (EDSGN)

**EDSGN 401 Engineering Systems Design** (3) Design requirements for complex systems; trade-offs between market opportunities and technology; translation of priorities and needs into an operational concept.

Effective: Spring 2012

Prerequisite:

**EDSGN 410 Robotics Design and Applications** (4) Introduction to robotics, with emphasis on the design of robotics systems through multidisciplinary integration of electrical, mechanical, and software components.

Effective: Spring 2012

Prerequisite:

**EDSGN 452 Projects in Community Service Engineering** (1-2) Students engage in research and design of appropriate solutions to real-life community-based problems and project management of such projects.

Effective: Summer 2008 Ending: Fall 2013

Prerequisite:

**EDSGN 452 Projects in Humanitarian Engineering** (2) Multidisciplinary student teams engage in integrated design of real-world humanitarian ventures.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: EDSGN 453

**EDSGN 453 Design for Developing Communities** (1) A seminar series related to the context and integrated design of Humanitarian Engineering and Social Entrepreneurship ventures in developing communities.

Effective: Summer 2013

Prerequisite:

**EDSGN 454 Humanitarian Engineering and Social Entrepreneurship Field Experience** (0.5) A hands-on integrated learning research and entrepreneurial engagement experience for students working on various humanitarian projects.

Effective: Summer 2013

Prerequisite:

**EDSGN 460W Multidisciplinary Capstone Design Project** (3 per semester/maximum of 6) Course provides multidisciplinary industry-sponsored and service-based senior design projects in conjunction with the Learning Factory.

Effective: Summer 2013

Prerequisite:

**EDSGN 479 (I E 479) Human Centered Product Design and Innovation** (3) Consumer product design for a global market, incorporating human factors principles and user desires in a multicultural perspective.

Effective: Summer 2010

Prerequisite:

**EDSGN 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2004

**EDSGN 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**EDSGN 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practice, or internships. Written and oral critique of activity required.

Effective: Summer 2004

**EDSGN 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2004

**EDSGN 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2004

**EDSGN 497B Solidworks Fundamentals** (3) Fundamentals of solidworks.

Effective: Summer 2013 Ending: Summer 2013

**EDSGN 497B Solidworks Fundamentals** (3) Fundamentals of solidworks.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**EDSGN 497G Current CAD Applications** (3) Students will use the latest version of AutoCAD as a design for 2D and 3D applications in a variety of disciplines.

Effective: Summer 2013 Ending: Summer 2013

EDSGN 497G **Current CAD Applications** (3) Students will use the latest version of AutoCAD as a design tool for 2D and 3D applications in a variety of disciplines.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDSGN 497J **Open Source 3-D Printing** (3) Students build, test, and redesign open-source 3D printers, design models, and run a 3D printing service.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

EDSGN 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2008

EDSGN 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

EDSGN 547 (M E 547) **Designing for Human Variability** (3) Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.  
Effective: Summer 2009

EDSGN 549 (I E 549) **Design Decision Making** (3) Complexity of design-making; state-of-the-art methods and tools.  
Effective: Summer 2011

EDSGN 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2004

EDSGN 594 **Research Topics** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 2004

EDSGN 595 **Internship** (1-9) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 2004

EDSGN 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2004

EDSGN 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2004

EDSGN 597A **Engineering Design Studio I** (3) Students examine engineering design from a broad perspective, including design thinking, systems design, and societal contexts. Students bring together many disparate aspects of their previous engineering and non-engineering experiences and investigate new aspects. The material will be presented through a variety of hands-on activities including design projects. Current and best industry practices will also be examined. This course provides a unique opportunity to explore material from many engineering fields and other disciplines within the context of design. The course will be taught using a studio model. Student evaluations will be based upon the quality of written reports, prototypes, and team performance.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

EDSGN 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2004

EDSGN 599 (IL) **Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

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## Engineering Mechanics (E MCH)

E MCH 400 **Advanced Strength of Materials and Design** (3) Combined stresses; energy methods; special problems in bending and torsion; plates; thin-walled structures; buckling and stability; design projects.

Effective: Spring 2008

Prerequisite:

E MCH 402 **Applied and Experimental Stress Analysis** (3) Experimental design of structural and machine components; photoelasticity, electrical resistance strain gauge techniques, Moire techniques, interferometry, holography.

Effective: Spring 2008

Prerequisite:

E MCH 403 **Strength Design in Materials and Structures** (4) Determination, interpretation, significance, and application of mechanical properties such as plastic flow, fatigue strength, creep resistance, and dynamic properties.

Effective: Spring 2008

Prerequisite:

E MCH 407 **Computer Methods in Engineering Design** (3) Computer methods in mechanical design: solid modeling, graphics, surface smoothing/interpolation and underlying numerics: simultaneous equations, quadrature, eigen problems, discrete models.

Effective: Spring 2008

Prerequisite:

E MCH 409 **Advanced Mechanics** (3) Continuation of E MCH 012; Euler's equations for the rotation of a rigid body, gyroscopic motion, impulsive motion, Lagrangian mechanics.

Effective: Spring 2008

Prerequisite:

E MCH 416H **Failure and Failure Analysis of Solids** (3) Examination and analysis of the various modes of failure of solid materials.

Effective: Spring 2008

Prerequisite:

E MCH 440 (MATSE 440) **Nondestructive Evaluation of Flaws** (3) Methods and limitations of nondestructive evaluation of mechanical flaws; optical, acoustical, electromagnetic, x-ray, radiography, thermography, and dye techniques.

Effective: Spring 2008

Prerequisite:

E MCH 446 **Mechanics of Viscoelastic Materials** (3) Nature of viscoelastic materials, constitutive relations, thermorheological materials, viscoelastic stress analysis, rubber elasticity, viscoelastic liquids, experimental techniques for material characterization.

Effective: Spring 2008

Prerequisite:

E MCH 461 (M E 461) **Finite Elements in Engineering** (3) Computer modeling and fundamental analysis of solid, fluid, and heat flow problems using existing computer codes.

Effective: Spring 2011

Prerequisite:

E MCH 470 (M E 470) **Analysis and Design in Vibration Engineering** (3) Application of Lagrange's equations to mechanical system modeling, multiple-degree-of-freedom systems, experimental and computer methods; some emphasis on design applications.

Effective: Spring 2008

Prerequisite:

E MCH 471 **Engineering Composite Materials** (3) Properties, manufacture, forms of composites; micromechanics; orthotropic lamina properties; laminate analysis; theories; failure analysis; thermal, environmental effects.

Effective: Spring 2008

Prerequisite:

E MCH 473 (AERSP 473) **Composites Processing** (3) An introduction to the principles of mechanics governing manufacturing, computer-aided design, and testing of composite materials and structures.

Effective: Summer 1988

Prerequisite:

E MCH 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

E MCH 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

E MCH 500 (M E 560) **Solid Mechanics** (3) Introduction to continuum mechanics, variational methods, and finite element formulations; application to bars, beams, cylinders, disks, and plates.

Effective: Fall 2007

**E MCH 506 Experimental Stress Analysis** (3) Experimental methods of stress determination, including photoelasticity, stress coat, and electric strain gauge techniques; stress analogies; strain rosettes for combined stress determinations.

Effective: Summer 2011

Prerequisite:

**E MCH 507 Theory of Elasticity and Applications** (3) Equations of equilibrium and compatibility; stresses and strains in beams, curved members, rotating discs, thick cylinders, torsion and structural members.

Effective: Spring 2008

Prerequisite:

**E MCH 509 Theory of Plates and Shells** (3) Bending and buckling of plates; elastic foundations; deformation of shells, multilayer shells, stress and stability analysis, weight optimization, application problems.

Effective: Spring 2008

Prerequisite:

**E MCH 514 (E SC 514) Engineering Science and Mechanics Seminar** (1 per semester) Current literature and special problems in engineering mechanics.

Effective: Spring 1999

**E MCH 516 Mathematical Theory of Elasticity** (3) Fundamental equations and problems of elasticity theory; uniqueness theorems and variational principles; methods of stress functions and displacement potential; applications.

Effective: Winter 1978

Prerequisite:

**E MCH 520 Advanced Dynamics** (3) Dynamics of a particle and of rigid bodies; Newtonian equations in moving coordinate systems; Lagrange's and Hamilton's equations of motion; special problems in vibrations and dynamics.

Effective: Spring 2008

Prerequisite:

**E MCH 521 (ACS 521) Stress Waves in Solids** (3) Recent advances in Ultrasonic Nondestructive Evaluation: waves; reflection and refraction; horizontal shear; multi-layer structures; stress; viscoelastic media; testing principles.

Effective: Spring 1998

Prerequisite:

**E MCH 523 Ultrasonic Nondestructive Evaluation** (3) Methods, techniques, applications of Ultrasonic Nondestructive Evaluation wave propagation; signal processing and pattern recognition applied to UNDE; practical laboratory demonstrations.

Effective: Spring 1998

**E MCH 524A Mathematical Methods in Engineering** (3) Special functions, boundary value problems, eigenfunctions and eigenvalue problems; applications to engineering systems in mechanics, vibrations, and other fields.

Effective: Spring 1999

Prerequisite:

**E MCH 524B Mathematical Methods in Engineering** (3) Boundary-value problems in curvilinear coordinates, integral transforms; application to diffusion, vibration, Laplace and Helmholtz equations in engineering systems.

Effective: Spring 1999

Prerequisite:

**E MCH 524C Mathematical Methods in Engineering** (3) Green's functions applied to problems in potentials, vibration, wave propagation and diffusion with special emphasis on asymptotic methods.

Effective: Spring 1999

Prerequisite:

**E MCH 527 Structural Dynamics** (3) Dynamic behavior of structural systems; normal modes; input spectra; finite element representation of frameworks, plates, and shells; impedance; elastic-plastic response.

Effective: Fall 2007

Prerequisite:

**E MCH 528 Experimental Methods in Vibrations** (3) Investigation of one or more degrees of freedom, free and forced mechanical vibrations, vibration properties of materials, nondestructive testing.

Effective: Fall 2007

Prerequisite:

**E MCH 530 Mechanical Behavior of Materials** (3) Engineering materials mechanical responses; stress/strain in service context of temperature, time, chemical environment; mechanical testing characterization; design applications.

Effective: Spring 1989

**E MCH 531 Theory of Plasticity and Applications** (3) Yield condition; plastic stress-strain relations; theory of slip-line fields; applications to bending, torsion, axially symmetric bodies, metal processing.

Effective: Winter 1978

Prerequisite:

**E MCH 532 Fracture Mechanics** (3) Stress analysis of cracks; stable and unstable crack growth in structures and materials; materials fracture resistance.

Effective: Fall 1983

Prerequisite:

E MCH 533 **Scanned Image Microscopy** (3) Imaging principles, quantitative data acquisition techniques, and applications for scanned image microscopy are discussed.

Effective: Summer 2003

Prerequisite:

E MCH 534 (MATSE 563) **Micromechanisms of Fracture** (3) Mechanisms of fracture and their relationship to loading conditions, environment, flow behavior, processing history, and microstructure.

Effective: Spring 2003

Prerequisite:

E MCH 535 (MATSE 564) **Deformation Mechanisms in Materials** (3) Deformation of crystalline/amorphous solids and relationship to structure; elastic, viscoelastic and plastic response over a range of temperatures and strain rates.

Effective: Fall 2004

Prerequisite:

E MCH 536 **Thermal Stress Analysis** (3) Thermoelasticity, thermal shock, and design.

Effective: Summer 2013

Prerequisite:

E MCH 540 **Introduction to Continuum Mechanics** (3) Algebra and analysis of tensors; balance equations of classical physics; the linear theories of continuum mechanics.

Effective: Winter 1978

E MCH 546 **Theory of Viscoelasticity and Applications** (3) Linear and nonlinear viscoelastic theories; generalized isotropic and anisotropic viscoelastic stress-strain relations.

Effective: Winter 1978

Prerequisite:

E MCH 550 **Variational and Energy Methods in Engineering** (3) Application of variational calculus and Hamilton's principle to various conservative and nonconservative systems; closed form and approximate technique.

Effective: Spring 1984

Prerequisite:

E MCH 560 **Finite Element Analysis** (3) General theory; application to statics and dynamics of solids, structures, fluids, and heat flow; use of existing computer codes.

Effective: Spring 2008

Prerequisite:

E MCH 562 (A B E 562) **Boundary Element Analysis** (3) Numerical solution of boundary value problems using fundamental solutions; application to problems in potential theory, diffusion, and elastostatics.

Effective: Spring 1996

Prerequisite:

E MCH 563 (M E 563) **Nonlinear Finite Elements** (3) Advanced theory of semidiscrete formulations for continua and structures; emphasizes dynamic and nonlinear problems.

Effective: Spring 1996

Prerequisite:

E MCH 571 (AERSP 571, M E 571) **Foundations of Structural Dynamics and Vibration** (3) Modeling approaches and analysis methods of structural dynamics and vibration.

Effective: Fall 2007

Prerequisite:

E MCH 581 **Micromechanics of Composites** (3) A rigorous application of mechanics to the understanding of relationships between microstructure and thermomechanical properties of composites.

Effective: Summer 2011

Prerequisite:

E MCH 582 **Metal Matrix Composites** (3) Processing and properties of metal matrix composites, with emphasis on fabrication techniques, interfaces, fatigue, fracture, and micromechanics.

Effective: Fall 1988

Prerequisite:

E MCH 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1996

E MCH 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

E MCH 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

E MCH 597A **Physical Principles in Biomedical Ultrasonics** (3) Physical principles of advanced ultrasonic imaging and quantitative data acquisition techniques in the field of biology and medicine.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E MCH 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

E MCH 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

E MCH 602 (E SC 602) **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Fall 2003

E MCH 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

E MCH 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Engineering Mgmt (ENGMT)

**ENGMT 501 Engineering Management Science** (3) Mathematical models involving optimization, simulation and forecasting to provide quantitative solutions to engineering management problems; scheduling, distribution, inventory control.

Effective: Summer 2009

**ENGMT 510 Economics and Financial Studies for Engineers** (3) Economic feasibility of projects, systems and products. Project budgets, estimation, return on investment, supply and demand, and earned value management.

Effective: Summer 2009

**ENGMT 511 Engineering for Energy and the Environment** (3) Engineering analysis of new technologies with environmental consideration leading to alternative energy sources and sustainable development.

Effective: Summer 2013

**ENGMT 530 Engineering Law** (3) Overview of the legal system and legal issues applied to engineering: contracts, bidding, proposals, torts, professional liability, the intellectual property.

Effective: Summer 2009

**ENGMT 539 Engineering Management Strategy** (3) Project- and discussion-based capstone to the engineering management program.

Effective: Summer 2009

Prerequisite:

**ENGMT 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 2011

**ENGMT 597A Special Topics: Engineering for Energy and the Environment** (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2013 Ending: Summer 2013

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## Engineering Science (E SC)

E SC 400H **Electromagnetic Fields** (3) Irrotational and solenoidal fields, potentials, vector and scalar field and wave equations, harmonic and wave functions in various coordinates, radiation.

Effective: Fall 2003

Prerequisite:

E SC 404H **Analysis in Engineering Science** (3) Unified application of coordinate transformations; Laplace's, heat, and wave equations to boundary value problems and problems of continua in engineering.

Effective: Spring 2001

Prerequisite:

E SC 406H **Analysis in Engineering Science II, Honors** (3) Application of complex variable theory, integral equations, and the calculus of variations to engineering problems.

Effective: Fall 1983

Prerequisite:

E SC 407H **Computer Methods in Engineering Science, Honors** (3) Numerical solution of differential equations including fundamentals: roots of single nonlinear and simultaneous (Matrix) equations, least squares fitting and statistical goodness, interpolation, finite differences, differentiation, integration, eigensolutions.

Effective: Spring 2007

Prerequisite: Concurrent: MATH 220

E SC 410H **Senior Design Project, Honors** (3) Design and synthesis in the context of a specific design project undertaken during the senior year.

Effective: Summer 1998

Prerequisite:

E SC 411H **Senior Research and Design Project II, Honors** (3) Design and synthesis in the context of a specific design project undertaken during the senior year.

Effective: Spring 2007

Prerequisite:

E SC 414M **Elements of Material Engineering** (3) Structure and imperfections in engineered materials; their influence on properties, behavior, and processing. Applications of metals, ceramics, polymers, and composites.

Effective: Spring 2008

Prerequisite:

E SC 417 (MATSE 417) **Electrical and Magnetic Properties** (3) Electrical conductivity, dielectric properties, piezoelectric and ferroelectric phenomena; magnetic properties of ceramics.

Effective: Summer 2006

Prerequisite:

E SC 419 **Electronic Properties and Applications of Materials** (3) The course covers the electrical, optoelectronic, dielectric, and other electron-based properties of solids, semiconductors in particular, and their engineering/ device applications.

Effective: Summer 2006

Prerequisite:

E SC 433H **Engineering Science Research Laboratory Experience** (1) Hands-on lab experience and exposure to campus-wide interdisciplinary experimental research. Experimental probability and statistics. Applications across all Engineering Science disciplines.

Effective: Spring 2007

Prerequisite:

E SC 445 **Semiconductor Optoelectronic Devices** (3) The course will present the basic engineering science and technology involved in modern semiconductor optoelectronic devices.

Effective: Spring 2007

Prerequisite:

E SC 450 (MATSE 450) **Synthesis and Processing of Electronic and Photonic Materials** (3) The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

Effective: Fall 2005

Prerequisite:

E SC 455 **Electrochemical Methods in Corrosion Science and Engineering** (3) The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials.

Effective: Summer 2011 Ending: Summer 2013

Prerequisite:

E SC 455 **Electrochemical Methods Engineering and Corrosion Science** (3) The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

E SC 456 (E E 456, EGEE 456) **Introduction to Neural Networks** (3) Artificial Neural Networks as a solving tool for difficult



problems for which conventional methods are not available.

Effective: Spring 2008

Prerequisite:

E SC 475 (MATSE 475) **Particulate Materials Processing** (3) Fundamentals of processing particulate materials including production, characterization, handling, compaction, and sintering of metal, carbide, intermetallic, and composite powders.

Effective: Spring 2008

Prerequisite:

E SC 481 **Elements of Nano/Micro-electromechanical Systems Processing and Design** (3) Interdisciplinary fundamentals of nano/microelectromechanical systems (NEMS/ MEMS), including design, fabrication and machining of miniature systems. Draws from mechanics, science and materials.

Effective: Spring 2008

Prerequisite:

E SC 482 **Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics** (3) Principles and applications of Micro-Optoelectromechanical and Nanophotonic devices and systems.

Effective: Summer 2006

Prerequisite:

E SC 483 (MATSE 483) **Simulation and Design of Nanostructures** (3) Introduction to computer simulation techniques and their applications at the physical/life sciences interface.

Effective: Fall 2007

Prerequisite:

E SC 484 **Biologically Inspired Nanomaterials** (3) Advances in biomolecular-based Science and technology at the physical/life sciences interface.

Effective: Summer 2006

Prerequisite:

E SC 494 **Senior Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Summer 1986

E SC 494H **Senior Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Fall 2007

E SC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

E SC 496A **Business Opportunities in Engineering Independent Study** (1) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

E SC 497A **Business Opportunities in Engineering and Business Plan** (3) The principal goal of this course is to inform engineering students of business opportunities in Engineering and to create a Business Plan.

Effective: Summer 2013 Ending: Summer 2013

E SC 497A **Business Opportunities in Engineering** (2) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 497B **Business Opportunities in Engineering** (2) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

Effective: Summer 2013 Ending: Summer 2013

E SC 497B **Multidisciplinary Design Project** (3) Multidisciplinary teams engage students from other departments to provide a broad perspective typical of real-live experiences.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 497C **Business Opportunities in Engineering and Individual Business Plan** (3) The principal goal of this course is to inform engineering students of business opportunities in Engineering and to create a Business Plan.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 497D **Business Opportunities in Engineering** (2) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 501 **Solid State Energy Conversion** (3) Principles of solid state energy conversion and their utilization in engineering devices. Emphasis on current research and development efforts.

Effective: Spring 2008 Ending: Summer 2013

Prerequisite:

E SC 501 **Solar Cell Devices** (3) Principles of photovoltaic energy conversion and their utilization in engineering devices. Emphasis on current solar cell research and development efforts.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

E SC 502 **Semiconductor Heterojunctions and Applications** (3) Theory, fabrication techniques, and electronic applications of semiconductor heterojunctions, including metal-semiconductor and electrolyte-semiconductor junctions.

Effective: Fall 1989

Prerequisite:

E SC 511 **Engineering Materials for Energy Conversion and Storage** (3) This course treats engineering materials and systems employed in conventional and unconventional direct energy conversion and energy storage.

Effective: Summer 1981

E SC 514 (E MCH 514) **Engineering Science and Mechanics Seminar** (1 per semester) Current literature and special problems in engineering mechanics.

Effective: Summer 1998

E SC 536 **Wave Propagation and Scattering** (4) Survey of analytical and numerical methods for solving acoustic, electromagnetic and elastic wave propagation and scattering problems.

Effective: Spring 1988

Prerequisite:

E SC 537 **Multiple Scattering Theories and Dynamic Properties of Composite Materials** (3) Acoustic, dielectric, elastic dynamic properties; periodic, random composites; wave propagation and scattering; attenuation, dispersion; super-viscous absorption; sonar, optical, ultrasonic applications.

Effective: Summer 1988

E SC 540 **Laser Optics Fundamentals** (3) Selected topics in optics and laser physics, and their application in laser-materials processing.

Effective: Spring 2005

E SC 541 **Laser-Materials Interactions** (3) Laser beam interactions with metallic, ceramic, polymeric and biological materials; effects of wavelength, power, spatial and temporal distributions of intensity.

Effective: Spring 2005

E SC 542 **Laser-Integrated Manufacturing** (3) Integration of lasers into manufacturing processes: laser-assisted surface modifications; laser joining; laser-based material shaping processes.

Effective: Spring 2005 Ending: Summer 2013

Prerequisite:

E SC 542 **Laser-Integrated Manufacturing** (3) Integration of lasers into manufacturing processes: laser-assisted surface modifications; laser joining; laser-based material shaping processes.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

E SC 543 **Laser Microprocessing** (3) Laser microprocessing of engineered and biological materials for electronic, opto-electronic, MEMS and medical/therapeutic applications.

Effective: Spring 2005 Ending: Summer 2013

Prerequisite:

E SC 543 **Laser Microprocessing** (3) Laser microprocessing of engineered and biological materials for electronic, opto-electronic, MEMS and medical/therapeutic applications.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

E SC 544 **Laser Laboratory** (3) Laser systems for materials processing, safety, critical processing parameters, diagnostic measurements, automation, sensing and control.

Effective: Spring 2005 Ending: Summer 2013

Prerequisite:

E SC 544 **Laser Laboratory** (3) Laser systems for materials processing, safety, critical processing parameters, diagnostic measurements, automation, sensing and control.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

E SC 577 **Engineered Thin Films** (3) Broad overview of the preparation-characterization-property relations for thin films used in a wide range of industrial applications.

Effective: Spring 1993

Prerequisite:

E SC 581 **Microelectromechanical Systems/Smart Structures** (3) Methods of micromachining, smart structure fabrication. Design, modeling for physical, chemical, biomedical microsensors/actuators. Smart structures and microsystems packaging/integration.

Effective: Spring 1998

Prerequisite:

E SC 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1996

E SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

E SC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

E SC 597A **Bio-Architecture** (3) Biological architecture observed in nature; emphasis of symmetry and topology with several examples from recent literature.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 597F **Applications of Soft Lithography in Bionanotechnology** (3) Soft lithography techniques and applications in biological sciences with an emphasis on studies of mechanobiology, tissue engineering, and biochemical pathways.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

E SC 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

E SC 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 1983

E SC 602 (E MCH 602) **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.

Effective: Fall 2003

E SC 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

E SC 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1983

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## English (ENGL)

**ENGL 400 Authors, Texts, Contexts** (3 per semester, maximum of 6) Styles, cultural milieus, critical perspectives toward particular English- language authors and/or movements they represent, and the idea of authorship. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 401 Studies in Genre** (3 per semester, maximum of 6) English-language texts exemplifying particular genres, with attention to critical theories, historical development, rhetorical strategies, and social, cultural, and aesthetic values. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 401W Creative Writing Theory** (3) Theories of art and creativity which inform the making of literary works.

Effective: Fall 2007

Prerequisite:

**ENGL 402 Literature and Society** (3 per semester, maximum of 6) Texts confronting social, political, technological, or other issues in the English-speaking world. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 403 Literature and Culture** (3 per semester, maximum of 6) Historical, theoretical, and practical issues within cultural studies in relation to English-speaking texts. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 404 Mapping Identity, Difference, and Place** (3 per semester, maximum of 6) Ethnicity, gender, class, race with reference to theoretical inquiry into identity, difference, and place in English-language literatures. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 405 Taking Shakespeare From Page to Stage** (3) Students experience a Shakespeare play as a text to be explicated and as a script to be performed.

Effective: Summer 2003

Prerequisite:

**ENGL 407 History of the English Language** (3) Historical and structural study of developments in English sounds, forms, inflections, syntax, derivations, and meanings.

Effective: Spring 1987

Prerequisite:

**ENGL 409 Composition Theory and Practice for Teachers** (3) An overview of the theory and practice of writing for teachers, with emphasis on the writing process.

Effective: Summer 2000

Prerequisite: Concurrent: EDUC 452

**ENGL 412 Advanced Fiction Writing** (3 per semester/maximum of 6) Advanced study of the techniques of fiction writing; regular practice in writing the short story; group discussion of student work.

Effective: Spring 1992

Prerequisite:

**ENGL 413 Advanced Poetry Writing** (3 per semester/maximum of 6) Advanced study of the techniques of poetic composition; regular practice in writing poetry; group discussion of student work.

Effective: Spring 1992 Ending: Summer 2013

Prerequisite:

**ENGL 413 Advanced Poetry Writing** (3 per semester/maximum of 6) Advanced study of the techniques of poetic composition; regular practice in writing poetry; group discussion of student work.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**ENGL 414 Biographical Writing** (3) Writing of biography and autobiography, character sketches, "profiles," and literary portraits; analysis and interpretations of source materials.

Effective: Spring 1987

Prerequisite:

**ENGL 415 Advanced Nonfiction Writing** (3 per semester/maximum of 6) Advanced study of the principles of nonfiction; substantial practice in writing and submitting magazine articles for publication.

Effective: Spring 1992

Prerequisite:

**ENGL 416 Science Writing** (3 per semester/maximum of 6) Prepares scientists and writers to gather, interpret, and present scientific information to the layman with clarity and accuracy.

Effective: Spring 2001

Prerequisite:

**ENGL 417 The Editorial Process** (3) The process of editing from typescript through final proof.

Effective: Summer 2011

Prerequisite:

**ENGL 418 Advanced Technical Writing and Editing** (3 per semester/maximum of 6) Preparing and editing professional papers for subject specialists and for others interested in careers as writers or editors.

Effective: Fall 1987

Prerequisite:

**ENGL 419 Advanced Business Writing** (3) Preparing and editing reports and presentations common to business, industry, and government.

Effective: Fall 1987

Prerequisite:

**ENGL 420 Writing for the Web** (3) Analysis and composition of informative, persuasive, and "creative" Web texts, based on rhetorical principles; no prior Web writing experience required.

Effective: Spring 2002

Prerequisite:

**ENGL 421 Advanced Expository Writing** (3) Develops skill in writing expository essays, with particular attention to style. Intended for liberal arts majors.

Effective: Spring 1987

Prerequisite:

**ENGL 422 Fiction Workshop** (3 per semester/maximum of 6) Practice and criticism in the composition of the short story and the novel.

Effective: Spring 1985

Prerequisite:

**ENGL 423 Poetry Writing Workshop** (3 per semester/maximum of 6) Extensive practice in writing poetry; consideration of contemporary poetic forms; selected readings.

Effective: Spring 1985

Prerequisite:

**ENGL 424 (ENVST 424) Creative Writing and the Natural World** (3) Creative writing workshop focused on the environment and related issues.

Effective: Summer 2011

Prerequisite:

**ENGL 425 Nonfiction Workshop** (3 per semester/maximum of 6) Extensive writing of nonfiction for publication; an introduction to the principles of writing the nonfiction book.

Effective: Spring 1985

Prerequisite:

**ENGL 426 (US) (LTNST 426) Chicana and Chicano Cultural Production: Literature, Film, Music** (3) An in-depth study of Chicana/Chicano literature, film, and music from the inception of the Chicano Movement (1965-1975) to the present.

Effective: Spring 2007

Prerequisite:

**ENGL 427 (J ST 427) Topics in Jewish American Literature** (3) An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.

Effective: Spring 2009 Ending: Fall 2013

Prerequisite:

**ENGL 427 (J ST 427) Topics in Jewish American Literature** (3 per semester/maximum of 9) An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**ENGL 428 (US) (AAS 428) Asian American Literatures** (3 per semester/maximum of 6) A seminar on the literatures and cultures of Asian America, with attention to forms of geographic, historical, and ethnic diversity.

Effective: Summer 2010

**ENGL 429 (CMLIT 429) New Media and Literature** (3) New media literary genres; critical discussion of creative works in digital media.

Effective: Summer 2010

**ENGL 430 The American Renaissance** (3) Studies in the works and the interrelationships of writers such as Emerson, Hawthorne, Poe, Thoreau, Whitman, Melville, and Dickinson.

Effective: Spring 1995

Prerequisite:

**ENGL 431 (US) (AM ST 475) Black American Writers** (3 per semester, maximum of 6) A particular genre or historical period in the development of Black American literature.

Effective: Fall 2007

Prerequisite:

**ENGL 432 The American Novel to 1900** (3) Such writers as Hawthorne, Melville, Stowe, Mark Twain, James, Crane, Chopin, and others.  
Effective: Spring 1992  
Prerequisite:

**ENGL 433 The American Novel: 1900-1945** (3) Such writers as Wharton, Dreiser, Cather, Fitzgerald, Faulkner, Hemingway, Hurston, Wright, and others.  
Effective: Spring 1992  
Prerequisite:

**ENGL 434 (AM ST 472) Topics in American Literature** (3 per semester) Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.)  
Effective: Fall 2007  
Prerequisite:

**ENGL 435 The American Short Story** (3) Development of the short story as a recognized art form, with emphasis on major writers.  
Effective: Spring 1984  
Prerequisite:

**ENGL 436 American Fiction Since 1945** (3) Representative fiction by such writers as Barth, Bellow, Ellison, Heller, Mailer, Morrison, Nabokov, Oates, O'Connor, Pynchon, Updike, Walker.  
Effective: Spring 1992  
Prerequisite:

**ENGL 437 The Poet in America** (3) American poets such as Bradstreet, Taylor, Poe, Emerson, Whitman, Dickinson, Frost, Eliot, Stevens, Hughes, Brooks, Moore, Williams, Plath, Rich, Lowell.  
Effective: Spring 1992  
Prerequisite:

**ENGL 438 American Drama** (3) Development from the colonial period to playwrights such as O'Neill, Wilder, Hellman, Miller, Williams, Albee, Shepard, Norman, Wilson, and others.  
Effective: Spring 1992  
Prerequisite:

**ENGL 439 American Nonfiction Prose** (3) Major prose writers such as Franklin, Emerson, Thoreau, Fuller, Henry Adams, Mailer, Baldwin, McCarthy, Dillard, Didion, Angelou, and others.  
Effective: Spring 1992  
Prerequisite:

**ENGL 440 Studies in Shakespeare** (3) Intensive study of a single genre, topic, or critical approach to selected plays.  
Effective: Summer 1991  
Prerequisite:

**ENGL 441 Chaucer** (3) The principal narrative poems and their background.  
Effective: Spring 1984  
Prerequisite:

**ENGL 442 Medieval English Literature** (3) Study of major works and genres of medieval English literature, exclusive of Chaucer.  
Effective: Spring 1992  
Prerequisite:

**ENGL 443 The English Renaissance** (3) Such writers as More, Sidney, Spenser, Shakespeare, Donne, Jonson, Bacon, and Marvell.  
Effective: Spring 1984  
Prerequisite:

**ENGL 444 Shakespeare** (3) Selected tragedies, comedies, and histories.  
Effective: Spring 1984  
Prerequisite:

**ENGL 445 Shakespeare's Contemporaries** (3) Selected plays by Shakespeare's major predecessors and contemporaries: Kyd, Marlowe, Jonson, Webster, Marston, Middleton, and others.  
Effective: Spring 1984  
Prerequisite:

**ENGL 446 Milton** (3) Analysis of principal poems and their background.  
Effective: Spring 1984  
Prerequisite:

**ENGL 447 The Restoration and the Eighteenth Century** (3) The neoclassical age (1660-1776). Such writers as Dryden, Congreve, Swift, Pope, Fielding, Goldsmith, Sheridan, Boswell, Johnson.  
Effective: Spring 1995  
Prerequisite:

**ENGL 448 The English Novel to Jane Austen** (3) Novelists such as Defoe, Richardson, Fielding, Smollett, Sterne, and Austen.  
Effective: Spring 1995  
Prerequisite:

**ENGL 450 The Romantics** (3) Poets such as Blake, Wordsworth, Coleridge, Keats, Shelley, and Byron; also prose by writers such as Hazlitt, Lamb, and DeQuincey.

Effective: Spring 1995

Prerequisite:

**ENGL 451 Literary Modernism in English** (3) Survey of literary modernism in English and English translation in a variety of genres, including poetry, fiction, and drama.

Effective: Fall 2007

Prerequisite:

**ENGL 452 The Victorians** (3) Poets such as Tennyson, Browning, Arnold, and Hopkins; also prose by writers such as Carlyle, Mill, Ruskin, and Arnold.

Effective: Spring 1995

Prerequisite:

**ENGL 453 Victorian Novel** (3) Novelists such as the Brontes, Thackeray, Dickens, George Eliot, Meredith, and Hardy.

Effective: Spring 1995

Prerequisite:

**ENGL 454 Modern British and Irish Drama** (3) From Wilde and Shaw to the present season.

Effective: Fall 2004

Prerequisite:

**ENGL 455 Topics in British Literature** (3) Focused study of a particular genre, theme, or problem in British literature. (May be repeated for credit.)

Effective: Fall 2001

Prerequisite:

**ENGL 456 British Fiction, 1900-1945** (3) Major writers such as Conrad, Lawrence, Mansfield, Forster, Joyce, Woolf, Waugh, Greene, Bowen, Beckett, and others.

Effective: Spring 1995

Prerequisite:

**ENGL 457 British Fiction Since 1945** (3) Readings in British fiction since World War II.

Effective: Spring 1995

Prerequisite:

**ENGL 458 Twentieth-Century Poetry** (3) Poets writing in English such as Yeats, Pound, Eliot, Frost, Auden, Stevens, Plath, Bishop, Brooks, H.D., and others.

Effective: Spring 1995

Prerequisite:

**ENGL 461 (US) The Vernacular Roots of African American Literature** (3) The relationship between oral tradition and literary texts and the double consciousness of African American voice in "print."

Effective: Summer 2005

Prerequisite:

**ENGL 462 (US) (WMNST 462) Reading Black, Reading Feminist** (3) Female identity and its construction in textual representations of gender, class, color, and cultural difference in English-language literatures.

Effective: Summer 2005

Prerequisite:

**ENGL 463 (US) African American Autobiography** (3) The African American literary quest for identity and its adaptation to Euro-American culture and autobiographies.

Effective: Summer 2005

Prerequisite:

**ENGL 466 (US) African American Novel I** (3) Thematic, structural, and stylistic characteristics of the African American novel from residually oral forms to satiric realism.

Effective: Summer 2005

Prerequisite:

**ENGL 467 (US) African American Novel II** (3) Thematic, stylistic, and structural characteristics of the African American novel from naturalism to modernism and postmodernism.

Effective: Summer 2005

Prerequisite:

**ENGL 468 (US) African American Poetry** (3) African American poetry within the contexts of the black oral tradition and transformed European literary tradition.

Effective: Summer 2005

Prerequisite:

**ENGL 469 (US) (AF AM 469) Slavery and the Literary Imagination** (3) The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans.

Effective: Fall 2012

Prerequisite:

**ENGL 470 Rhetorical Theory and Practice** (3) Application of certain rhetorical principles to problems in composition. Writing exercise. Designed as preparation for the teaching of composition.

Effective: Spring 1995

Prerequisite:

**ENGL 471 Rhetorical Traditions** (3 per semester, maximum of 6) Introduces major traditions of rhetorical inquiry and their relevance for English studies. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 472 Current Theories of Writing and Reading** (3 per semester, maximum of 6) Investigates models of textual production and reception current within English studies. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 473 Rhetorical Approaches to Discourse** (3 per semester, maximum of 6) Practices the criticism of written texts from selected rhetorical perspectives. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 474 Issues in Rhetoric and Composition** (3 per semester, maximum of 6) Examines selected topics in the field of rhetoric and composition. (Section subtitles may appear in the Schedule of Courses.)

Effective: Fall 1997

Prerequisite:

**ENGL 477 Teaching Children's Literature** (3) Teaching Children's Literature in light of recent literary pedagogy, the history of childhood, and critical approaches to Children's Literature.

Effective: Fall 2007

Prerequisite:

**ENGL 479 Business or Technical Writing Practicum** (1-3) Practical experience applying business or technical writing principles, working with advanced business, science, or engineering students on classroom projects.

Effective: Fall 2007

Prerequisite:

**ENGL 480 Communication Design for Writers** (3) This course explores visual design, non-verbal communication, and software packages used in professional settings to most effectively present written communications.

Effective: Summer 2005

Prerequisite:

**ENGL 481 Literary Theory: Historical Perspectives** (3) Selected topics in the history of literary criticism and theory within the English-language tradition.

Effective: Summer 1994

Prerequisite:

**ENGL 482 Contemporary Literary Theory and Practice** (3 per semester, maximum of 6) Contemporary literary theories and their implication for critical practice as applied to British, American, and other English-language literary works.

Effective: Summer 1992

Prerequisite:

**ENGL 482W Contemporary Literary and Cultural Theory** (3) Contemporary literary and cultural theories and their implication for critical practice as applies to a variety of texts, e.g. literary, linguistic, visual, multimedia, and/or popular.

Effective: Fall 2007

Prerequisite:

**ENGL 483 Problems in Critical Theory and Practice** (3) Intensive study of one or more recent theoretical approaches as applied to British, American, and other English-language literary works.

Effective: Summer 1994

Prerequisite:

**ENGL 484 James Joyce** (3) Analysis of principal works and their background.

Effective: Fall 2007

Prerequisite:

**ENGL 485 Australian and New Zealand Literature and Culture** (3) Questions of nationality, identity, gender, race, class, colonialism, and postcolonialism in these literatures.

Effective: Summer 1995

Prerequisite:

**ENGL 486 (IL) The World Novel in English** (3) Studies in the novel, written in English, by writers outside of the United States and Great Britain.

Effective: Fall 2007

Prerequisite:

**ENGL 487W Senior Seminar** (3) Issues, themes, periods, critical theories, etc., that invite students to use prior English studies, limited to seniors majoring in English.

Effective: Summer 1997

Prerequisite:

**ENGL 488 (IL) (CMLIT 488) Modern Continental Drama** (3) From Ibsen to the drama of today: Strindberg, Chekhov, Hauptmann, Pirandello, Ionesco, Beckett, Genet, and others.

Effective: Spring 2006

Prerequisite:

**ENGL 489 (WMNST 489) British Women Writers** (3) A study of selected British women writers.



Effective: Spring 2008

Prerequisite:

ENGL 490 (US;IL) (WMNST 490) **Women Writers and Their Worlds** (3) American and British literature written from the perspective of women.

Effective: Summer 2005

Prerequisite:

ENGL 491 **The Capstone Course in Professional Writing** (3) This culminating course for Professional Writing majors concentrates on reflective analyses, design, and presentation of documents in the development of professional portfolios.

Effective: Summer 2004

Prerequisite:

ENGL 492 (AM ST 476, WMNST 491) **American Women Writers** (3) A study of selected American women writers.

Effective: Spring 2008

Prerequisite:

ENGL 493 (AM ST 493) **The Folktale in American Literature** (3) A survey of the literary uses of the folktale and legendary materials, with particular concentration on the literature of America.

Effective: Spring 1986

Prerequisite:

ENGL 494 **Senior Thesis in English** (1-6) Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.

Effective: Fall 2007

Prerequisite:

ENGL 494H **Senior Thesis in English** (1-6) Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.

Effective: Fall 2007

Prerequisite:

ENGL 495 **Internship** (3-12) Supervised practicum in fields appropriate to the English major.

Effective: Spring 2001

ENGL 496 **Independent Studies** (1-18) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

ENGL 496A **Literature of and About the Middle East** (3) Examines representative texts of and about middle eastern culture, political and socio-economic conditions.

Effective: Summer 2013 Ending: Summer 2013

ENGL 496B **Advanced Studies in Memoir** (1-6) Read six classic memoirs and write and revise two memoirs that experiment with voice and style.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

ENGL 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

ENGL 497A **Mont Alto Film Project - III** (3) Practicum in filmmaking. Part III of IV covers principle photography and production for a full-length feature film.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ENGL 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

ENGL 499 (IL) **Foreign Study--English** (3-6) Studies abroad in English language and/or literature.

Effective: Summer 2005

ENGL 501 **Materials and Methods of Research** (3) Materials and techniques of research in English and American literary history; form and content of these. Required of all graduate students with an English major.

Effective: Fall 1983

ENGL 502 **Theory and Teaching of Composition** (3) Study of grammar, logic, rhetoric, and style in their applicability to teaching composition.

Effective: Winter 1978

ENGL 503 (LL ED 503) **Research Methods in Composition** (3) Introduction to the issues and methods of empirical

research in composition.  
Effective: Fall 1993

**ENGL 504 Rhetoric and Poetics** (3) Historical relations between rhetorical theory and poetics; approaches to rhetorical criticism of poetic discourse.  
Effective: Summer 1995

**ENGL 506 The English Language** (3) A problem-centered approach to literary and oral forms of English, utilizing historical and analytic perspectives.  
Effective: Winter 1978

**ENGL 507 English Composition Studies** (3) An overview of composition studies, with particular attention to the schools of writing pedagogy.  
Effective: Spring 2001  
Prerequisite:

**ENGL 510 Scholarly Editing: Theory and Practice** (3) Study of editorial theory from McKerrow and Greg to the present; experience in scholarly editing and manuscript study.  
Effective: Fall 1989  
Prerequisite:

**ENGL 511 Thesis Workshop and Professional Writing** (3) Professional writing for graduate students.  
Effective: Summer 2008

**ENGL 512 The Writing of Fiction** (3 per semester/maximum of 15) Supervised workshop in advanced techniques of writing fiction.  
Effective: Fall 1996

**ENGL 513 The Writing of Poetry** (3 per semester/maximum of 15) For the student with considerable experience in writing poetry; a workshop devoted to advanced poetic technique.  
Effective: Fall 1996

**ENGL 515 The Writing of Nonfiction** (3 per semester/maximum of 15) Supervised workshop in advanced nonfiction techniques.  
Effective: Fall 1996

**ENGL 521 Old English Language** (3) An introduction to the main features of the Old English language; readings in simple Old English prose and poetry.  
Effective: Winter 1978

**ENGL 522 Beowulf** (3) Reading and critical analysis.  
Effective: Winter 1978  
Prerequisite:

**ENGL 530 The Literature of Biography and Autobiography** (1-3 per semester, maximum of 6) Study of biographical and autobiographical theory and practice through analysis of major English and American works in each genre.  
Effective: Spring 1992

**ENGL 540 Studies in Elizabethan Prose and Poetry** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include figures such as Spenser and Sidney.  
Effective: Summer 1997

**ENGL 541 Medieval Studies** (1-3 per semester, maximum of 12) Studies in medieval English literature. Topics studied might include medieval romances, drama, or major figures aside from Chaucer.  
Effective: Summer 1997

**ENGL 543 Studies in Early Seventeenth-Century Literature** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Donne, Herbert, Jonson, Bacon.  
Effective: Summer 1997

**ENGL 545 Chaucer** (1-3 per semester, maximum of 12) Major and minor works of Geoffrey Chaucer. The works studied will vary from year to year.  
Effective: Summer 1997

**ENGL 546 Milton** (3) The poetry and prose of John Milton.  
Effective: Winter 1978

ENGL 548 **Elizabethan and Jacobean Drama** (1-3 per semester, maximum of 12) English drama from 1558 to 1642, exclusive of Shakespeare.  
Effective: Summer 1997

ENGL 549 **Shakespeare** (1-3 per semester, maximum of 12) Special problems of sources, chronology, text, characterization, and motivation in the drama.  
Effective: Summer 1997

ENGL 550 **English Literature 1660-1800** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Dryden, Swift, Pope, Johnson, Fielding, Gibbon.  
Effective: Summer 1997

ENGL 553 **Literacy Studies** (3) An overview of current research on literacy, with particular attention to language, thought, and learning and their applications to writing.  
Effective: Spring 2001  
Prerequisite:

ENGL 554 **Studies in Early American Literature** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Bradstreet, Taylor, Mather, Franklin, Edwards, Paine.  
Effective: Summer 1997

ENGL 558 **Nineteenth-Century British Fiction** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Dickens, Thackeray, the Brontes, George Eliot, Hardy.  
Effective: Summer 1997

ENGL 560 **American Romanticism** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Hawthorne, Melville, Emerson, Thoreau, Whitman.  
Effective: Summer 1997

ENGL 561 **Studies in the Romantic Movement** (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Blake, Wordsworth, Coleridge, Byron, Shelley, Keats.  
Effective: Summer 1997

ENGL 562 **Studies in the Literature of Victorian England** (1-3 per semester, maximum of 12) Figures will vary from year to year. Writers studied might include Tennyson, Browning, Arnold, Newman, Ruskin, Trollope.  
Effective: Summer 1997

ENGL 564 **Studies in Nineteenth-Century American Literature** (1-3 per semester, maximum of 12) Writers will vary from year to year. Writers studied might include Cooper, Poe, Dickinson, Twain, James.  
Effective: Summer 1997

ENGL 565 **Period Studies in African-American Literature** (3 per semester/maximum of 9) Studies of periods in African-American literature. Periods might include the Harlem Renaissance or the Black Arts Movement.  
Effective: Spring 1998

ENGL 566 **Genre Studies in African-American Literature** (3 per semester/maximum of 9) Genre will vary from year to year, but will include categories such as poetry, fiction, essays, sermons, autobiographies, short stories.  
Effective: Spring 1998

ENGL 567 **Thematic Studies in African-American Literature** (3 per semester/maximum of 9) Exploration of key concepts in African-American culture as manifested in various literary discourses.  
Effective: Spring 1998

ENGL 568 **Gender Issues in African-American Literature** (3 per semester/maximum of 9) Gender issues in African-American literature and culture. Issues may include the Black woman writer or Gay and Lesbian writers.  
Effective: Spring 1998

ENGL 570 **The Writer as Critic: Reviewing Contemporary Poetry, Fiction, and Non-Fiction** (3) Students will write and revise book reviews of poetry, fiction, and non-fiction for a variety of newspapers and literary magazines.  
Effective: Summer 2002

ENGL 571 **Writer in the Community** (3) Students study the theory and practice of creative writing pedagogy in non-university settings.  
Effective: Summer 2009

ENGL 573 **Studies in Twentieth-Century British Literature** (1-3 per semester, maximum of 12) Major figures studied

will vary from year to year. Writers studied might include Yeats, Conrad, Joyce, Shaw, Lawrence, Auden.  
Effective: Summer 1997

**ENGL 574 Studies in Twentieth-Century American Literature** (1-3 per semester, maximum of 12) Figures studied will vary from year to year. Writers studied might include Dreiser, Wharton, Eliot, Hemingway, Fitzgerald, Faulkner, O'Neill, Williams.  
Effective: Summer 1997

**ENGL 575 Experimentation and Modernism in Twentieth-Century British and American Fiction** (1-3 per semester, maximum of 12) Figures studied will be drawn from the era of Joyce and Virginia Woolf to the present.  
Effective: Summer 1997

**ENGL 576 Studies in Twentieth-Century American Fiction** (1-3 per semester, maximum of 12) Concentrated study in such major American writers as Hemingway, Faulkner, and Fitzgerald.  
Effective: Summer 1997

**ENGL 577 Contemporary Fiction** (1-3 per semester, maximum of 12) Exploration of contemporary English language fiction.  
Effective: Summer 1997

**ENGL 582 Survey of Contemporary Literary Theory** (3) Exploration of the dimensions of discourse as reflected in recent theories of rhetoric, poetics, and literary criticism.  
Effective: Summer 1990

**ENGL 583 Studies in Critical Theory** (1-3 per semester/maximum of 12) Study of specific contemporary critical approaches to literature and application to English and/or American literary works.  
Effective: Summer 1997

**ENGL 584 Studies in Rhetoric** (1-3 per semester/maximum of 12) Specific rhetorical problems, issues, or figures; topics will change from year to year.  
Effective: Summer 1997

**ENGL 585 Studies in British Fiction** (1-3 per semester, maximum of 6) No description.  
Effective: Spring 1988

**ENGL 586 Readings in Literature** (1-12) Programs of readings designed to meet specific needs of individual students.  
Effective: Winter 1978

**ENGL 588 Studies in American Fiction** (1-3 per semester, maximum of 12) No description.  
Effective: Summer 1997

**ENGL 589 Studies in American Poetry** (1-3 per semester, maximum of 12) No description.  
Effective: Summer 1997

**ENGL 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1996

**ENGL 596 Individual Studies** (1-12) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2009

**ENGL 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**ENGL 597A Feminism and the Girl** (3) Feminists maintain a vested interest in girls both as "women-in-training" or little women and as subjects unto themselves.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENGL 597A The History of the Book in America to 1900** (3) Introduction to material text studies/book history, featuring American literary works through 1900 in a variety of genres and media.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENGL 597B (WMNST 597B) **Gen(d)ering the Climate Change Crisis: Feminist Narratives of Environment, Ecology, and Epistemology** (3) This is a course about the facts and the fictions of climate change, and about feminist critique.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ENGL 597B **Interdisciplinary Perspectives on Writing Research** (3) This course introduces methods collectively labeled empirical qualitative in writing research, including ethnography, teacher research, narrative analysis, and grounded theory.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENGL 597C **Reading After the Anthropocene** (3) Geologists have recently proposed the marking out of a new epoch after the Holocene: the Anthropocene. This course will alternate and literary texts concerned with the topic.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ENGL 597C **Modernism and the Muysterries of Sociability** (3) Explores the aesthetic and political work of sociability (salons, parties, art groups, seances) in modernism's critical engagement with modernity.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENGL 597D **Visual Culture** (3) Foundational and recent theories of visual and their application to "things," texts, new media, and exhibitions.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENGL 597E **Digital Humanities** (3) This seminar will investigate the theoretical and material landscape of the Digital Humanities.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENGL 597F **"The Muse Is Music": Modernism and Postmodernism in Words and Music** (3) Music as subject and form in the literatures of modernism and postmodernism.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENGL 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

ENGL 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

ENGL 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Fall 1983

ENGL 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Spring 2000

ENGL 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

ENGL 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## **Enterprise Architecture (EA)**

**EA 870 Applied Research Methods for Enterprise Architecture** (3) Foundations, methods and conduct for EA Research Methodologies.

Effective: Spring 2013

**EA 871 Enterprise Architecture Foundations I** (3) Theoretical foundations and practice of enterprise architecture.

Effective: Fall 2012

**EA 872 Enterprise Architecture Foundations II** (3) Develops additional capabilities for justifying Enterprise Architecture decision making.

Effective: Fall 2012

Prerequisite:

**EA 873 Enterprise Modeling** (3) Theoretical foundations and practice of enterprise modeling.

Effective: Summer 2012

Prerequisite:

**EA 874 Enterprise Information Technology Architecture** (3) Theoretical foundations and practice of the enterprise information technology architecture.

Effective: Summer 2012

Prerequisite:

**EA 875 Enterprise Architecture Leadership** (3) Develops additional capabilities for leading, communicating, and implementing Enterprise Architecture.

Effective: Summer 2012

Prerequisite:

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## Entomology (ENT)

ENT 402W (VB SC 402W) **Biology of Animal Parasites** (3) An introduction to animal parasitology. Emphasizes placed on host/parasite interactions, parasites of zoonotic importance, control programs and taxonomy.

Effective: Spring 2010

Prerequisite:

ENT 410 **Insect Structure and Function** (3) Integrated physiology and anatomy of insects; emphasis on unique adaptations, genetic regulation of development, insects as model systems, environmental physiology.

Effective: Summer 1994

Prerequisite:

ENT 420 **Introduction to Population Dynamics** (3) Principles of population regulation, demographic analysis, modeling of dynamic processes are discussed; laboratories involve the exploration of population growth models.

Effective: Summer 1994

Prerequisite:

ENT 425 **Freshwater Entomology** (3) Collection and identification of insects and other arthropods in freshwater ecosystems; field study of habitats.

Effective: Fall 2000

ENT 430 (B M B 430, BIOL 430) **Developmental Biology** (3) Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

Effective: Summer 1994

Prerequisite:

ENT 445 **Evolution of Insect Societies** (3) Basic principles of Darwinian theory and their application to understanding the evolution of complex social behavior in insects are addressed.

Effective: Spring 2012

Prerequisite:

ENT 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

ENT 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

ENT 497A **Pollination Biology** (3) Flowering plants and their animal pollinators serve as key components for both natural ecosystems and agrosystems, and abound with interesting examples of ecology and evolution in action. Knowledge of pollination biology is thus broadly relevant, with applications in the fields of ecology, evolutionary biology, conservation, entomology, and horticulture. This course will provide students with a fundamental understanding of animal-mediated pollination, focusing on (1) plant and pollinator diversity, biology, and natural history, (2) the ecology and evolution of plant-pollinator relationships including pollination syndromes, mutualisms, and evolutionary strategies of generalists and specialists, (3) foraging economics and learning behavior (4) the important contributions pollinators make to natural ecosystems and agriculture, and (5) the factors that contribute to pollinator declines and possible conservation strategies.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

ENT 497B **Sensory Biology of Insects** (3) This course provides students an understanding of insect sensory systems including contributing to behaviors performed for survival and reproduction.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENT 497C **Medical Entomology** (3) This course will present principles of transmission of human and animal pathogens by insects, mites, and ticks, and will discuss other non-transmission based aspects of medically important arthropods such as envenomization and forensic entomology. We will discuss basic arthropod biology with special attention to biological properties of vectors and their interactions with pathogens. We will cover basic components of arthropod-borne disease cycles and principles of pathogen transmission dynamics. We will discuss the major groups of arthropod-borne pathogens and vectors. Special topics will include emergent pathogens, vector genetics, traditional and modern disease control strategies and venomous arthropods.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

ENT 518 **Insect Natural History** (2) Experiential learning in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic systems.

Effective: Spring 2012

Prerequisite:

ENT 520 **Frontiers in Insect Science** (4) This graduate course is designed to provide an overview of the diversity of subjects that fall within the subject of entomology.

Effective: Fall 2011

**ENT 522 Critical Thinking and Professional Development in Entomology** (6) This is a required course for Entomology graduate students focusing on developing the professional skills needed for a successful career in basic or applied research.  
Effective: Spring 2012

**ENT 530 Seminar in Insect Science** (1 per semester/maximum of 4) Seminar in insect science. Topics range from insect phys & immunology to chemical ecology & epidemiology.  
Effective: Spring 2012  
Prerequisite:

**ENT 535 Statistical Techniques in Entomology** (3) Research methods course covering experimental design and analysis in entomology, ecology, and the agricultural science.  
Effective: Summer 2012

**ENT 539 Chemical Ecology of Insects** (3) Interactions of insects with environmental chemicals, including natural and synthetic compounds; host finding and other behavior modifying cues.  
Effective: Spring 1986

**ENT 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**ENT 595 Internship** (10-12) Supervised field experience and study related to the student's major professional interest. Written and oral critique of activity required. Limited to Master of Agriculture degree in entomology.  
Effective: Spring 1987  
Prerequisite:

**ENT 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses  
Effective: Spring 1987

**ENT 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**ENT 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**ENT 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**ENT 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in Entomology courses (1-599).  
Effective: Fall 1983

**ENT 603 Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Fall 2008

**ENT 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**ENT 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Entrepreneurship (ENTR)

**ENTR 400 Financing Entrepreneurial Ventures (3)** Overview of alternative forms of financing including seed capital, valuing a company, going public, partnerships, and acquisitions.

Effective: Summer 2000

Prerequisite:

**ENTR 410 Entrepreneurial Marketing (3)** Principles of Internet marketing and strategies for marketing new ventures on the Web.

Effective: Spring 2007

Prerequisite:

**ENTR 420 Leadership and Growth of New Ventures (3)** Leadership of an entrepreneurial organization, including organizational effectiveness, stages of entrepreneurial growth, strategies for the future, and developing people.

Effective: Summer 2000

Prerequisite:

**ENTR 430 Entrepreneurship and New Product Development (3)** Examines the process of designing, testing and launching new products, and developing a strategy for commercialization of the technology.

Effective: Summer 2000

Prerequisite:

**ENTR 440 Entrepreneurship and Franchising (3)** Overview of the entire franchising process with a focus on licensing and distributorship, trade marks, strategy, and growing the enterprise.

Effective: Summer 2000

Prerequisite:

**ENTR 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2000

**ENTR 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2000

**ENTR 497A Sheetz Fellow Program (1)** This course is an introduction to the Sheetz Fellows Program. It prepares students with an entrepreneurial mindset for leadership roles by providing them with mentoring opportunities, academic challenges, and resources. Topic areas include; servant leadership, business networking, social networking, study abroad exploration, and resume development. The Sheetz Fellows experience offers "an education for leadership" in the best tradition of the Business program. It molds well-rounded students who are ready for the world and prepares students for citizenship and for life-long learning.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENTR 497A Sheetz Fellow Program (1)** This course is an introduction to the Sheetz Fellows Program. It prepares students with an entrepreneurial mindset for leadership roles by providing them with mentoring opportunities, academic challenges, and resources. Topic areas include; servant leadership, business networking, social networking, study abroad exploration, and resume development. The Sheetz Fellows experience offers "an education for leadership" in the best tradition of the Business program. It molds well-grounded students who are ready for the world and prepares students for citizenship and for life-long learning.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ENTR 500 Innovation and Entrepreneurship (1-3)** Practical and theoretical insights into analyzing a new business opportunity that you have created.

Effective: Summer 2008

**ENTR 501 Opportunity Creation and Launch (2)** Identify a new opportunity, quantify its potential, understand key competitive factors, and develop presentations to secure venture financing.

Effective: Summer 2002

**ENTR 502 Starting and Growing a New Business (2)** An overview of traditional entrepreneurship considerations including competition, management teams, financing, and exit plans.

Effective: Summer 2002

**ENTR 503 Garber Venture Capital Practicum (1-2)** Structure investment opportunities, conduct due diligence, and potentially invest funds from the Smeal College of Business Garber Venture Capital Fund.

Effective: Summer 2002

**ENTR 504 Essentials of Business Planning (2)** Create a concise and coherent business plan for a start-up or a new corporate initiative.

Effective: Spring 2011

**ENTR 571 Strategic Innovation in Corporate Networks (2)** Capstone course integrating themes related to innovation by exploring entrepreneurship as strategic force throughout a full range of corporate entities.  
Effective: Spring 2010

**ENTR 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2002

**ENTR 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2002

**ENTR 597C Technology Commercialization (2)** The course will use prototypes to set up problem-based learning projects on how to commercialize technology both within corporations and as spin offs/ startups.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENTR 597E Sustainable Business Strategies (2)** Course will provide a unique view of business issues that relate to sustainability and corporate social responsibility.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**ENTR 597E Creating Value Through Social Entrepreneurship (2)** Gain a toolkit of social-entrepreneur tactics for creating change; apply this toolkit to startup contexts as well as traditional managerial roles.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**ENTR 597F Entrepreneurial Finance (2)** Students will learn by examining real cases including bootstrapping, grants, corporate partnering, etc. This course is suitable to students wishing to start their own companies or wishing to learn more about private equity models.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

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## **Environ Poll Control (E P C)**

E P C 590 **Colloquium** (1) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1996

E P C 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

E P C 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## Environmental Engineering (ENVE)

**ENVE 401 Occupational Safety and Environmental Health** (1) Regulations, management practices, hazard identification, exposure assessment, monitoring, employee protection, and program management for occupational safety and health.  
Effective: Fall 2011  
Prerequisite:

**ENVE 411 Water Supply and Pollution Control** (3) Water supply, wastewater characteristics, design of unit processes for water and wastewater treatment, sludge processing, and related new technologies.  
Effective: Fall 2011  
Prerequisite:

**ENVE 413W Operation and Control of Treatment Systems** (3) Wastewater treatment, water treatment, solids handling, hazardous waste site control and operations, operator certification, report writing.  
Effective: Fall 2011  
Prerequisite: Concurrent: ENVE 416

**ENVE 415 Hydrology** (3) Watershed response to rainfall events; hydrologic systems; ground water flow.  
Effective: Fall 2011  
Prerequisite:

**ENVE 416 Treatment Plant Design** (3) Design of treatment facilities for water and waste water based on regulatory requirements and standards.  
Effective: Fall 2011  
Prerequisite: Concurrent: ENVE 417

**ENVE 417 Hydraulic Design** (3) Design of water and waste water conveyance systems and storage facilities.  
Effective: Fall 2011  
Prerequisite:

**ENVE 424 Solid Waste Management** (3) Solid waste collection and disposal techniques; recycling and design optimization; including content analysis, legislation, and planning.  
Effective: Fall 2011  
Prerequisite:

**ENVE 425 Hazardous Waste Management** (3) Overview of regulations, risk assessment, waste minimization and pollution prevention, treatment of hazardous waste, and remediation of contaminated sites.  
Effective: Fall 2011  
Prerequisite:

**ENVE 430 Sustainable Engineering** (3) A course on engineering which uses ecological principles to minimize waste and maximally use input materials.  
Effective: Summer 2003  
Prerequisite:

**ENVE 460 Environmental Law** (3) This course provides a survey of Federal and State environmental laws, including statutory, common and administrative law. May not be taken for graduate credit by Dickinson School of Law students in the concurrent J.D./EPC programs.  
Effective: Summer 2003  
Prerequisite:

**ENVE 470 Air Quality** (3) Overview of air quality issues with regard to the sources, measurements, effects, transport and control of potential air contaminants.  
Effective: Fall 2011  
Prerequisite:

**ENVE 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2005

**ENVE 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

**ENVE 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2005

**ENVE 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 1996

**ENVE 540 Biodegradation and Bioremediation** (3) Microbial degradation and transformation of organic and inorganic contaminants. Principles of current bioremediation technologies for soil and groundwater contaminants.

Effective: Spring 2013

Prerequisite:

**ENVE 550 Chemical Fate and Transport** (3) Chemical fate and transport modeling of environmental systems as applied to ecological systems, treatment technologies, and human health exposure assessments.

Effective: Summer 2004

**ENVE 569 Environmental Risk Assessment** (3) Overview of ecological and human risk, including hazard identification, dose response, exposure assessment, and risk characterization.

Effective: Fall 1996

**ENVE 594 Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2003

**ENVE 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2003

**ENVE 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Fall 2001

**ENVE 599 (IL) Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

Effective: Spring 2005

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## **Evid-Based Medicine (EBM)**

**EBM 713 Evidence-based Medicine I (1)** This is fundamentally a course about applying the basic principles of clinical epidemiology/biostatistics to clinical medicine. Physicians need to be knowledgeable consumers of medical literature/information whatever the source. Physicians need to be able to judge the validity of scientific evidence and apply it to patient care.  
Effective: Spring 2008

**EBM 723 Evidence-based Medicine II (1)** This is fundamentally a course about applying the basic principles of clinical epidemiology/biostatistics to clinical medicine. Physicians need to be knowledgeable consumers of medical literature/information whatever the source. Physicians need to be able to judge the validity of scientific evidence and apply it to patient care.  
Effective: Spring 2008

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## **Exercise/Sport Scien (EXSCI)**

EXSCI 595 (PHSIO 595) **Internship in Exercise Physiology and Cardiac Rehabilitation** (1-15) Clinical and related research aspects of exercise physiology and exercise prescription with respect to cardiac and cardiovascular rehabilitation.

Effective: Spring 1988

Prerequisite:

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## Family Law/Est Plan (FMEST)

**FMEST 960 Trusts and Estates (3)** This course examines the disposition of property at death by intestate succession and by will. The execution, revocation, construction, and contest of wills, as well as limits on the power to dispose of property by will, are studied. This course also examines the creation, purposes and termination of trusts, including informal trusts, and the interrelationship between trusts and wills.  
Effective: Fall 1998 Ending: Summer 2013

**FMEST 960 Wills, Trusts and Estates (3)** This course examines the disposition of property at death by intestate succession and by will. The execution, revocation, construction, and contest of wills, as well as limits on the power to dispose of property by will, are studied. This course also examines the creation, purposes and termination of trusts, including informal trusts, and the interrelationship between trusts and wills.  
Effective: Fall 2013 Future: Fall 2013

**FMEST 962 Family Law (3)** This course studies legal problems pertaining to the organization, operation, and dissolution of the family. It includes material on privacy, alternative families, marriage and annulment, child and spousal support, termination of parental rights, adoption and care of the child, divorce, alimony, property distribution at divorce, and custody of children.  
Effective: Summer 2011

**FMEST 963 Elder Law (2-3)** Introduction to modern elder law, including Medicaid, Social Security, advance planning documents and protection laws targeting fraud and elder abuse.  
Effective: Fall 2005 Ending: Summer 2013

**FMEST 963 Elder Law (2-3)** This course presents a survey of the legal issues associated with aging, including introduction to national and global demographics on population aging; comparative policies on Social Security; quality of health care, including care under Medicare and Medicaid (and alternative forms of payment systems for health care and long term care); age discrimination in employment; housing for older adults, including nursing homes, assisted living and continuing care facilities; advance health care decision making; and fiduciary duties of agents and family members.  
Effective: Fall 2013 Future: Fall 2013

**FMEST 964 Estate Planning (3)** Studies the concepts and techniques required to develop estate plans. Topics include the initial client interview, drafting of wills and trusts, powers of attorney, living wills, disability planning and income taxation of trusts and estates. The psychological and ethical aspects of estate planning will be covered. The course will also survey the federal gift, estate and generation skipping taxes. The course is intended to be an introduction to estate planning, valuable to both the person intending to specialize in the field and the general practitioner.  
Effective: Fall 2012  
Prerequisite:

**FMEST 970 Probate Practice (2)** This course deals primarily with the handling of estates following the decedent's death. Emphasis is thus placed on accounts and distribution, the responsibilities of estate administrators and personal representatives, inheritance tax problems and will contests. Other topics include avoidance of probate and the drafting of wills.  
Effective: Fall 1998  
Prerequisite:

**FMEST 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2008

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## Family/Community Med-Hy (FCMED)

**FCMED 722 Family Medicine Acting Internship (5)** The goal of the inpatient experience is to allow the fourth-year medical student to accept responsibility for the planning and execution of ongoing care of hospitalized patients, evaluate patients in the emergency room to determine if hospitalization is necessary and to perform the duties of an admitting physician. The student will work as a member of the family medicine inpatient service team and will remain in the hospital until the days' work is completed. The student will have one weekend free. Three weekends will be spent working with the inpatient team.

Effective: Spring 2003

Prerequisite:

**FCMED 730 Advanced Communications Elective - Paired Observation & Video Editing (POVE) (5)** Provides the opportunity for students working together to advance their communication skills in clinical settings.

Effective: Fall 2010

Prerequisite:

**FCMED 771 Family & Community Medicine Clerkship (5)** Student participation in ambulatory clinical care of the patient in his own environment and in a variety of health care centers.

Effective: Spring 2009

**FCMED 796 Family & Community Medicine Individual Studies (5)** Creative projects including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2010

Prerequisite:

**FCMED 796A Family & Community Medicine Individual Studies for 3rd Year (2.5)** Family & Community Medicine Individual Studies for 3rd Year.

Effective: Spring 2009

**FCMED 797 Family & Community Medicine Special Topics (5)** Advanced training in interpersonal communication skills, community health, rural health, ambulatory care analysis, clinical nutrition, geriatrics, and other topics.

Effective: Spring 2009

Prerequisite:

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## **Field Placemnt Clini (FPC)**

FPC 998 **Special Topics** (1-12) Externship Placements offer students the opportunity to work and learn in a variety of settings outside the Law School under the supervision of a full- time faculty member.

Effective: Spring 2012

Prerequisite:

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## Finance (FIN)

**FIN 405 Advanced Financial Management (3)** An examination of the development and application of decision rules for major long-term financial and investment problems of the firm.

Effective: Summer 1993

Prerequisite:

**FIN 406 Security Analysis and Portfolio Management (3)** Advanced valuation theory; fundamentals of security analysis; portfolio construction and management.

Effective: Spring 2011

Prerequisite:

**FIN 406H Security Analysis and Portfolio Management (Honors) (3)** Advanced valuation theory; fundamentals of security analysis; portfolio construction and management.

Effective: Summer 2011

Prerequisite:

**FIN 407 Multinational Financial Management (3)** Analysis of the international aspects of managerial finance; emphasis on the impact of the international financial environment on firm operations.

Effective: Spring 2005

Prerequisite:

**FIN 408 Financial Markets and Institutions (3)** Functional analysis of major credit institutions; sources and uses of funds; impact of government regulation.

Effective: Fall 1994

Prerequisite:

**FIN 408H Financial Markets and Institutions (Honors) (3)** Introduction to bonds, equities, derivatives, and financial institutions including insurance, pension funds and mutual funds.

Effective: Spring 2012

Prerequisite:

**FIN 409 Real Estate Finance and Investment (3)** The sources and uses of credit; instruments and methods of financing; the theory and practice of real estate investment analysis.

Effective: Summer 2011

Prerequisite:

**FIN 410 Derivative Markets (3)** Functions, techniques, and impact of speculation conducted through forward markets; the nature of speculative transactions, pricing, and methods of trading.

Effective: Spring 2011

Prerequisite:

**FIN 412 Commercial Bank Management (3)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints.

Effective: Fall 1994

Prerequisite:

**FIN 413 Risk Management of Financial Institutions (3)** Measuring and managing risk faced by financial institutions.

Effective: Summer 2007

Prerequisite:

**FIN 414 Financial Trading and Applications (3)** This course focuses on financial modeling and analysis of trading strategies. Bloomberg, Reuters, spreadsheets and trading simulations are used extensively.

Effective: Summer 2007

Prerequisite:

**FIN 415 Advanced Financial Modeling (3)** Develop financial models using spreadsheets, VBA programming, and trading room applications such as Bloomberg and @Risk.

Effective: Spring 2011

Prerequisite:

**FIN 420 Investment and Portfolio Analysis (3)** Investment and risk, types of security investments, sources of investment information, the broker, the stock market, portfolio management.

Effective: Spring 2008

Prerequisite:

**FIN 427 Derivative Securities (3)** Introduction to futures contracts and options, leading to a working understanding of their importance in financial management applications.

Effective: Spring 2008

Prerequisite:

**FIN 430 Estate Planning (3)** Liquidity planning, titling and transfer of property, trusts, federal unified tax system, gifting, incapacity planning, legal documents.

Effective: Spring 2008

Prerequisite:

**FIN 450 Retirement Planning (3)** Retirement planning: qualified and non-qualified plans, characteristics, provisions, regulations administration, application approach with case studies.

Effective: Spring 2008

**FIN 451 Intermediate Financial Management (3)** Case studies are used to develop skills in solving a variety of financial management problems.

Effective: Spring 2010

Prerequisite:

**FIN 456 (IL) International Capital Markets (3)** This course develops understanding of international capital markets by striking a balance between institutional details, theoretical foundation and practical application.

Effective: Spring 2008

Prerequisite:

**FIN 460 (R M 460) Real Estate Financial Analysis (3)** Debt and equity financing, capital structure, "creative financing," risk analysis, corporate asset management.

Effective: Spring 2012

Prerequisite:

**FIN 461 Portfolio Management and Analysis (3)** Investment policy and process, modern portfolio theory, portfolio construction, and portfolio performance measurement and evaluation.

Effective: Fall 2011

Prerequisite:

**FIN 470 (R M 470) Real Estate and Capital Markets (3)** Analysis of publicly-traded real estate of both the equity, (REITs) and debt (MBSs) sides. The course also provides international perspectives.

Effective: Spring 2012

Prerequisite:

**FIN 471 International Finance (3)** Financial decision making in an international environment. Emphasis on topics relevant to small businesses and entrepreneurs.

Effective: Spring 2010

Prerequisite:

**FIN 475 Financial Decision Making (3)** Problems and cases in financial decision making for non-financial corporations and financial institutions.

Effective: Fall 2009

Prerequisite:

**FIN 481 Advanced Financial Analysis (3)** Capstone course integrating financial analysis coursework. This course is based on the case study method which provides a challenging setting in which to apply business concepts.

Effective: Spring 2009

Prerequisite:

**FIN 489 Seminar in Finance (3)** In-depth study of new trends, concepts, and practices in financial or portfolio management.

Effective: Spring 2008

Prerequisite:

**FIN 491 Financial Planning Capstone (3)** Critical thinking and decision-making about personal financial planning topics in the context of the financial planning process.

Effective: Summer 2012

Prerequisite:

**FIN 494 Research Projects (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2003

**FIN 494H Research Projects (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2008

**FIN 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

**FIN 495A Nittany Lion Fund -- Lead Fund Manager Practicum (3 per semester/maximum of 6)** Advanced work with the Nittany Lion Fund. Lead Fund Managers are accountable for sector and stock performance as well as reports. Students delegate work to Associate Fund Managers while focusing a great amount of attention to all aspects of stock pitches, weekly and quarterly reports, along with conducting weekly training session for new analysts.

Effective: Summer 2011

Prerequisite:

**FIN 495B Nittany Lion Fund - Executive Board Practicum (3 per semester/maximum of 6)** Oversight of the Nittany Lion Fund (NLF) and its overall performance. Executive Board members and Directors are accountable for all aspects of the Nittany Lion Fund. Students interact with investors and are responsible for delivering professionally developed performance reports, weekly information updates, and annual shareholder meetings. Executive Board members assume specific duties within the NLF associated with their position, along with a shared responsibility for being a spokesperson for the fund.

Effective: Summer 2011

**FIN 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**FIN 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**FIN 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2003

**FIN 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2007

**FIN 504 Problems in Finance** (3-6) Planned individual projects involving library, laboratory, or field work.  
Effective: Winter 1978

**FIN 505 Multinational Managerial Finance** (3) Analysis of the international aspects of managerial finance. Emphasis on the environmental and institutional factors influencing capital acquisition and allocation.  
Effective: Spring 2012  
Prerequisite:

**FIN 506 Portfolio Theory and Policy** (3) Rigorous examination and analysis of asset-holder behavior under conditions of risk and uncertainty.  
Effective: Winter 1978

**FIN 508 Analysis of Financial Markets** (3) Analysis of factors affecting price determination in financial markets.  
Effective: Winter 1978

**FIN 513 Speculative Markets** (3) Analysis of derivative securities covering options, forwards, futures, OTC derivatives; topics include valuation, trading, hedging. Involves computer analysis.  
Effective: Spring 1998  
Prerequisite:

**FIN 515 Nittany Lion Fund Manager** (3) Focuses on applied issues and topics in the management of investments.  
Effective: Summer 2008

**FIN 531 Financial Management** (3) An intensive examination of techniques available to aid the financial manager in decision making.  
Effective: Spring 2006  
Prerequisite:

**FIN 532 Financial Decision Processes** (3) Financial decision making under uncertainty; positive and normative models and current issues in financial management.  
Effective: Winter 1978

**FIN 541 Security Analysis** (3) Discussion and application of analytical techniques in security valuation, including use of computers.  
Effective: Winter 1978

**FIN 550 Financial Analysis and Valuation** (2) Builds upon and reinforces the theoretical and institutional finance frameworks learned in introductory business finance.  
Effective: Summer 2002  
Prerequisite:

**FIN 555 (I B 555) Global Finance** (1-3) Analyze international business finance problems, impact of evolving international payment systems on business, financial management in modern multi-national enterprise.  
Effective: Fall 2008  
Prerequisite:

**FIN 563 Financial Management Simulation and Corporate Interaction** (2) An immersion experience in financial decision-making through a simulation exercise and interaction with senior financial officers.  
Effective: Summer 2002  
Prerequisite:

**FIN 565 Investment Management Portfolio Analysis Immersion** (2) An intensive familiarization with the Smeal College Trading Room in combination with a visit to Wall Street trading rooms.

Effective: Summer 2002

Prerequisite:

**FIN 570 Financial Modeling (2)** Introduces and applies equity, debt, derivative models and computational techniques using Excel and Visual Basic for Applications.

Effective: Summer 2008

**FIN 571 Strategic Financial Management (2)** Comprehensive course in corporate finance and the strategic implications of various financial decisions.

Effective: Summer 2002

Prerequisite:

**FIN 577 Financial Engineering and Corporate Strategy (2)** Study and application of derivative strategies, financial innovation, and modern financial techniques to re-engineer risk exposure and enhance strategic opportunities.

Effective: Summer 2002

Prerequisite:

**FIN 581 Fundamentals of Financial Markets (2)** Operation, structure of money, bond markets and concepts; and techniques used in evaluating and managing fixed income portfolios.

Effective: Summer 2002

Prerequisite:

**FIN 583 Modern Portfolio Management: Theory and Practice (2)** Theoretical foundations and tools needed for structuring, managing, and monitoring the performance of an investment portfolio.

Effective: Spring 2012

Prerequisite:

**FIN 585 Financial Innovation and Portfolio Risk Management (2)** Introduction to fundamental derivatives, standard valuation models, and practical applications to portfolio management; recognition, measurement, and management of portfolio risk.

Effective: Spring 2012

Prerequisite:

**FIN 587 Investment Management I (1)** Applied issues and topics in the management of investments.

Effective: Summer 2002

Prerequisite:

**FIN 588 Investment Management II (1)** Complex applied issues and topics in the management of investments.

Effective: Summer 2002

Prerequisite:

**FIN 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**FIN 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**FIN 596A Financial Management (3)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**FIN 596B Globalization Strategies (3)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**FIN 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**FIN 597A Asset Pricing Theory (3)** This course develops the theory of financial markets; topics include intertemporal portfolio choice, asset and option pricing models and determinants of cross-sectional stock returns.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**FIN 597C Research Methods (3)** The class focuses on the empirical research methods, data, and econometrics used in the asset pricing subfields of financial economics.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**FIN 599 (IL) FOREIGN STUDY--FINANCE (1-12)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

Prerequisite:

FIN 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

FIN 601 **PH.D. DISSERTATION FULL-TIME** (0) NO DESCRIPTION.  
Effective: Summer 1993

FIN 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Graduate students will be assigned on a selective basis teaching responsibilities in FIN 301, 305, and 306.  
Effective: Spring 1984

FIN 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

FIN 611 **PH.D. DISSERTATION PART-TIME** (0) NO DESCRIPTION.  
Effective: Summer 1993

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## Finance - Behrend (FNC)

FNC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

FNC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year of semester.

Effective: Spring 1987

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## Financial Analysis (FINAN)

**FINAN 518 Financial Markets and the Economy (3)** Operation, regulation, use, and evaluation of principal financial markets and institutions; monetary policy, asset pricing, and their effects on business.

Effective: Spring 2005

Prerequisite:

**FINAN 521 Corporate Finance (3)** An in-depth analysis of concepts and techniques of corporate financial management.

Effective: Spring 1996

Prerequisite:

**FINAN 522 Investment and Portfolio Management (3)** Investment analysis and portfolio management theory and applications.

Effective: Spring 1997

Prerequisite:

**FINAN 523 Risk Management of Modern Financial Institutions (3)** Evaluating and managing risks faced by modern financial institutions in a dynamic financial market.

Effective: Summer 2009

Prerequisite:

**FINAN 526 International Finance (3)** Basics of corporate finance extended to the international environment through a special consideration of exchange rate behavior and its management.

Effective: Spring 1996

Prerequisite:

**FINAN 527 Derivative Securities (3)** Use of financial futures, options, and swaps for risk management and investment; pricing models, trading strategies hedging price risk.

Effective: Spring 2002

Prerequisite:

**FINAN 531 Managing Financial Operations (3)** A course for financial managers: working capital management, financial planning, financial controls, reporting, financial strategies; theory and practice.

Effective: Spring 1991

Prerequisite:

**FINAN 575 Seminar in Current Issues in Finance (3)** In depth analysis of current issues in financial management; topics will be rotated to reflect the current needs of managers.

Effective: Summer 2002

Prerequisite:

**FINAN 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2009

**FINAN 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1999

**FINAN 597 Special topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1999

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## **Fld Plcmnt Int Just (FPIJP)**

**FPIJP 995 International Justice Externship Program (10)** The International Justice Externship Program will provide students with the opportunity to spend a semester at the Hague in the Netherlands earning 10 hours of academic credit for approximately 30 hours of supervised work. Students will work in the Office of the Special Prosecutor at the Hague. The externship will enable students to pursue advanced practical training and research opportunities in international criminal law beyond our curricular offerings. Students will have the opportunity to analyze sophisticated areas of international law in a real world context. Each student participating in the Hague semester is required to enroll in a concurrent two-credit seminar. The seminar component will address international trial investigative techniques, tribunal jurisdiction and procedure, and areas of international civil and criminal law that are most relevant to legal practice before international tribunals.

Effective: Summer 2011

Prerequisite:

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## **Fld Plcmt Harrisburg (FPHBG)**

FPHBG 995 **Field Placement Harrisburg Program** (8) Program will provide experiential learning opportunities for law students relating to legislative and administrative law practice and the formulation of public policy at the state government level.

Effective: Fall 2010

Concurrent: GOVMT 987 and FPHBG 996

FPHBG 996 **Field Placement Harrisburg Program** (1) Guided reflection component of the Harrisburg Externship Program.

Effective: Fall 2010

Concurrent: GOVMT 987 and FPHBG 995

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## Food Science (FD SC)

FD SC 400 **Food Chemistry** (4) Chemical properties of food constituents as influenced by processing and storage.

Effective: Fall 2009

Prerequisite:

FD SC 404 **Sensory Evaluation of Foods** (3) Sensory evaluation of food, methods of test analyses, panel selection and training, taste sensation theory, consumer testing methods.

Effective: Spring 2001

Prerequisite:

FD SC 405 **Food Engineering Principles** (3) Engineering principles of importance to food manufacturing, including units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, and psychrometrics.

Effective: Spring 2009

Prerequisite:

FD SC 406 **Physiology of Nutrition** (3) Physiological mechanisms involved in thirst and appetite, digestion, absorption, utilization of nutrients, respiration, and body temperature regulation.

Effective: Spring 2001

Prerequisite:

FD SC 407 **Food Toxins** (2) Microbiological and chemical aspects of food poisoning; toxicological principles; case histories and prevention of problems.

Effective: Winter 1978

Prerequisite:

FD SC 408 **Food Microbiology** (2) Significance of microorganisms in food commodities, microbial spoilage, food-borne infections, and intoxication; methods of preservation, processing, and control.

Effective: Fall 2009

Prerequisite:

FD SC 409W **Laboratory in Food Microbiology** (3) Methods of isolation, detection of spoilage, pathogenic microorganisms in foods; effects of processing and preservation on survival of food microorganisms.

Effective: Fall 2009

Prerequisite:

FD SC 410 **Chemical Methods of Food Analysis** (3) Qualitative and quantitative determinations of food constituents.

Effective: Spring 2001

Prerequisite:

FD SC 411 **Managing Food Quality** (2) Principles and applications of Hazard Analysis Critical Control Points. Statistical tools for the control and improvement of food quality.

Effective: Summer 1999

Prerequisite:

FD SC 413 **Science and Technology of Plant Foods** (3) Physical and chemical behavior of plant-based raw materials and ingredients, with emphasis on parameters influencing finished product quality.

Effective: Fall 2009

Prerequisite:

FD SC 414 **Science and Technology of Dairy Foods** (3) Physical and chemical behavior of dairy-based raw materials and ingredients, with emphasis on parameters influencing finished product specifications.

Effective: Fall 2009

Prerequisite:

FD SC 415 **Science and Technology of Muscle Foods** (3) Physical and chemical properties of muscle food commodities, with emphasis on muscle-based ingredients in formulated foods.

Effective: Fall 2009

Prerequisite:

FD SC 430 **Unit Operations in Food Processing** (3) Thermal processing, refrigeration, freezing, dehydration, and concentration in the food industry, including effects on food quality; food packaging; waste management.

Effective: Fall 2009

Prerequisite:

FD SC 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 1992

Prerequisite:

FD SC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

FD SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**FD SC 497A Food Product and Process Design for African Markets (3)** A project-based, senior design course focused on the challenges of food product and process design in a cultural environment novel to U.S. students. Course topics include concept generation, prototype development, scale-up, product optimization, package design, and raw material sourcing. Students will begin with an indigenous African food from which they will develop formulae, processes and packaging for an entrepreneurial food enterprise.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**FD SC 497B Getting Ahead in Research: Learning to Communicate Scientifically (1)** Developed to enhance the undergraduate food science experience. Prepares students for graduate school and provide set of skills that are applicable to any career.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**FD SC 497F Food Systems in Italy (Travel) (0.5)** Further develop an understanding and appreciation of the Italian food system by traveling to Italy and touring the various food industry sights.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**FD SC 497G Supervised Experience in College Teaching for Undergraduates (1-3)** Supervised teaching experience for undergraduate students in the Food Science program.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**FD SC 499 (IL) Foreign Studies (1-12 per semester/maximum of 12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2013

**FD SC 500A Fundamentals of Food Science - Microbiology (1)** Overview of the field of Food Science with the focus on microbiology.

Effective: Spring 2011

**FD SC 500B Fundamentals of Food Science - Engineering (1)** Overview of the field of Food Science with the focus on engineering.

Effective: Spring 2011

**FD SC 500C Fundamentals of Food Science - Chemistry (1)** Overview of the field of Food Science with the focus on chemistry.

Effective: Spring 2011

**FD SC 500D Fundamentals of Food Science - Nutrition (1)** Overview of the applications of nutrition in the field of Food Science.

Effective: Spring 2011

**FD SC 501 Research Methods in Food Science (2)** Planning and conducting research in food science including: problem definition, experimental design, collecting and recording data, and effective communication.

Effective: Summer 2002

**FD SC 506 Flavor Chemistry (3)** Formation, analysis and release of flavors in food systems.

Effective: Fall 2003

Prerequisite:

**FD SC 507 Advanced Food Microbiology (3)** Roles of microorganisms in food preservation, spoilage, health and disease. Recent advances in detection, tracking and control of foodborne pathogens.

Effective: Fall 2011

Prerequisite:

**FD SC 510 Carbohydrate Hydrocolloids (3)** Physicochemical behavior of edible carbohydrate hydrocolloids, with emphasis on starch and selected exudates, extracts, flours, and fermentation products.

Effective: Fall 1988

Prerequisite:

**FD SC 514 Food Physical Chemistry (3)** Physical principles underlying food structure and quality.

Effective: Fall 2011

Prerequisite:

**FD SC 521 (AGBIO 521) Food Defense: Prevention Planning for Food Processors (3)** Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply.

Effective: Summer 2010

Prerequisite:

**FD SC 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

Effective: Spring 1987

FD SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on individual basis and fall outside the scope of formal courses.

Effective: Spring 1987

FD SC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

FD SC 597E **Advanced Wine Production and Analysis** (3) Laboratory-based course in the processing and analysis of musts and wines. Emphasizes hands-on application and advanced problem solving in enology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

FD SC 597G **Readings in Ingestive Behavior** (1) Students lead discussion of original research in the field of ingestive behavior with a focus on food intake in particular.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

FD SC 597K (NUTR 597K) **Food Addiction: Fact or Fiction?** (3) Original literature using both human subjects and animal models relevant to the topic of food addiction will be discussed.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

FD SC 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

FD SC 601 **Ph.D. Dissertation Full Time** (0) No description.

Effective: Fall 1983

FD SC 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in the development of instructional materials, the organization and conduct of lectures/laboratories, the evaluation and counseling of students.

Effective: Fall 1983

FD SC 603 **Foreign Academic Experience** (1-12) Foreign study and/or research approved by the food science program constituting progress toward the degree.

Effective: Fall 2010

FD SC 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

FD SC 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1983

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## Forensic Science (FRNSC)

FRNSC 400 **Courtroom Proceedings and Testimony** (1) Introduction to courtroom proceedings and testimony as they related to forensic science.

Effective: Fall 2012

Prerequisite:

FRNSC 410 **A Scientific Approach to Crime Scene Investigation** (2) Principles of crime scene investigation with emphasis on scientific philosophy, concepts, and procedures.

Effective: Fall 2012

Prerequisite:

FRNSC 411 **Criminalistics: Trace and Impression Evidence** (3) Laboratory-based examination of forensic evidence; microscopy, classification and identification.

Effective: Fall 2012

Prerequisite:

FRNSC 413 **Criminalistics: Biology** (3) Laboratory-based examination of forensic evidence; biological fluid identification, hair microscopy.

Effective: Fall 2012

Prerequisite:

FRNSC 415W **Laboratory in Crime Scene Investigation** (2) Laboratory course covering crime scene investigation with emphasis on scientific philosophy, concepts, procedures, problem solving, and hands-on activities.

Effective: Summer 2012

Prerequisite:

FRNSC 421W **Forensic Molecular Biology** (4) Concepts and application of serology of molecular biology techniques to analyze biological evidence collected at crime scenes.

Effective: Fall 2012

Prerequisite:

FRNSC 427W (CHEM 427W) **Forensic Chemistry** (4) Analytical and instrumental methods used in the forensic sciences with special emphasis on the analysis and characterization of trace evidence.

Effective: Fall 2012

Prerequisite:

FRNSC 475 **Forensic Science Seminar** (1) Presentation and discussion of special issues in forensic science; extension and application of background knowledge to unusual topics and cases.

Effective: Spring 2008

Prerequisite:

FRNSC 485W **Coalescence of Forensic Science Concepts**. (4) Advanced concepts in criminalistics as they apply to criminal and civil investigations.

Effective: Spring 2013

Prerequisite: Concurrent: FRNSC 421W FRNSC 427W

FRNSC 494 **Research Projects** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2008

FRNSC 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 2008

FRNSC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2006

FRNSC 497A **Chromatography and Electrochemistry** (3) The course topics include gas, liquid, and other forms of chromatography, mass spectroscopy, and important techniques of electrochemistry. The course material is designed to increase student understanding of both the analytical instruments and used in the laboratory and the principles underlying the measurements. Evaluation of student performance is based on the level to which a student understands how an instrument operates and how particular components determine overall performance and specifications; limitations to measurements as a function instrument design; criteria by which one selects an appropriate instrument to obtain the desired measurements; and criteria by which one selects appropriate components to build an instrument for specific uses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

FRNSC 532 **Drug Chemistry and Toxicology** (3) Chemical and toxicological properties of therapeutic and non-therapeutic drugs and the analytical and instrumental methods of their identification and quantification.

Effective: Spring 2010

FRNSC 541 **Forensic Seminar Series** (1) Advanced concepts in forensic science through presentation of journal articles, case studies, and research findings.  
Effective: Spring 2009

FRNSC 561 **Ethics in forensic Science** (1) The ethics of forensic science, including issues of evidence handling, data analysis, and courtroom testimony.  
Effective: Spring 2009

FRNSC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2006

FRNSC 801 **Criminalistics III** (4) Advanced CSI investigation, criminalistics, and scene reconstruction with mock courtroom testimony.  
Effective: Summer 2013

FRNSC 821 **Forensic Molecular Biology II** (4) Advanced concepts and application of molecular biology techniques to the analysis of biological evidence collected at crime scenes.  
Effective: Spring 2008 Ending: Fall 2013  
Prerequisite:

FRNSC 821 **Forensic Molecular Biology II** (4) Advanced concepts and application of molecular biology techniques to the analysis of biological evidence collected at crime scenes.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

FRNSC 831 **Forensic Chemistry II** (3) Advanced chemical techniques in forensic science, including examination of complex trace evidence and advanced instrumental analysis.  
Effective: Summer 2013  
Prerequisite:

FRNSC 832 **Forensic Drug Chemistry** (3) Advanced chemical techniques in forensic science, including analytical and instrumental methods used in the analysis and characterization of drugs.  
Effective: Spring 2007  
Prerequisite:

FRNSC 833 **Forensic Toxicology** (3) Advanced chemical techniques in forensic science, including the elements of industrial and environmental toxicology.  
Effective: Spring 2007  
Prerequisite:

FRNSC 894 **Research Projects in Forensic Science** (1-12) Supervised student research projects identified on an individual or small-group basis.  
Effective: Spring 2007

FRNSC 895 **Internship** (1-6) Supervised off-campus, non-group instruction, including field experiences, a practicum, or internships; written and oral critique of activity required.  
Effective: Spring 2007

FRNSC 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 2007

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## Forestry (FOR)

FOR 400 **Senior Forest Practicum** (2) Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.

Effective: Summer 2013 Ending: Fall 2013

Prerequisite:

FOR 400 **Senior Forest Practicum** (2) Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

FOR 401 **Urban Forest Management** (3) Uses and values of urban vegetation, open space, and wildlife; planning, financing, support, management, and administration of urban forestry programs.

Effective: Summer 2013

Prerequisite:

FOR 403 **Invasive Forest Plants: Identification, Ecology, and Management** (3) Survey of common nonnative ("exotic") herbs, forbs, shrubs, trees, and vines that invade forested habitats in Pennsylvania and the region. Field identification, life history traits, ecosystem-related challenges and problems, and management options and considerations are reviewed.

Effective: Spring 2013

Prerequisite:

FOR 409 **Tree Physiology** (2) Fundamentals of the relationship of the basic physiological functions of forest trees to form.

Effective: Summer 2013

Prerequisite:

FOR 410 **Elements of Forest Ecosystem Management** (3) Fundamentals of forest ecosystem management for goods and services.

Effective: Summer 2013

Prerequisite:

FOR 416 **Forest Recreation** (3) The management and administration of multiple-use forest lands and wilderness for forest recreational experiences, with emphasis on public forests.

Effective: Summer 2013

Prerequisite:

FOR 418 (US;IL) **Agroforestry: Science, Design, and Practice** (3) Agroforestry integrates trees in agricultural landscapes, and/or agriculture products into forested areas for multiple benefits.

Effective: Summer 2013

FOR 421 **Silviculture** (3) The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands.

Effective: Summer 2013 Ending: Spring 2014

Prerequisite:

FOR 421 **Silviculture** (3) The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands.

Effective: Summer 2014 Future: Summer 2014

Prerequisite:

FOR 430 (W F S 430) **Conservation Biology** (3) The application of biological principles to issues in the conservation of biodiversity.

Effective: Summer 2013

Prerequisite:

FOR 439 **Timber Sale Administration** (2) Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales.

Effective: Summer 2013 Ending: Spring 2014

Prerequisite:

FOR 439 **Timber Sale Administration** (2) Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales.

Effective: Summer 2014 Future: Summer 2014

Prerequisite:

FOR 440 **Forest and Conservation Economics** (3) The role and application of economics and finance to forest resource conservation and management.

Effective: Spring 2013

Prerequisite:

FOR 450W **Human Dimensions of Natural Resources** (3) Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions.

Effective: Summer 2013 Ending: Fall 2013

Prerequisite:

**FOR 450W Human Dimensions of Natural Resources (3)** Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**FOR 455 Remote Sensing and Spatial Data Handling (3)** Remote sensing systems, with emphasis on application to forest ecosystem analysis. Includes introduction to computer systems for spatial data handling.

Effective: Summer 2013

Prerequisite:

**FOR 466W Forest Resource Management (3)** Optimum use of forest's tangible and intangible resources by application of financial and administrative management principles and management science techniques.

Effective: Spring 2001 Ending: Fall 2013

Prerequisite:

**FOR 466W Forest Management and Planning (3)** Rationale, process, and tools for forest management decision-making and planning. Developing and communicating forest plans for forested properties.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**FOR 470 Watershed Management (3)** Management of wild land watersheds for control of the amount and timing of water yield, water quality, erosion, and sedimentation.

Effective: Summer 2013

Prerequisite:

**FOR 471 Watershed Management Laboratory (1)** Introduction to hydrologic and climatic measurements and computations useful in watershed management.

Effective: Summer 2013

Prerequisite:

**FOR 475 Principles of Forest Soils Management (3)** Effect of current forest management practices on the properties and productive capacity of forest soils.

Effective: Summer 2013

Prerequisite:

**FOR 480 Policy and Administration (3)** Forest resources policy objectives; criteria and goals of society; policy implementation by ownership classes; planning, administration, and evaluation of programs.

Effective: Summer 2013 Ending: Spring 2014

Prerequisite:

**FOR 480 Policy and Administration (3)** Forest resources policy objectives; criteria and goals of society; policy implementation by ownership classes; planning, administration, and evaluation of programs.

Effective: Summer 2014 Future: Summer 2014

Prerequisite:

**FOR 488Y (IL) Global Forest Conservation (3)** Ecological, economic, technological, and political aspects of forested ecosystems in a global context, emphasizing tropical and developing countries.

Effective: Spring 2013

Prerequisite:

**FOR 494 Forestry Research (3)** Introduction to the theory, principles, and practices of forestry research; supervised research experience.

Effective: Summer 2013

Prerequisite:

**FOR 494H Forestry Research (3)** Introduction to the theory, principles, and practices of forestry research; supervised research experience.

Effective: Summer 2013

Prerequisite:

**FOR 495 Forestry Internship (1-6)** Supervised field experience related to the student's major.

Effective: Summer 2013

Prerequisite:

**FOR 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

**FOR 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

**FOR 497A Senior Forest Practicum (2)** Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**FOR 497C Human Dimensions of Natural Resources and the Environment (3)** Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

FOR 497F **Invasive Forest Plants** (3) Survey of common nonnative ("exotic") herbs, forbs, shrubs, trees, and vines that invade forested habitats in Pennsylvania and the mid-Atlantic region.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

FOR 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2013

FOR 508 **Forest Ecology** (3) The forest ecosystem, variations in space and time, classification, ordination techniques, dynamic aspects such as energy flow and nutrient cycling.

Effective: Summer 2013

FOR 517 **Forest Microclimatology** (3) A quantitative treatment of climate near the ground, with special reference to the role of forests and terrain.

Effective: Summer 2013

Prerequisite:

FOR 520 **Snow Hydrology** (2) Role of snow and ice in the hydrologic cycle, with special emphasis on effects of forests and land use.

Effective: Summer 2013

Prerequisite:

FOR 521 **Advanced Silviculture** (3) Specific silvicultural practices for the establishment and manipulation of forest stands with respect to recent developments and research needs.

Effective: Summer 2013

Prerequisite:

FOR 530 **Conservation Genetics** (3) Discussion of the use of genetic principles and technologies in the conservation and management of biological diversity.

Effective: Summer 2013

Prerequisite:

FOR 550 **Multivariate Analysis in Forestry Research** (3) Analysis and interpretation of research data involving several response variables. Includes computational considerations for large data sets.

Effective: Summer 2013

FOR 555 **Multispectral Remote Sensing** (3) Computer analysis of data from nonimaging remote sensors as applied to mapping of natural resources and land use.

Effective: Summer 2013

Prerequisite:

FOR 565 **GIS Based Socio-Ecological Landscape Analysis** (3) GIS-based socio-ecological analysis of landscape context for natural resources in relations to present and prospective patterns of land use.

Effective: Summer 2013

Prerequisite:

FOR 570 **Watershed Stewardship Practicum I** (3) Application of integrated community-based watershed planning for water resources management.

Effective: Summer 2013

Prerequisite:

FOR 571 **Watershed Stewardship Practicum II** (3) Application of integrated community-based watershed planning for water resources management.

Effective: Summer 2013

Prerequisite:

FOR 590 (W F S 590) **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2013

FOR 591A **Seminar in Watershed Stewardship Issues** (1) Exploration of watershed stewardship issues.

Effective: Summer 2013

Prerequisite:

FOR 591B **Seminar in Watershed Stewardship Planning** (1) Exploration of watershed stewardship planning processes.

Effective: Summer 2013

Prerequisite:

FOR 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

FOR 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2013

**FOR 597A Science - Policy Interface (2)** Scientists are increasingly being called upon to provide input to the policy process and are typically averse to or intimidated by engaging in this process for numerous reasons. This course will explore the philosophical issues surrounding scientist input in the policy process. In addition, this course will move beyond philosophical discussion by providing guidance on how to effectively communicate with non-scientists.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**FOR 600 Thesis Research (1-15)** No description.  
Effective: Summer 2013

**FOR 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Summer 2013

**FOR 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Provides an opportunity for supervised and graded teaching experience in forestry courses.  
Effective: Summer 2013

**FOR 603 Foreign Academic Experience (1-12)** Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.  
Effective: Summer 2013

**FOR 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Summer 2013

**FOR 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Summer 2013

**FOR 880 Bioenergy Feedstocks (3)** This course comprehensively addresses the characteristics, production, and improvement of plants as feedstocks for conversion to energy.  
Effective: Summer 2013  
Prerequisite:

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## Found Clinical Med (FCM)

FCM 713 **Foundations of Clinical Medicine I** (2) Foundational course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

Effective: Summer 2007

Prerequisite:

FCM 714 **Foundations of Clinical Medicine I** (2) Foundational course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

Effective: Summer 2007

Prerequisite:

FCM 723 **Foundations of Clinical Medicine II** (2) Advanced course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

Effective: Summer 2007

Prerequisite:

FCM 724 **Foundations of Clinical Medicine II** (2) Advanced course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

Effective: Summer 2007

Prerequisite:

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## **Founda Patient Cente (FPCC)**

**FPCC 713 Foundations of Patient Centered Care - I** (2) First semester of a four-part course to learn and apply clinical interviewing and examination skills at the novice level integrated with healthcare practice topics.  
Effective: Summer 2013

**FPCC 723 Foundations of Patient Centered Care - 3** (2) Third semester of a four-part course to learn and apply clinical interviewing and examination skills at the competent level integrated with healthcare practice topics.  
Effective: Summer 2013

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## **Fp - Health Law Clin (FPHLC)**

FPHLC 995 **Field-Placement Clinic: Health Law** (2-3) See Student Handbook.  
Effective: Spring 2004

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## **Fp - Higher Educatio (FPHED)**

FPHED 995 **Field Placement - Higher Education** (2-3) Externships in Penn State's offices at University Park and other campuses where appropriate.  
Effective: Fall 2006

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## **Fp - Intnal Crim Tri (FPICT)**

**FPICT 995A Field Placement - International Criminal Tribunal** (7) Externship in the office of the Prosecutor of the International Criminal Tribunal for the former Yugoslavia.

Effective: Summer 2012

Prerequisite:

**FPICT 995B Field Placement - International Criminal Tribunal** (3) Externship in the office of the Prosecutor of the International Criminal Tribunal for the former Yugoslavia.

Effective: Summer 2012

Prerequisite:

**FPICT 995C Field Placement - International Criminal Tribunal** (3) Externship in the office of the Prosecutor of the International Criminal Tribunal for the former Yugoslavia.

Effective: Summer 2012

Prerequisite:

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## **Fp - Judicial Clinic (FPJUD)**

FPJUD 995 **Field-Placement Clinic: Judicial** (2-3) See Student Handbook.  
Effective: Spring 2004

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## **Fp - Local Gvmt Clin (FPLGC)**

FPLGC 995 **Field-Placement Clinic: Local Government** (2-3) See Student Handbook.  
Effective: Spring 2004

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## Fp- W Dc Seminar Pro (FPWDC)

**FPWDC 995 Washington D.C. Externship Program (10)** The Washington semester externship will provide students with the opportunity to spend a semester in Washington, D.C. earning academic credit for approximately 32 hours of supervised work. Students will work in one of several selected and approved governmental or nonprofit entities.

Effective: Spring 2011

Prerequisite:

**FPWDC 995A Field-Placement Clinic: U.S. Attorneys Office for the District of Columbia (9-10)** An intensive semester-long field placement with the United States Attorney's Office for the District of Columbia.

Effective: Spring 2007

**FPWDC 995B Field-Placement Clinic: U.S. Department of the Treasury, Office of Foreign Assets Control (9-10)** An intensive semester-long field placement with the Office of Foreign Assets Control of the U.S. Department of the Treasury.

Effective: Spring 2007

**FPWDC 995C Field-Placement Clinic: U.S.-China Economic Review and Security Commission (9-10)** An intensive semester-long field placement with the U.S.-China Economic Review and Security Commission.

Effective: Spring 2007

**FPWDC 995D Field-Placement Clinic: U.S. Department of Health and Human Services, Office for Civil Rights (9-10)** An intensive semester-long field placement with the Office for Civil Rights of the United States Department of Health and Human Services.

Effective: Spring 2007

**FPWDC 995E Field-Placement Clinic: U.S. Equal Employment Opportunity Commission, Office of Federal Operations Appellate Review Programs. (9-10)** An intensive semester-long field placement with the EEOC Office of Federal Operations Appellate Review Programs.

Effective: Spring 2007

**FPWDC 995F Field-Placement Clinic: United States House of Representatives (9-10)** An intensive semester-long field placement with a United States Congressman.

Effective: Spring 2007

**FPWDC 995G Field-Placement Clinic: United States Securities and Exchange Commission (9-10)** An intensive semester-long field placement with the United States Securities and Exchange Commission.

Effective: Spring 2007

**FPWDC 997 Special Topics (9-10)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 2007

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## **Fp-Admin Agency Clin (FPADM)**

FPADM 995 **Field-Placement Clinic: Administrative Law** (2-3) See Student Handbook.  
Effective: Spring 2004

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## **Fp-Cabinet Lvl Agncs (FPCLA)**

FPCLA 995 **Field-Placement Clinic: Cabinet Level Agency** (2-3) See Student Handbook.  
Effective: Spring 2004

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## **Fp-Legislation Clin (FPLEG)**

FPLEG 995 **Field-Placement Clinic: Legislation** (2-3) See Student Handbook.  
Effective: Spring 2004

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## **Fp-Misc Public Servc (FPMPS)**

FPMPS 995 **Field-Placement Clinic: Miscellaneous** (2-3) See Student Handbook.  
Effective: Spring 2004

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## Fp-Misc Summer Extrn (FPEXT)

FPEXT 995 **Externship Placement** (2-6 per semester/maximum of 9) Externship Placements offer students the opportunity to work and learn in a variety of settings outside the Law School under the supervision of a full-time faculty member. Placements are in public service or nonprofit offices, including local, state and federal government and judicial offices. Students work with experienced supervisors in those offices to develop skills in legislative drafting, opinion writing, client counseling, research, administrative and criminal practice, statutory analysis and interpretation, and application and enforcement of regulations. Through their work and class discussions, students are expected to develop a heightened awareness of the methods and functions of the legislative, regulatory, judicial, and public interest representation functions.

Effective: Summer 2011

Prerequisite:

FPEXT 995A **Field Placement Clinic--Summer Externship** (2-3) See Handbook for description.

Effective: Spring 2004

FPEXT 997 **Special Topics** (1-10) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 2007

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## **Fp-Pub Prosecutr Cln (FPPPC)**

FPPPC 995 **Field-Placement Clinic: Public Prosecutor** (2-3) See Student Handbook.  
Effective: Spring 2004

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## **Fp-Public Def Clinic (FPPDC)**

FPPDC 995 **Field-Placement Clinic: Public Defender** (2-3) See Student Handbook.  
Effective: Spring 2004

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## French (FR)

FR 401 (IL) **Advanced Oral Communication** (3) Emphasis on speaking and listening comprehension through discussion of current issues, using journalistic materials.

Effective: Spring 2006

Prerequisite:

FR 402Y (IL) **Advanced Grammar and Writing** (3) Advanced study of the structure of the French language. Intensive essay writing.

Effective: Spring 2006

Prerequisite:

FR 407 (IL) **Business Writing in French** (3) Common forms of business communication; writing of reports and abstracts.

Effective: Spring 2007

Prerequisite:

FR 408 (IL) **French-American Business Translation** (3) Translation from French to English of actual documents from the business world; theoretical consideration and systematic vocabulary building.

Effective: Spring 2007

Prerequisite:

FR 409 (IL) **Commercial and Technical Translation** (3) Translation from English to French of commercial and technical materials; vocabulary building; writing of abstracts and summaries.

Effective: Spring 2006

Prerequisite:

FR 410 (IL) **French Press** (3) Extensive readings of selected french daily and weekly newspapers and magazines, along with newscast viewings.

Effective: Spring 2007

Prerequisite:

FR 417 (IL) **French Phonology** (3) A formal study of the sound pattern of French.

Effective: Spring 2007

Prerequisite:

FR 418 (IL) **French Syntax** (3) A formal theory of word order and related issues in French grammar.

Effective: Spring 2006

Prerequisite:

FR 419 **French Semantics** (3) The study of meaning in human language with a special focus on how it is encoded in French.

Effective: Summer 2011

Prerequisite:

FR 422 (IL) **Old French Literature** (3) Medieval masterpieces in original and modern French versions.

Effective: Fall 2006

Prerequisite:

FR 426Y (IL) **French Literature of the Renaissance** (3) Survey of key texts from sixteenth century France, with attention to historical and philosophical currents of French social thought.

Effective: Fall 2006

Prerequisite:

FR 430 (IL) **Contemporary France** (3) Study of contemporary French society, politics, and culture from 1870 to the present.

Effective: Summer 2013

FR 436Y (IL) **Readings in Seventeenth-Century French Literature** (3) Baroque and classicism: reappraisal of major and lesser-known 17th-century texts and theories.

Effective: Fall 2006

Prerequisite:

FR 440 (IL) **Teaching of Romance Languages** (3) Theories of second language acquisition. Current classroom practices in the teaching of Romance languages.

Effective: Spring 2006

Prerequisite:

FR 445Y (IL) **Self and Society in Eighteenth-Century France** (3) The changing relationship of the individual to society in pre-Revolutionary France will be explored in texts by major writers.

Effective: Spring 2006

Prerequisite:

FR 452Y (IL) **Nineteenth-Century French Literature** (3) Selected readings in romanticism, realism, and symbolism, including Balzac, Stendhal, Sand, Baudelaire, and others, with emphasis on cultural issues.

Effective: Fall 2006

Prerequisite:

FR 453Y (IL) **La Belle Epoque: Politics, Society, and Culture in France, 1880-1914** (3) Interdisciplinary perspectives on the politics, society, and culture of France, 1880-1914.

Effective: Summer 2013

Prerequisite:

FR 458 (IL) **African Literature of French Expression** (3) Genesis of Franco-African literature in the 1930s; phases of the negritude movement; colonial and national literature.

Effective: Fall 2006

Prerequisite:

FR 460 (IL) **Contemporary French Literature** (3) Major authors and movements in French novel, drama, and poetry from Proust to the present.

Effective: Fall 2006

Prerequisite:

FR 470 (IL) **Race and Gender Issues in Literatures in French** (3) A critical presentation, taught in French, of changing ideas and values on race and gender in French and Francophone literatures.

Effective: Summer 2005

Prerequisite:

FR 475 **Women's History in Post-Revolutionary France** (3-6 per semester/maximum of 6) Women's history and creativity in post-revolutionary France.

Effective: Summer 2013

Prerequisite:

FR 487 (IL) **Topics in French Film History and Theory I: 1895-1945** (3) Provide background needed to understand the broad outlines of French film history and theory in their first fifty years (1895-1945).

Effective: Spring 2006

Prerequisite:

FR 488 (IL) **Topics in French Film History and Theory II: 1945-2002** (3) Provide background needed to understand the broad outlines of French film history and theory in their second half-century (1945-2002).

Effective: Spring 2006

Prerequisite:

FR 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

FR 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

FR 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 1998

Prerequisite:

FR 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

FR 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

FR 499 (IL) **Foreign Study--French** (3-12) Advanced studies in French language and literature.

Effective: Summer 2005

Prerequisite:

FR 500 **History of the French Language** (3) Evolution of French from its origins to the present-day, with emphasis on Old French philology.

Effective: Fall 1984

FR 501A **Pro-Seminar in French Studies I** (1.5) Professional and scholarly development in interdisciplinary French Studies.

Effective: Fall 2012

FR 501B **Pro-Seminar in French Studies II** (1.5 per semester/maximum of 3) Professional and scholarly development in interdisciplinary French Studies.

Effective: Fall 2012

Prerequisite:

FR 502 **Introduction to French Linguistics** (3) An overview of the major subfields of linguistics as they apply to the French language.

Effective: Spring 1997

**FR 503 French Phonology** (3) A theoretical approach to the sound structure of French.

Effective: Spring 2007

**FR 504 French Syntax** (3) An in-depth study of sentence structure in the French language.

Effective: Fall 2004

**FR 505 Semantics of French** (3) An in-depth study of how meaning is computed based on French data.

Effective: Spring 2007

**FR 510 Stylistique Avancee** (3) An introduction to literary creativity through practice of textual analysis, interpretation, and to basic concepts of contemporary poetics.

Effective: Summer 1999

**FR 529 Seminar in Renaissance Literature** (3 per semester/maximum of 6) Intensive study of various French Renaissance writers in relation to selected artistic issues of the period.

Effective: Fall 1983

**FR 530 La France Contemporaine** (3) A comprehensive cross-sectional view of French society and its institutions since World War II.

Effective: Winter 1980

**FR 531 Francophone Culture** (3 per semester/maximum of 6) Concept of francophone; French minorities in Europe and North America; role of French language in Africa, Middle East, Far East.

Effective: Fall 1983

**FR 532 French Regions and Regionalisms** (3) Interdisciplinary perspectives on the culture, history, and geography of the French regions and their regionalist identity movements.

Effective: Spring 1992

**FR 533 Baroque Aesthetics in Seventeenth-Century French Literature and Intellectual History** (3) Based on the Foucauldian notion of episteme, the course analyzes major literary texts and intellectual trends.

Effective: Fall 1999

**FR 535 Texts and Performances** (3) Based upon current theories of theater, the course focuses on problematics of French drama from the Seventeenth-Century to the present.

Effective: Summer 1999

**FR 540 Eighteenth-Century French Novel** (3) Examination of the rise of the genre including formal considerations of narrative technique as well as historical context.

Effective: Summer 1999

**FR 543 Seminar: Studies in the Enlightenment** (3 per semester/maximum of 6) Discourse and thematic analysis of selected works of French Enlightenment genres: essay, drama, fiction, poetry.

Effective: Fall 1983

**FR 545 Analysis of French Civilization** (3 per semester/maximum of 6) French cultural aspects, other than language and literature, conducted in French with the collaboration of specialists outside the French department.

Effective: Summer 1990

**FR 547 Modernism and Postmodernism** (3-6) Interdisciplinary approaches to these concepts, with a focus on artistic and literary objects in the French context.

Effective: Spring 1994

Prerequisite:

**FR 558 African Novel in French** (3) Development of novel in French from colonial era to independence; Africanization of genre with African verbal artforms.

Effective: Spring 1986

**FR 559 Issues in Francophone Literatures** (3) Diversity issues in Francophone literatures explored through various literary genres: variable focus may combine genre and topic.

Effective: Spring 1997

**FR 562 French Romanticism and Realism** (3) Romanticism, realism, and their variations in the context of social and

political revolution.  
Effective: Spring 1998

FR 564 **Figures of Alterity in Nineteenth-Century French Literature** (3) Representations of otherness in nineteenth-century French literature examined through race, gender, religion, and class paradigms.  
Effective: Spring 1998

FR 565 **Seminar: Nineteenth-Century Studies** (1-6) Various nineteenth-century French writers considered in relation to selected esthetic and cultural problems raised during the period.  
Effective: Fall 1983

FR 566 **Women Writers in Nineteenth-Century France** (3) Women's literary production in nineteenth-century France, including novels, poetry, travel narratives, children's literature, and essays.  
Effective: Spring 1995

FR 569 **Major Texts of Twentieth-Century French Literature** (3-6) Established contemporary literary texts, figures, and aesthetic movements in various genres from Proust to Sartre and from Genet to Conde.  
Effective: Summer 1999

FR 570 **Modern French Poetry** (3 per semester/maximum of 6) Exploration of the poetic genre and its diversification through poetic prose, free verse, and metaphorical narrative, from Baudelaire to Cixous.  
Effective: Summer 1999

FR 571 **French Literary Theory and Criticism** (3) Major trends in contemporary theory and criticism from genre debates to socio-political approaches to literature, post-structuralism, deconstruction, and reception theories.  
Effective: Summer 1999

FR 572 **Seminar: Twentieth-Century French Literature** (3 per semester/maximum of 6) Specialized consideration of contemporary writers; for advanced students.  
Effective: Fall 1983

FR 574 **French Folklore and Popular Culture** (3) Historical survey of French folklore and popular culture, with an emphasis on the modern period.  
Effective: Summer 1993

FR 580 **Approaches to French Civilization** (3) French interdisciplinary methods of cultural analysis and cultural history, with applications to French cultural artifacts.  
Effective: Spring 1992

FR 581 **Theory and Techniques of Teaching French** (1-6) No description.  
Effective: Fall 1983

FR 589 (CMLIT 589, GER 589, SPAN 589) **Technology in Foreign Language Education: An Overview** (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)  
Effective: Spring 2004

FR 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

FR 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

FR 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

FR 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

FR 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Activities to be included in the teaching assignment will be lecturing, leading discussions, conducting recitations, correcting and grading student papers and examinations.  
Effective: Fall 1983

FR 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Fall 1999

FR 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

FR 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Fuel Science (F SC)

F SC 401 **Introduction to Fuel Technology** (3) An introduction to the scientific and engineering principles of fuel technology. For non-fuel science majors; fuel science majors will not receive credit.

Effective: Summer 2007

Prerequisite:

F SC 431 **The Chemistry of Fuels** (3) Nature and properties of fossil and other fuels, including aerospace, in relation to use; preparation of fuels; by-products; fuel analysis.

Effective: Spring 2008

Prerequisite:

F SC 432 (CH E 432) **Petroleum Processing** (3) A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

Effective: Summer 2007

Prerequisite:

F SC 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2000

F SC 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

F SC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1999

F SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1999

F SC 503 **Analytical Methods in Fuel Science** (3) Analytical and characterization methods used in fuel science and applied to fuel processing, combustion, and conversion are emphasized.

Effective: Spring 2009

Prerequisite:

F SC 504 **Problems in Fuels Engineering** (3) A problem-based, active learning course on the utilization of fossil fuels and renewable energy.

Effective: Fall 2009

Prerequisite:

F SC 506 **Carbon Reactions** (3) Current approaches to heterogeneous reactions in combustion and gasification of carbonaceous solids, including those derived from coal and petroleum sources.

Effective: Spring 1999

Prerequisite:

F SC 590 (EME 590, MNG 590, P N G 590) **Colloquium** (1-3) Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

Effective: Spring 2009

F SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1999

F SC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1999

F SC 600 **Thesis Research** (1-15) No description.

Effective: Spring 1999

F SC 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Spring 1999

F SC 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Spring 1999

F SC 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1999

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## **Gastroenterology-Hy (GI)**

GI 729 **Gastroenterology** (5) Some of the areas studied will be: smooth muscle physiology; peristalsis and sphincter function; neuro-homonal control of motility; psychophysiological interaction in the gut; and symptoms of altered GI motility.

Effective: Fall 2001

Prerequisite:

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## Genetics (GENET)

GENET 581 **Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A** (1) Examines uses of genetic studies in understanding biological processes associated with bacterial and viral pathogenesis.

Effective: Fall 2007

Prerequisite:

GENET 582 **Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways: B** (1) Examines uses and interrelationships of genetic studies with model systems from yeast to mice in elucidating signaling pathways.

Effective: Fall 2007

Prerequisite:

GENET 583 **Genetics of Model Organisms: Genetic Analysis of Cancer and Cancer-related Phenotypes: C** (1) Examines uses and interrelationships of genetic studies with model eukaryotes in understanding biological processes.

Effective: Fall 2007

Prerequisite:

GENET 584 **Human Genetics A: Human Chromosomes** (1) This course explores the human chromosome analysis and disease gene identification for simple mendelian disorders.

Effective: Fall 2007

Prerequisite:

GENET 585 **Human Genetics B: Non-mendelian Genetics** (1) This course explores genetic disease mechanisms that alter chromosome behavior or show non-mendelian patterns of inheritance.

Effective: Fall 2007

Prerequisite:

GENET 586 **Human Genetics C: Complex Traits** (1) This course explores the human genome landscape, how individuals vary, and gene identification for multigenic traits and disorders.

Effective: Fall 2007

Prerequisite:

GENET 587 **Genetic Approaches to Biomedical Problems** (3) Advanced training of students with interest in genetic approaches to problem solving.

Effective: Spring 2010

Prerequisite:

GENET 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

GENET 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1990

GENET 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1990

GENET 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1996

GENET 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

GENET 601 **Ph.D. Dissertation Full Time** (0) No description.

Effective: Fall 1983

GENET 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

GENET 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1983

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## Geo-Environmental Engineering (GEOEE)

GEOEE 557 **Computational Geomechanics I** (3) Finite element and boundary element analysis of rock mechanics, groundwater flow, and mass transport.  
Effective: Spring 2012

GEOEE 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1999

GEOEE 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1999

GEOEE 597 **Special Topics** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1999

GEOEE 600 **Thesis Research** (1-15) No description.  
Effective: Spring 2000

GEOEE 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 2000

GEOEE 610 **Thesis Research Off-Campus** (1-15) No description.  
Effective: Spring 2000

GEOEE 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 2000

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## Geodesign (GEODZ)

GEODZ 511 **Geodesign History, Theory, Principles** (3) Students study the theory and principles of geospatially-based design by investigating the methods and collaborative nature of the geodesign process.

Effective: Summer 2013

Prerequisite:

GEODZ 822 **GeoDesign Models I: Evaluation and Decision** (3) The principles, inherent values and practical applications of Evaluation and Decision models as implemented within the Geodesign Framework.

Effective: Summer 2013

Prerequisite:

GEODZ 824 **GeoDesign Models II: Process and Impact** (3) The principles, inherent values and practical applications of Process and Impact models as implemented within the Geodesign Framework.

Effective: Summer 2013

Prerequisite:

GEODZ 826 **GeoDesign Models III: Representation and Change** (3) The principles, inherent values and practical applications of Representation and Change models as implemented within the Geodesign Framework.

Effective: Summer 2013

Prerequisite:

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## Geography (GEOG)

**GEOG 411 Forest Geography** (3) This course studies processes that control spatial and temporal change in forests.  
Effective: Fall 2007  
Prerequisite:

**GEOG 411W Forest Geography** (3) This course studies processes that control spatial and temporal change in forests.  
Effective: Fall 2007  
Prerequisite:

**GEOG 412W Climatic Change and Variability** (3) Theories and observations of past, present, and future climatic change and variability; introduction to techniques used in climatic change research.  
Effective: Spring 2007  
Prerequisite:

**GEOG 417 Satellite Climatology** (3) A discussion of the application of satellite data to current and planned large-scale climate experiments.  
Effective: Spring 2007  
Prerequisite:

**GEOG 420Y (US;IL) Comparative Urbanism** (3) This course investigates selected urban issues through the lens of comparative urbanism.  
Effective: Fall 2011  
Prerequisite:

**GEOG 423Y (US) Historical Geography of North America** (3) Exploration, settlement, and changing patterns of human occupation from the seventeenth century to the 1930s.  
Effective: Fall 2011  
Prerequisite:

**GEOG 424 (US;IL) Geography of the Global Economy** (3) Focus on industrial location theory, factors in industrial location, studies of selected industries and problems of industrial development.  
Effective: Spring 2011  
Prerequisite:

**GEOG 425 (US) Geography of Race, Class, and Poverty in America** (3) This class examines the spatial interactions of race, class and poverty in the United States.  
Effective: Fall 2011  
Prerequisite:

**GEOG 426Y (US;IL) (WMNST 426Y) Gender and Geography** (3) Description and explanation of the links between gender relations and spatial structures.  
Effective: Summer 2011 Ending: Summer 2013  
Prerequisite:

**GEOG 426Y (US;IL) (WMNST 426Y) Gender Geographies** (3) Description and explanation of the links between gender relations and spatial structures.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**GEOG 427 (US;IL) Urban Historical Geography** (3) Study of the development and transformation of the historical urban built environment.  
Effective: Spring 2007  
Prerequisite:

**GEOG 428 (US) Political Geography** (3) Geographical foundations of political phenomena; significant geographic factors in growth and development of states, boundary problems, population distribution, colonies, and internal and international regional problems.  
Effective: Spring 2007  
Prerequisite:

**GEOG 428Y (US;IL) Political Geography** (3) Geographical foundations of political phenomena; significant geographic factors in growth and development of states, boundary problems, population distribution, colonies, and internal and international regional problems.  
Effective: Spring 2012  
Prerequisite:

**GEOG 429 (US;IL) Geographic Perspectives on Global Urbanization** (3) This course reflects critically on a number of issues related to global urbanization, including the culture and political economy of urban space.  
Effective: Spring 2012  
Prerequisite:

**GEOG 430 Human Use of Environment** (3) The human use of resources and ecosystems and social causes and consequences of environmental degradation in different parts of the world; development of environmental policy and management strategies.  
Effective: Fall 2008  
Prerequisite:

**GEOG 431 Geography of Water Resources (3)** Perspectives on water as a resource and hazard for human society; water resource issues in environmental and regional planning.

Effective: Spring 2007

Prerequisite:

**GEOG 432 (EME 432) Energy Policy (3)** Analysis, formulation, implementation, and impacts of energy-related policies, regulations, and initiatives.

Effective: Summer 2010

Prerequisite:

**GEOG 434 Politics of the Environment (3)** This course explores politics related to the use, transformation, valuation, and representation of the environment.

Effective: Spring 2007

Prerequisite:

**GEOG 435H (IL) Global Change and Sustainability - Bulgaria (3)** Sustainability in the context of climate change, global socioeconomic change and regional transformation in Bulgaria; embedded foreign fieldwork (honors).

Effective: Summer 2008

Prerequisite:

**GEOG 436 Ecology, Economy, and Society (3)** Analyses of major themes in ecology and economic development, poverty-alleviation, and sustainability.

Effective: Summer 2006

Prerequisite:

**GEOG 438W Human Dimensions of Global Warming (3)** Human dimensions of climate change: human causes, human consequences, and policy implications of global warming.

Effective: Spring 2012

Prerequisite:

**GEOG 439 Property and the Global Environment (3)** This course reviews theoretical and empirical relationships between multiple legal, economic, and cultural approaches to property, and environmental quality and conflicts.

Effective: Summer 2006

Prerequisite:

**GEOG 440 Topics in Regional Geography (3)** Analysis of historical, contemporary and future environmental and societal issues in a specified world region from a geographical perspective.

Effective: Summer 2006

Prerequisite:

**GEOG 444 African Resources and Development (3)** Ecological and cultural factors in the geography of Africa; natural resources and development.

Effective: Spring 2001

Prerequisite:

**GEOG 461W Dynamic Cartographic Representation (3)** Theory and practice of mapping and geo-representation in a dynamic media context. Applications in science, policy, travel, and education.

Effective: Spring 2010

Prerequisite:

**GEOG 463 Geospatial Information Management (3)** This course examines geospatial data representations and algorithmic techniques that apply to spatially-organized data in digital form.

Effective: Fall 2011

Prerequisite:

**GEOG 464 Advanced Spatial Analysis (3)** Skills and knowledge for applying quantitative methods to analyze information with spatial distributions.

Effective: Spring 2012

Prerequisite:

**GEOG 467 Applied Cartographic Design (3)** Project-based map production problems with emphasis on map design and advanced mapping tools in geographic information systems.

Effective: Fall 2011

Prerequisite:

**GEOG 468 Geographic Information Systems Design and Evaluation (3)** Design and evaluation of Geographic Information Systems and other forms of integrated spatial data systems.

Effective: Spring 2007

Prerequisite:

**GEOG 469 Energy Industry Applications of GIS (3)** Roles of geographic information systems in energy siting decisions focusing on electric energy transmission networks.

Effective: Summer 2010

Prerequisite:

**GEOG 475H (LER 475H) Labor in the Global Economy: U.S. and South African Perspectives (3)** This course focuses on how the nature of work is changing in the global economy, and the implications for economic opportunity and inequality in both.

Effective: Spring 2008

Prerequisite:



**GEOG 480 Exploring Imagery and Elevation Data in GIS Applications** (3) Using imagery and terrain data in typical application scenarios faced by the geospatial professional.

Effective: Spring 2013

Prerequisite:

**GEOG 482 The Nature of Geographic Information** (2) Orientation to the properties of geographic data and the practice of distance learning.

Effective: Summer 2004

Prerequisite:

**GEOG 483 Problem-Solving with GIS** (3) How geographic information systems facilitate data analysis and communication to address common geographic problems.

Effective: Summer 2004

Prerequisite:

**GEOG 484 GIS Database Development** (3) Database design, creation, maintenance, and data integration using desktop GIS software.

Effective: Summer 2004

Prerequisite:

**GEOG 485 GIS Programming and Customization** (3) Customizing GIS software to extend its built-in functionality and to automate repetitive tasks.

Effective: Fall 2007

Prerequisite:

**GEOG 486 Cartography and Visualization** (3) Theory and practice of cartographic design emphasizing effective visual thinking and visual communication with geographic information systems.

Effective: Summer 2004

Prerequisite:

**GEOG 487 Environmental Applications of GIS** (3) Real-world applications of GIS and spatial analysis to investigate a variety of current environmental issues.

Effective: Spring 2010

Prerequisite:

**GEOG 488 Acquiring and Integrating Geospatial Data** (3) Advanced technical, legal, ethical and institutional problems related to data acquisition for geospatial information systems.

Effective: Summer 2004

Prerequisite:

**GEOG 489 GIS Application Development** (3) Advanced topics in GIS customization, including the Systems Development Life Cycle, packaging and deployment, and consuming Web services.

Effective: Summer 2004

Prerequisite:

**GEOG 493 Service Learning** (3-12) Classroom instruction with supervised student activity on a group community service project.

Effective: Summer 2006

Prerequisite:

**GEOG 494 Research Project in Geography** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2006

Prerequisite:

**GEOG 494H Research Project in Geography** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

Prerequisite:

**GEOG 495 Internship** (1-13) Supervised off-campus, non-group instruction including individual field experience, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 1981

Prerequisite:

**GEOG 495B Geography Teaching Internship** (1-10) Supervised undergraduate teaching experience in which students serve as peer tutors, laboratory assistants, or course material developers.

Effective: Summer 2004

**GEOG 495C Internship Supervision and Mentoring** (1) Candidates for the Master of GIS degree sponsor a GIS-related internship for students in Penn State's resident undergraduate program.

Effective: Summer 2004

**GEOG 495G Giscience Internship** (1-10) Supervised research experience within the Department of Geography's GeoVISTA Center, Gould Center, or an appropriate external agency.

Effective: Spring 2007

Prerequisite:

**GEOG 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an

individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**GEOG 496C Individual Studies (3)** Individual project work supervised by a faculty member on a topic of mutual interest in geography and geographic information science.  
Effective: Summer 2013 Ending: Summer 2013

**GEOG 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**GEOG 497A Global Change Ecology: Understanding Earth System Resistance & Resilience (3)** This course explores impacts of human-driven change on ecosystems; participants apply ecological principles to strive for a healthier planet.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**GEOG 497A Geographics of Justice: Environment, Society and Development (3)** This course will examine the origins of social and environmental justice in the United States and their application globally.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**GEOG 497B Location Intelligence for Business (3)** Understanding location technology and geospatial analysis to support an efficient and effective pathway to better business decisions.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 497C Object-Oriented Modeling and Programming for GIScience (3)** Introduction to object-oriented modeling and programming for application in GIS, and spatial information processing in general.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**GEOG 497C Health Geographics (3)** This course provides a rigorous examination of the geographics of human health using case studies from the United States and abroad.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**GEOG 497D Lidar Technology and Applications (3)** Understanding lidar systems' design, operation, data processing techniques, and product generations to address typical applications scenarios faced by the geospatial professional.  
Effective: Summer 2013 Ending: Summer 2013

**GEOG 497D Lidar Technology and Applications (3)** Understanding lidar systems' design, operation, data processing techniques, and product generation to address typical application scenarios faced by the geospatial professional.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1998

**GEOG 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2006  
Prerequisite:

**GEOG 500 Introduction to Geographic Research (1-3)** No description.  
Effective: Spring 1981

**GEOG 501A Research Perspectives in Physical Geography (1)** This course presents contemporary perspectives on Physical Geography, emphasizing the major issues and integrative themes of the sub-discipline.  
Effective: Summer 2008

**GEOG 501B Research Perspectives in Human Geography (1)** This course presents contemporary perspectives on Human Geography, emphasizing the major issues and integrative themes of the sub-discipline.  
Effective: Fall 2007

**GEOG 501C Research Perspectives in Human-Environment Geography (1)** Contemporary perspectives on Human-Environment Geography, emphasizing major issues and integrative themes of the sub-discipline.  
Effective: Summer 2008

**GEOG 501D Research Perspectives in GIScience (1)** This course presents contemporary perspectives on Geographic Information Science, emphasizing the major issues and integrative themes of the sub-discipline.  
Effective: Summer 2008

**GEOG 502 Research Scholarship in Geography** (3) Learning the craft of scholarly research in geography.  
Effective: Summer 2008  
Prerequisite:

**GEOG 510 Seminar in Physical Geography** (3 per semester/maximum of 18) Analysis of current literature in physical geography focusing on theoretical and methodological debates.  
Effective: Summer 2012  
Prerequisite:

**GEOG 520 Seminar in Human Geography** (3 per semester/maximum of 18) Analysis of current literature in human geography focusing on theoretical and methodological debates.  
Effective: Spring 2012

**GEOG 521 Map Symbolization and Design Theory** (3) Introduction to theoretical issues in map design and symbolization with emphasis on current research trends and practical application of research. Students who have passed GEOG 421 may not schedule this course for credit.  
Effective: Spring 2007  
Prerequisite:

**GEOG 530 Human-Environment Seminar** (3 per semester/maximum of 18) Theory and method in human-environment interaction subfields; may be re-taken when topics vary; readings, discussions, research.  
Effective: Spring 2012

**GEOG 560 Seminar in Geographic Information Science** (3 per semester/maximum of 18) Geographic information science problems/theory, e.g. GIS, cartography, remote sensing, spatial analysis, modeling.  
Effective: Fall 2011

**GEOG 565 Selected Topics in Geographic Information Science** (3) Examination of geographic information science topics: GIS, cartography, remote sensing, spatial analysis, modeling, spatial cognition, geospatial semantics, geovisualization.  
Effective: Spring 2012

**GEOG 580 Spatial Data Structures and Algorithms** (3) In-depth examination of geographic information system components; representation and storage of spatial data, spatial algorithms, input-output considerations. Students who have passed GEOG 480 may not schedule this course for credit.  
Effective: Summer 1987  
Prerequisite:

**GEOG 583 Geospatial System Analysis and Design** (3) Systematic approach to requirements acquisition, specification, design and implementation of geospatial information systems.  
Effective: Summer 2004  
Prerequisite:

**GEOG 584 Geospatial Technology Project Management** (3) Principles of effective project management applied to the design and implementation of geospatial information systems.  
Effective: Summer 2004  
Prerequisite:

**GEOG 585 Open Web Mapping** (3) Design, development, and implementation of web mapping applications using OGC standards and open source software.  
Effective: Spring 2008  
Prerequisite:

**GEOG 586 Geographical Information Analysis** (3) Choosing and applying analytical methods for geospatial data, including point pattern analysis, interpolation, surface analysis, overlay analysis, and spatial autocorrelation.  
Effective: Summer 2004  
Prerequisite:

**GEOG 587 Conservation GIS** (3) Conservation GIS applies geospatial problem solving to ecological research and resource management issues to enhance conservation planning.  
Effective: Summer 2009  
Prerequisite:

**GEOG 588 Planning GIS for Emergency Management** (3) Requirements analysis and proposal writing to plan and implement GIS solutions supporting emergency management activities of government agencies and contractors.  
Effective: Summer 2008  
Prerequisite:

**GEOG 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**GEOG 591 GIS for Health Analysis** (3) Applications and theory in geographic information systems for analyzing the geographic dimensions of human health.  
Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**GEOG 594A Culminating Experiences in Geospatial Intelligence** (1-3 per semester/maximum of 3) Culminating experiences in current professional and ethical problems facing the geospatial intelligence professional.

Effective: Spring 2011

Prerequisite:

**GEOG 594B Geospatial Intelligence Capstone Experience** (2) Culminating experience in the iMPS-HLS for the online geospatial intelligence option.

Effective: Summer 2012

Prerequisite:

**GEOG 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**GEOG 596A Individual Studies -- Peer Review** (3) Preparation and presentation of a proposal for an individual capstone project, and reviews of presentations by student peers.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 596A Individual Studies -- Peer Review** (3) Preparation and presentation of a proposal for an individual capstone project, and review of presentation by student peers.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 596B Individual Studies -- Capstone Project** (3) Preparation and delivery of a formal professional presentation of the results of an individual capstone project.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 596B Individual Studies--Capstone Project** (3) Preparation and delivery of a formal professional presentation of the results of an individual capstone project.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 596C Individual Studies** (3) Individual project work supervised by a graduate faculty adviser.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 596C Individual Studies** (3) Individual project work supervised by a graduate faculty adviser.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 596I Independent Study** (1-3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 596I Independent Study in Geospatial Intelligence** (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 596K Independent Study in Geospatial Intelligence** (1) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 596K Independent Study in Geospatial Intelligence** (1) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**GEOG 597A Visual Analytics: Leveraging GeoSocial Data** (3) Conceptual and project-based introductions to visual analytics and its applications to geo-social data analysis and Big Data Social Science research.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 597E Emerging Trends in Remote Sensing and Advanced Image Analysis** (3) Advanced topics in remote sensing and image processing, including new sensors, applications, and decision making.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 597G Geographic Dimensions of Unmanned Aerial Systems (UAS)** (3) Common platforms, analytical strategies,

and policy dimensions of Unmanned Aerial Systems (UAS) in public, private, defense, and humanitarian applications.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 597I Geospatial Intelligence Capstone Experience (2)** Culminating experience in the iMPS-HLS for the Geospatial Intelligence option.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**GEOG 597I Special Topics in Geospatial Intelligence Futures (3)** Addresses cutting edge Geospatial Intelligence topics that impact the global academic and professional community.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 597K GIS for Analysis of Health (3)** The role of geographic information systems in understanding disease, including relevant spatial analysis of cartographic visualization techniques.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 2006

**GEOG 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

**GEOG 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 1983

**GEOG 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Theoretical and practical aspects of undergraduate instruction in geography.

Effective: Fall 1983

Prerequisite:

**GEOG 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Fall 2001

**GEOG 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 1983

**GEOG 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Fall 1983

**GEOG 860 Comparative GIS (3)** Formal methodology for evaluating, comparing, and recommending geospatial software solutions for a variety of professional uses.

Effective: Summer 2009

Prerequisite:

**GEOG 861 Map Projections for Geospatial Professionals (1)** Cultivates a working knowledge of map projections that professionals need to process geospatial data effectively for mapping and analysis.

Effective: Spring 2008

Prerequisite:

**GEOG 862 GPS and GNSS for Geospatial Professionals (3)** Cultivates a working knowledge of current and future capabilities of GPS and the emerging Global Navigation Satellite System.

Effective: Spring 2010

**GEOG 863 GIS Mashups for Geospatial Professionals (3)** Cultivates a working knowledge of how and why geospatial professionals develop web mapping applications that combine data from multiple sources.

Effective: Spring 2010

Prerequisite:

**GEOG 864 Professionalism in Geographic Information Science and Technology (2)** Prepares current and aspiring professionals to recognize, analyze and address legal and ethical issues in the GIS&T (geospatial) field.

Effective: Summer 2009

**GEOG 882 Geographic Foundations of Geospatial Intelligence (3)** Orientation to the geographic foundations of geospatial intelligence and its applications in national security, international relief work, and disaster management.

Effective: Summer 2008

**GEOG 883 Remote Sensing for the Geospatial Intelligence Professional (3)** Understanding remote sensing systems'

operation, data products, and processing techniques to address typical problem scenarios faced by the GEOINT professional.

Effective: Summer 2008

Prerequisite:

**GEOG 884 Geographic Information Systems for the Geospatial Intelligence Professional (3)** How geographic information systems facilitate data analysis and communication to address common geographic problems faced by the geospatial intelligence professional.

Effective: Summer 2008

Prerequisite:

**GEOG 885 Advanced Analytic Methods in Geospatial Intelligence (3)** Prepares current and aspiring geospatial intelligence professionals to apply and interpret results of non-quantitative analysis and modeling techniques.

Effective: Summer 2009

Prerequisite:

**GEOG 889 Seminar in Geospatial Intelligence (2)** Culminating experience that synthesizes topics addressed in earlier classes and explores emerging topics and methods of geospatial intelligence analysis.

Effective: Spring 2010

Prerequisite:

**GEOG 897 Special Topics (1-9)** Formal courses given on a topical or special interest subject.

Effective: Summer 2009

**GEOG 897A Cultural Intelligence, Applied Geography, and Homeland Security (3)** The process of geographically analyzing social, political, economics, and demographic information to understand human history, institutions, beliefs, and behaviors.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 897A Cultural Intelligence, Applied Geography, and Homeland Security (3)** The process of geographically analyzing social, political, institutions, beliefs, and behaviors.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 897B Special Topics/GIS (3)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 897C Cloud and Server GIS (3)** Students will evaluate and implement GIS which use cloud and server resources, using infrastructure, platform, and software service models.

Effective: Summer 2013 Ending: Summer 2013

**GEOG 897D Spatial Database Management for Geospatial Professionals (3)** Advanced topics in the storage, management, and retrieval of geospatial data using common proprietary and open-source relational database technologies.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOG 897K Map Projections for Geospatial Professionals (3)** Cultivates a working knowledge of map projections that professionals need to process geospatial data effectively for mapping and analysis.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

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## Geosciences (GEOSC)

GEOSC 402Y (IL) **Natural Disasters** (3) Case studies of the causes and consequences of natural disasters; analysis of disaster impact in different economic, cultural, and social conditions.

Effective: Summer 2005

Prerequisite:

GEOSC 405 (SOILS 405) **Hydropedology** (3) Soil and water interactions across scales, integrated studies of landscape-soil-water relationships, fundamental processes of water flow and chemical transport.

Effective: Spring 2008

Prerequisite:

GEOSC 409W **Geomicrobiology** (3) Investigation of modern and ancient microbial interactions with soils, sediments, the atmosphere, minerals, rocks, nutrients, and pollutants.

Effective: Summer 2008

Prerequisite:

GEOSC 410 **Marine Biogeochemistry** (3) Exploration of the ways in which life influences and is influenced by chemical, physical, and geological processes in the ocean.

Effective: Summer 2012

Prerequisite:

GEOSC 412 **Water Resources Geochemistry** (3) Aqueous geochemistry of silica, alumina, carbonate minerals, and selected metals; organic species in water; isotope geochemistry applied to water.

Effective: Summer 2007

Prerequisite:

GEOSC 413W **Techniques in Environmental Geochemistry** (3) This course teaches techniques needed for the collection, chemical analysis, and data analysis of environmental geochemical measurements. This course has one or more required field trips for which a fee is charged to the student.

Effective: Spring 2002

Prerequisite:

GEOSC 415 **Geochemistry** (3) Element abundance and genesis, application of chemical principles to earth materials, element fractionation in geologic processes.

Effective: Spring 2011

Prerequisite:

GEOSC 416 **Stable and Radioactive Isotopes in Geosciences: Introduction** (3) Discussions on theories for natural isotopic and element variations and their applications to the solution of geologic and cosmologic problems.

Effective: Summer 2007

Prerequisite:

GEOSC 418 (SOILS 419) **Soil Environmental Chemistry** (3) Introduction to chemical constituents and processes occurring in soils. Topics include mineral weathering, soil solution chemistry and adsorption of solutes.

Effective: Summer 2007

Prerequisite:

GEOSC 419 **The Organic Geochemistry of Natural Waters and Sediments** (3) Composition, sources, and fates of particulate and dissolved organic matter in natural environments; biogeochemical processes; organic geochemistry of anthropogenic contaminants.

Effective: Summer 2007

Prerequisite:

GEOSC 420 (BIOL 420) **Paleobotany** (3) Classification, morphology, phylogeny, and stratigraphic occurrence of fossil plants; practicum includes field trips and study of paleobotanical techniques and specimens.

Effective: Spring 2005

Prerequisite:

GEOSC 422 **Vertebrate Paleontology** (3) Course covers scientific thinking and skills in scientific writing, the history of vertebrates, and modern evolutionary theory applied to vertebrates.

This course contains from one to several field trips for which an additional charge will be made to cover transportation.

Effective: Spring 2009

Prerequisite:

GEOSC 424 **Paleontology and Fossils** (3) Concepts and procedures using fossils to solve problems in systematics, evolution, biostratigraphy, correlation, sedimentation, paleoecology, and global change.

Effective: Spring 2001

Prerequisite:

GEOSC 428 **Micropaleontology** (4) Biology and ecology of microfaunas and microfloras (e.g., foraminifera, coccolithophores, radiolaria, diatoms, dinoflagellates) and applications in biostratigraphy and paleoenvironmental reconstruction.

Effective: Summer 2004

Prerequisite:

GEOSC 434 **Volcanology** (3) Phenomena and products of volcanic eruptions; physical characteristics of lava and

pyroclastic material.  
Effective: Spring 2011  
Prerequisite:

**GEOSC 439 Principles of Stratigraphy** (3) An introduction to the description and genesis of sedimentary rock bodies, the determination of their stratal geometries, and their correlation. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)  
This course contains from one to several field trips for which an additional charge will be made to cover transportation.  
Effective: Spring 2001  
Prerequisite:

**GEOSC 440 Marine Geology** (3) Chemical and physical processes affecting the topography and sediments of the sea floor.  
Effective: Spring 2001  
Prerequisite:

**GEOSC 444 Matlab Applications for Geoscience** (2) An introduction to Matlab: m-file development, descriptive statistics, bootstrapping, Fourier transforms, regression, interpolation, least-squares, differentiation, integration, differential equations, signal analysis, graphics.  
Effective: Spring 2009  
Prerequisite:

**GEOSC 450 Risk Analysis in the Earth Sciences** (3) An introduction to concepts and methods of quantitative risk analysis with focus on water, climate, and energy related risks.  
Effective: Spring 2010  
Prerequisite:

**GEOSC 451 Natural Resources: Origins, Economics and Environmental Impact** (3) Geologic, economic and environmental issues related to exploitation of non-renewable natural resources (metals, minerals, rocks, and fossil fuels).  
Effective: Fall 2006  
Prerequisite:

**GEOSC 452 Hydrogeology** (3) Hydrologic cycle: occurrence, movement, quality, and quantity of groundwater; solute transport; quantitative hydrogeologic methods; role of water in geologic processes. This course has one or more required field trips for which a fee may be charged to the student.  
Effective: Spring 2008  
Prerequisite:

**GEOSC 454 Geology of Oil and Gas** (3) Properties, origin, migration, and occurrence of oil and gas. This course has one or more required field trips for which a fee is charged to the student.  
Effective: Spring 2002  
Prerequisite:

**GEOSC 461 Geology of North America** (3) Evolution of structural-stratigraphic framework of continent; interpretation of relevant data obtained from field, experimental, and geophysical observation.  
Effective: Spring 2001  
Prerequisite:

**GEOSC 465 Structural Geology** (4) Effects and mechanics of deformation of the earth's crust; practicum includes field trips and studies of maps and structural problems. This course has one or more field trips for which a fee is charged to the student.  
Effective: Spring 2002  
Prerequisite:

**GEOSC 470W Introduction to Field Geology** (3) Field interpretation of geologic features; principles and techniques of geologic mapping; interpretation of geologic maps and diagrams. This course has one or more required field trips for which a fee is charged to the student.  
Effective: Spring 2002  
Prerequisite:

**GEOSC 472A Field Geology I (Introduction to Field Methods)** (3) Introduction to geologic field methods and the 3-D characterization of earth structure and the reconstruction of geologic histories. This course includes travel outside the University for which an additional charge will be made to cover transportation, food, and lodging.  
Effective: Summer 2005  
Prerequisite:

**GEOSC 472B Field Geology II (Advanced Field Methods)** (3) Advanced application of geologic field methods to the 3-D characterization of earth structure and the reconstruction of geologic histories. This course includes travel outside the University for which an additional charge will be made to cover transportation, food, and lodging.  
Effective: Summer 2005  
Prerequisite:

**GEOSC 474 (BIOL 474) Astrobiology** (3) In depth treatment of principles/concepts of biochemical evolution, the origin/evolution of life; evaluation of distribution of life in the universe.  
Effective: Summer 2007  
Prerequisite:

**GEOSC 479 Advanced Stratigraphy** (3) Modern topics of sequence stratigraphy are addressed, with a heavy emphasis on field and laboratory data analysis and interpretation.  
Effective: Spring 1999  
Prerequisite:



**GEOSC 483 Environmental Geophysics (3)** This course presents the principles and applications of the variety of techniques geophysicists use to address environmental problems.

Effective: Fall 2001

Prerequisite:

**GEOSC 487 Analysis of Time Series (3)** Nonstatistical approach to data analysis; spectral and correlation analysis; filter theory; signal-to-noise improvement applied to geoscience data.

Effective: Fall 2010

Prerequisite:

**GEOSC 488 An Introduction to Seismology (4)** An overview of the observations, methods, and frameworks used in seismogram analysis for earthquake and earth-structure investigations (includes laboratory).

Effective: Spring 2003

Prerequisite:

**GEOSC 489 Dynamics of the Earth (4)** Constitution and dynamics of the solid earth; mechanics and consequences of Plate Tectonic processes.

Effective: Fall 2001

Prerequisite:

**GEOSC 494M Senior Thesis (1-4)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2007

Prerequisite:

**GEOSC 494W Senior Thesis (1-4)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Spring 2001

Prerequisite:

**GEOSC 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2001

**GEOSC 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**GEOSC 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**GEOSC 497A Geoscience Scholarship (3)** Intended for geoscience majors seeking research careers. Major focus on core skills: writing, speaking, discussion, scientific literature, professionalism.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOSC 497A Geologic Maps in ARCGIS (1)** This course provides an introduction to Geographic Information Systems (GIS) and their use in making geologic maps.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**GEOSC 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1997

**GEOSC 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**GEOSC 500 Issues in Geosciences (3)** Introduction of first year graduate students to issues in geosciences.

Effective: Summer 2003

Prerequisite:

**GEOSC 502 Evolution of the Biosphere (4)** The geologic history of the co-evolution of life and the surface environment is examined from a systems perspective.

Effective: Spring 1999

Prerequisite:

**GEOSC 505 Quantitative Physical Sedimentology (3)** Principles of fluid mechanics and mathematical modeling; their use in describing sediment transport, sedimentary structures, and sedimentary environments.

Effective: Summer 1996

**GEOSC 508 Mechanics of Earthquakes and Faulting (3)** An in-depth treatment of fundamental concepts in brittle faulting and earthquake mechanics with emphasis on physical processes.

Effective: Spring 2005

Prerequisite:

GEOSC 511B (MATSE 511B) **Transmission Electron Microscopy** (1) Principles and practice of transmission electron microscope operation. Students undertake individual projects.  
Effective: Spring 2005

GEOSC 512 (MATSE 512) **Principles of Crystal Chemistry** (3) Relation of structure to ionic size and nature; influence of pressure and temperature on structure; chemical-structural defects, crystalline solutions, phase-transitions.  
Effective: Spring 2003

GEOSC 514 **Data Inversion in the Earth Sciences** (3) This course focuses on how one finds theoretical parameters to explain observed data using discrete inverse theory.  
Effective: Spring 1999  
Prerequisite:

GEOSC 518 **Stable Isotope Geochemistry** (3) Theory of isotope fractionation mechanisms; its application to a wide range of problems in the earth and planetary sciences.  
Effective: Fall 1989

GEOSC 519 **Mineral Equilibria** (3) A thermodynamic treatment of minerals and their reactions under geochemically important conditions of temperature and pressure.  
Effective: Summer 2007  
Prerequisite:

GEOSC 521 **Thermal State of the Earth** (2-3) Analytical and numerical solutions to earth-related heat conduction and convection problems; geothermal energy; earth's heat flow and temperature.  
Effective: Spring 1998

GEOSC 522 **Geochemistry of Aqueous Systems** (2-3) Ionic and molecular equilibria related to stabilities and solubilities of minerals, with applications to ground water, sea water, and hydrothermal fluids.  
Effective: Summer 2007  
Prerequisite:

GEOSC 523 **Sedimentary Geochemistry** (2) Kinetics and thermodynamics of low-temperature processes in sediments. Applications to weathering processes, natural waters, deposition of sediments, and diagenesis.  
Effective: Summer 1996

GEOSC 529 **Paleontology** (1-6 per semester/maximum of 9) Morphology and distribution of significant fossil groups; sampling, preparation, and applications to biostatigraphy, evolution, paleoecology, sedimentation, and petrography.  
Effective: Fall 1989

GEOSC 533 **Principles of Geochemistry** (3) A comprehensive treatment of the principles of geochemistry applied to a wide variety of geologic settings and scales.  
Effective: Summer 2007  
Prerequisite:

GEOSC 540 **Ore Deposits I** (3) Geochemistry and geology of ore deposits formed by igneous and high- temperature hydrothermal processes.  
Effective: Fall 1989  
Prerequisite:

GEOSC 541 **Ore Deposits II** (3) Geochemistry and geology of ore deposits formed by low-temperature hydrothermal, sedimentary, and metamorphic processes; continuation of GEOSC 540.  
Effective: Fall 1989  
Prerequisite:

GEOSC 542 **Quantitative Methods in Hydrogeology** (1-4) Investigation of groundwater systems and resources, emphasizing both the practical use and limitations of modeling techniques.  
Effective: Fall 1989  
Prerequisite:

GEOSC 545 **Glacial Geology** (3) Glaciers: their characteristics, causes, deposits, landforms, effects in periglacial regions.  
Effective: Fall 1989

GEOSC 548 **Surface Processes** (3) Principles, application, and interpretation of Quaternary geochronology, surface process studies, and landscape evolution.  
Effective: Spring 1999  
Prerequisite:

GEOSC 555 **Advanced Structure and Petrofabrics** (1-3) Macroscopic and mesoscopic recognition, measurement, and interpretation of small-scale rock structures and mineral orientation patterns in deformed rocks.  
Effective: Fall 1989

**GEOSC 558 Multi-channel Seismic Processing and Interpretation** (4) This course covers the basics of seismic energy propagation, modern 2- and 3-D multi-channel seismic data acquisition methods, and data processing.

Effective: Spring 1999

Prerequisite:

**GEOSC 559 Seismology II** (3) Rigorously covers the methods of computing wave fields for point and distributed seismic sources in vertically inhomogeneous elastic media.

Effective: Spring 2005

Prerequisite:

**GEOSC 560 Kinetics of Geological Processes** (3) General development of the kinetic theory of crystal growth, diffusion, irreversible thermodynamics, and heterogeneous reactions needed for geosciences and related fields with applications to current problems.

Effective: Summer 2007

Prerequisite:

**GEOSC 561 Mathematical Modeling in the Geosciences** (4) The process of transforming a conceptual geoscience model into a numerical model is presented; students create and solve numerical models.

Effective: Spring 2000

Prerequisite:

**GEOSC 565 Tectonic Geomorphology** (3) Tectonic geomorphology examines interactions between tectonic and surface processes, paleoseismology, geodesy, structure, active deformation, and landform evolution.

Effective: Summer 1998

Prerequisite:

**GEOSC 572 Field Stratigraphy** (1-2) This course introduces students to field techniques used by stratigraphers, with the capstone experience being a field trip during May.

Effective: Fall 2005

Prerequisite:

**GEOSC 584 Clastic Depositional Environments** (3) Readings, group discussions, and field work on processes and sedimentary responses of common rock-forming environments.

Effective: Fall 1989

Prerequisite:

**GEOSC 585 Sedimentary Geology** (3) An integrated approach to the study of modern and ancient sedimentary environments and their deposits.

Effective: Spring 2000

Prerequisite:

**GEOSC 587 Preparing for an Academic Career in the Geosciences** (3) The course focuses on successful strategies for the academic job market and for launching an academic career.

Effective: Spring 2009

Prerequisite:

**GEOSC 589 Seminar in Aqueous Geochemistry** (1) A seminar aimed at reading current articles in aqueous geochemistry and biogeochemistry.

Effective: Fall 2001

Prerequisite:

**GEOSC 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1989

**GEOSC 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1989

**GEOSC 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1988

**GEOSC 597A Paleobiology Seminar** (1) Discussion of foundational papers and current, including student, research in paleobiology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEOSC 597A Topics in Earth Systems Science** (2) EarthTalks is an interdisciplinary seminar series that meets weekly and seeks to examine complex environmental challenges facing our world today.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**GEOSC 597B Multivariate Analysis in Geosciences** (3) Introduction of multivariate analytical methods with application to student research data.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEO597B AAPG Imperial Barrel Award Competition** (3) A team of five graduate will compete in AAPG's annual Imperial Barrel Award competition. (IBA). This class provides practical hands-on experience for students.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**GEO597C Topics in Earth Systems Science** (2) EarthTalks is an interdisciplinary seminar series that meets weekly and seeks to examine complex environmental challenges facing our world today.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEO597D Petroleum Geosystems** (3) Provides an understanding of all phases of hydrocarbon exploration and production through a combination of team-based problems, field trips, industry lectures and site-visits. Required for Petroleum Geosystems emphasis.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEO597D Paleobiology Seminar** (1) Discussion of foundational papers and current, including student, research in paleobiology.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**GEO597E Topics in Biogeochemistry** (2) This seminar addresses chemical interactions between the biosphere and the physical environment over Earth's history and as impacted by humans.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEO597F Advanced Crystallography** (1) We will review group theory, symmetry operations, and derive plane and space groups.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEO597G Dynamics of Rivers and Floodplains, Past and Present** (1) Seminar aimed at exploring physical, chemical, and biological dynamics of modern and ancient rivers and floodplains.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**GEO598 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 1999

**GEO600 Thesis Research** (1-15) No description.  
Effective: Spring 1989

**GEO601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1989

**GEO602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching geosciences courses.  
Effective: Fall 1983

**GEO610 Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1989

**GEO611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1989

**GEO897 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2008

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## German (GER)

GER 401Y (IL) **Advanced Composition** (3) Intensive practice in writing different text types in German.  
Effective: Spring 2012  
Prerequisite:

GER 408 (IL) **Advanced German Business Communications** (3) Study of German business organization, forms of business communications, business terminology; writing of reports and abstracts.  
Effective: Spring 2006  
Prerequisite:

GER 411 **The Teaching of German** (3) Theory, methods, techniques, materials, bibliography; use of inter-active media; contributions of linguistics or psychology to language learning.  
Effective: Summer 1994  
Prerequisite:

GER 412 (IL) **Contrastive Analysis of Modern German and English** (3) Structural comparison of the German and English grammatical systems: morphology, syntax, phonology.  
Effective: Spring 2006  
Prerequisite:

GER 420 (IL) **Genre** (3-9) Special studies in a particular literary genre in German literature, such as lyrical poetry, drama, or narrative prose.  
Effective: Spring 2006  
Prerequisite:

GER 430 (IL) **History of the German Language** (3) Development of German from its earliest stages, including historical and cultural aspects.  
Effective: Fall 2007  
Prerequisite:

GER 431 (IL) **History of German Literature and Culture I** (3) Significant works of German literature before the mid-eighteenth century considered in their cultural context.  
Effective: Spring 2006  
Prerequisite:

GER 432 (IL) **History of German Literature and Culture II** (3) Significant works of German literature from the mid-eighteenth century to the present considered in their cultural context.  
Effective: Spring 2006  
Prerequisite:

GER 440 (IL) **Seminar in German Culture** (3-6) Seminar devoted to a special topic in the field of German culture and civilization.  
Effective: Spring 2006  
Prerequisite:

GER 472 (IL) **Romanticism** (3) A study of both early and late romanticism, including such writers as Novalis, the Schlegels, E.T.A. Hoffmann, and Heine.  
Effective: Spring 2006  
Prerequisite:

GER 489 **Introduction to German Film History and Theory in Context** (3) Introduces films in German since the 1960s and addresses issues relevant to German and European cultures and politics.  
Effective: Spring 2005  
Prerequisite:

GER 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1994

GER 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

GER 495 **Internship** (3-9) Supervised off-campus, non-group instruction including individual field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 1981  
Prerequisite:

GER 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

GER 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1985

GER 499 (IL) **Foreign Study--German** (3-12) Advanced studies in German language, literature, and culture.

Effective: Summer 2005

Prerequisite:

GER 510 **Literary Theory: An Introduction** (3) Introduction to the major theoretical approaches to the contemporary study of culture (literature, film, art and politics).

Effective: Spring 2004

GER 511 **The Teaching of College German** (3) Theory, methods, techniques, materials, bibliography contributions of linguistics and psychology to language learning; methods of teaching post- secondary German.

Effective: Fall 2005

GER 513 **German Phonetics and Phonology** (3) This course examines German speech sounds and their organization into a linguistic system.

Effective: Spring 2009

GER 514 **German Syntax** (3) This course provides an overview of morphosyntactic processes in German.

Effective: Spring 2009

GER 515 **Introduction to German Applied Linguistics** (3) Introduction to the major areas of the broad field of Applied Linguistics as relevant to the study of German.

Effective: Spring 2003

GER 516 **The Acquisition of German and Dutch** (3) This course examines how children and adult learners acquire German and Dutch in naturalistic settings (i.e. non-classroom situations).

Effective: Spring 2009

GER 520 **Introduction to Middle High German** (3) Descriptive and historical grammar; readings in simple Middle High German texts.

Effective: Winter 1978

GER 523 **Gothic** (3) Introduction to the historical and comparative Germanic grammar; emphasis on the Gothic language and texts. Suitable for advanced students in English.

Effective: Winter 1978

GER 540 **Seminar in German Culture and Civilization** (3-12) Examination of special problems in German culture and civilization.

Effective: Fall 1997

GER 541 **German Literature of the Renaissance and Baroque** (3) Intensive survey and review of German literature between 1450 and 1700.

Effective: Fall 1997

GER 551 **German Literature from the Early Enlightenment to Storm and Stress** (3) Advanced overview of major developments in German literature from the early to the late 18th century.

Effective: Fall 1997

GER 552 **German Classicism and Romanticism** (3) Intensive survey of German literature from the late 18th through the first third of the 19th centuries.

Effective: Spring 1997

GER 561 **German Literature of the 19th Century--From Beidermeier to Realism** (3) Survey of major developments in German literature from the mid- to the late-19th century.

Effective: Fall 1997

GER 571 **German Literature from the Turn of the Century to 1945** (3) Advanced survey of German literature from the era of Naturalism to that of Exile literature.

Effective: Fall 1997

GER 572 **Post-War and Contemporary German Literature** (3) Intensive survey of German literature from Gruppe 47 through the literature of the GDR and down to the present.

Effective: Spring 1997

GER 581 **Topics in Literary Genres** (3-12) Special studies in the German lyric, drama, short story, and novel.  
Effective: Fall 1997

GER 582 **Topics in Germanic Philology and German Linguistics** (3 per semester, maximum of 12) Special studies of modern or older Germanic languages.  
Effective: Summer 1997

GER 589 (CMLIT 589, FR 589, SPAN 589) **Technology in Foreign Language Education: An Overview** (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)  
Effective: Spring 2004

GER 591 **German Literary Theory and Criticism** (3-6) Examination of major movements in literary theory and criticism with special reference to German literary thought.  
Effective: Fall 1997

GER 592 **Seminar in German Literature** (3 per semester, maximum of 12) Focused investigation of a major figure or theme in German literature.  
Effective: Summer 1997

GER 593 **Seminar in German Philology and German Linguistics** (3 per semester, maximum of 12) Focused investigation of a major topic in Germanic philology or linguistics.  
Effective: Summer 1997

GER 596 **Individual Studies** (1-9) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

GER 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

GER 597A **Sociability and Theory: from Socrates to Facebook with a String of Germans in Between** (3) This course examines the connection between social networks among intellectuals and the formation of critical aesthetic theories. Intellectuals do not all work in isolation, rather they can thrive on friendship and sociability. Starting with Plato's "Symposium" and concluding with the social media of digital humanities, this course will examine how the give and take of written correspondence and conversation heightens the complexity of aesthetic theory.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

GER 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

GER 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

GER 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Instruction of lower division German courses with observation by the supervisor and attendance at regular meetings to discuss classroom techniques.  
Effective: Fall 1983

GER 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Spring 2000

GER 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

GER 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Global Health (GH)

**GH 717 Global Health Scholars First Year Elective (1-5)** This course provides exposure to basic concepts of global health, tailored to first year medical students with a focus on community health assessment and engagement.

Effective: Spring 2010

Prerequisite:

**GH 727 Global Health Scholars Second Year Elective (1-5)** This course provides exposure to basic concepts of global health, designed for the second year medical students, with a focus on the global burden of disease and community-oriented participatory research. Students will utilize the knowledge and skills gained during this year, guided by faculty, to develop a health improvement intervention for the host site (e.g. San Pablo, Ecuador). This elective does not meet graduation requirements. It is offered as part of the Global Health Scholars Program.

Effective: Spring 2010

Prerequisite:

**GH 747 Global Health Scholars Fourth Year Elective (4)** Global Health Scholars 4th year elective.

Effective: Summer 2011

Prerequisite:

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## Government & Politic (GOVMT)

**GOVMT 952 Administrative Law (3)** The administrative process, rules and rule making, inspections and investigations, administrative hearings, rules of evidence, presumptions, burden of proof, formal and informal actions, orders, the right to, methods of obtaining, and scope of judicial review are examined.  
Effective: Fall 1998

**GOVMT 954 Election Law (2)** This course covers federal and state election law and will examine the constitutional basis for the regulation of elections, the development of the law in this area over the last 30 years, as well as criminal and civil enforcement of the law, the role of the Federal Election Commission, the formation and regulation of political action committees, as well as related federal tax law provisions impacting operation of political committees and advocacy organizations. The course will also examine the intersection of the election law with congressional ethics rules, lobbying regulations and representation of political candidates and entities in election law matters.  
Effective: Spring 2012

**GOVMT 970 Legislation (3)** This course deals with the enactment and construction of statutes with specific attention to the organization, procedures and powers of federal and state legislative bodies, to statutory drafting and construction, and to lobbying.  
Effective: Summer 2011

**GOVMT 971 Statutory Interpretation (3)** The course covers the wide variety of tools that lawyers and judges use to interpret statutes. A basic introduction to the legislative process and how important aspects of that process are relevant to statutory interpretation is also included. Students will be introduced to important techniques of statutory interpretation and the theoretical support for varying approaches to how judges do and should interpret statutes.  
Effective: Summer 2011

**GOVMT 985 Aviation Law (2)** This course seeks to give the students a firm grounding in the law governing the domestic use of airspace for transportation and recreation. The licensing requirements of pilots, the struggle of the aviation industry to adapt to the market, the safety and security of passengers and the problems involved in building airports are just a few of the topics covered. The course provides an opportunity for those students who are interested in aviation to apply many of the subject they have studied in law school to a particular area of human activity. The cases studied in the course involve, inter alia: Administrative Law, Antitrust, Bankruptcy, Conflicts of Law, Contracts, Local Government Law, Environmental Law, Labor Law, Property Sales, Taxation and Torts.  
Effective: Summer 2011

**GOVMT 987 State and Local Government Law (3)** Important issues in governmental organization and management are surveyed. Emphasis is placed on intergovernmental relations, the legislative process, personnel issues, financing, and contracting. The course will conclude with a consideration of recent trends toward metropolitan regionalism.  
Effective: Fall 1998

**GOVMT 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2008

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## Greek (GREEK)

Knowledge of Greek or Latin not required. See also CLASSICS AND ANCIENT MEDITERRANEAN STUDIES and LATIN,

**GREEK 401 Introductory Reading in Greek Literature** (3-6) Analysis of selected passages of ancient Greek literature; attention will be paid to grammatical as well as literary details.

Effective: Summer 2011

Prerequisite:

**GREEK 420 Greek Prose Authors** (3-6) Readings in representative authors.

Effective: Summer 2011

**GREEK 425 Greek Historians** (3-6) Translation and study of one or more of the ancient Greek historians.

Effective: Summer 2011

Prerequisite:

**GREEK 430 Greek Poetry** (3-6) Translation and analysis of selected readings in Greek poetry.

Effective: Summer 2011

Prerequisite:

**GREEK 440 Greek Drama** (3-6) Translation and study of a selected play.

Effective: Summer 2011

Prerequisite:

**GREEK 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**GREEK 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**GREEK 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**GREEK 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**GREEK 499 (IL) Foreign Studies** (12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**GREEK 509 Greek Seminar** (3-9) No description.

Effective: Fall 1983

**GREEK 520 Greek Mythography** (3) This graduate seminar focuses on ancient Greek mythographic authors from the beginnings of the genre (6th C.B.C.E.) to the Roman period.

Effective: Fall 2008

**GREEK 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2000

**GREEK 599 (IL) Foreign Studies** (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

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## Health Administration (H ADM)

H ADM 503 (P ADM 503) **Research Methods** (3) Examination of research methodologies relevant to administration, planning, and public policy.

Effective: Fall 2012

Prerequisite:

H ADM 506 (P ADM 506) **Management Information Systems for Public and Health Administration** (3) The design, implementation, and purpose of computerized management information systems in health and non-profit organizations.

Effective: Spring 2003

H ADM 510 (P ADM 510) **Organization Behavior** (3) Examines the concepts of human behavior in formal organizations, systems analysis, conceptual models, and decision processes.

Effective: Spring 2003

H ADM 539 **Health Systems Organization** (3) Health care delivery presented as a socio-technical systems focusing upon resources, policy issues, institutions, technology, and innovations.

Effective: Fall 1997

Prerequisite:

H ADM 540 **Health Administrative Policy Formulation** (3) Analysis of administrative problems from a total organization viewpoint. Case studies of actual organizations are used for analysis.

Effective: Summer 1997

Prerequisite:

H ADM 541 **Health Economics and Policy** (3) Public policy issues, health system components from economic perspective. Economic analysis of health sector, medical markets, health care regulation.

Effective: Summer 1997

Prerequisite:

H ADM 542 **Health Care Politics and Policy** (3) This course reviews political considerations and the policy process as they pertain to health care in the United States.

Effective: Summer 1997

Prerequisite:

H ADM 543 **Long-Term Care Administration and Policy** (3) This course reviews theory and practice related to long-term care administration and policy.

Effective: Summer 1997

Prerequisite:

H ADM 545 **Health Financial Management** (3) Theory and techniques of financial management applied to health organizations; forecasting, control systems, working capital, capital budgeting, and institutional financing.

Effective: Summer 1997

Prerequisite:

H ADM 546 **Health Planning for Public Administration** (3) Comprehensive planning and program planning for health services, facilities, and manpower; social, economic, and political considerations; methodological problems.

Effective: Summer 1997

Prerequisite:

H ADM 548 **Health Care Quality Assurance** (3) This course reviews theory, methods, outcomes, and management of quality assurance in health care organizations.

Effective: Summer 1997

Prerequisite:

H ADM 551 **Health Care Law** (3) Course on health law for administrators with coverage including hospital governance, taxation, licensure, liability, malpractice, patients' rights, anti-trust.

Effective: Summer 1997

Prerequisite:

H ADM 552 **Health Delivery Systems** (3) This course discusses design and implementation of health care delivery systems and the pressure and stakeholders which impact those systems.

Effective: Spring 2005

Prerequisite:

H ADM 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1998

H ADM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1997

H ADM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1999

H ADM 597A **Health Care Marketing** (3) Introduction to the theory, concepts, skills, and principles of marketing applied to health related organizations and networks.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

H ADM 597A **Healthcare Ethics** (3) This course exposes the student to contemporary ethical issues in medicine. The class will function as a hospital ethics committee and each students will be assigned a role in the committee. A lecture will be presented on each topic after which there will be presented a case to the ethics committee for discussion and decision.  
Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

H ADM 597A **Comparative Health Systems** (3) This course will examine global health systems from a comparative perspective. For each country (from developed to developing countries) we will examine the following: a very general overview of the economy and very brief history; a description of their healthcare system; an evaluation of each health system in terms of cost, quality, and access; and current and emerging challenges facing each country. In an increasingly globalized society, a clear understanding of international healthcare systems is a fundamental step toward improving the quality of health and healthcare systems in the United States and abroad.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

H ADM 597B **Health Care Leadership** (3) This course examines the dynamic nature of leadership in the healthcare organizations. An emphasis is placed on the application and practice of leadership theories, models, practices, and capabilities of leadership within a health organization. Students will also explore the leadership qualities of successful healthcare leaders as well as embark on a journey of self-discovery of their own leadership potential.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

H ADM 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 2006

H ADM 897A **Health Care Costs for Health Administration** (3) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2013 Ending: Summer 2013

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## Health Education (HL ED)

HL ED 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

HL ED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

HL ED 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1993

HL ED 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1992

HL ED 596 **Individual Studies** (1-9) Individual studies course.  
Effective: Spring 1987

HL ED 597 **Special Topics** (1-9) Special topics course.  
Effective: Spring 1987

HL ED 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

HL ED 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

HL ED 602 **Supervised Experience in College Teaching** (1-3 per semester maximum of 6) Preparation and presentation of materials in lecture and laboratory classes under the supervision of a full-time faculty member.  
Effective: Fall 1983  
Prerequisite:

HL ED 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

HL ED 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Health Education (HLHED)

HLHED 406 **Human Sexuality** (3) Examination of physiology, diseases, attitudes, morality, and controversial topics related to human sexuality.

Effective: Fall 2012

Prerequisite:

HLHED 415 **Planning and Developing Health Education Programs** (3) Premises and strategies for planning, implementing, and evaluating wellness programs in corporate, hospital, and community agency settings.

Effective: Fall 1997

Prerequisite:

HLHED 420 **Development of Stress Management Programs for Health Education** (3) Planning, development, and implementing strategies for stress management programs for health education professionals in school, community, and corporate settings.

Effective: Fall 1997

Prerequisite:

HLHED 443 **Alcohol and Drug Education** (3) Principles of integration and coordination of alcohol and drug education programs for health education and other social service professions.

Effective: Fall 1997

Prerequisite:

HLHED 456 **Advanced Techniques in School and Community Health Education** (3) Public health, mental health, nutrition, dental school health, physical education, accident prevention, health teaching; projects, consultation, visitation, discussions, and resources.

Effective: Fall 1997

Prerequisite:

HLHED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 1997

HLHED 501 **World Health Promotion** (3) Analysis of the various health problems that affect humans throughout the world; emphasis will be placed on personal health issues.

Effective: Fall 1997

HLHED 516 **Evaluation of Health Education and Promotion Programs** (3) Criteria and strategies to assess the impact of health education and health promotion programs in school, community, and corporate settings.

Effective: Fall 1997

HLHED 530 **Research Techniques in Health Education** (3) Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in the health education field.

Effective: Fall 1997

HLHED 552 **Current Health Education Issues** (3) Analysis of scientific and political foundations of current issues within health education tasks, with emphasis on research and action implications.

Effective: Fall 1997

HLHED 553 **Multicultural Health Issues** (3) This course is designed to explore cultural factors influencing the health status among racial/ethnic groups in the United States.

Effective: Summer 2002

HLHED 582 (EDUC 582) **Spirituality and Culture in Health and Education Professions** (3) This course focuses on the cultural aspects of spirituality and its place in the health and education professions.

Effective: Summer 2009

HLHED 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1997

HLHED 591 **Capstone Seminar in Health Education** (3) Culminating or capstone experience for students in the M. Ed. program in Health Education.

Effective: Fall 1997

Prerequisite:

HLHED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1997

HLHED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 1997

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## Health Law (HLTHL)

**HLTHL 960 Food and Drug Law** (3) This survey course covers the federal regulation of food, human and animal drugs, medical devices, cosmetics, biologics, and agricultural biotechnology. The primary focus will be on the Federal Food, Drug, and Cosmetic Act and the operations of the U.S. Food and Drug Administration. The course will also cover related status implemented by the U.S. Department of Agriculture, the interaction between federal regulation and private tort litigation, and international trade in FDA-regulated products.

Effective: Spring 2012 Ending: Summer 2013

Prerequisite:

**HLTHL 960 Food and Drug Regulation** (3) This survey course covers the federal regulation of food, human and animal drugs, medical devices, cosmetics, biologics, and agricultural biotechnology. The primary focus will be on the Federal Food, Drug, and Cosmetic Act and the operations of the U.S. Food and Drug Administration. The course will also cover related status implemented by the U.S. Department of Agriculture, the interaction between federal regulation and private tort litigation, and international trade in FDA-regulated products.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**HLTHL 961 Bioethics and Public Health Law** (3) The course will focus on the laws governing ethical issues that arise in the course of providing medical care and ensuring public health. Specific topics include treatment at the end of life, reproductive rights, organ transplantation, genetic testing, human experimentation, and infectious disease control and prevention. A central theme is the conflict between patients' interests and the interests of others and/or social interests. This course also explores the intersection of ethics and economics in terms of the social right to care and the rationing of limited medical resources.

Effective: Summer 2012

**HLTHL 963 Healthcare Organization and Finance** (3) This introductory health law course will examine how the law influences the regulation, structure, financing, and delivery of healthcare in the United States. We will also consider the challenges facing healthcare providers, regulators, and consumers. Issues to be addressed include private health insurance and managed care, ERISA, COBRA, HIPAA, Medicare, Medicaid, fraud and abuse, and antitrust.

Effective: Summer 2012

**HLTHL 971 Law and Medicine** (3) This course focuses on law concerning the physician-patient relationship as well as bioethical issues that arise in that relationship. It covers confidentiality, medical malpractice, informed consent, the duty to treat, refusing life-sustaining medical treatment, physicians and patients on matters relating to patient care.

Effective: Fall 2008

**HLTHL 997 Special Topics** (1-9) Special topics in the Health Law field.

Effective: Spring 2008

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## Health Policy and Administration (H P A)

H P A 401 (IL) **Comparative Health Systems** (3) Comparative analysis of health services in selected developed and developing countries.  
Effective: Summer 2011

H P A 410 **Principles of Public Health Administration** (3) The rationale for, and the patterns of, public health service at all levels of government in the United States.  
Effective: Summer 2011

H P A 420 **Principles of Managed Care** (3) Survey of managed health care, including history, typology, current issues, management challenges, and impacts on patients, providers, and special populations.  
Effective: Summer 2011

H P A 430 **Health Care Leadership** (3) This course provides an opportunity to students to learn about the challenges of leadership in health care.  
Effective: Summer 2013  
Prerequisite:

H P A 433 **Administration of Hospital and Health Service Systems** (3) Analysis of administrative structures and interorganizational arrangements among hospitals and other health care organizations.  
Effective: Spring 1998  
Prerequisite:

H P A 440 (US;IL) (BB H 440) **Principles of Epidemiology** (3) Theory of epidemiology and significant case studies. Potential application to health care.  
Effective: Fall 2008  
Prerequisite:

H P A 440U (US;IL) (BB H 440U) **Principles of Epidemiology** (3) Theory of epidemiology and significant case studies. Potential application to health care.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

H P A 442 **Long-Term Care Management** (3) Management and policy issues for institutional, community, and home settings for chronic care services.  
Effective: Spring 1998  
Prerequisite:

H P A 445 (ECON 445) **Health Economics** (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.  
Effective: Spring 1994  
Prerequisite:

H P A 445W (ECON 445W) **Health Economics** (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.  
Effective: Spring 2008  
Prerequisite:

H P A 447 **Financing Health Care** (3) Analysis of financial flows, third party payment programs, and reimbursement practices in the health services sector.  
Effective: Fall 2011  
Prerequisite:

H P A 450 **Healthcare Policies and Politics** (3) Survey of health care's political contexts: formulation, implementation, and modification stages of policy process; politics of private interests (associations) at national and state levels.  
Effective: Summer 2011  
Prerequisite:

H P A 455 **Strategic Planning and Marketing for Health Services** (3) Introduction to principles and methods of strategic planning and marketing.  
Effective: Spring 1998  
Prerequisite:

H P A 460 **Human Resource Management in Health Care Organizations** (3) Foundations of human resource management applied to health care organizations, including hospitals, long-term care facilities, and community health organizations.  
Effective: Spring 1998  
Prerequisite:

H P A 470 **Health Care Information Management** (3) This course introduces information systems terminology, data structures, software applications, and their management functions in health services organizations.  
Effective: Summer 2000  
Prerequisite:

**H P A 490 Physician Practice Management (3)** Development of skills needed to effectively manage physician practices.  
Effective: Spring 2012  
Prerequisite:

**H P A 494H Senior Honors Thesis (1-6)** Independent study related to student's interests directed by a faculty supervisor and culminating in the production of a thesis.  
Effective: Summer 2006  
Prerequisite:

**H P A 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**H P A 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**H P A 497A Quality Management of HealthCare Services (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2013 Ending: Summer 2013

**H P A 497A Healthcare Leadership (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**H P A 497A Healthcare Leadership II (3)** Teambuilding and group leader course for HPA seniors.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**H P A 497B (BB H 497A) Immigrant Health Issues (3)** This course will review the demographic, cultural, economic, social, political and ethical factors that impact the health of immigrants to the United States.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**H P A 497B Human Diversity and Health Administration (3)** The health care literature makes frequent reference to the terms culture, cultural competence, diversity, and health disparities. Understanding these terms, their complex meanings and current application in health policy and administration is the subject matter of this course. By the end of the course students will be able to describe the above concepts and their use in health care policy; identify and describe the application of these concepts in health care administration; and demonstrate an understanding of these concepts and their application in health care practice.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**H P A 497C Introduction to Health Insurance and Payment (3)** This course covers basic concepts and issues related to health insurance and payment for health care providers. Topics covered in the course include theories behind demand for health insurance, mechanisms through which Americans obtain health insurance, the impact of health insurance on health, as well as payment arrangements for health care providers.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**H P A 503 Health Services Organizational Behavior (3)** A systematic application of the principles of organizational behavior to understanding professional roles in health services organizations.  
Effective: Spring 2011

**H P A 510 Health Services Financing and Policy (3)** Introduction to health policy focusing on health services financing, insurance and other current health policy topics.  
Effective: Spring 2011

**H P A 511 Research Seminar on Health Services Financing and Policy (3)** An examination of seminal and current research on health services financing, insurance and health policy.  
Effective: Spring 2011  
Prerequisite: Concurrent: H P A 510

**H P A 520 Introduction to Health Services Organizations and Delivery (3)** Introduction to health systems, health services organization and health care delivery focused on trends, problems and issues.  
Effective: Spring 2011

**H P A 521 Research Seminar on Health Services Organization and Delivery (3)** An examination of seminal and current research on health services organization and delivery, emphasizing costs, access and quality.  
Effective: Spring 2011  
Prerequisite: Concurrent: H P A 520

**H P A 523 Managerial Epidemiology (3)** Introduction to the principles and methods of managerial epidemiology and its application to health care.

Effective: Spring 2011

Prerequisite:

**H P A 524 Management of Health Services Organizations (3)** A systematic study of the roles of health services managers and the organizational and environmental context within which they work.

Effective: Spring 2011

**H P A 526 (SOC 526) Health Disparities (3)** This course provides an overview of social factors that lead to demographic disparities in health.

Effective: Summer 2012

**H P A 528 Health Data Analysis for Research (3)** Introduction to data sources and use of software for data management and analysis in health services research.

Effective: Spring 2011

Prerequisite:

**H P A 531 Health Problem Analysis (3)** Logic of empirical inquiry in study of community problems in health; integration of theory and practice, technical data, and values.

Effective: Summer 1995

**H P A 540 Epidemiological Applications in Health Services Research (3)** The course emphasizes theoretical as well as practical issues relating to applying advanced methods of epidemiology in health services research.

Effective: Fall 2001

Prerequisite:

**H P A 541 Poverty, Race, Ethnicity and Child Health (3)** Seminar focusing on disparities in infant, child, and adolescent health, and policies and programs impacting these disparities.

Effective: Spring 2011

**H P A 545 Introduction to Health Economics (3)** Survey of the application of economics to the roles of markets and government in health care.

Effective: Spring 2011

**H P A 547 Health Services Reimbursement (3)** Analysis of third party reimbursement of health care providers.

Effective: Summer 1992

Prerequisite:

**H P A 551 Quality Improvement in Healthcare (3)** Examination of major approaches to performance improvement in contemporary healthcare systems.

Effective: Summer 2010

**H P A 556 Strategy Development in Health Services Organization (3)** Integration of prior course work in the program to develop a strategic plan for a health services organization.

Effective: Spring 2011

Prerequisite:

**H P A 561 Introduction to Research Design in Health Services Research (3)** Review and critical analysis of state-of-the-art health services research methods.

Effective: Summer 1999

**H P A 562 Economics Applications in Health Services Research (3)** Application of theoretical and empirical tools of microeconomics to issues in health services utilization and delivery.

Effective: Spring 2011

Prerequisite:

**H P A 563 Organizational Studies in Health Services Research (3)** Applications of theoretical and empirical tools of organizational studies in the delivery of health care.

Effective: Spring 2011

Prerequisite:

**H P A 564 Research Methods in Health Services Research (3)** Introduction to regression models in health services research, including violations and tests of model assumptions and solutions for those violations.

Effective: Spring 2011

Prerequisite:

**H P A 566 Advanced Methods in Health Services Research I (3)** Advanced topics course focusing on extensions of the ordinary least squares regression model and nonlinear methods in health services research.

Effective: Summer 2010

Prerequisite:

**H P A 567 Advanced Methods in Health Services Research II (3)** Application of advanced methods to health services research topics focused on empirical approaches to causal inference in nonexperimental data.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

H P A 590 **Colloquium** (1-3) Introduction to the field of health services research.  
Effective: Summer 1998

H P A 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 1990  
Prerequisite:

H P A 596 (CSP D 596) **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1987

H P A 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 1987

H P A 597A **HealthCare Across the Lifecourse** (3) Introduce students to fundamental theories, concepts, issues, and strategies related to a population health approach to health and health services across the lifecourse.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

H P A 597B **Program Planning and Evaluation** (3) Theory and methods specifically applicable to program, design, and evaluation of human services within a lifespan perspective.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

H P A 600 **THESIS RESEARCH** (1-15) NO DESCRIPTION.  
Effective: Summer 1992

H P A 601 **PH.D. DISSERTATION FULL-TIME** (0) NO DESCRIPTION.  
Effective: Summer 1992

H P A 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Supervised and graded teaching experience in selected undergraduate Health Policy and Administration courses.  
Effective: Fall 1989  
Prerequisite:

H P A 610 **THESIS RESEARCH OFF-CAMPUS** (1-15) NO DESCRIPTION.  
Effective: Summer 1992

H P A 611 **PH.D. DISSERTATION PART-TIME** (0) NO DESCRIPTION.  
Effective: Summer 1992

H P A 805 **Change Leadership in Health Services Organizations** (3) Exploration of diagnostic and intervention strategies employed in planned change in health services organizations and programs.  
Effective: Spring 2011

H P A 822 **Clinical Issues for Health Services Management** (3) Introduction to current clinical issues in health services organizations focusing on the role of managers.  
Effective: Spring 2011

H P A 835 **Financial Management in Health Institutions** (3) The financial environment of health institutions; financial aspects of management decision making; emphasis on revenue sources, budgeting, and cost control.  
Effective: Fall 2009  
Prerequisite:

H P A 836 **Health Law** (3) The legal process as it applies to the health administrator, health organization, medical provider, and patient.  
Effective: Spring 2011  
Prerequisite:

H P A 850 **Health Care Marketing** (3) Introduction to the theory, concepts, skills, and principles of marketing applied to health related organizations and networks.  
Effective: Spring 2011  
Prerequisite:

H P A 855 **Information Systems in Health Services Administration** (3) Foundations of information systems for supporting clinical services, quality improvement, and administrative functions in health services management.  
Effective: Summer 2010  
Prerequisite:

H P A 895 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practica, or

internships. Written and oral critique of activity required.  
Effective: Summer 2010

H P A 896 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2009

H P A 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2008

H P A 897A **Health Care Operations Management** (3) WD course offering for the MHA On0line program.  
Effective: Summer 2013 Ending: Summer 2013

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## Hebrew (HEBR)

HEBR 401 **Advanced Hebrew--Conversation Emphasis** (3 per semester, maximum of 6) Development of oral proficiency through discussions focusing on issues in contemporary Jewish culture.  
Effective: Summer 2011

HEBR 402 **Advanced Hebrew--Reading Emphasis** (3 per semester, maximum of 6) Readings in representative works of traditional and modern literature; practice in composition; study of aspects of Jewish culture.  
Effective: Summer 2011

HEBR 451 **Advanced Biblical Hebrew** (3) Translation and analysis of selected readings in Biblical Hebrew texts; attention will be paid to grammatical as well as literary details.  
Effective: Spring 2007  
Prerequisite:

HEBR 452 **Readings in Biblical Hebrew** (3) Translation and analysis of selected readings in Biblical Hebrew texts; attention will be paid to grammatical as well as literary details.  
Effective: Spring 2007  
Prerequisite:

HEBR 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1994

HEBR 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

HEBR 496 **Independent Studies** (1-18) Creative projects including research and design which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1982

HEBR 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.  
Effective: Fall 1983

HEBR 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 1992

HEBR 499 (IL) **Foreign Study--Advanced Hebrew** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

HEBR 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1997

HEBR 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2003

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## **Hematology-Hy (HEM)**

HEM 721 **Hematology** (3) Some of the areas studied will be: Erythrocyte Disorders; Hemostasis; Myeloid Stem Cell Disorders; Lymphoproliferative and Immunoproliferative Diseases; Blood Banking; and Hematology Laboratory.  
Effective: Fall 2001  
Prerequisite:

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## Higher Education (HI ED)

HI ED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1995

HI ED 497A **Pro Seminar: Topics in the Study of Higher Education for HIED MED Students** (3) An orientation to graduate study in HI ED, exploration of foundational topics in HI ED, the identification of careers for HI ED MED.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1995

HI ED 503 (CI ED 503, EDTHP 507) **Ethnicity, National Identity, and Education** (3) Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.  
Effective: Summer 1995

HI ED 545 **Higher Education in the United States** (3) Introduction to the educational context and major organizational and academic characteristics of postsecondary education; analysis of issues and future trends.  
Effective: Summer 1995

HI ED 546 **College Teaching** (2-3) Principles involved in teaching at the college level; effective use of teaching aids; criteria used in evaluation.  
Effective: Summer 1995

HI ED 548 **Curriculums in Higher Education** (2-3) Various types of curriculums and philosophies underlying them; ways in which curriculums are developed; elective versus required courses; evaluation of achievement.  
Effective: Summer 1995

HI ED 549 (ADTED 549) **Community Junior College and the Technical Institute** (2-3) Distinctive contributions to meeting the need for postsecondary education; development, functions, curriculum and instruction, government, administration, and finance.  
Effective: Summer 1995

HI ED 552 **Administration in Higher Education** (3) Philosophy of administration; principles of scientific management and their application in colleges and universities; case studies of administrative problems.  
Effective: Summer 1995  
Prerequisite:

HI ED 553 (CI ED 553, EDTHP 553, SOC 553) **Educational Mobility in Comparative Perspective** (3) Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America.  
Effective: Spring 2003

HI ED 554 **The History of American Higher Education** (3) An examination of the development of American higher education against the background of influential social, political, economic, and intellectual issues.  
Effective: Summer 1995

HI ED 556 **Higher Education Students and Clientele** (3) Characteristics of higher postsecondary education students and other clientele; changes during postsecondary education years and during college; educational challenges and responses.  
Effective: Summer 1995

HI ED 557 (EDTHP 557, SOC 557) **Sociology of Higher Education** (3) Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis.  
Effective: Fall 2000  
Prerequisite:

HI ED 560 **Legal Issues in Higher Education** (3) A process for analyzing case law on issues of access, student rights, employment, collective bargaining, church/state, private sector, and liability.  
Effective: Summer 1995

HI ED 562 **Organizational Theory and Higher Education** (3) Application of social science theory and research to postsecondary education organizations and administration; use of research in administrative practice.  
Effective: Summer 1995



Prerequisite:

HI ED 571 (CI ED 571) **Comparative Higher Education** (3) Comparative methods of studying structural variations in systems of higher education in principal industrialized nations and other selected countries.  
Effective: Spring 1995

HI ED 585 (EDLDR 585, EDTHP 585) **Research Design: Implications for Decisions in Higher Education** (3) A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.  
Effective: Fall 2004  
Prerequisite:

HI ED 586 (EDLDR 586, EDTHP 586) **Qualitative Methods in Educational Research** (3) Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques.  
Effective: Fall 2004  
Prerequisite:

HI ED 587 (EDLDR 587, EDTHP 587) **Education Policy and Politics** (3) The political economy and bureaucratic politics of educational organizations, with special attention to the policy-making, implementation, and evaluation processes.  
Effective: Fall 2004

HI ED 588 (EDLDR 588, EDTHP 588) **Qualitative Methods in Educational Research II** (3) Advanced study of methods involved in executing and analyzing qualitative research in education.  
Effective: Summer 2007  
Prerequisite:

HI ED 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1995

HI ED 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1995

HI ED 595 **Internship in Higher Education** (1-9) Supervised experience in administrative offices, in research, on instructional teams, and in college teaching.  
Effective: Summer 1995

HI ED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and fall outside the scope of formal courses.  
Effective: Summer 1995

HI ED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 1995

HI ED 597A **Higher Education Engagement and Outreach** (3) This course is intended to provide graduate students with an overview of university engagement and outreach. Historical contexts for extension, outreach, and engagement will ground the subsequent exploration of perspectives and issues associated with the outward-facing mission embraced by many institutions of higher education. Distinguishing characteristics of extension, outreach, and engagement, respectively, will be presented as well as opportunities to delve into each of these forms of outreach. Of the three, engagement will be addressed in the greatest depth and will include considerations relevant to students planning faculty careers as well as those planning higher education administration careers. Guest speakers will be invited to share their particular areas of relevant expertise with students and readings will be drawn from a range of scholarly and practitioner sources.  
Effective: Summer 2013 Ending: Summer 2013

HI ED 597A **College Student Development** (3) Administrative and teaching effectiveness in postsecondary educational settings is largely dependent upon one's familiarity with and appreciation for the unique developmental needs of students. Student outcomes can be significantly enhanced when programs, services, curricula, and pedagogical techniques are designed by those who understand and intentionally apply appropriate theoretical frameworks to their work. Exposure to student development theory is essential in the academic preparation of postsecondary administrations and faculty, as students unarguable should be the primary focus of current and future efforts in higher education. To this end, theories that have emerged from years of research on college students will be reviewed and discussed in this course, with the ultimate goal of inspiring class members to become more reflective and intentional facilitators of environments and experiences that offer healthy, constructive developmental opportunities.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 597B **Higher Education Quantitative Analysis and Interpretation** (3) Practical course covering empirically analyzing higher education topics, including conceptualization, data management/analysis using SPSS, presenting results and preparation.  
Effective: Summer 2013 Ending: Summer 2013

HI ED 597B **Campus Environments** (3) Simply stated: context matters. While many would like to think that individuals' behaviors and outcomes are shaped by a person's character and internal characteristics alone, environment can have a powerful, and often unconscious, influence. This principle has been widely applied in social psychology, and particularly applies to the experiences of community members on college campuses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 597C (INSYS 597C) **Online Innovations in Learning and the Future of Education** (3) Examines MOOC's, badges, competency-based learning, prior to learning assessments, and trends, and extrapolates the future of K-12 and Higher Education.  
Effective: Summer 2013 Ending: Summer 2013

HI ED 597C (EDTHP 597C, EDLDR 597C) **Foundations of Educational Research** (3) This course is designed to begin a reading of the history and philosophies of education research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 597D (EDTHP 597D) **Data Analysis for Educational Research** (3) This course bridges theoretical statistics coursework and practical research with real, large-scale datasets.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 597E (EDTHP 597E, EDLDR 597E) **Reviewing and Editing for Education Policy Journals** (3) This course introduces advanced doctoral students to the major journals in the field of education policy and provides a systematic introduction to reviewing and editing policy journals in the field of education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 597F (EDLDR 597F, EDTHP 597F) **Race, Law and Education: Six U.S. Supreme Court Cases** (3) This class is designed to introduce students to the legal standards used to examine "race-conscious" policies intended to address racial/ethnic inequities in K-12 and higher education. We will consider the justifications educators have presented to support these policies, which justifications have been convincing to the Court, and how these justifications intersect across K-12 and higher education. We will also focus on how social science research has informed the legal developments in these cases. Over the course, we will cover six landmark U.S. Supreme Court cases on race and education, including *Brown v. Board of Education* (1954), the Court's most recent decision on K-12 voluntary desegregation policies, *Parents Involved in Community Schools v. Seattle School District No. 1* (2007), and the Court's forthcoming opinion on affirmative action in higher education, *Fisher v. University of Texas* (2013).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HI ED 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2005

HI ED 600 **Thesis Research** (1-15) No description.  
Effective: Summer 1995

HI ED 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 1995

HI ED 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 9) Preparation and presentation of materials in undergraduate classes under the supervision of a full-time faculty member.  
Effective: Fall 2012

HI ED 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1995

HI ED 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1995

HI ED 801 **Foundations of Institutional Research** (3) Survey course explores fundamental methods and research on campus decisions, enrollment management, faculty work analysis, institutional effectiveness, accreditation, student outcomes.  
Effective: Spring 2010

HI ED 810 **Planning and Resource Management in Higher Education** (3) Strategic planning and resource management in higher education through institutional research.  
Effective: Spring 2010

HI ED 820 **Studying Students & Student Affairs Program** (3) Studying the relationship of college activities to academic

success by students.  
Effective: Spring 2010

HI ED 830 **Designing Institutional Research Studies** (3) Develop skills to design and execute IR studies using quantitative and qualitative research methods.  
Effective: Spring 2010

HI ED 840 **Assessing Student Outcomes & Evaluating Academic Programs** (3) Academic program assessment/student outcomes in accountability and accreditation processes.  
Effective: Spring 2010

HI ED 850 **Analyzing Faculty Workload, Performance, and Compensation** (3) Develop research skills to analyze faculty workload and performance in teaching, research, outreach, and compensation.  
Effective: Spring 2010

HI ED 860 **Conducting Enrollment Management Studies** (3) Studies three stages of enrollment management: Pre-admission, initial student experience, and student success and completion.  
Effective: Spring 2010

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## History (HIST)

**HIST 400 Research in Ancient Sources** (3) Guided research in the literature of ancient Mediterranean civilizations.  
Effective: Spring 2008  
Prerequisite:

**HIST 401 (IL) (J ST 401) Ancient Technologies and Socio-cultural History in the Ancient Levant** (3) Social and intellectual development in the Ancient Levant as they affected and were affected by technological development.  
Effective: Spring 2006  
Prerequisite:

**HIST 402 (IL) The Rise of the Greek Polis** (3) Development of the Greek city-state from Homeric times to the fifth century B.C.; special references to Athenian society.  
Effective: Spring 2006  
Prerequisite:

**HIST 403 (IL) Alexander the Great and the Hellenistic World** (3) The career of Alexander, his impact on his own time, and the Hellenistic legacy.  
Effective: Spring 2006  
Prerequisite:

**HIST 405Y (IL) The Roman Empire** (3) The political and social history of the Roman empire; economic institutions and religious groups which influenced Roman administration.  
Effective: Spring 2006  
Prerequisite:

**HIST 406W Research in Medieval Sources** (3) Guided research in the literature of medieval Europe.  
Effective: Spring 2008  
Prerequisite:

**HIST 407 (IL) Early Medieval Society** (3) Rise of European nations and evolution of their social and political institutions from the time of Constantine to the Crusades.  
Effective: Spring 2006  
Prerequisite:

**HIST 408 (IL) Church and State in the High Middle Ages** (3) European political, institutional, and social history in light of church- state tensions from the Crusades to the Renaissance.  
Effective: Spring 2006  
Prerequisite:

**HIST 408U (IL) Church and State in the High Middle Ages** (3) European political, institutional, and social history in light of church- state tensions from the Crusades to the Renaissance.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**HIST 409Y (IL) (J ST 409Y, RL ST 407Y) European Anti-Semitism from Antiquity to the Present** (3) Surveys the history of anti-Semitism in Europe from antiquity through the Middle Ages to the present.  
Effective: Summer 2005

**HIST 410 (US;IL) (J ST 410, RL ST 410) Jews in the Medieval World** (3) Trends in medieval Jewish society under Islam and Western Christendom.  
Effective: Spring 2006

**HIST 411 (IL) (MEDVL 411) Medieval Britain** (3) Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.  
Effective: Spring 2006  
Prerequisite:

**HIST 411U (IL) (MEDVL 411U) Medieval Britain** (3) Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**HIST 412 (IL) Intellectual History of the Middle Ages** (3) Intensive study of selected topics, such as philosophy, mysticism, heresy, the church, literary and artistic expression, and science.  
Effective: Spring 2006  
Prerequisite:

**HIST 413 (IL) (MEDVL 413) Medieval Celtic Studies** (3) Celtic civilization from antiquity to the end of the middle ages.  
Effective: Spring 2006  
Prerequisite:

**HIST 414 (IL) Renaissance and Reformation** (3) The transformation of consciousness from medieval to modern times, with special emphasis on Renaissance Italy and Reformation Germany.  
Effective: Spring 2006  
Prerequisite:

- HIST 415 (US;IL) Race, Gender, and Politics in the United States and South Africa (3)** This thematic course will compare key issues, figures, and events in the historical development of the United States and South Africa.  
Effective: Spring 2013  
Prerequisite:
- HIST 416 (J ST 416) Zionist History 1890-1948 (3)** History of Zionist thought and politics to the foundation of Esrael 1948.  
Effective: Summer 1997
- HIST 417 (IL) The Age of Absolutism (3)** Seventeenth- and eighteenth-century royal absolutism in France, Prussia, and Austria; concurrent economic, social, and scientific developments; the Enlightenment.  
Effective: Spring 2006  
Prerequisite:
- HIST 418 (IL) The French Revolution and the Napoleonic Era (3)** Development of revolutionary France and the First French Empire and their impact on Europe from 1789 to the Vienna settlement.  
Effective: Spring 2006  
Prerequisite:
- HIST 418W (IL) The French Revolution and the Napoleonic Era (3)** Developments of revolutionary France and the First French Empire and their impact on Europe from 1789 to the Vienna settlement.  
Effective: Spring 2008  
Prerequisite:
- HIST 419 (US;IL) The History of Feminist Thought (3)** A critical analysis of European and United States feminist thought from the renaissance to the present.  
Effective: Spring 2013  
Prerequisite:
- HIST 420 (IL) Recent European History (3)** Impact of two World Wars in twentieth century; social conflict and economic catastrophe; political radicalism; post-1945 recovery and cooperation.  
Effective: Spring 2006  
Prerequisite:
- HIST 421 (IL) (WMNST 421) The History of European Women (3)** European women's lives from the Middle Ages to the present.  
Effective: Spring 2013  
Prerequisite:
- HIST 424H (J ST 424H, RL ST 424H) Monotheism and the Birth of the West (3)** The birth of monotheism and its relation to social organization, the idea of individuality, and science.  
Effective: Fall 2012  
Prerequisite:
- HIST 427 (IL) Germany Since 1860 (3)** Bismarckian power-state; rise to economic dominance; welfare and warfare under Weimar republic and Hitler; post-1945 reconstruction and democracy.  
Effective: Spring 2006  
Prerequisite:
- HIST 427U (IL) Germany Since 1860 (3)** Bismarckian power-state; rise to economic dominance; welfare and warfare under Weimar republic and Hitler; post-1945 reconstruction and democracy.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:
- HIST 428 (IL) (S T S 428) The Darwinian Revolution (3)** The origins and implications of evolutionary theory.  
Effective: Spring 2006  
Prerequisite:
- HIST 429 Europe in the Age of Nationalism, 1789-1914 (3)** Emphasizing the role of nationalism in European cultural, diplomatic and imperial developments; concurrent economic and social changes.  
Effective: Spring 2008  
Prerequisite:
- HIST 430 (IL) Eastern Europe in Modern Times (3)** Influence of geography, economic conditions, and nationalism upon the Eastern European and Balkan peoples; Pan-Slavism, conflicting interests of the great powers.  
Effective: Spring 2006  
Prerequisite:
- HIST 431 (US;IL) (AF AM 431) Black Liberation and American Foreign Policy (3)** This course deals with American foreign policy and Black liberation in Africa since 1945.  
Effective: Fall 2012  
Prerequisite:
- HIST 432 (IL) (AF AM 432) Between Nation and Empire: The Caribbean in the 20th Century (3)** An exploration of the political evolution of the Caribbean Region over the course of the 20th Century.  
Effective: Fall 2012  
Prerequisite:
- HIST 433 (IL) Imperial Russia, 1700-1917 (3)** Enlightened absolutism, mercantilism, westernization; economic progress,

liberal reforms, and revolutionary movement; major intellectual and cultural trends; Russia as great power.

Effective: Spring 2006

Prerequisite:

HIST 433U (IL) **Imperial Russia, 1700-1917** (3) Enlightened absolutism, mercantilism, westernization; economic progress, liberal reforms, and revolutionary movement; major intellectual and cultural trends; Russia as great power.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

HIST 434 (IL) **History of the Soviet Union** (3) Revolution; social, political, economic, and cultural continuity and change in the U.S.S.R. since 1917.

Effective: Spring 2006

Prerequisite:

HIST 435 **Topics in European History** (3 per semester/maximum of 9) Study of a particular period or country in European history, its significance and relation to other areas and the present. (May be repeated for credit.)

Effective: Spring 2008

Prerequisite:

HIST 436 (IL) **Great Britain Under the Tudors and Stuarts, 1485-1688** (3) Religious, political, and constitutional developments in the British Isles.

Effective: Spring 2006

Prerequisite:

HIST 436U (IL) **Great Britain Under the Tudors and Stuarts, 1485-1688** (3) Religious, political, and constitutional developments in the British Isles.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

HIST 437 (IL) **Great Britain 1688-1867** (3) Social, economic, and political history of Great Britain from late Stuart times until the mid-Victorian era.

Effective: Spring 2006

Prerequisite:

HIST 438 (IL) **Great Britain 1867-Present** (3) Social, economic, and political history of Great Britain from the mid-Victorian era to the present.

Effective: Spring 2006

Prerequisite:

HIST 440 (US) **Colonial America to 1753** (3) Background, establishment, and growth of the American colonies, including economic, political, social, religious, and intellectual developments.

Effective: Spring 2006

Prerequisite:

HIST 441 (US) **Revolutionary America, 1753-1783** (3) Forces in Great Britain and America causing withdrawal of thirteen colonies from the British Empire and the Revolutionary War.

Effective: Spring 2006

Prerequisite:

HIST 442 (US) **The Early American Republic, 1783-1850** (3) Confederation and Constitution; the Federalist and Jeffersonian periods; "the Era of Good Feelings"; "the Age of Jackson."

Effective: Spring 2006

Prerequisite:

HIST 444 (US) **The United States in Civil War and Reconstruction--1850-1877** (3) Causes of the Civil War; conduct of the war, North and South; impact of the war; problems of Reconstruction.

Effective: Spring 2006

Prerequisite:

HIST 444W (US) **The United States in Civil War and Reconstruction--1850-1877** (3) Causes of the Civil War; conduct of the war, North and South; impact of the war; problems of reconstruction.

Effective: Spring 2008

Prerequisite:

HIST 445 (US) **The Emergence of Modern America** (3) Economic, social, political history of the United States, 1877-1919, emphasizing growth of industrialism and development as a modern nation.

Effective: Spring 2006

Prerequisite:

HIST 446 (US) **America Between the Wars** (3) The Roaring Twenties, the Great Crash, Depression, and New Deal; war debts, reparations, isolationism, and World War II.

Effective: Spring 2006

HIST 447 (US) **Recent American History** (3) Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945.

Effective: Spring 2006 Ending: Fall 2013

Prerequisite:

HIST 447 (US) (AM ST 447) **Recent American History** (3) Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

HIST 448 (US) **America in the 1960s** (3) Social, political, and cultural themes in the United States in the 1960s.

Effective: Spring 2006

Prerequisite:

HIST 449 (US) **Constitutional History of the United States to 1877** (3) Colonial background; framing and adoption of the constitution; development of the court under Marshall and Taney; sectionalism, Civil War, Reconstruction.

Effective: Spring 2006

Prerequisite:

HIST 449U (US) **Constitutional History of the United States to 1877** (3) Colonial background; framing and adoption of the constitution; development of the court under Marshall and Taney; sectionalism, Civil War, Reconstruction.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

HIST 450 (US) **Constitutional History of the United States Since 1877** (3) Constitutional developments from laissez-faire to the welfare state; imperialism, war, internationalism; the contemporary court, civil liberties, and civil rights.

Effective: Spring 2006

Prerequisite:

HIST 451 (US) **The Consumer Revolution** (3) The origins and impact of American consumer society since 1870.

Effective: Spring 2006

Prerequisite:

HIST 451U (US) **The Consumer Revolution** (3) The origins and impact of American consumer society since 1870.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

HIST 452 (US;IL) **History of U.S. Foreign Relations** (3) History of U.S. foreign relations since 1789; emphasis on twentieth century.

Effective: Spring 2006

Prerequisite:

HIST 453 **American Environmental History** (3) The history of the ways Americans have used and thought about the environment since 1500.

Effective: Summer 2012

Prerequisite:

HIST 454 (US) **American Military History** (3) Development of U.S. military policy, 1776 to the present, emphasizing the conduct of our wars, interrelationship of civil and military authority.

Effective: Spring 2006

Prerequisite:

HIST 456Y (US) **The Social History of American Vernacular Building, 1607-1980** (3) Social, historical, and cultural context of American building including settlements, housing, workplaces, stores, recreational facilities; changes over time.

Effective: Spring 2006

Prerequisite:

HIST 457 (US;IL) (S T S 457, WMNST 457) **The History of Women in Science** (3) Critical analysis of the roles women, gender, and minorities have played in natural sciences.

Effective: Spring 2013

Prerequisite:

HIST 458Y (US) (LER 458Y) **History of Work in America** (3) A study of selected problems in the history of work in the United States, especially since 1877.

Effective: Spring 2008

Prerequisite:

HIST 459Y (US) **Social and Cultural History of the United States Since 1783** (3) Role of immigration, social reform movements, religion, education, science, literature, and the arts in American history.

Effective: Spring 2006

HIST 460 (US;IL) **United States Foreign Intelligence** (3) Aims, methods, and organization of U.S. foreign intelligence from the American Revolution to the Cold War and beyond.

Effective: Spring 2006

HIST 461 (US;IL) **The Emergence of the American City: 1100-1880** (3) The growth of American cities from their urban origins in Europe and the Native-American Southwest to 1880.

Effective: Spring 2006

HIST 462 (US;IL) **The Twentieth Century City** (3) Political, economic, social, and cultural transformations in American cities from 1880 to 2000.

Effective: Spring 2006

HIST 463 (US) **American Thought to 1865** (3) Introduction to, scholarly commentary on, major documents of American Intellectual history, early colonial period to end of the Civil War.

Effective: Spring 2006

Prerequisite:

HIST 464 (US) **American Thought from 1865** (3) Introduction to, scholarly commentary on, major documents of American Intellectual history from end of the Civil War to the present.

Effective: Spring 2006

Prerequisite:

HIST 465 (US) (AF AM 465) **Civil Rights and American Politics 1933-1968** (3) The civil rights struggle and its impact upon American politics.

Effective: Spring 2013

Prerequisite:

HIST 466 (US;IL) (WMNST 466) **Lesbian and Gay History** (3) Critical exploration of the history of sexuality, focusing especially on the emergence of modern lesbian and gay identities.

Effective: Spring 2013

Prerequisite:

HIST 467 (US;IL) (LTNST 467) **Latin America and the United States** (3) Historical development of policies of the United States with regard to Latin- American affairs from colonial times to the present.

Effective: Fall 2008

HIST 468 (IL) **Mexico and the Caribbean Nations in the Twentieth Century** (3) Political, economic, and social development in Mexico and the Caribbean since 1900. Emphasis on Mexican, Guatemalan, and Cuban revolutions.

Effective: Spring 2006

HIST 469 (CRIMJ 469) **Drugs and Drug Policy in the United States** (3) Examines the history and dimensions of drug use and analyzes the impact of drug policy.

Effective: Spring 2008

Prerequisite:

HIST 470 **Modern Bondage: Slavery in the Americas, 1492-1888** (3) The work, culture, ideology, and political economy of slavery in the Americas between 1500 and 1888.

Effective: Summer 2007

Prerequisite:

HIST 470H **Modern Bondage: Slavery in the Americas, 1492-1888** (3) The work, culture, ideology, and political economy of slavery in the Americas between 1500 and 1888.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

HIST 471Y (IL) (RL ST 471Y) **Classical Islamic Civilization, 600-1258** (3) Pre-Islamic Arabia; Muhammad; Arab conquests; Islamic beliefs and institutions; literary, artistic, and scientific achievements; relations with Europe; breakdown of unity.

Effective: Fall 2006

HIST 472 (IL) **The Ottoman Empire and Other Muslim States** (3) Turkish and Mongol invasions; Mamluks; Ottoman expansion and institutions; Safavid Persia; disintegration and reform; emergence of modern Turkey and Iran.

Effective: Spring 2006

Prerequisite:

HIST 473 (IL) **The Contemporary Middle East** (3) Political, economic, and social changes in Turkey, Iran, Israel, and the Arab countries in the twentieth century; Arab-Israeli conflict.

Effective: Spring 2006

HIST 474 (JAPNS 426) **Early Modern Japan** (3) Japanese history from 1580-1880.

Effective: Spring 2013

Prerequisite:

HIST 475Y (IL) **The Making and Emergence of Modern India** (3) India's transition to social, economic, and political modernity through the experience of British colonial rule and the nationalist struggle.

Effective: Spring 2006

Prerequisite:

HIST 477 **American Military History to 1900** (3) Development of United States military policy, 1776-1900, emphasizing conduct of wars, interrelationship of civil and military authority.

Effective: Spring 2008

Prerequisite:

HIST 478 **American Military History Since 1900** (3) Development of United States military policy in the 20th and 21st centuries, emphasizing conduct of wars, interrelationship of civil and military authority.

Effective: Spring 2008

Prerequisite:

HIST 479 (IL) **History of Imperialism and Nationalism in Africa** (3) Theories and types of imperialism; varied patterns of colonial administration; initial African responses; nationalism; decolonization and independence.



Effective: Spring 2006

Prerequisite:

**HIST 480 (IL) Medieval Japan (3)** An overview of Japan between 1150-1550, a period of political decentralization, cultural efflorescence, and social change.

Effective: Spring 2006

Prerequisite:

**HIST 481 (IL) Modern Japan Since 1800 (3)** The transformation of Japan from a pre-modern, isolated, and agricultural nation into a highly industrialized world power.

Effective: Spring 2006

Prerequisite:

**HIST 482 (CHNS 424) Confucius and the Great Books of Early China (3)** This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China.

Effective: Spring 2013

Prerequisite:

**HIST 483 (IL) Chinese Society and Culture to 1800 (3)** The social, political, and cultural issues and developments from ancient to the late-imperial times.

Effective: Spring 2006

Prerequisite:

**HIST 484Y (IL) History of Chinese Thought (3)** A study of the dynamic historical development of Chinese thought with its diverse expressions from antiquity to the present.

Effective: Spring 2006

Prerequisite:

**HIST 485Y (IL) Nineteenth-Century China (3)** Ch'ing society and institutions; "opening" to the west; imperialism; domestic upheaval and its effect upon Chinese society; reform movements.

Effective: Spring 2006

Prerequisite:

**HIST 486 (IL) Twentieth-Century China (3)** China from the Republican Revolution of 1911 to the present; nationalism, cultural change; development of communism.

Effective: Spring 2006

Prerequisite:

**HIST 487 American Diplomacy, 1776-1914 (3)** Developments in the foreign policy of the United States from independence to the eve of World War I.

Effective: Spring 2008

Prerequisite:

**HIST 488 American Diplomacy Since 1914 (3)** Developments in the foreign policy of the United States since the eve of World War I.

Effective: Spring 2008

Prerequisite:

**HIST 489 (IL) (PL SC 486, ASIA 489) International Culture in East Asia (3)** Study of the role of culture in East Asian regional and East-West international relations.

Effective: Summer 2013

Prerequisite:

**HIST 490 (L ST 490) Archival Management (1-3)** Introduction to the principles and procedures in the management of archives and historical manuscripts.

Effective: Fall 1978

**HIST 491 (IL) British Civil Wars and Revolutions, 1639-1651 (3)** This is an advanced course on the history of the general crisis in the British Isles, from the outbreak of war between England and Scotland in 1639 to the securing of the Commonwealth regime following the destruction of the last major royalist army in 1651.

Effective: Fall 2009

Prerequisite:

**HIST 492 (IL) Witchcraft in Early Modern Europe (3)** Survey of the social, economic, political, and religious conditions of accusations and prosecutions of witchcraft in western Europe and north America, from 1500 to 1700.

Effective: Fall 2009

Prerequisite:

**HIST 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**HIST 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**HIST 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.

Effective: Summer 1986

Prerequisite:

**HIST 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**HIST 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**HIST 497A Radicalism in American History** (3) Movements for social change: programs/methods of particular groups, how they understood contemporary problems, possibilities for social change, relationship to American society.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HIST 497B (J ST 497B) The Holocaust** (3) This course for advanced undergraduate students will focus on the actual history and the historiography of the Holocaust. After discussion some of the most important studies about the Holocaust and the main historiography debates, we will look at the origins and the evolution of the "Final Solution." The class will touch on the function of the "Ghettos," the role of the mobile killing units, the extermination camps, and Jewish resistance. Apart from discussion the historiography, we will work mostly with primary sources: documents created by the perpetrators, bystanders, and victims; files relating to postwar trials of perpetrators; photographs; representations of objects relating to the Holocaust; memoirs by survivors; interviews with survivors and bystanders. Students are expected to do extensive reading for this class and prepare oral presentations on their respective paper topic. The research paper for this course will be based largely on primary sources.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HIST 499 (IL) Foreign Study--History** (1-6) Study in selected foreign countries of various periods and topics in history.

Effective: Summer 2005

Prerequisite:

**HIST 500 Theory, Method and the Practice of History** (3) An examination of the theory and methodologies of the historical discipline and classic works of historiography.

Effective: Fall 2012

**HIST 502 Historiography** (3) No description.

Effective: Winter 1978

**HIST 503 Studies in Greek History** (3-6) No description.

Effective: Winter 1978

**HIST 504 Studies in Roman History** (3-6) No description.

Effective: Winter 1978

**HIST 505 (J ST 505) Biblical Historiography in its Ancient Setting** (3 per semester/maximum of 6) Methods of historical reconstruction in Biblical and other historiography from the earliest Mesopotamian records through those of the 6th century B.C.E.

Effective: Spring 1995

Prerequisite:

**HIST 509 Medieval Civilization** (3-9) No description.

Effective: Winter 1978

**HIST 511 Topics in Medieval Britain** (3 per semester, maximum of 6) Readings and research in major themes of the history of medieval Britain.

Effective: Summer 1994

**HIST 512 Church and State in Medieval Europe** (3) This course provides students with an overview of the political developments of church and secular government in medieval Europe.

Effective: Fall 2011

**HIST 514 The Early Modern World: Empires, Trade, and Religion** (3) This course provides an overview of early modern history, with an emphasis on cultural encounters between the different global regions.

Effective: Summer 2012

**HIST 515 Early Modern Europe** (3-6) A graduate seminar examining selected topics in early modern European history through readings, discussions, and research papers.

Effective: Spring 1987

**HIST 516 (WMNST 516) US Women's and Gender History (3)** A critical analysis of gender and theories of gender in selected American historical contexts.  
Effective: Fall 2012

**HIST 520 Studies in Twentieth-Century Europe (3-6)** No description.  
Effective: Winter 1978

**HIST 522 Studies in Modern European Intellectual History (3-6)** A seminar examining developments in modern European intellectual history through readings, class discussions, and research papers.  
Effective: Summer 1986

**HIST 524 Deviance, Crime and Madness in Modern Europe (3)** Historiography of deviance, crime, and madness in Europe from the late-18th century to the present.  
Effective: Fall 2013 Future: Fall 2013

**HIST 525 Imperial Borderlands in Modern Europe (3)** This course provides students with an overview of the processes of constructing borders in a variety of forms, ethnic, religious, trade, and linguistic, in a European imperial context.  
Effective: Summer 2012

**HIST 527 Societies, Citizens, and Violence in Modern Europe (3)** The social and cultural history of warfare in modern Europe, with specific emphasis on the First and Second World Wars.  
Effective: Fall 2011

**HIST 529 Methods in Modern Social History (3 per semester, maximum of 6)** Sources, interpretations, research methods, and current debates in modern social history.  
Effective: Summer 1994

**HIST 530 Methods in the History of Science and Technology (3 per semester, maximum of 6)** Modern research methods and historiographical controversies in the history of science and technology.  
Effective: Summer 1994

**HIST 531 Religion and State-Making in the Early Modern World, 1400-1800 (3)** This course provides students with an overview of the process of state-making in relationship to religious convictions in the Early Modern era, ca. 1400- 1800.  
Effective: Summer 2012

**HIST 533 Studies in Russian and Soviet History (3-6)** No description.  
Effective: Winter 1978

**HIST 534 The Catholic World 1540-1770 (3)** This course examines the relationship between world history and Catholicism.  
Effective: Summer 2012

**HIST 535 History of the Body (3)** This course provides students with an overview of the contribution of intellectual and cultural historians to the field of "body history."  
Effective: Summer 2012

**HIST 537 Studies in British History (3-6)** No description.  
Effective: Winter 1978

**HIST 539 Topics in Military History (3 per semester, maximum of 9)** Studies in the history of wars and of the political, social, economic, diplomatic, and theoretical foundations of warfare.  
Effective: Summer 1994

**HIST 540 Studies in Colonial and Revolutionary America (3-6)** No description.  
Effective: Fall 1983

**HIST 541 War in the Early Modern and Modern World (3)** The study of the causes, conduct, and political, social, diplomatic, cultural, and economic consequences of war from 1500 to the present.  
Effective: Summer 2012

**HIST 542 The United States and Global Migration 1815-1924 (3)** Students study the impact of immigration on American society in a global setting.  
Effective: Fall 2011

**HIST 543 Topics in Antebellum America** (3 per semester, maximum of 6) Social, intellectual, and cultural developments from the period after the nation's founding until the start of the Civil War.  
Effective: Summer 1994 Ending: Summer 2013

**HIST 543 Antebellum America 1789-1860** (3 per semester, maximum of 6) Social, intellectual, and cultural developments from the period after the nation's founding until the start of the Civil War.  
Effective: Fall 2013 Future: Fall 2013

**HIST 544 Topics in the Civil War and Reconstruction** (3 per semester, maximum of 6) Background and impact of the Civil War and the two succeeding decades, with emphasis on historiography and selected topics.  
Effective: Summer 1994

**HIST 545 Topics in Gilded Age and Progressive Era America, 1877-1919** (3 per semester, maximum of 6) Social, political, economic, and cultural history of the United States from the Gilded Age through Progressivism and World War I.  
Effective: Summer 1994 Ending: Summer 2013

**HIST 545 Emergence of Modern America, 1860-1919** (3 per semester, maximum of 6) Social, political, economic, and cultural history of the United States from the Civil War through Progressivism and World War I.  
Effective: Fall 2013 Future: Fall 2013

**HIST 546 Topics in United States History Since 1919** (3 per semester, maximum of 6) Readings and research in major themes of the history of the United States in the twentieth century.  
Effective: Summer 1994 Ending: Summer 2013

**HIST 546 The Rise and Fall of Modern America, 1919 to the present** (3 per semester, maximum of 6) Readings and research in major themes of the history of the United States in the twentieth century.  
Effective: Fall 2013 Future: Fall 2013

**HIST 547 Slavery in the Americas** (3) Slavery in South America, the Caribbean, and North America from 16th century European colonization through the 19th century abolition movement.  
Effective: Summer 2012

**HIST 548 Topics in United States South** (3 per semester, maximum of 6) Major themes of southern United States history.  
Effective: Summer 1994

**HIST 549 Topics in African-American History** (3 per semester, maximum of 6) Readings, research, and methods in the study of African-American history.  
Effective: Summer 1994

**HIST 551 The African American Freedom Struggle in the Twentieth Century** (3) Theory and history of African American freedom movements for social and political change in the 20th century US.  
Effective: Summer 2012

**HIST 552 Late Modern America Society, Culture, and Politics 1975-2008** (3) This course considers the political, cultural and social history of the United States from 1975 to the present.  
Effective: Summer 2012

**HIST 555 Topics in American Labor History** (3 per semester/maximum of 6) American working-class experience from its artisanal and agricultural roots through the rise, maturation, and transformations of industrial capitalism.  
Effective: Spring 2012

**HIST 556 Social Movements in the Twentieth Century US** (3) Students study the theory and history of movements for social and political change in the 20th century US.  
Effective: Summer 2012

**HIST 560 Topics in American Religion** (3 per semester, maximum of 6) The social, political, and intellectual contexts of American religious thought.  
Effective: Spring 2012

**HIST 567 Latin American Social History, 1500-1900** (3) This course provides students with an overview of the social history of Latin America, 1500-1900.  
Effective: Summer 2012

**HIST 568 Early Modern Iberia and the Americas** (3) This course studies the creation of Portugal, Spain, and their empires in the Americas in the fifteenth to seventeenth centuries.

Effective: Summer 2012

**HIST 569 Seminar in Latin-American History (3-6)** No description.

Effective: Winter 1978

**HIST 570 Modern Latin American and Caribbean History (3)** This course provides students with an overview of the historiography of modern Latin America and the Caribbean.

Effective: Summer 2012

**HIST 571 History of the US-Mexico Borderlands (3)** This course examines the history and historiography of the US-Mexico Borderlands from the mid-nineteenth century to the mid-twentieth century.

Effective: Summer 2012

**HIST 572 Race and Empire in the Americas, Caribbean & Pacific (3)** An overview of the US as an empire in Latin America, the Caribbean and Pacific in the modern era.

Effective: Summer 2012

**HIST 580 Pre-modern China (3)** This course provides students with an overview of the literature and themes in pre-modern Chinese history.

Effective: Summer 2012

**HIST 581 Late Imperial and Modern China (3)** This course provides students with an overview of the literature and themes in late imperial and modern Chinese history.

Effective: Summer 2012

**HIST 582 Women and Gender in Modern Chinese History (3)** Examines the historical literature on women and gender in late imperial and twentieth century China.

Effective: Summer 2012

**HIST 585 Culture and Society in Late Imperial China (3)** This course examines the cultural developments of late imperial China (14th-18th century) in their broad social contexts.

Effective: Fall 2012

**HIST 586 Modern Japan (3)** This course provides students with an overview of the literature and themes in modern Japanese history.

Effective: Summer 2012

**HIST 587 Topics in Modern South Asian History (3 per semester, maximum of 6)** Research and readings in the history of South Asia since the late eighteenth century.

Effective: Summer 1994

**HIST 588 Ethnicity and Borderlands in Late Imperial China (3)** An examination and overview of literature and themes related to ethnicity, borderlands, and governance in late imperial China.

Effective: Summer 2012

**HIST 589 World History: Themes and Approaches (3)** This course provides students with the thematic and theoretical foundation for the study and teaching of world history.

Effective: Summer 2012

**HIST 591 Archives Practicum (3-6)** Training and supervised work experience in archival activities--Option A: Archival Management; Option B: Oral History.

Effective: Winter 1978

Prerequisite:

**HIST 592 Proseminar (3-9)** Readings in fundamental historical works; different sections will treat such topics as United States History and Early Modern History.

Effective: Summer 1998

**HIST 593 Research Seminar (3)** Seminar in research methods of the discipline.

Effective: Summer 2009

Prerequisite:

**HIST 595 Internship (1-12)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 1987

Prerequisite:

**HIST 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**HIST 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**HIST 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**HIST 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**HIST 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Students enrolled will lead discussion sections, grade papers and examinations, given an occasional lecture, and assist instructors in planning survey level courses.  
Effective: Fall 1983

**HIST 603 Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Spring 2002

**HIST 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**HIST 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Homeland Security (HLS)

HLS 558 (PSY 558, PHP 558) **Disaster Psychology** (3) Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.

Effective: Spring 2012

Prerequisite:

HLS 594 (PHP 594) **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2012

Prerequisite:

HLS 801 (P ADM 801) **Homeland Security Administration: Policies and Programs** (3) Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management approaches.

Effective: Summer 2010

HLS 803 (PHIL 803) **Homeland Security: Social and Ethical Issues** (3) This course will examine the social, political, legal, and ethical issues that arise in the context of homeland security.

Effective: Summer 2010

HLS 805 (CRIM 805) **Violence, Threats, Terror, and Insurgency** (3) This course provides overview of the domestic and global issues related to homeland security.

Effective: Summer 2010

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## Horticulture (HORT)

**HORT 402W Plant Nutrition** (3) Mineral nutrition of higher plants, including nutrient acquisition, transport, metabolism, and practical implications.

Effective: Summer 2013

Prerequisite:

**HORT 407 Plant Breeding** (3) The scientific principles and techniques of utilizing genetic variability in improving the heredity of plants for specific purposes.

Effective: Summer 2013

**HORT 408 Landscape Plant Establishment and Maintenance** (4) The principles and practices involved in the establishment of plants in the landscape, and their subsequent maintenance.

Effective: Summer 2013

Prerequisite:

**HORT 410W Issues in Landscape Contracting** (3) This will be a survey of business management, regulatory, and environmental issues facing the landscape contracting profession. Laboratory.

Effective: Summer 2013

Prerequisite:

**HORT 412W Post-Harvest Physiology** (3) Harvesting, handling, storage, and transportation of horticultural crops; primary emphasis on physiological response to pre- and post-harvest environmental factors.

Effective: Summer 2013

Prerequisite:

**HORT 420 Plant Growth Regulators** (3) Plant growth regulators, their chemical and physical properties; general principles, practices, and applications in regulating plant growth and development.

Effective: Summer 2013

Prerequisite:

**HORT 431 Small Fruit Culture** (3) Cultural requirements and production practices of the principal small fruit crops: strawberries, grapes, blueberries, brambles, and cranberries.

Effective: Summer 2013

Prerequisite:

**HORT 432 Deciduous Tree Fruits** (3) Science, art, and techniques of regulated cropping; orchard designs and management systems.

Effective: Summer 2013

Prerequisite:

**HORT 433 Vegetable Crops** (3) Cultural requirements of important vegetable crops in conjunction with physiological processes and problems related to commercial production.

Effective: Summer 2013

Prerequisite:

**HORT 445 Plant Ecology** (3) Advanced lectures on plant ecology which stress integration of physiological, population-level and community-level phenomena, and ecology in agriculture.

Effective: Summer 2013

Prerequisite:

**HORT 450 Greenhouse Management** (3) Maintenance and manipulation of the greenhouse production systems including structures, covers, light, temperature, carbon dioxide, water, growing media, fertilizer and greenhouse cost accounting.

Effective: Summer 2013

Prerequisite:

**HORT 453 Flower Crop Production and Management** (3) Production of greenhouse flower and foliage plants; development of management skills for a greenhouse business.

Effective: Summer 2013

Prerequisite:

**HORT 455 Retail Horticulture Business Management** (3) The nature, operation, and management of retail horticulture business, emphasizing retail greenhouses, nurseries, and flower shops.

Effective: Summer 2013

Prerequisite:

**HORT 457 Interior Landscaping** (3) Foliage identification, environmental factors affecting plants, concepts of interior plant design, installation and maintenance.

Effective: Summer 2013

Prerequisite:

**HORT 459 (BIOTC 459, BIOL 459) Plant Tissue Culture and Biotechnology** (3) Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

Effective: Summer 2013

Prerequisite:

**HORT 464 Landscape Construction I** (4) Standards, processes, and computations for site grading, drainage, earthwork,



vehicular circulation, parking; detailing, and finishing of landscape construction materials.

Effective: Summer 2013

Prerequisite:

**HORT 466 Landscape Construction II** (5) Project scheduling methods, plant installation techniques, and field layout principles and practices. Implications of site preparation.

Effective: Summer 2013

Prerequisite:

**HORT 468 Landscape Estimating and Bidding** (2) Reading and interpreting contract drawings and specifications, quantity take-offs, cost estimating, and bid document preparation.

Effective: Summer 2013

Prerequisite:

**HORT 490 Senior Seminar** (1) Exploration of the interrelationships of horticulture, science, and society; evaluation of attributes and abilities related to various career opportunities.

Effective: Summer 2013

Prerequisite:

**HORT 495 Internship** (1-13) Supervised off campus experience in a public or commercial horticultural enterprise. Written and oral critique of activity required.

Effective: Summer 2013

Prerequisite:

**HORT 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

**HORT 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

**HORT 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

**HORT 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2013

**HORT 499C (IL) (INTAG 499C) Food Security Strategies for Smallholder Agriculture in Southeast Asia** (2) This course explores regional food security issues and poverty alleviation strategies for small farms. Requires travel to Southeast Asia between semesters.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HORT 499D (IL) (INTAG 499D) Food Security Strategies for Smallholder Agriculture in Southeast Asia** (1) This course explores regional food security issues and poverty alleviation strategies for small farms. Requires travel to Southeast Asia between semesters.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**HORT 514 (PLBIO 514) Modern Techniques and Concepts in Plant Ecophysiology** (2) An intensive introduction to concepts of plant ecophysiology and modern techniques used in this field.

Effective: Summer 2013

Prerequisite:

**HORT 517 Ecology of Plant Roots** (2) Form and function of roots from an ecological perspective using examples from both wild and crop plants.

Effective: Summer 2013

**HORT 520 Advanced Plant Growth Regulators** (2) Advanced topics in plant growth regulators, their chemical and physical properties; physiological, biochemical and molecular regulation of plant growth and development.

Effective: Summer 2013

Prerequisite:

**HORT 524 Experimental Procedures in Plant Science Research** (3) Experimental methods, computer techniques, interpretation of statistical analyses, and communication of research results.

Effective: Summer 2013

Prerequisite:

**HORT 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2013

**HORT 596 Individual Studies** (1-9) Creative projects including non-thesis research, supervised on an individual basis and

which fall outside the scope of formal courses.  
Effective: Summer 2013

HORT 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2013

HORT 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2013

HORT 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2013

HORT 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Provides an opportunity for horticulture graduate students to gain experience in teaching under the supervision of a faculty member.  
Effective: Summer 2013

HORT 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2013

HORT 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2013

HORT 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2013

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## Hotel, Restaurant, and Institutional Management (HRIM)

**HRIM 411 Beverage Management and Wine Selection** (3) Management issues in beverage service and products. Students taste wines, brews, and distilled spirits.

Effective: Spring 2004

Prerequisite:

**HRIM 413 New Product Development for Commercial Foodservice** (3) This course introduces students to a new product development process that requires coordination, communication, and integration throughout the organization.

Effective: Spring 2010

Prerequisite:

**HRIM 415 International Cuisine** (3) Cooking and eating practices of cultures around the world, including historical, religious, cultural, geographic, and political influences on each cuisine.

Effective: Spring 2007

Prerequisite:

**HRIM 430 Advanced Food Production and Service Management** (3) Simulation and application of technical, conceptual, interpersonal skills. Emphasis on group dynamics; improvement in managerial skills; management team functions.

Effective: Spring 2007

Prerequisite:

**HRIM 435 Financial Management in Hospitality Operations** (3) Fiscal techniques in the development, management, and control of hospitality establishments.

Effective: Spring 2011

Prerequisite:

**HRIM 437 Hospitality Project Evaluation and Funding** (3) Current techniques for project evaluation in the hospitality industry; trends in hospitality project funding.

Effective: Spring 2004

Prerequisite:

**HRIM 438 Cases in Financial Analysis** (3) Financial analysis and decision making is examined through a series of hospitality-oriented cases.

Effective: Spring 2004

Prerequisite:

**HRIM 442 Hospitality Marketing** (3) Marketing management in the hospitality industry, including analyzing the market through market research and developing a marketing plan.

Effective: Fall 2010

Prerequisite:

**HRIM 443 Sales Planning and Advertising for Hospitality Operations** (3) Elements of sales management, advertising, promotion, and public relations as applied to hospitality organizations.

Effective: Fall 2010

Prerequisite:

**HRIM 466 (US) Human Resource Management in the Hospitality Industry** (3) Recruitment, selection, training, performance appraisal, and compensation of hospitality human resources in today's culturally diverse work force.

Effective: Fall 2010

Prerequisite:

**HRIM 467 Management of Hotel and Restaurant Employee Relations** (3) Survey and analysis of managerial strategies for employee relations in hospitality operations.

Effective: Fall 2010

Prerequisite:

**HRIM 471 Evaluation of Hospitality Technology** (3) This course provides students with an understanding of the variety of information technologies used in the hospitality industry.

Effective: Spring 2012 Ending: Fall 2013

Prerequisite:

**HRIM 471 New Trends and System Selection in Hospitality Information Technology** (3) This course introduces the student to new information technology in the hospitality industry and to the system selection process.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**HRIM 480 Advanced Hotel Management** (3) Advanced hotel operations, internal control systems, and service philosophy. Integrates management, departmental operations, law, technology applications, marketing and managerial accounting.

Effective: Spring 2007

Prerequisite:

**HRIM 482 Hospitality Real Estate** (3) The course focuses on commercial real estate concepts related to the hospitality industry.

Effective: Fall 2010

Prerequisite:

**HRIM 483 Revenue Management** (3) Students learn how to effectively implement revenue management strategies and

techniques in the hospitality industry.

Effective: Spring 2011

Prerequisite:

**HRIM 484 Hospitality Entrepreneurship (3)** The course focuses on successfully launching new business ventures in the hospitality industry.

Effective: Summer 2013

Prerequisite:

**HRIM 486 Casino Marketing (3)** Students will learn marketing techniques for casinos which take into account the external environment, individual consumer choices, and ethical considerations.

Effective: Summer 2010

Prerequisite: Concurrent: HRIM 487

**HRIM 487 Casino Operations and Societal Impact of Gaming (3)** Students will learn the structure, culture, and ethical responsibility toward disordered gambling and other lifestyle issues of modern casinos.

Effective: Summer 2010

Prerequisite: Concurrent: HRIM 486

**HRIM 490W Strategic Hospitality Management (3)** This capstone writing-intensive class integrates content from throughout the previous curriculum, focusing on strategic application to current industry issues.

Effective: Fall 2010

Prerequisite:

**HRIM 492 Advanced Professional Seminar in Hotel, Restaurant and Institutional Management (1)** Course prepares senior HR&IM students to assume leadership positions in the hospitality industry (Focus on careers, leadership, ethics, lifelong learning).

Effective: Spring 2004

Prerequisite: Concurrent: HRIM 430 HRIM 466 HRIM 490

**HRIM 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2004

Prerequisite:

**HRIM 495A Hotel Internships-PS Hospitality Services Internship (3)** Students will participate in a supervised internship with Penn State Hospitality Services.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**HRIM 495A Hotel Internships-PS Hospitality Services Internship (3)** A supervised work experience internship with Penn State Hospitality Services, including weekly class meetings.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**HRIM 495B Executive Internships-NLI (3)** Students will participate in a supervised internship with the Nittany Lion Inn.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**HRIM 495B Executive Internship-PSHS (3)** A project-oriented supervised internship with a Penn State Hospitality Services department head.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**HRIM 495C Housing and Food Service Internship (3)** A supervised rotational internship with a facility within PSU Housing & Food Service, including a weekly class meeting.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**HRIM 495D HRIM Teaching Assistant (1-6)** Student performs as a teaching assistant for an HRIM course. Assists faculty member with class.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**HRIM 495D HRIM Teaching Assistant (1-6)** Student performs as a teaching assistant for an HRIM course. Assists faculty member with class.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**HRIM 495E External/Off Campus Internship (1-6)** Students will participate in a supervised internship with an approved site participant. Internships are typically one semester in length.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**HRIM 495E External/Off Campus Internship (1-6)** Students will participate in a supervised internship with an approved site participant. Internships are typically one semester in length.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**HRIM 495E External/Off Campus Internship (1-3)** A supervised internship with an approved site participant. Internships are typically one semester or summer in length.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**HRIM 495F Housing & Food Service Internship (3)** Students will participate in a supervised internship with a facility within PSU Housing & Food Service.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**HRIM 495G Supervisory Internship (6)** Students will participate in a supervised internship with an approved site location.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**HRIM 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2004

**HRIM 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2004

**HRIM 497A Advanced Meeting Planning (3)** Students will apply advanced concepts and applications to Event & Meeting Planning and implement an event plan.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**HRIM 497A Meeting & Events I (3)** Students will learn concepts and applications to Event & Meeting Planning.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HRIM 497C Managing Continuing Care Retirement Communities (3)** Managing continuing care retirement communities.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HRIM 497E Corporate Social Responsibility (3)** Examines the role of ethics and corporate social responsibility in the hospitality industry.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HRIM 497F Entrepreneurship in the Hospitality Industry (3)** This course will explore the characteristics of the successful entrepreneur and the process of starting a new business venture.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HRIM 497F Hospitality Asset Management (3)** This course introduces financial management and related concepts for decision-making to enhance, maintain, monitor value and performance of hospitality assets.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HRIM 497I Special Topics in Restaurant Management (3)** Students learn about special or current issues in the restaurant and foodservice industry through library research, on-line activities, class presentations.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HRIM 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2008

**HRIM 498A International Hospitality Management (2-3)** International hospitality management, organization, practices and structures, cultural influences, and managing an international environment.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HRIM 498F International Food Service Management and Cuisine (3)** This course is designed to cover major European cuisines and oenology in a European setting.

Effective: Summer 2013 Ending: Summer 2013

**HRIM 498G French Cuisine and Culture (3)** Program will including intensive classes on language and culture, products, cuisine, wine, and also design and atmosphere.

Effective: Summer 2013 Ending: Summer 2013

**HRIM 498I International Hospitality Management (3)** This course is designed to expose students to international hospitality management, organization, practices, and structures in a European setting.

Effective: Summer 2013 Ending: Summer 2013

**HRIM 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2007

**HRIM 503 Research Methods in Hotel, Restaurant, and Institutional Management (3)** An introduction to the process of research; problem-solving approaches; the research proposal and the development of the research question.

Effective: Fall 2003

Prerequisite:

**HRIM 511 Services Marketing for the Hospitality Industry (3)** Hospitality services marketing.

Effective: Spring 2003

**HRIM 585 Seminar in Hotel, Restaurant, and Institutional Management (1-9)** This course is a doctoral seminar in HR&IM that addresses the conceptual foundations of the HR&IM knowledge base.

Effective: Fall 2003

**HRIM 586 Research Methods and Evaluation in Hotel, Restaurant, and Institutional Management (1-9)** This course is a doctoral seminar in HR&IM that addresses various research methodologies and evaluation procedures that are applicable to HR&IM.

Effective: Fall 2003

**HRIM 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2003

**HRIM 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2003

**HRIM 595 Internship (1-18)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 2003

**HRIM 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2003

**HRIM 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Fall 2003

**HRIM 597A Ph.D. Seminar on Hospitality Strategic Management (3)** The objective of this doctoral seminar is to explore the conceptual and applied dimensions of strategic management in the context of hospitality operations.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HRIM 597A Ph.D. Seminar on Interdisciplinary Research in Hospitality Inquiry (3)** The objective of this doctoral seminar is to explore conceptual and applied dimensions of interdisciplinary research in hospitality inquiry.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HRIM 599 Foreign Studies (1-2 per semester/maximum of 4)** Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2007

**HRIM 600 Thesis Research (1-15)** No description.

Effective: Fall 2004

**HRIM 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 2004

**HRIM 602 Supervised Experience in College Teaching (1-3 per semester, maximum of 6)** No description.

Effective: Fall 2004

**HRIM 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 2004

**HRIM 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Fall 2004

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## **Hum Dim Nat Res Env (HDNRE)**

### **HDNRE 574 Integrated Perspectives in Human Dimensions of Natural Resources and the Environment (3)**

Introduction to the integration and application of interdisciplinary concepts to contemporary natural resource and environmental issues.  
Effective: Fall 2008

### **HDNRE 575 Ethical Issues in Human Dimensions of Natural Resources and the Environment (3)**

Introduction to ethical issues in human dimensions of natural resources and the environment.  
Effective: Summer 2013

### **HDNRE 590 Human Dimensions in Natural Resources and the Environment Colloquium (1)**

Professional socialization and training, development, and assessment of meta-theoretical frameworks and cohort building.  
Effective: Summer 2013

Prerequisite:

### **HDNRE 597 Special Topics (1-9)**

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2009

### **HDNRE 600 Thesis Research (1-15 per semester/max of 99)**

No description.  
Effective: Summer 2009

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## Hum Res & Empmnt Rel (HRER)

HRER 500 **Topics in Comparative Industrial Relations** (3 per semester/maximum of 6) Similarities and differences of various aspects in industrial relations assessed within the political, economic, and historical contexts.  
Effective: Spring 2008

HRER 501 **Labor and Employment Law** (3) Legal context of employment in the United States.  
Effective: Spring 2008

HRER 502 **Organization of the Workplace** (3) Organization and transformations of the workplace and the labor process, including Taylorism, Fordism, and flexible forms.  
Effective: Spring 2008

HRER 503 **Seminar in International Human Resources Studies** (3) Seminar course exploring human resource studies from an international perspective.  
Effective: Summer 2013

HRER 504 **Seminar in Employment Relations** (3) Theory, process, and issues of employment relations, including collective bargaining and contract administration.  
Effective: Fall 2012

HRER 505 **Seminar in Human Resources** (3) Current human resource topics in the context of organizational strategy, planning, and responsibility.  
Effective: Spring 2011

HRER 510 **Introduction to Graduate Studies in Human Resources and Employment Relations** (1) An overview of professional development and research activities of scholars of Human Resources and Employment Relations.  
Effective: Spring 2008

HRER 512 **Research Methods in Human Resources and Employment Relations I** (3) Research design, sampling design, data collection, and analysis; modeling, means and comparison of means, correlation analysis; and case study.  
Effective: Spring 2008  
Prerequisite:

HRER 513 **Research Methods in Human Resources and Employment Relations II** (3) Continuation of research design, validity and reliability; experimental design and ANOVA; survey design, and multiple regression models.  
Effective: Spring 2012

HRER 516 **Labor Market Analysis** (3) Neoclassical, institutional and systemic theories of external and internal labor markets and their dynamics.  
Effective: Spring 2008

HRER 536 **Diversity in the Workplace** (3) Women and minorities in the workplace.  
Effective: Spring 2008

HRER 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2008

HRER 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 2008

HRER 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2008

HRER 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2008

HRER 597A **Seminar in International Human Resources** (3) This course will explore the practice of human resource management in an international context.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HRER 597B Work-Life Practices and Policies (3)** Explore the causes and consequences of conflicts between work, family, and other life commitments, and how these may be resolved.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HRER 599 (IL) Foreign Studies (1-12 per semester, maximum of 24)** Full-time graduate-level foreign study at overseas institution with whom linkages have been established.  
Effective: Spring 2008

**HRER 600 Thesis Research (1-15)** No description.  
Effective: Spring 2008

**HRER 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Spring 2008

**HRER 610 Thesis Research Off-Campus (1-15)** No description.  
Effective: Spring 2008

**HRER 800 International and Comparative Employment Relations (3)** This course examines employment relations systems in the world today and the influence of globalization on employment relations practice.  
Effective: Fall 2007

**HRER 802 Organizations in the Workplace (3)** This course provides students with an overview of selected managerial behavior and career topics in modern organizations.  
Effective: Fall 2007

**HRER 811 Labor and Employment Law II (3)** Advanced topics in labor and employment law; such areas as immigration, unemployment compensation, and safety/health.  
Effective: Fall 2011  
Prerequisite:

**HRER 816 Labor Market Analysis (3)** Neoclassical economic and institutional theoretical perspectives on labor supply, demand for labor, internal labor markets, wage determination and labor policies.  
Effective: Fall 2007

**HRER 836 Diversity in the Workplace (3)** This course examines workplace diversity, gender and race challenges facing employers and employees, and the skills for managing diversity.  
Effective: Fall 2007

**HRER 894 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

**HRER 897 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2010

**HRER 897B Strategic Business Concepts for HRER Professionals (3)** Increasingly in most sophisticated organizations, human resources has evolved from an administrative support function to being viewed as a strategic partner along with finance, operations, logistics, etc. - the other main players in most organizations. How has HR achieved this transformation? Primarily by doing two things, which will comprise the two halves of this course. In one half of the course, we will learn to analyze financial statements and to understand common corporate finance concepts. This is crucial for HR management to fully understand and support the business objectives of the organization, which are typically expressed in financial terms. HR managers need to be comfortable talking that talk; and understanding financial concepts such as what line items are involved when the business seeks to increase its gross margins, or which of the organizations's costs are fixed and what are variable?  
Effective: Summer 2013 Ending: Summer 2013

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## **Human Development (H DEV)**

H DEV 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1993

H DEV 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1993

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## Human Development and Family Studies (HD FS)

HD FS 401 **Project Planning, Implementation, and Evaluation in the Human Services** (3) Exercises and activities related to the design, planning, implementation and management, and evaluation of projects and programs in the human services.

Effective: Fall 2006

Prerequisite:

HD FS 402 **Human Services Seminar** (4) Presentations and discussion of contemporary human issues by students and visiting professionals.

Effective: Summer 1997

Prerequisite:

HD FS 405 (US) **Gender and Social Development** (3) A review of gender-related patterns of social development over the lifespan, as influenced by biological, sociological, and psychological factors.

Effective: Spring 2006

Prerequisite:

HD FS 410 **Communities and Families** (3) Family and community interaction, emphasizing strategies for intervention to solve family-community problems.

Effective: Spring 1996

Prerequisite:

HD FS 411 **The Helping Relationship** (3) Theory and research related to interpersonal conditions which facilitate personal growth; intensive interpersonal competency training.

Effective: Spring 1996

Prerequisite:

HD FS 412 **Adult-Child Relationships** (3) Theories, research, and application of adult behavior for maximizing adult-child relationships and optimizing child socialization and self-development.

Effective: Spring 2007

Prerequisite:

HD FS 413 **Developmental Problems in Adulthood** (3) Analysis of individual developmental problems from young adulthood through old age and their prevention and modification.

Effective: Spring 2001

Prerequisite:

HD FS 414 **Resolving Human Development and Family Problems** (3) Strategies for, and roles of professional specialists in, the solution of problems in human development and family functioning.

Effective: Spring 1996

Prerequisite:

HD FS 415 **Program Development in Family Relationships** (3) Methods for planning, developing, and evaluating human service programs for families across the life span.

Effective: Spring 2001

Prerequisite:

HD FS 416 (US) (SOC 411) **Racial and Ethnic Diversity and the American Family** (3) This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States.

Effective: Spring 2005

Prerequisite:

HD FS 417 (US;IL) **Biocultural Studies of Family Organization** (3) Study of variability in family organization with an emphasis on cultural and economic factors influencing household organization and family roles.

Effective: Spring 2006

Prerequisite:

HD FS 418 **Family Relationships** (3) Dynamics of family interaction; effects of parenthood, sibling and intergeneration relationships on family solidarity.

Effective: Spring 2001

Prerequisite:

HD FS 420 **Laboratory in Individual and Family Enhancement** (3) Supervised practice in methods of assessment, intervention, and evaluation to enhance individual and family development.

Effective: Spring 1996

Prerequisite:

HD FS 424 (US) **Family Development in an Economic Context** (3) Economic conditions influencing family functioning; familial effects on the economy; strategies to enhance work-family relations.

Effective: Spring 2006

Prerequisite:

HD FS 425 (US) **Work as a Context for Human Development** (3) Theory and research on role of work in adult development; interrelationships between work and family; workplace interventions to enhance development.

Effective: Spring 2006

Prerequisite:

HD FS 427 (KINES 427) **Developmental Sport & Exercise Psychology** (3) Developmental changes in the antecedents and consequences of physical activity across the lifespan.

Effective: Spring 2008

Prerequisite:

HD FS 428 **Infant Development** (3) Conceptual analysis, assessment, and empirical investigation of normal and deviant development, prenatal through first two years of life.

Effective: Spring 2007

Prerequisite:

HD FS 429 **Advanced Child Development** (3) Processes of development during childhood from birth to adolescence. Emphasis upon theory, method, and empirical research.

Effective: Spring 2007

Prerequisite:

HD FS 430 **Experience in Preschool Groups** (6) Guided practicum experience in planning and facilitating developmentally appropriate activities for young children.

Effective: Spring 2007

Prerequisite:

HD FS 431 (SOC 431) **Family Disorganization: Stress Points in the Contemporary Family** (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

Effective: Spring 1996

Prerequisite:

HD FS 432 **Developmental Problems in Childhood and Adolescence** (3) Analysis of problems in individual development from infancy through adolescence; prevention and modification of developmental difficulties.

Effective: Spring 2007

Prerequisite:

HD FS 433 **Developmental Transition to Adulthood** (3) Conceptual analysis and empirical investigation of interrelationships between developmental processes during the period of pubertal growth.

Effective: Spring 1996

Prerequisite:

HD FS 434 (SOC 435) **Perspectives on Aging** (3) An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

Effective: Fall 2007

Prerequisite:

HD FS 440 (SOC 440) **Family Policy** (3) An in-depth examination of family policy.

Effective: Spring 2007

Prerequisite:

HD FS 445 (PSYCH 416) **Development Throughout Adulthood** (3) Processes of development and change of behavior from early adulthood through old age, emphasizing theory, method, and empirical research.

Effective: Spring 2007

Prerequisite:

HD FS 446 **Programs and Services in Gerontology** (3) Theoretical and historical views of the conceptualization and delivery of programs and services to older persons within a multidisciplinary developmental framework.

Effective: Spring 1996

Prerequisite:

HD FS 447 **Issues in Gerontology** (3) Analysis of major issues in adulthood and aging, with an emphasis on integration of theory and research.

Effective: Spring 1996

Prerequisite:

HD FS 450 **Developmental Child Programs and Services** (3) Current and historical views of the conceptualization and delivery of child programs and services within a multidisciplinary developmental framework.

Effective: Spring 2007

Prerequisite:

HD FS 452 **Child Maltreatment Prevention, Intervention, and Legal Issues** (3) Examines causes, correlates, and consequences of child maltreatment, empirically supported prevention/intervention programs, the Child Welfare System and relevant legal issues.

Effective: Spring 2013

Prerequisite:

HD FS 453 **Family Participation and Involvement in Child Services** (3) Current and historical perspectives of roles and functions of family members in designing, delivering, and evaluating of child service programs.

Effective: Spring 2001

Prerequisite:

HD FS 454 (E C E 454) **Development and Administration of Child Service Programs** (3) Planning, administering, and evaluating child service programs at several administrative levels using methods from relevant disciplines.

Effective: Spring 1996

Prerequisite:

HD FS 455 **Development and Administration of Human Services Programs** (3) Fundamentals of program development

and administration of human service programs in community settings; emphasis given to program content, strategies, and the overall planning process.

Effective: Fall 2009

Prerequisite:

**HD FS 468 Biological Bases of Behavioral Development (3)** Biological, genetic, and experiential influences in development through the lifespan.

Effective: Spring 2007

Prerequisite:

**HD FS 477 Analysis of Family Problems (3)** Analysis of families' behavioral, managerial, interpersonal, and financial problems and their interrelationships.

Effective: Spring 2001

Prerequisite:

**HD FS 490 Introduction to Internship Experience (2)** Planning and preparation for field experience in human service setting. Analysis of human service system and arrangement of site.

Effective: Spring 1996

Prerequisite:

**HD FS 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2000

**HD FS 494H Senior Honors Thesis (1-6)** Independent study under the direction of the thesis advisor of topics related to the interests of the student, culminating in presentation of a thesis.

Effective: Summer 1997

Prerequisite:

**HD FS 495A Internship: Advanced Experience (9)** Full-time, one semester experiential training in human service settings. Open to HD FS majors only.

Effective: Fall 2006 Ending: Fall 2013

Prerequisite:

**HD FS 495A Internship: Advanced Experience (9)** Full-time, one semester experiential training in human service settings. Open to HD FS majors only.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**HD FS 495B Internship: Advanced Project (3)** Implementation of internship projects or scholarly paper. Open to HD FS majors only.

Effective: Fall 2006

Prerequisite:

**HD FS 495C Professional Practicum in Human Services (3-8)** Guided professional practicum in human services, usually in the form of a project related to a human services issue.

Effective: Summer 1997

Prerequisite:

**HD FS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1990

**HD FS 496B Infant Temperment (1-3)** This class is for students to learn about the research process by getting hands-on experience on a research project examining infant and child development. Students will have the opportunity to collect data, learn coding systems, and do data entry. Discussions about the research process occur during weekly lab meetings.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HD FS 496C Marcellus Shale Family Project (1-3)** The Marcellus Family Project involves coding and analyzing data from community leaders and parents regarding the implications of Marcellus Shale development for families. Students will also assist with preparing newsletters for participants.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HD FS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 1990

**HD FS 497A Issues in Child Adoption (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013 Ending: Summer 2013

**HD FS 497A DORA College Program (1)** The DORA College Program is a peer based mental health wellness and suicide prevention program. Students will learn how to be a peer educator and administer the DORA program to small groups of students on campus. Students will meet for 3 sessions to learn how to be group leaders and implement awareness sessions. Following the satisfactory completion of the training program, the students, in pairs, will conduct at least 1 but

not more than 3 sessions with groups of students. It is expected that students will develop skills as listeners, as well as speakers, that they will reflect on their experiences, and share their insights with other members of the class via journals, class discussions, and reflection papers.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**HD FS 497B Human Development and Family Studies Rwanda Field Experience (0.5)** This is a two week, hands-on learning experience for students working on various child development and education projects at the Star School in Kigali, Rwanda.

Effective: Summer 2013 Ending: Summer 2013

**HD FS 497C Peer and Consultation (1-3)** Students register for this course if they will be serving as a teaching assistant in HD FS courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**HD FS 497H Professional Development (1)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**HD FS 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**HD FS 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Fall 2007

**HD FS 499A (IL) Early Childhood in Italy (3)** This course will give students the opportunity to examine the way in which Italians structure the early childhood years, and the social policies that support this structure. Students will observe children in public, as well as having the opportunity to visit preschool and day care programs for young children.

Effective: Summer 2013 Ending: Summer 2013

**HD FS 499B (IL) Historical Roots of the Modern Italian Family (3)** The purpose of this course is to examine the historical roots of the Italian family system as it has evolved from antiquity to modernity. Issues to be explored include the implications of economic, political, religious, and social factors, the status of Italian women over time with regard to legal rights, roles, societal expectations and cultural values, and the attitudes toward and practices regarding child rearing.

Effective: Summer 2013 Ending: Summer 2013

**HD FS 499C (IL) Italian Relationships: Both Cultural and Familial (3)** The purpose of this course is to examine the cultural factors affecting business, friendship, and family relationships in Italy. Issues to be explored include the implications of economic, political, religious, and social factors on Italian families, and the influence of the Catholic Church on family and social roles in Italy.

Effective: Summer 2013 Ending: Summer 2013

**HD FS 501 Human Development Across the Lifespan (3)** Multidisciplinary study of theories and research on human development across the lifespan.

Effective: Spring 2002

**HD FS 502 Biological Systems in Developmental Context (3)** Discusses the development of key biological systems, and their influences on behavior across the lifespan.

Effective: Summer 2013

**HD FS 503 Human Development Intervention: Analysis of Theories and Approaches (3)** Theoretical and empirical analyses of multilevel approaches for enhancing development of individuals and families.

Effective: Spring 1993

Prerequisite:

**HD FS 504 Consultation in Human Development Intervention (3)** Principles of consultative and collaborative practice with human development intervention programs in formal or informal community settings.

Effective: Spring 1993

Prerequisite:

**HD FS 506 Design and Evaluation of Prevention Programs Across the Life Span (3)** An introduction to the theory and application of program evaluation; both process and outcome evaluation strategies are addressed.

Effective: Spring 2002

Prerequisite:

**HD FS 507 Women, Families, and Society (3)** Analysis and critique of research and theory on women's development and role in family and society.

Effective: Spring 2002

HD FS 508 **Best Practices in Preventive Intervention** (1-6) Implementing empirically validated preventative programs; discussion and evaluation of theory and techniques.  
Effective: Spring 2002  
Prerequisite:

HD FS 509 **Nature-Nurture Issues in Human Development** (3) Introduction to nature-nurture interactions in life-span development; biological, psychological, and cultural factors in ontogeny and phylogeny.  
Effective: Spring 1999

HD FS 515 **Professional Issues in Human Development and Family Studies** (1-6) Overview of issues in professional development for careers in human development and family studies.  
Effective: Spring 2002

HD FS 516 **Methods of Research in Human Development** (3) Review of basic research methods and statistics as applied to human development and family studies.  
Effective: Fall 2001

HD FS 517 **Multivariate Study of Change and Human Development** (3) Models of development and change derived from empirical research utilizing multivariate research design and procedures.  
Effective: Spring 1992  
Prerequisite:

HD FS 518 **Applied Statistics Laboratory** (1) This course provides graduate students with practical skills in data entry, data management, and applied statistical analyses.  
Effective: Fall 2001

HD FS 519 **Methods of Statistical Analysis in Human Development** (3) An overview of basic statistical concepts, models, and methods for the analysis of development and change.  
Effective: Summer 1990  
Prerequisite:

HD FS 520 **Seminar in Prenatal and Infant Development** (1-6) Prenatal and infant development, with emphasis on multiple determinants of early development and their relationship to later behavior.  
Effective: Summer 1990  
Prerequisite:

HD FS 522 **Risk and Resilience in Human Development: Foundation for Prevention** (3) Reviews the concepts of risk, protection, resilience, and competence; examines these concepts in intervention and longitudinal studies.  
Effective: Spring 2002  
Prerequisite:

HD FS 523 **Strategies for Data Analysis in Developmental Research** (3) This course provides the skills necessary to confront the data analytic issues presented in the Human Development and Family Studies methodology core curriculum.  
Effective: Spring 1996  
Prerequisite:

HD FS 524 **Work as a Context for Human Development** (3) The interconnections between work, family life, and individual development.  
Effective: Spring 2002  
Prerequisite:

HD FS 525 **Introduction to Family Studies** (3) Introduction to current theory and research about micro and macro forces related to family relationships and development.  
Effective: Spring 2002

HD FS 526 (PSY 526) **Measurement in Human Development** (3) Principles and methods for assessment of human developmental processes across the life span.  
Effective: Spring 2007  
Prerequisite:

HD FS 527 **Social Epidemiology** (3) Application of epidemiological methods to issues in the study of human development.  
Effective: Fall 2001  
Prerequisite:

HD FS 528 (PSY 528) **Observational Methodologies for Development** (3) Design and application of observational methods in developmental research.  
Effective: Spring 1994  
Prerequisite:

HD FS 529 (PSY 529) **Seminar in Child Development** (1-6) Readings and reports on recent findings in child development.  
Effective: Summer 1990  
Prerequisite:

HD FS 531 (SOC 531) **Family Disorganization: Stress Points in the Contemporary Family** (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.  
Effective: Summer 1994



HD FS 532 (NUTR 532) **Childhood Obesity** (3) This course addresses how genetic predispositions, behavioral and environmental factors affect children's obesity risk and examines strategies for obesity prevention.  
Effective: Spring 2012

HD FS 533 (NUTR 533) **Adult Obesity** (3) Important current and emerging topics in obesity research relevant to government policy and general public education; emphasis on adult obesity.  
Effective: Spring 2012

HD FS 536 (PSY 536) **Research Methods in Developmental Processes** (3) Methodological issues in research on varying stages of development across the individual life span.  
Effective: Spring 1995  
Prerequisite:

HD FS 537 (SOC 537) **Biosocial Perspectives on the Family** (3) The implications of knowledge from behavioral endocrinology, behavior genetics, and evolutionary psychology for understanding family relationships and child development.  
Effective: Summer 2002

HD FS 539 **Seminar in Adolescent Development** (1-6) Cultural, psychological, and biological aspects of the developmental transition to adulthood.  
Effective: Summer 1990  
Prerequisite:

HD FS 544 **Seminar in Dysfunctional Patterns in Family Organization** (1-6) Processes of familial dysfunction and disorganization and their explanation in economic, social-psychological, and managerial terms.  
Effective: Summer 1990  
Prerequisite:

HD FS 545 **Families and Socioeconomic Systems** (1-6) Functional interrelationships between families and social and economic systems.  
Effective: Summer 1990  
Prerequisite:

HD FS 546 **Seminar in Family Relationships** (1-9) Interpersonal interaction within family systems throughout the life cycle.  
Effective: Summer 1990  
Prerequisite:

HD FS 549 (PSY 549) **Developmental Theory** (3) Conceptual frameworks and major contributions to the study of individual development across the life-span.  
Effective: Summer 1990  
Prerequisite:

HD FS 565 **Developmental Behavioral Genetics** (3) Theories and methods of developmental behavioral genetics and their application to human life-span development.  
Effective: Spring 1990

HD FS 569 **Seminar on Development in Middle Age** (1-6) Interdisciplinary approach to study of human development in middle age, including psychological, cultural, and biological aspects.  
Effective: Fall 2001  
Prerequisite:

HD FS 577 **Poverty, Policies, and Child Development** (3) Focuses on interrelationships among families, poverty, and social policies.  
Effective: Fall 2001  
Prerequisite:

HD FS 579 **Seminar in Adult Development and Aging** (1-9) A seminar dealing with specific topics concerning adult development and aging.  
Effective: Summer 1990  
Prerequisite:

HD FS 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1990

HD FS 595 **Field Projects in Individual and Family Studies** (1-9) Supervised research or internship in human services program.  
Effective: Summer 1990  
Prerequisite:

HD FS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1990

## Prerequisite:

HD FS 596A **Graduate Student Orientation** (1) This is a continuation of orientation meeting for our first year graduate students.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

## Prerequisite:

HD FS 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 1990

HD FS 597A **Aging in a Welfare State** (2) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 2013 Ending: Summer 2013

HD FS 597A **Developmental Cognitive Neuroscience of Adolescence** (3) Adolescence is a unique, transitional period of development, often through to begin with the onset of puberty and end with the acquisition of adult social roles. Based on this conceptualization, the study of adolescence necessitates cross-disciplinary inquiry using multiple methodologies as change occurs across numerous domains (biological, psychological, social, etc.). In this course, students will evaluate theoretical and cutting-edge empirical research investigating the varied development changes of adolescence, principally from a developmental cognitive neuroscience perspective. Particular emphasis will be placed on understanding major non-invasive neuroimaging techniques (e.g., functional magnetic resonance imaging) and the role these tools have played in our understanding of adolescent development and brain-behavior relationships.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 597B **Quantitative Methods for Intervention Science** (3) The purpose of this course is to enable students to learn about and apply innovative quantitative, empirically-based approaches to development of multicomponent behavioral interventions. Here the term "behavioral intervention" is used broadly to refer to any intervention for prevention or treatment of health problems, for educational enhancement, or for promotion of health and well-being, that includes one or more behavioral components. A behavioral intervention may be aimed at any age and delivered in any context, may include medical components such as pharmaceuticals, and may be multi-level. The approaches covered in this course can be used to build a new behavioral intervention or improve an existing one, and can be applied not only to intervention content, but also to implementation fidelity and adherence.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 597C **Person-Specific and EMA Data Analysis** (3) a) To build up a thorough understanding of factor analytic and dynamic systems modeling of multivariate psychological time series obtained with single and multiple subjects, including time series obtained in Ecological Momentary Assessment; b) To learn to independently implement any of these models in commercial structural equation modeling software as well as the special-purpose program MKFM6; c) to learn to apply these models to diverse data sets and correctly interpret the obtained results.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 597D **New Methods for Analyzing Intensive Longitudinal Data** (1) There has been a recent increase in the use of the Internet, smart phones, and wearable devices to collect many repeated assessments from participants of studies in behavioral and health research. In addition, many long-term panel studies have matured to the point of yielding many time points. Such data, referred to as intensive longitudinal data (ILD), can be summarized in order to apply standard methods for the analysis of longitudinal data. However, new methods for the analysis of ILD provide the opportunity to address questions about dynamic processes. We will briefly review the use of multilevel models to analyze ILD, and then introduce the time-varying effect models for estimating dynamic associations between variables. The class will include a conceptual introduction to new methods for analyzing ILD, mathematical details of the time-varying effect model for intensively assessed normal, binary, and count outcomes, and time for students to practice applying

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 597E **fMRI Data Analysis** (3) To build up a thorough understanding of statistical models used in the analysis of multivariate fMRI time series.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 597F **Electroencephalogram (EEG) Coherency Analysis** (1) Topographic analysis of multi-lead EEG often is based on coherency analysis (correlation analysis in the frequency domain). Coherency analysis also is important in the analysis of several other psychophysiological response systems. Even intensive measurements of social group interactions have been analyzed by means of coherency analysis. In this course the fundamentals of coherency analysis will be presented, starting with a concise introduction in multivariate time series analysis in the time and frequency domain. Special emphasis will be given to alternative ways to estimate coherency matrices, including derived amplitude and phase spectra. The problem of volume conduction in EEG and ways to deal with that will be discussed.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 597G **Research and Theory on Contemplative Practices Across the Lifespan** (3) This seminar will review current research and theory on Contemplative Practices including forms of meditation, yoga, and other contemplative actions. There will be a special emphasis placed on children, youth, families and schools. However, there also will be some coverage of contemplative practices with adults including the use of contemplative practices with aging and end-of-life processes. The seminar will be held weekly for 3 hours, with part of each class devoted to exposure to different

experimental practices.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

HD FS 600 **Thesis Research** (1-15) No description.

Effective: Summer 1990

HD FS 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Summer 1990

HD FS 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Effective: Summer 2004

HD FS 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Fall 2006

HD FS 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 1990

HD FS 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Summer 1990

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## Humanities (HUM)

**HUM 500 Research Methods and Scholarly Inquiry in the Humanities** (3) Study of the methods and materials of scholarship, use of reference tools, evaluation of evidence, and writing of research papers.  
Effective: Spring 1989

**HUM 515 Seminar** (3 per semester/maximum of 9) A seminar focusing on typical methods and approaches of a single discipline within the humanities.  
Effective: Summer 1988

**HUM 525 Studies in Aesthetics** (3) Philosophical investigation into the nature of art, aesthetic experience, artistic meaning, criticism, grounds for judgment, and history of aesthetic theory.  
Effective: Spring 1989

**HUM 530 Seminar in Comparative Arts** (3 per semester/maximum of 9) A seminar focusing on selected periods or artists in two or more disciplines within the humanities.  
Effective: Summer 1988

**HUM 535 Topics in Cultural and Intellectual History** (3 per semester/maximum of 9) Study of methods, issues, and selected topics in the history of thought, social values, and creative expression.  
Effective: Summer 1988

**HUM 550 Junior College Teaching Internship** (3) Teaching humanities courses in a two-year college under a faculty supervisor, who will direct, criticize, and evaluate the intern.  
Effective: Summer 1988  
Prerequisite:

**HUM 560 Interrelations in the Humanities** (3) The study and practice of conducting interdisciplinary research and of investigating and supporting inter-art analogies.  
Effective: Spring 1989  
Prerequisite:

**HUM 580 Master's Production** (1-6) An original scholarly master's paper or creative production initiated by the student, supervised by an appropriate professor, and judged by a committee.  
Effective: Winter 1981

**HUM 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**HUM 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**HUM 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1987

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## **Humanities (HUMAN)**

**HUMAN 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**HUMAN 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

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## Humanities-Hy (HMN)

**HMN 713 Medical Humanities (5)** Medical Humanities introduces the first-year student of medicine to topics which explore questions of value and meaning in and around medicine.

Effective: Summer 2007

Prerequisite:

**HMN 740 Folk and Alternative Health Systems (2.5)** Critical examination of alternative/folk health systems and some of the ways in which they influence current health care delivery.

Effective: Spring 1999

**HMN 741 Education for Physicians on End of Life Care (EPEC) (2.5)** This course introduces the essential clinical competencies required to provide quality end-of-life care.

Effective: Fall 2009

Prerequisite:

**HMN 742 Putting It Into Words: A Right-Brain Retrospective of Formative Moments in Medical School (PIW) (2.5)** This creative writing workshop requires MS IVs to convey their reflections as medical students in a variety of genres which, collectively, result in a portfolio and publication.

Effective: Fall 2009

Prerequisite:

**HMN 743 Graphic Storytelling and Medical Narratives (2.5)** In this course, students will explore the use of graphic storytelling (or Comics) as a medium for communicating medical narratives.

Effective: Fall 2009

**HMN 744 Humanities: Patients as Teachers, Students as Filmmakers Video Project: The Video Slam (2.5)** This course teaches medical students about the full impact of illness and serious procedures on patients and their families.

Effective: Fall 2009

Prerequisite:

**HMN 745 Medicine and Ethics Under Pressure (2.5)** This course explores situational and systemic challenges to ethical behavior in biomedical research and the practice of medicine.

Effective: Fall 2009

**HMN 746 CAM and Integrative Holistic Medicine (2.5)** This course presents current topics in Integrative Holistic Medicine and discusses the transition from Complementary and Alternative Medicine.

Effective: Fall 2009

Prerequisite:

**HMN 747 Contemporary Issues in Bioethics (2.5)** In this course, students will conduct in-depth examinations of current issues in bioethics. Topics will include. Organ transplantation; PVS & the Value of a Human Being; Childhood Immunizations; Mistakes; What Counts as Medically Necessary?; Child Abuse; Physician-Assisted Death; Genetics.

Effective: Fall 2009

Prerequisite:

**HMN 748 Controlling Human Heredity: Lessons From History (2.5)** This course reviews the key steps in the development of our thoughts and practices relating to childbirth and medical genetics over the past 400 years.

Effective: Spring 2010

Prerequisite:

**HMN 749 Sufferers and Healers: Lessons From History (2.5)** This course reviews the key steps in the development of medicine from its supernatural beginnings steeped in magic and religion through the creation of medical science.

Effective: Fall 2009

Prerequisite:

**HMN 750 Creativity, Art, and Healing (CAH) (2.5)** This course introduces students to the core components of the creative arts and healing.

Effective: Fall 2009

Prerequisite:

**HMN 751 The Narratives of Aging: Exploring Creative Approaches to Dementia Care (2.5)** This course invites students to examine brain aging in an historical and cultural context, and contrast dominant reductionist understandings of dementia with a more humanistic, biopsychosocial model of care resurgent in recent years that places greater relative emphasis on the remaining strengths, capacities, and creativity of persons with dementia rather than focusing on deficits and losses.

Effective: Spring 2012

Prerequisite:

**HMN 752 Chronic Disease and the Self (2.5)** Utilizes published autobiographical patient narratives and live patient interviews to explore the impact of illness.

Effective: Spring 2011

Prerequisite:

**HMN 753 Finding 'Right' Answers: Solving Ethical Dilemmas in Medical Practice** (2.5) At the end of the four weeks students will be equipped with four cognitive frameworks for thinking about and solving ethical issues in their clinical practice.

Effective: Spring 2012

Prerequisite:

**HMN 754 The Practice of Virtue in Medicine** (2.5) This course requires the student to study and recognize the great human virtues and to learn to practice virtue in medicine.

Effective: Spring 2012

Prerequisite:

**HMN 757 "Are You Listening?" Developing Effective Communication With Our Patients** (5) Effective communication with patients is a vital skill for every physician. This course will delve into the interpersonal space between physician and patient.

Effective: Fall 2012

Prerequisite:

**HMN 758 Documentary Filmmaking About Innovations in Patient Centered Care** (5) Students make short documentary films about innovations that make care more patient centered.

Effective: Fall 2012

Prerequisite:

**HMN 796 Individual Studies** (1-15) Studies outside the scope of formal courses, supervised on an individual basis.

Effective: Spring 1988

Prerequisite:

**HMN 797 Special Topics** (1-6) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1988

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## Ihc - Appellate (IHAPP)

IHAPP 995 **Civil Rights Appellate Clinic** (4 per semester/maximum of 8) This clinical offering will provide intensive training in appellate advocacy by involving students in non criminal civil rights cases before the state appellate courts, federal courts of appeal and the United States Supreme Court. Students will assist in case selection, the development of substantive legal positions, provide research, assist in appellate strategy development and draft briefs. As this is a new clinical offering an initial focus will be on amicus briefs, however the driving decision for case selection will be which cases, during any particular clinic session, offer the best pedagogical value. In working on these cases students will have exposure to top civil rights and appellate litigators in the country.

Effective: Summer 2011

Prerequisite:

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## Ihc - Immigration (IHIMM)

IHIMM 995 **Center for Immigrants' Rights - Course Component** (3) Students will acquire the skills necessary to be an effective immigration advocate and attorney. Students will work on innovative projects relating to U.S. immigration policy and immigrants' rights.

Effective: Spring 2011

Prerequisite:

IHIMM 995A **Center for Immigrants' Rights: Course Component** (5) The course component of the Center teaches students the skills necessary to be an effective immigration advocate and attorney.

Effective: Spring 2011

Prerequisite:

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## **Ihc - Refugee Law (IHREF)**

IHREF 995A **In-House Clinic - Refugee Law Clinic** (3) Representation of foreign nationals seeking political asylum or related forms of relief in US Courts.

Effective: Fall 2008

Prerequisite:

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## **Ihc-Art,Sprt,Ent Law (IHASE)**

IHASE 995A **In-House Clinic--Art, Sports, and Entertainment Law** (1-2 per semester/maximum of 4) This clinic is designed to acquaint students with the unique yet pragmatic knowledge and skills incident to rendering quality legal service in the art, sports, and entertainment professions.

Effective: Spring 2011

Prerequisite:

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## **Ihc-Children'S Advoc (IHCAD)**

IHCAD 995A **In-House Clinic-Children's Advocacy** (4 per semester/maximum of 8) The course will provide instruction to students in the legal representation of children in various civil matters, including dependency, adoption and custody actions. Students will be managing a caseload of clients. Students will meet directly with their clients, and correspond with agencies and opposing counsel. Students will appear at all court appearances with a supervising attorney. The supervising attorney will meet with students individually on a regular basis for case reviews. The classroom component of the course will focus on various substantive and skills issues, including lectures on child interviewing skills and lectures from physicians on the medical aspects of child abuse. etc.

Effective: Summer 2011

Prerequisite:

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## **Ihc-Disability Law (IHDIS)**

**IHDIS 995A In-House Clinic--Disability Law** (4 per semester/maximum of 8) Up to four students per semester represent indigent persons with disabilities who have legal concerns related to those disabilities. The bulk of the work consists of administrative hearings before the Social Security Administration and judicial review in federal court. Matters handled include Social Security and Supplemental Security Income, special education, disability discrimination, and Medicare and Medicaid claims. Students are obligated to work 12 hours per week in the Clinic, and there are weekly meetings with the supervisor, either individually or as a group. This course is graded.

Effective: Spring 2011

Prerequisite:

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## Ihc-Family Law (IHFAM)

**IHFAM 995A In-House Clinic--Family Law** (4 per semester/maximum of 8) In this clinic, up to twelve students per semester represent indigent clients, primarily before the Court of Common Pleas of Cumberland County, in domestic matters. Cases include divorce, child support, spousal support, custody and visitation, dependency (neglect), domestic violence, and related matters. Students are required to work 16 hours a week at the Clinic, and there are weekly clinic meetings, either as a group or individually with supervisors.

Effective: Summer 2011

Prerequisite:

**IHFAM 995B Family Law Clinic** (5 per semester/maximum of 10) In this clinic, up to seven students per semester represent indigent clients and domestic abuse victims in family law cases. All cases are in the Court of Common Pleas of Centre County. The work includes divorce, child support, spousal support, custody/visitation, domestic violence, and related matters. Students should expect to work as much time as is necessary to represent their clients successfully, which will be an average of twenty hours per week. Students also participate in a weekly clinic seminar which includes skills training, theoretical examination of clinical work, and case rounds. Each student also meets individually with the clinic supervisor to discuss their case work and their progress in the clinic. Only third-year law students are admitted in the Fall Semester. Students earn 5 graded credits.

Effective: Spring 2012

Prerequisite:

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## **Immun&Infest Disease (I I D)**

I I D 600 **Thesis Research** (1-9 per semester/maximum of 36) Laboratory work on thesis project.  
Effective: Summer 2012

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## **In Hse Rur Econ Dev (IHRED)**

**IHRED 995 Rural Economic Development Clinic** (4 per semester/maximum of 8) The Rural Economic Development Clinic will provide students with practical legal experience representing individuals and entities in Pennsylvania's rural communities, primarily within the broad fields of agricultural, food, and energy law. Students will work with agricultural producers, businesses, landowners, and nonprofit organizations on specific projects that will involve transactional work such as preparing/reviewing contracts, addressing basic business entity issues, and providing general legal counsel.

Effective: Fall 2012

Prerequisite:

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## **In-House Clinic (IHCLN)**

IHCLN 997 **Special Topics** (1-8) Faculty approval required.  
Effective: Fall 2010

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## **In-House Inmate (IHINM)**

IHINM 995B **In-House Clinic - Inmate Assistance** (2) The clinic provides legal advice to inmates in state and county prisons relating to civil and criminal matters.

Effective: Fall 2008

Prerequisite:

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## **In-Hse Comm Lw Clinc (IHCLC)**

IHCLC 995 **Community Law Clinic** (4 per semester/maximum of 8) A general civil litigation clinic, which includes various forms of mediation, negotiation, etc., in addition to civil hearings and traditional courtroom litigation. Due to the litigation component of this clinic, it will serve only students residing in Carlisle. Areas of law which students will be exposed to include: divorce, custody, support, protection from abuse, adoption, social security and supplemental security income claims, guardianships, special education, American with Disabilities Act claims, civil rights actions, and health care directives. Cases will be selected based on educational value to students and expertise of the clinical faculty.

Effective: Summer 2012

Prerequisite:

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## **Indig Crim Just Clin (IHICJ)**

IHICJ 995 **Indigent Criminal Justice Clinic** (5 per semester/maximum of 10) The Indigent Criminal Justice Clinic provides students with the opportunity to represent indigent criminal defendants accused of misdemeanor offenses in the Centre Court of Common Pleas under the supervision of an attorney from the Centre County Public Defender Office. Students learn litigation, negotiation and advocacy skills as they represent defendants through all stages of a criminal case.

Effective: Summer 2013

Prerequisite:

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## Industrial Engineering (I E)

**I E 402 Advanced Engineering Economy** (3) Concepts and techniques of analyses useful in evaluating engineering projects under deterministic and uncertain conditions.

Effective: Summer 1995

Prerequisite:

**I E 405 Linear Programming** (3) An introduction to the theory and application of the simplex method in solving the linear programming and dual problem.

Effective: Spring 2001 Ending: Fall 2013

Prerequisite:

**I E 405 Deterministic Models in Operations Research** (3) Deterministic models in operation research including linear programming, flows in networks, project management, transportation and assignment models and integer programming.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**I E 408 Cognitive Work Design** (3) Design and evaluation of cognitive work, including the human/computer interface, visual displays, software design, and automated system monitoring, with emphasis on human performance.

Effective: Spring 2006

Prerequisite:

**I E 418 Human/Computer Interface Design** (3) Design and evaluation of the human/computer interface, including human performance, visual displays, software design, and automated system monitoring.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**I E 418 Human/Computer Interface Design** (3) Design and evaluation of the human/computer interface, including human performance, visual displays, software design, and automated system monitoring.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**I E 419 Work Design - Productivity and Safety** (3) Methods improvement, physical work design, productivity, work measurement; principles and practice of safety.

Effective: Spring 2006

Prerequisite:

**I E 424 Process Quality Engineering** (3) Statistical methods for engineering process characterization and improvement. For non-Industrial Engineering majors.

Effective: Summer 1994 Ending: Summer 2013

Prerequisite:

**I E 424 Process Quality Engineering** (3) Statistical methods for engineering process characterization and improvement. For non-Industrial Engineering majors.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**I E 425 Introduction to Operations Research** (3) An introduction to the method and techniques of mathematical decision making, including inventory, replacement, allocation, and waiting line problems.

Effective: Spring 2006 Ending: Fall 2013

Prerequisite: Concurrent: I E 405

**I E 425 Stochastic Models in Operations Research** (3) Stochastic models in operations research with real world applications including dynamic programming, Markov chains, queueing models and inventory models.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: I E 405

**I E 428 Metal Casting** (3) Application of engineering principles to the design of castings; casting of ferrous and nonferrous alloys; laboratory and simulation projects.

Effective: Summer 1995

Prerequisite:

**I E 433 Regression Analysis and Design of Experiments** (3) Theory and Application of Regression Analysis and Design of Experiments to build models and optimize process and product parameters.

Effective: Summer 2005

Prerequisite:

**I E 434 Statistical Quality Control** (3) Statistical techniques for univariate and multivariate monitoring of independent and autocorrelated processes; foundations of quality control and improvement.

Effective: Summer 2007

Prerequisite:

**I E 436 Six Sigma Methodology** (3) Techniques for structured problem-solving to improve the quality and cost of products and processes.

Effective: Spring 2010

Prerequisite:

**I E 453 Simulation Modeling for Decision Support** (3) Introduction of concepts of simulation modeling and analysis, with

application to manufacturing and production systems.

Effective: Fall 2009

Prerequisite:

**I E 454 Applied Decision Analysis (3)** Theory and practice of decision analysis applied to engineering problems.

Effective: Fall 1992

Prerequisite:

**I E 456 (M E 456) Industrial Robot Applications (3)** Introduction to robotics, with emphasis on robot selection, programming, and economic justification for manufacturing applications.

Effective: Spring 2011

Prerequisite:

**I E 460 Service Systems Engineering (3)** Use of quantitative models and methods for analysis, design and control of service systems.

Effective: Spring 2011

Prerequisite:

**I E 462 Introduction to Expert Systems (3)** Building expert systems in general; emphasis on knowledge representation and inference mechanisms in the manufacturing domain.

Effective: Fall 2009

Prerequisite:

**I E 463 Computer Aided Design and Manufacturing (3)** Three dimensional modeling and manufacture of parts and assemblies using Computer Aided Design and manufacturing software, and numerically controlled machines.

Effective: Spring 2008 Ending: Summer 2013

Prerequisite:

**I E 463 Computer Aided Design and Manufacturing (3)** Three dimensional modeling and manufacture of parts and assemblies using Computer Aided Design and manufacturing software, and numerically controlled machines.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**I E 464 Assembly of Printed Circuit Boards (3)** Manufacturing processes and principles for assembly of printed circuit boards with surface mount and through-hole technology.

Effective: Spring 2008

Prerequisite:

**I E 466 Concurrent Engineering (3)** Concurrent engineering methods for product/process development, capturing customer requirements, insuring manufacturability and serviceability.

Effective: Summer 1996

Prerequisite:

**I E 467 Facility Layout and Material Handling (3)** Analytical, simulation and computer-aided graphical methods to generate effective layout designs; design and integration of material handling systems and equipment. For Industrial Engineering majors.

Effective: Fall 2007

Prerequisite:

**I E 468 Optimization Modeling and Methods (3)** Mathematical modeling of linear, integer, and nonlinear programming problems and computational methods for solving these classes of problems.

Effective: Fall 2001

Prerequisite:

**I E 469 Global Industrial Engineering Experience (1)** Students will learn how to prepare for a short term, professional exchange in a foreign nation. Students will then travel to a designated university within a foreign nation for the purpose of a five day cultural and professional exchange.

Effective: Summer 2009

Prerequisite:

**I E 470 Manufacturing System Design and Analysis (3)** Contemporary design and analysis methodologies used to organize systems for economic manufacture of products.

Effective: Spring 2012 Ending: Summer 2013

Prerequisite:

**I E 470 Manufacturing System Design and Analysis (3)** Contemporary design and analysis methodologies used to organize systems for economic manufacture of products.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**I E 477 Computer Control of Manufacturing Machines and Processes (3)** Elements of computer control and discrete-time modeling. Design and analysis of digital controls for manufacturing machines and processes.

Effective: Fall 2009

Prerequisite:

**I E 478 Retail Services Engineering (3)** Introduction to retail services operations, process models, and application of information technologies to enhance productivity and profitability.

Effective: Spring 2010

Prerequisite:

**I E 479 (EDSGN 479) Human Centered Product Design and Innovation (3)** Consumer product design for a global market,

incorporating human factors principles and user desires in a multicultural perspective.

Effective: Summer 2010

Prerequisite:

I E 480W **Capstone Design Project** (3) Industry-based senior capstone design project emphasizing manufacturing systems, service systems, and information systems in an interdisciplinary setting.

Effective: Spring 2009

Prerequisite:

I E 494H **Senior Honors Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Spring 2000

I E 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1992

I E 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

I E 497D **Micro/Nano Fabrication** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

I E 499 (IL) **Foreign Studies--Industrial Engineering** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

I E 505 **Linear Programming** (3) An accelerated treatment of the main theorems of linear programming and duality structures plus introduction to numerical and computational aspects of solving large-scale problems.

Effective: Fall 1992

Prerequisite:

I E 507 **Operations Research: Scheduling Models** (3) Scheduling models with simultaneous job arrival and probabilistic job arrival, network scheduling, and scheduling simulation techniques.

Effective: Fall 1992

Prerequisite:

I E 509 **Operations Research: Waiting Line Models** (3) Waiting line models including models with infinite queues, finite queues, single and multiple servers under various priorities and disciplines.

Effective: Spring 1994

Prerequisite:

I E 510 **Integer Programming** (3) Study of advanced topics in mathematical programming; emphasis on large-scale systems involving integer variables.

Effective: Spring 1994

Prerequisite:

I E 511 **Experimental Design in Engineering** (3) Statistical design and analysis of experiments in engineering; experimental models and experimental designs using the analysis of variance.

Effective: Fall 1992

Prerequisite:

I E 512 **Graph Theory and Networks in Management** (3) Graph and network theory; application to problems of flows in networks, transportation and assignment problems, pert/CPM, facilities planning.

Effective: Spring 1994

Prerequisite:

I E 516 (SC&IS 516) **Applied Stochastic Processes** (3) Study of stochastic processes and their applications to engineering and supply chain and information systems.

Effective: Spring 2006

Prerequisite:

I E 518 **Materials, Forming Processes, and Quality** (3) Study of the principles and mechanisms of conventional and developing manufacturing processes and the methods of determining work piece quality and properties.

Effective: Summer 2013

Prerequisite:

I E 519 (SC&IS 519) **Dynamic Programming** (3) Theory and application of dynamic programming; Markov decision processes with emphasis on applications in engineering systems, supply chain and information systems.

Effective: Spring 2006

Prerequisite:

I E 520 **Multiple Criteria Optimization** (3) Study of concepts and methods in analysis of systems involving multiple objectives with applications to engineering, economic, and environmental systems.

Effective: Spring 2000

Prerequisite:

**I E 521 Nonlinear Programming (3)** Fundamental theory of optimization including classical optimization, convex analysis, optimality conditions and duality, algorithmic solution strategies, variational methods in optimization.

Effective: Spring 1994

Prerequisite:

**I E 522 Discrete Event Systems Simulation (3)** Fundamentals of discrete event simulation, including event scheduling, time advance mechanisms, random variate generation, and output analysis.

Effective: Spring 2002

Prerequisite:

**I E 528 Metal Cutting Theory (3)** Study of the theory of metal cutting, contemporary and future problems of metal removal processes; critical analysis of current literature.

Effective: Summer 2011

**I E 530 Financial Engineering (3)** Financial option pricing and portfolio design relevant to investment decision making.

Effective: Fall 2010

Prerequisite:

**I E 532 Reliability Engineering (3)** Mathematical definition of concepts in reliability engineering; methods of system reliability calculation; reliability modeling, estimation, and acceptance testing procedures.

Effective: Fall 1992

Prerequisite:

**I E 540 Manufacturing Systems Simulation (3)** Use of simulation in design and process improvement of manufacturing systems. Analysis of simulation language structure. Readings in current literature.

Effective: Spring 1998

Prerequisite:

**I E 546 (M E 546) Designing Product Families (3)** Product families, product platforms, mass customization, product variety, modularity, commonality, robust design, product architectures.

Effective: Summer 2013

Prerequisite:

**I E 547 (EDSGN 547, M E 547) Designing for Human Variability (3)** Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.

Effective: Summer 2009

**I E 549 (EDSGN 549) Design Decision Making (3)** Complexity of design decision-making; state-of-the-art methods and tools.

Effective: Summer 2011

**I E 550 Manufacturing Systems (3)** Fundamental theory for analyzing manufacturing systems including structural analysis, optimization and economics of manufacturing systems, automated and computer-aided manufacturing.

Effective: Summer 2013

**I E 551 Computer Control of Manufacturing Systems (3)** Analysis of microprocessor-controlled servo loops, adaptive control, stochastic methods in control; analysis of NC machines, robots, and their controllers.

Effective: Summer 2011

**I E 552 (BIOE 552) Mechanics of the Musculoskeletal System (3)** Structure and biomechanics of bone, cartilage, and skeletal muscle; dynamics and control of musculoskeletal system models.

Effective: Summer 1998

Prerequisite:

**I E 553 (BIOE 553) Engineering of Human Work (3)** Physics and physiology of humans at work; models of muscle strength, dynamic movements; neural control; physical work capacity; rest allocation.

Effective: Fall 1992

Prerequisite:

**I E 554 Production, Planning, and Control (3)** Analysis of research literature for topics including scheduling, capacity planning, and lot sizing applied to manufacturing and production.

Effective: Summer 2013

Prerequisite:

**I E 555 Statistical Process Monitoring and Analysis (3)** Statistical techniques for univariate and multivariate monitoring of dependent and autocorrelated processes; theoretical and numerical approaches for analyzing performance.

Effective: Spring 2008

**I E 556 (M E 556) Robotic Concepts (3)** Analysis of robotic systems; end effectors, vision systems, sensors, stability and control, off-line programming, simulation of robotic systems.

Effective: Fall 1992

Prerequisite:



**I E 557 Human-in-the-Loop Simulation (3)** Design and programming of simulations that facilitate human control, real-time discrete-event simulation, supervisory control of dynamic system.

Effective: Spring 2009

Prerequisite:

**I E 558 Engineering of Cognitive Work (3)** Information processing and decision making models of the human in the modern workplace, emphasizing visual inspection and other industrial applications.

Effective: Fall 1992

Prerequisite:

**I E 559 Law and Technology: Products Liability (3)** A seminar course on one area of law and technology, products liability.

Effective: Spring 2008

**I E 562 Expert Systems Design in Industrial Engineering (3)** Methodological aspects of expert systems design and review of some existing systems with emphasis on manufacturing and industrial engineering.

Effective: Summer 2013

Prerequisite:

**I E 563 Computer-Aided Design for Manufacturing (3)** Study of CAD systems and concepts including 3D wireframe and solid modeling systems, emphasizing manufacturing applications.

Effective: Fall 1992

Prerequisite:

**I E 566 Quality Control (3)** Advanced quality assurance and control topics, including multivariate methods, economic design for control and acceptance, dimensioning, tolerancing, and error analysis.

Effective: Summer 2013

**I E 567 Distributed Systems and Control (3)** Advances in distributed control and decision-making in enterprises and supply chains with emphasis on computing, algorithms, and dynamics.

Effective: Spring 2006

**I E 570 (SC&IS 570) Operations Research in Supply Chains (3)** Use of operations research models and methods for solving problems in supply chain systems.

Effective: Summer 2006 Ending: Fall 2013

Prerequisite:

**I E 570 (SC&IS 570) Supply Chain Engineering (3)** Use of operations research models and methods for solving problems in supply chain systems.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**I E 582 Information Technology for Industrial and Manufacturing Engineering (3)** Students will learn advanced information technology concepts, tools, and techniques for designing and implementing manufacturing systems.

Effective: Spring 2008

Prerequisite:

**I E 583 Response Surface Methodology and Process Optimization (3)** Response Surface Methodologies used for sequential experimentation and optimization of production processes. Statistical design and analysis of such experiments.

Effective: Spring 2002

Prerequisite:

**I E 584 Time Series Control and Process Adjustment (3)** Design of Time Series-based process controllers for Quality Engineering. Study of the effect of autocorrelation on control chart performance.

Effective: Summer 2013

**I E 588 Nonlinear Networks and the Price of Anarchy (3)** Introduction to congestion games, including elements of non-cooperative game theory, equilibrium network flows, Braess paradox, and the price of anarchy.

Effective: Fall 2010 Ending: Summer 2013

Prerequisite:

**I E 588 Nonlinear Networks (3)** Foundation in congestion games, including elements of non-cooperative game theory, equilibrium network flows, Braess paradox, and the price of anarchy.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**I E 589 Dynamic Optimization and Differential Games (3)** Dynamic optimization and dynamic non-cooperative games emphasizing industrial applications.

Effective: Fall 2007

Prerequisite: Concurrent: I E 521

**I E 590 I E Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1993

Prerequisite:

**I E 594A Technical Paper Presentation (1)** Preparation of a paper in a technical journal format based upon the student's

course work project.  
Effective: Spring 2000  
Prerequisite:

**I E 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1992

**I E 597 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1992

**I E 597B Design of Experiments (3)** Stochastic processes including discrete and continuous time stochastic processes, discrete and continuous time Markov chains, renewal processes and Brownian Motion.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**I E 597B Manufacturing with Materials (3)** Selection of cost-effective materials and manufacturing methods for manufacturing components.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**I E 597C Global Manufacturing (3)** The main objective of this course is to provide interested students from the college of engineering with sufficient background to understand the trends, dynamics and emerging models that are shaping the global manufacturing scene. Particular emphasis is placed on a prospective evaluation of global manufacturing environment drivers followed by a normative analysis of emergent manufacturing strategies and responses to globalization.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**I E 597C Service Networks: Empirical Analysis, Modeling & Management (3)** Empirical analysis of contact center and patient flow data, fluid models, asymptotic approximations, system design, staffing, skill-based routing and scheduling.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**I E 597D Robust Modeling, Optimization and Computation (3)** This is designed for students interested in robust modeling, optimization and computation. The major objective3 of the course is to teach students modeling and optimization under uncertainty using robust optimization and solving large scale and high dimension problems involving a large number of variables and constraints.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**I E 597E Advanced Linear Programming (3)** Statistical design and analysis of experiments in engineering and experimental design using the analysis of variance and regression.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**I E 597F Manufacturing Process Engineering (3)** In this course, the students will learn the creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources. In addition to these objectives, the processes will also be safe for employees and consumers and economically optimal.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**I E 597F Measurement System Design (3)** Theoretical and practical knowledge in discrete part metrology for the validation, monitoring and control of the output of manufacturing processes.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**I E 597I Advanced Stochastic Processes (3)** Study of topics on Markov Processes, Poisson Processes, Renewal and Regenerative Processes, Brownian motions, Martingales and limit theorems.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**I E 600 Thesis Research (1-15)** No description.  
Effective: Fall 1992

**I E 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1992

**I E 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1992

**I E 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1992



## Industrial Health and Safety (I H S)

I H S 500 **Occupational Safety Engineering** (3) Provides a basis to assist students in understanding/applying the scientific and engineering principles associated with the field of safety.

Effective: Summer 2002

Prerequisite:

I H S 510 **Occupational Health** (3) Introduction to Occupational Health including history, general concepts, hazardous workplace exposures, occupational disorders, and prevention of occupational disease.

Effective: Summer 2002

Prerequisite:

I H S 520 **Contemporary Issues in Industrial Health and Safety** (3) Evaluation of industrial processes, hazards, labor, and corporate structure, so that hazard control programs and implementation plans can be formulated.

Effective: Summer 2002

Prerequisite:

I H S 590 (ENNEC 590) **Colloquium** (1-3) Continuing seminars that consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

Effective: Spring 2009

I H S 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2002

I H S 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2002

I H S 600 **Thesis Research** (1-15) No description.

Effective: Summer 2002

I H S 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2002

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## Information Science (IN SC)

IN SC 431 **Information Systems Architecture** (3) Principles and priorities of enterprise system design, middleware and service-oriented architectures and web services.  
Effective: Summer 2005

IN SC 463 **Languages of the Web** (3) Taxonomy of programming languages and frameworks used in the development of web-based information systems.  
Effective: Summer 2005

IN SC 480 **Software Development Lifecycle** (3) Modern Software Development Techniques and Processes. Software Paradigms including OO and lifecycle modeling and improvement.  
Effective: Summer 2005

IN SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that they may be topical or of special interest.  
Effective: Spring 1998

IN SC 497A **Special Topics: Business Intelligence** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that they may be topical or of special interest.  
Effective: Summer 2013 Ending: Summer 2013

IN SC 521 **Database Design Concepts** (3) The requirements capture, design, and development of relational database applications; analysis of business requirements and development of appropriate database systems.  
Effective: Summer 2002  
Prerequisite:

IN SC 525 **Applied Data Mining** (3) Functional overviews of algorithms used in data mining will be presented and contemporary data mining software used to conduct a project.  
Effective: Spring 2006  
Prerequisite:

IN SC 526 **Business Process Management and Integration** (3) Design and development of business processes that align business objectives with Information Technology (IT) systems.  
Effective: Fall 2012

IN SC 531 **Information Technology Law** (3) Examines the legal concepts/issues applicable to the field of information technology and to information technology, software engineering, and computer professionals.  
Effective: Summer 2002  
Prerequisite:

IN SC 535 **Information Technology: Economic Aspects** (3) Course examines how changes in information technology affect established organizations and the development of new firms, products, and markets.  
Effective: Summer 2002  
Prerequisite:

IN SC 536 **Information Technology: Economic Aspects Seminar** (3) Course examines the start up of new technology firms or the transformation of old economy companies into Internet companies.  
Effective: Fall 2003  
Prerequisite:

IN SC 539 **IT Systems Seminar** (3) A culminating, integrative capstone experience for IN SC students, including a formal technical paper and in-class presentation.  
Effective: Spring 2001  
Prerequisite:

IN SC 561 **Web Security and Privacy** (3) A web-centric look at the latest techniques and practices in computer security as they apply to the Internet.  
Effective: Spring 2010 Ending: Summer 2013  
Prerequisite:

IN SC 561 **Web Security and Privacy** (3) A web-centric look at the latest techniques and practices in computer security as they apply to the Internet.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

IN SC 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1999

IN SC 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or

small-group basis.  
Effective: Spring 1999

IN SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1999

IN SC 597 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1998

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## Information Sciences And Technology (IST)

**IST 402 Emerging Issues and Technologies** (3 per semester/maximum of 9) Introduction to emerging issues, technology forecasting and analysis; overview of emerging issues and leading technologies in IST and how they impact information systems, users, the IT labor force and society.

Effective: Fall 2006

Prerequisite:

**IST 411 Distributed-Object Computing** (3) Introduction to distributed-object computing and its use in client/server and real-world computing applications.

Effective: Summer 1999

Prerequisite:

**IST 412 The Engineering of Complex Software Systems** (3) Introduction to the engineering of complex software systems including software system specification, design and implementation, integration and test, and evolution.

Effective: Summer 1999

Prerequisite:

**IST 413 Usability Engineering** (3) This course addresses activities in the system development process that ensure usability. It considers the emerging concept of usability, requirements gathering and analysis, activity design, information design, interaction design, documentation design, user testing and usability evaluation.

Effective: Spring 2007

Prerequisite:

**IST 420 Fundamentals of Systems and Enterprise Integration** (3) Introductory course on integration of information technology into different venues, including the planning, development, and implementation of the integration.

Effective: Summer 2003

Prerequisite:

**IST 421 Advanced Enterprise Integration: Technologies and Applications** (3) Advanced course on the integration of information technology into systems applications.

Effective: Spring 2004

Prerequisite:

**IST 422 Enterprise Architecture Foundations** (3) Theoretical foundations and practice of enterprise architecture.

Effective: Summer 2013

Prerequisite:

**IST 423 Enterprise Information Management and Storage Architecture** (3) Provide in-depth study of the concepts, issues, and technologies associated with the complex world of enterprise information and storage architecture.

Effective: Summer 2013

Prerequisite:

**IST 424 Architectural Modeling of Organizations** (3) Theoretical foundations and practice of enterprise modeling.

Effective: Summer 2013

Prerequisite:

**IST 425 (ENGR 425, MGMT 425) New Venture Creation** (3) Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors.

Effective: Spring 2011

Prerequisite:

**IST 426 (MGMT 426, ENGR 426) Invention Commercialization** (3) Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology.

Effective: Spring 2011

Prerequisite:

**IST 431 The Information Environment** (3) Survey of social environment of information technology themes: Community, sovereignty, privacy, ethics, economics, and knowledge management.

Effective: Fall 2004

Prerequisite:

**IST 432 Legal and Regulatory Environment of Information Science and Technology** (3) Legal environment of information technology, constitutional/political issues, intellectual property, management, e-commerce, privacy, access, computer contracting, cyberspace regulation.

Effective: Spring 2007

Prerequisite:

**IST 440W Information Sciences and Technology Integration and Problem Solving** (3) Problem-based approach to technology integration by focusing on real-life problems faced by an organization.

Effective: Fall 2002

Prerequisite:

**IST 441 Information Retrieval and Organization** (3) Introductory course for seniors and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and nontextual information resources. Introduces students to the principles of information storage and retrieval systems and databases.

Effective: Spring 2004

Prerequisite:

**IST 442 (IL) Information Technology in an International Context (3)** International concepts to improve strategies for the design, dissemination, and use of information technology.

Effective: Summer 2006

Prerequisite:

**IST 443 IT Professional Services Theory and Practice (3)** Explores and applies the basic concepts, methodologies, tools, and techniques of consulting and professional service organizations in information sciences and technology.

Effective: Spring 2006

Prerequisite:

**IST 444 Advanced IT Professional Services (3)** Explores advanced IT professional services topics, and the unique application of consulting methods in various industry sectors.

Effective: Summer 2005

Prerequisite:

**IST 445H Globalization Trends and World Issues (3)** This course covers trends in globalization and their influence on U.S. policy making as well as the role of the U.S. in international issues.

Effective: Summer 2005

Prerequisite:

**IST 446 An Introduction to Building Computer/Video Games (3)** An interdisciplinary course that introduces students to process and techniques involved in developing a video or computer game.

Effective: Summer 2006

Prerequisite:

**IST 451 Network Security (3)** Fundamental issues and concepts of network security, network security technologies and protocols, and emerging technologies in network security.

Effective: Spring 2012

Prerequisite:

**IST 452 Legal and Regulatory Environment of Privacy and Security (3)** Exploration of legal, regulatory, public policy, and ethical issues related to security and privacy for information technology professionals in public institutions, private enterprise, and IT services.

Effective: Spring 2012

Prerequisite:

**IST 453 Legal, Regulatory, Policy Environment of Cyber Forensics (3)** Legal, regulatory and public policy environment of computer and network forensics that constrain investigatory and monitoring activities in computer and network environments.

Effective: Summer 2006

Prerequisite:

**IST 454 Computer and Cyber Forensics (3)** Fundamental issues and concepts of computer forensics; aspects of computer and cyber crime; methods to uncover, protect, exploit, and document digital evidence; tools, techniques, and procedure to perform computer and cyber crime investigation.

Effective: Spring 2012

Prerequisite:

**IST 456 Security and Risk Management (3)** Contemporary Security Issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.

Effective: Spring 2012 Ending: Summer 2013

Prerequisite:

**IST 456 Information Security Management (3)** Contemporary Security Issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**IST 461 Database Management and Administration (3)** Introduces advanced topics in database management systems that are fundamental to effective administration of enterprise information systems.

Effective: Spring 2006

Prerequisite:

**IST 462 Database Modeling and Applications (3)** This course introduces advanced topics in database modeling and applications.

Effective: Spring 2006

Prerequisite:

**IST 489H Research Methods for the Information Sciences and Technology (3)** Seminar course focused on approaches to studying information and communication technologies and writing theses and other research reports.

Effective: Summer 2006

Prerequisite:

**IST 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or



internships. Written and oral critique of activity required.

Effective: Fall 1999

Prerequisite:

**IST 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 2000

**IST 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2000

**IST 497B Social Network Analysis and Social Media Analytics (3)** This course will introduce the theories and methods for analyzing the dynamic social networks formed in social media.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**IST 497E Mobile and Ubiquitous Computing (3)** Seminar focused on the research themes and hands-on development of mobile & ubiquitous computing applications.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**IST 497K Innovation & Design in a Digital World (3)** This course emphasizes digital design methods and business models. Topics include user experience, prototyping, business model canvas, and design thinking.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**IST 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2001

**IST 501 Integrative Theories and Methods of the Information Sciences and Technology (3)** An integrative treatment of research and theories on how technologies are used to meet information needs at multiple levels of analysis.

Effective: Summer 2013 Ending: Summer 2013

**IST 501 Interdisciplinary Research Methods for Information Sciences and Technology (6)** An interdisciplinary introduction to the research methods for investigating how information technologies are analyzed, designed, and evaluated to meet human needs at multiple levels of analysis.

Effective: Fall 2013 Future: Fall 2013

**IST 503 Foundations for IST Research (3)** Study of major methodological, normative, and theoretical issues in philosophy of science related to research in information sciences and technology.

Effective: Spring 2007

Concurrent: IST 501

**IST 510 Foundations in Computational Informatics (3)** Foundational theories and techniques in general computational informatics.

Effective: Summer 2013

Prerequisite:

**IST 511 Information Management: Information and Technology (3)** Introduction to theoretical, computational, and practical issues involved in managing textual, spatial, temporal, and multimedia information in a computerized system.

Effective: Fall 2001

Prerequisite:

**IST 512 Information Processing Architecture and Technology (3)** This course introduces the core theories, concepts, and methods regarding information and technology from an information processing point of view.

Effective: Summer 2005

**IST 515 Information Security and Assurance (3)** This course covers theoretical, conceptual, and methodological foundations of information security and assurance.

Effective: Spring 2011 Ending: Summer 2013

Prerequisite:

**IST 516 Web and Internet Information Retrieval (3)** The course addresses aspects of searching, retrieving and modeling the Web/ Internet as information repositories using mathematical and probabilistic treatments.

Effective: Spring 2007

Prerequisite:

**IST 520 Foundations in Human-Centered Design (3)** Foundational theories in Human-Centered Interactions used for Human-Centered Design.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**IST 521 Human-Computer Interaction: The User and Technology (3)** Users, models of users, developing the models,

technology for creating interfaces; examples of good research and implications for Human-Computer Interface (HCI) design.

Effective: Fall 2001

Prerequisite:

**IST 522 Models and Theories of Human-Computer Interaction (3)** This course covers the theoretical foundations of human-computer interaction that prepares students in planning and conducting research in HCI.

Effective: Summer 2005 Ending: Fall 2013

**IST 525 Computer-Supported Cooperative Work (3)** IST 525 introduces theories, empirical findings, evaluation methods, and design frameworks in computer-supported cooperative work.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite:

**IST 525 Computer-Supported Cooperative Work (3)** IST 525 introduces theories, empirical findings, evaluation methods, and design frameworks in computer-supported cooperative work.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**IST 526 Development Tools and Visualizations for Human-Computer Interaction (3)** IST 526 addresses concepts and tools for developing working user interface software and prototypes to provide effective information visualizations.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite:

**IST 526 Development Tools and Visualizations for Human-Computer Interaction (3)** IST 526 addresses concepts and tools for developing working user interface software and prototypes to provide effective information visualizations.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**IST 530 Foundations in Social Informatics (3)** Foundations in social theories used in the study of the human context within which information and information technology exists.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**IST 531 Human Information Behavior: Information and the User (3)** Introduction to research into the nature of human information and communication processes at the individual, social, and organizational levels.

Effective: Fall 2001 Ending: Fall 2013

Prerequisite:

**IST 532 Organizational Informatics (3)** Researching Information and Information Systems in Organizations.

Effective: Summer 2005

Prerequisite:

**IST 535 Information Technology Valuation, Markets and Innovation (3)** This course covers the economic aspects of information technology and innovations.

Effective: Summer 2006

Prerequisite:

**IST 536 Public and Community Informatics (3)** Theories and uses of ICT in public sector and community organizations.

Effective: Spring 2007

Prerequisite:

**IST 541 Qualitative Research in Information Sciences and Technology (3)** Assists IST researchers in their efforts to learn about and employ appropriate qualitative methods in their research.

Effective: Spring 2004

Prerequisite:

**IST 552 Data and Knowledge Management (3)** This course introduces the computational foundations, methodologies and tools for data and knowledge management.

Effective: Summer 2009 Ending: Fall 2013

**IST 554 Network Management and Security (3)** Essential skills and knowledge for effectively utilizing networks and Internet technologies to facilitate, manage and secure data communications and applications.

Effective: Summer 2009

**IST 555 Intelligent Agents and Distributed Decision Making (3)** Distributed decision making theories and agent-based technologies, models and systems with applications in command and control, emergency and resource management.

Effective: Summer 2009

**IST 557 (STAT 557) Data Mining I (3)** This course introduces data mining and statistical/machine learning, and their applications in information retrieval, database management, and image analysis.

Effective: Summer 2009

Prerequisite:

**IST 558 (STAT 558) Data Mining II (3)** Advanced data mining techniques: temporal pattern mining, network mining, boosting, discriminative models, generative models, data warehouse, and choosing mining algorithms.

Effective: Summer 2010

Prerequisite:

**IST 562 Theoretical Foundations of Information Science (3)** This course introduces the theoretical foundations of information science, with applications in communication, signal processing, machine learning, and pattern recognition.

Effective: Summer 2009

Prerequisite:

**IST 564 Crisis, Disaster and Risk Management (3)** This course examines the fundamental elements of crisis, disaster, risk and emergency management.

Effective: Summer 2009

**IST 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2000

**IST 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2001

**IST 594A Principles of Scholarship (1)** Students will address the issues and challenges inherent in pursuing a PhD and in the role of university faculty member, including conducting researching, the craft of teaching, manuscript reviewing, conference presentation, and job hunting.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**IST 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2000

**IST 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2000

**IST 597A (A ED 597A, WMNST 597A) Gender, Art and STEM (3)** This course introduces FemTechNet, a global network of preeminent feminist scientists and artists who collaborate across areas of health, climate change, and information technology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**IST 597B Design-related Research (3)** Course provides review of design-related research, including: foundational philosophical positions; empirical and theory-building work in design-related research; with tactics and techniques for conducting such research.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**IST 597C IST Integration of Theories and Methods (3)** Surveys theories and methods of IST research for application to practical problems.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**IST 597D Big Data Fundamentals (3)** Foundations and applications of big data science: complexity, cyberinfrastructure, data structures, search security, processing, analytics, visualization, mining, governance and management. Should be familiar with databases and statistics.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**IST 597E Advanced Topics in Art, Photography, and Information Technology (3)** The course will cover some latest research and development advancements in the intersection of art, photography, and information technology.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**IST 597I Advanced Topics in Social Network Analysis and Social Media Mining (3)** The course will discuss advanced topics in dynamic social network analysis through online interactions in social media.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**IST 597J Web Analytics (3)** The course touches on the theoretical and methodological foundations of web data but the major focus will be analytical method.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**IST 597K Online Public Forums (3)** This course explores opportunities to enable large-scale civic engagement in online Public Forums through innovative use of social computing and deliberative technologies.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

IST 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 2001

IST 600 **Thesis Research** (1-15) No description.  
Effective: Fall 2001

IST 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 2001

IST 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) No description.  
Effective: Fall 2001

IST 610 **Thesis Research Off-Campus** (1-15) No description.  
Effective: Fall 2001

IST 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 2001

IST 815 **Information Security and Assurance** (3) This course provides theoretical and practical foundations of information security assurance.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

IST 841 **Search Engines & Information Retrieval** (3) Introductory course on search engines and information retrieval. Search, indexing, ranking, and search evaluation are formally defined, explained, and used.  
Effective: Summer 2010

IST 852 **Knowledge Management** (3) This course provides a foundation in knowledge management concepts and paradigms, emphasizing computational methodologies and tools for supporting data and knowledge management practices.  
Effective: Spring 2014 Future: Spring 2014

IST 868 **Topics in Visual Analytics for Security Intelligence** (3) Introduce visual analytic techniques for security informatics and intelligence. Survey technical approaches for data analysis, threats and vulnerability, communicating risk.  
Effective: Fall 2010 Ending: Fall 2013  
Prerequisite:

IST 868 **Topics in Visual Analytics for Security Intelligence** (3) Introduce visual analytic techniques for security informatics and intelligence. Survey technical approaches for data analysis, threats and vulnerability, communicating risk.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

IST 885 **Introduction to Multisensor Data Fusion** (3) Understanding the concepts, techniques, and issues surrounding the fusion of information from multiple sensors and sources of data.  
Effective: Summer 2009

IST 896 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2011

IST 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2011

IST 898 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2011

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## Information Systems (INFSY)

**INFSY 535 Object-Oriented Design and Program Development in Business** (3) Overview of key concepts in object design and the application of these concepts in business software development.

Effective: Fall 2001

Prerequisite:

**INFSY 540 Information Technology and Knowledge Management** (3) Information systems management, enterprise models of information technology, information technology and knowledge management.

Effective: Spring 2005

Prerequisite:

**INFSY 543 Electronic Commerce** (3) Overview of key aspects of E-Commerce within an organizational context including coverage of managerial issues and supporting technology.

Effective: Spring 2004

Prerequisite:

**INFSY 544 Design, Development, and Management of E-business** (3) Advanced topics in e-business including effective design, development, and management of E-business.

Effective: Summer 2004

Prerequisite:

**INFSY 545 Program, Data, and File Structures** (3) Program, data, and file structures are studied as they relate to management of data in information systems.

Effective: Fall 2001

Prerequisite:

**INFSY 547 WEB Enabled Technologies** (3) Integrating design principles and applying technologies that support business related, web-based applications.

Effective: Fall 2001

Prerequisite:

**INFSY 554 Master's Project** (3) Development of an original master's project in the student's field of interest and preparation of a paper.

Effective: Spring 1992

Prerequisite:

**INFSY 555 Data Management Systems** (3) Concepts and theory of database management systems explored through data modeling and planning techniques.

Effective: Fall 2001

Prerequisite:

**INFSY 556 Data Warehousing** (3) The study of the requirements collection, design, and development of data warehouses.

Effective: Fall 2001

Prerequisite:

**INFSY 560 Data Communications Systems and Networks** (3) Hardware and software concepts relevant to current communications and networking technology. The importance of telecommunications is emphasized.

Effective: Spring 1992

Prerequisite:

**INFSY 563 Network Security** (3) This is a study of network security concepts, technology and issues. Authentication, privacy and integrity of messages are analyzed.

Effective: Summer 2004

Prerequisite:

**INFSY 564 Wireless Networks** (3) This course is a study of wireless network standards, technology and applications. Both local and wide area networks are covered.

Effective: Summer 2004

Prerequisite:

**INFSY 565 Intelligent Systems in Business** (3) This course will emphasize the analysis, design, and application of intelligent systems within organizational settings.

Effective: Fall 2001

Prerequisite:

**INFSY 566 Data Mining and Knowledge Discovery** (3) The study and application of data mining techniques used to mine patterns in large transactional databases.

Effective: Fall 2001

Prerequisite:

**INFSY 570 Software Engineering in the Analysis and Design of Information Systems** (3) Software engineering concepts, specifically the analysis and design of structured information systems using computer-aided software engineering (CASE).

Effective: Spring 2001

Prerequisite:

**INFSY 575 Seminar in Information Technology Management** (3) Examination of selected topics relevant to current and

future managerial and organizational issues of information technology.

Effective: Spring 1992

Prerequisite:

**INFSY 585 Applications in Medical Informatics** (3) Analysis of complex systems specific to the support of healthcare management and delivery applications.

Effective: Summer 2004

Prerequisite:

**INFSY 587 Global Information Technology** (3) Comprehensive coverage of components, applications, and issues of global information technology management in organizations worldwide.

Effective: Summer 1997

Prerequisite:

**INFSY 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2009

**INFSY 595 Internship** (1-18) Supervised off-campus, nongroup instruction, including field experience, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 1997

**INFSY 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1992

**INFSY 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1999

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## Instructional Systems (INSYS)

**INSYS 415 Systematic Instructional Development (3)** Preparation in the use of a nine-step model for systematically analyzing instructional problems and developing validated, practical solutions.  
Effective: Summer 1996 Ending: Summer 2013

**INSYS 415A Systematic Instructional Development (3)** Preparation in the use of a nine-step model for systematically analyzing instructional problems and developing validated, practical solutions.  
Effective: Fall 2013 Future: Fall 2013

**INSYS 415B Systematic Instructional Development for Teachers (3)** Preparation of teachers to use a systematic model to design learning environments for K-12 classrooms.  
Effective: Summer 2012  
Prerequisite:

**INSYS 432 Designing Learning Within Course Management Systems (3)** Hands-on design of didactic and constructivist instructor-facilitated online lessons within the affordances and constraints of course management systems.  
Effective: Summer 2013  
Concurrent: ADTED 470

**INSYS 433 Teaching and Learning Online in K-12 Settings (3)** Explores uses of online technologies for K-12 settings including cybercharter and blended settings.  
Effective: Summer 2013

**INSYS 441 Design, Development, and Evaluation of Internet Resources (3)** Design, production, and evaluation of instructional materials for delivery on the Internet.  
Effective: Fall 2001

**INSYS 442 Innovative Instructional Applications of Microcomputer Technology (3)** Educators experience and develop innovative instructional applications of text-processing, database management, spreadsheet, and telecommunication software in their classrooms.  
Effective: Fall 2008  
Prerequisite:

**INSYS 447 Instructional Design for Multimedia Technologies (3)** State of the art multimedia technology hardware such as interactive video, CD-ROM and digitizing audio and video.  
Effective: Fall 2001

**INSYS 471 Introduction to Educational System Design (3)** Investigates systems theory and how components of educational systems interact; develops insights on current issues and models in Educational System Design.  
Effective: Summer 1996

**INSYS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1996

**INSYS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 1996

**INSYS 497A Teaching and Learning Online in K-12 Settings (3)** Explores uses of online technologies for K-12 settings including cybercharter and blended settings.  
Effective: Summer 2013 Ending: Summer 2013

**INSYS 497E Technology in Higher Education (3)** An overview of technologies currently implemented in higher education - from LMSs to apps, and corresponding research, theory and critiques.  
Effective: Summer 2013 Ending: Summer 2013

**INSYS 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1996

**INSYS 521 Instructional Systems Analysis (3)** Conducting needs analysis, performance analysis, task analysis, learner analysis, and environmental analysis in preparation for instructional design.  
Effective: Fall 2001  
Prerequisite:

**INSYS 522 Analyzing Outcomes and Learners** (3) Analyzing instructional outcomes, analyzing tasks, and writing objectives for the instructional design; analyzing learners characteristics.

Effective: Summer 1998

Prerequisite:

**INSYS 525 Instructional Design Models, Strategies, and Tactics** (3) Application of instructional design models and design of appropriate instructional strategies and tactics.

Effective: Spring 1999

Prerequisite:

**INSYS 527 Designing Constructivist Learning Environments** (3) Designing learning environments based on constructivist principles of learning that provide modeling, coaching, and scaffolding.

Effective: Summer 1996

Prerequisite:

**INSYS 544 Designing Video for Instruction and Training** (3) The application of theory to the design of visual instruction for multimedia instruction.

Effective: Summer 1996

Prerequisite:

**INSYS 545 Research in Instructional Computing** (3) The critical analysis of research in instructional computing and the application of research methodologies in instructional computing research.

Effective: Fall 2001

Prerequisite:

**INSYS 549 Current Topics in Emerging Technologies** (3) An in-depth seminar on the instructional and training design implications of specific new technologies as they emerge.

Effective: Fall 2001

Prerequisite:

**INSYS 551 Performance Technology for Instructional Designers** (3) Methods of identifying human performance problems in organizations and developing instructional and non-instructional interventions.

Effective: Summer 1996

Prerequisite:

**INSYS 553 Managing and Consulting for Instructional Development** (3) Knowledge and skills in managing and coordinating an instructional development project and consulting with subject matter experts and clients.

Effective: Summer 1996

Prerequisite:

**INSYS 574 Applied Qualitative Research for Work Practice, Innovation, and Systems Design** (3) Investigates qualitative research paradigms and methodologies; develops skills in use of ethnographic methods in work practice, innovation and systems design.

Effective: Summer 2000

Prerequisite:

**INSYS 575 Designing Experimental Research in Instructional Systems** (3) Designing research studies in Instructional Systems of a quantitative and experimental nature. Will result in a research proposal.

Effective: Spring 2007

**INSYS 581 Theoretical Foundations of Instructional Systems** (3) Analysis of theoretical foundations of the instructional systems (systems and cybernetics, communications, cognitive psychology, sociological, constructivist, ecological) for doctoral students.

Effective: Summer 1996

Prerequisite:

**INSYS 583 Survey of Research in Instructional Systems and Technology** (3) Analysis and evaluation of research in domains of instructional systems and technology.

Effective: Summer 1996

Prerequisite:

**INSYS 586 Diffusion and Adoption of Innovations** (3) Understanding change process in educational contexts, comparing various models, tailoring them to individual needs, and creating personalized model of change.

Effective: Summer 1998

Prerequisite:

**INSYS 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 1996

**INSYS 594 Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2003

**INSYS 595 Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 1996



**INSYS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1996

**INSYS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 1996

**INSYS 597A Integrating Mobile and Everyday Technologies into Learning Environments (3)** Integrating Mobile and Everyday Technologies into learning Environments examines how people use and learn with mobile devices in daily life.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INSYS 597B Designing Learning With Course Management Systems (3)** This course is designed for practicing teachers in K-12 settings including those in online cyber-schools, but would be informative for anyone designing online learning. A central outcome of this course is to increase your capability to design effective learning in a Course Management Systems (CMS). This course considers the theory and practice of online learning by reviewing the most up-to-date research on effective online instruction especially as related to the affordances and constraints of CMS in order to allow you to optimize the learning objects that you will design by fully using the internal features of the CMS as well as incorporating external tools (i.e., go outside the CMS, create something, bring the artifacts back inside). The course readings, discussions, assignments, and activities lead to and support a major course project that you will develop and deliver.  
Effective: Summer 2013 Ending: Summer 2013

**INSYS 597B Design Studio (3)** Design Studio is an environment for students to apply the skills, processes, and dispositions of Interaction Design. Too often educational technologies are used for relatively low level tasks. Students will be encouraged to design innovative educational technologies--creative ways of using technology to solve educational problems. Innovative educational technologies help people to solve various authentic educational programs in ways that have not been tried before. Completing Design Studio will also help people to identify research questions that are suitable for dissertation research and will stimulate fundable design projects.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INSYS 597C (HI ED 597C) Online Innovations in Learning and the Future of Education (3)** Examines MOOCs, badges, competency-based learning, prior learning assessments, and trends, and extrapolates the future of K-12 and Higher Education.  
Effective: Summer 2013 Ending: Summer 2013

**INSYS 600 Thesis Research (1-15)** No description.  
Effective: Summer 1996

**INSYS 601 PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.**  
Effective: Summer 1996

**INSYS 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) NO DESCRIPTION.**  
Effective: Summer 1996

**INSYS 610 THESIS RESEARCH OFF-CAMPUS (1-15) NO DESCRIPTION.**  
Effective: Summer 1996

**INSYS 611 PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.**  
Effective: Summer 1996

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## Insurance (INS)

INS 575 **Risk Management** (2) Develop an understanding of the risks facing corporations and the methods available to deal with those risks.

Effective: Summer 2011

Prerequisite:

INS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

INS 599 (IL) **Foreign Study--Insurance** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2011

Prerequisite:

INS 600 **Thesis Research** (1-15) No description.

Effective: Summer 2011

INS 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2011

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## Integrative Biosc (IBIOS)

IBIOS 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 1997

IBIOS 511 (BMMB 511, VB SC 511) **Molecular Immunology** (2) The study of molecular and biochemical events that influence immune responses and define current questions in immunology.  
Effective: Spring 2008  
Prerequisite:

IBIOS 530 (VB SC 530) **Regulation of gene expression by xenobiotics** (3) The mechanisms by which foreign chemicals alter gene expression and the techniques used to examine this effect are examined.  
Effective: Spring 2008  
Prerequisite:

IBIOS 532 (VB SC 532) **Developmental and Reproductive Toxicology** (3) Effects of environmental chemicals, nutrients and drugs on embryo/fetal development and maternal/paternal toxicity.  
Effective: Spring 2008  
Prerequisite:

IBIOS 551 (BMMB 551) **Genomics** (3) Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics.  
Effective: Summer 2007

IBIOS 570 **Molecular Toxicology Seminar Series** (2) This course provides an opportunity for students in the Cellular and Molecular Mechanisms of Toxicity program to interact with leading scientists.  
Effective: Spring 1999

IBIOS 571 **Current Issues in Biotechnology** (2) Lecture-discussion series by academic and industry experts on the cutting-edge of science, business, intellectual property, legal, social, and ethical issues in biotechnology. The course also requires a group project, involving case studies or market research on various areas of biotechnology.  
Effective: Spring 2006

IBIOS 572 **Benchmark Papers** (2) Discussion of current literature on molecular, cellular and developmental biology.  
Effective: Summer 2007

IBIOS 580 **Critical Reading in Immunobiology** (1) Literature review of cellular, molecular, genetic and biochemical analysis of in vitro and in vivo immunology.  
Effective: Summer 2004  
Prerequisite:

IBIOS 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 1997

IBIOS 591 **Ethics in the Life Sciences** (1) An examination of integrity and misconduct in life sciences research, including issues of data collection, publication, authorship, and peer review.  
Effective: Spring 1999

IBIOS 592 **Current Research Seminar** (2) This course uses a weekly biological seminar as a springboard for discussion of a research topic of high current interest.  
Effective: Spring 1999

IBIOS 593 **Molecular biology Laboratory** (3) An intensive laboratory course on the principles and techniques of nucleic acid purification, analysis by restriction enzymes, gel electrophoresis, nucleic acid labeling and hybridization, cloning, sequencing, PCR amplification, and analysis of cloned heterologous gene expression by western blotting.  
Effective: Spring 2000

IBIOS 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2000

IBIOS 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 1997

**IBIOS 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1997

**IBIOS 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1997

**IBIOS 598 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1999

**IBIOS 598E Tutorials in Bioinformatics and Genomics** (1) Review of current scientific literature in the area of bioinformatics and genomics.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**IBIOS 600 Thesis Research** (1-15) No description.  
Effective: Spring 1998

**IBIOS 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1998

**IBIOS 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Summer 1997

**IBIOS 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2002

**IBIOS 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2002

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## Intercollege Mba (IMBA)

**IMBA 501 Markets, Industry Analysis, and Business Strategy** (3) How markets determine prices and activity in the business firm; the firm's microeconomic and macroeconomic environments; formulation of competitive strategy.

Effective: Summer 2008

Prerequisite:

**IMBA 502 Financial and Accounting Tools** (3) Introduction to financial systems and reports, ability to analyze financial information, apply financial tools, and communicate financial information.

Effective: Summer 2008

Prerequisite:

**IMBA 513 Data Analysis Resource Module** (2) Applications of statistical methods in business management: selection of methods, interpretation of results, and presentation.

Effective: Summer 2008

Prerequisite:

**IMBA 515 Accounting for External Reporting** (2) Ability to read financial reports and analyze their content.

Effective: Summer 2008

Prerequisite:

**IMBA 516 Organizational Behavior and Performance** (2) Analysis of conceptual models, systems, and decision processes consistent with high levels of individual, group, and organizational performance.

Effective: Summer 2008

Prerequisite:

**IMBA 517 Corporate Governance** (2) Study of interrelationships among shareholders, boards of directors, and managers (owner agents) and other stakeholders in a modern public corporation.

Effective: Summer 2008

Prerequisite:

**IMBA 520 Managing Culture, Visions, Mission and Values** (2) Processes and models related to organizational culture and climate, leadership, and mentoring.

Effective: Spring 2005

Prerequisite:

**IMBA 521 Strategic Analysis** (2) Analysis of a company case; development of the ability to draw sound conclusions on business strategies and performance.

Effective: Summer 2008

Prerequisite:

**IMBA 522 Financial Management** (2) Analyze capital investment projects, examine the general principles of asset valuation, and study the valuation of stocks and bonds.

Effective: Summer 2008

Prerequisite:

**IMBA 523 Organizational Development, Intervention and Change** (2) Analysis and assessment of conceptual models, systems, and decision processes for organizational development, intervention and change; transformation and reengineering processes.

Effective: Summer 2008

Prerequisite:

**IMBA 530 Marketing in a Global Environment** (3) Global marketing planning and strategic formulation for profit and non-profit firms in creation, promotion, pricing, and distribution of goods and services.

Effective: Summer 2008

Prerequisite:

**IMBA 531 Project Management** (2) A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment.

Effective: Summer 2008

Prerequisite:

**IMBA 543 Accounting for Internal Decision Making** (2) Covers basic concepts, issues, tools, and techniques in the use of accounting information for internal decision making.

Effective: Summer 2008

Prerequisite:

**IMBA 544 Managing Human Resources** (3) Processes and issues related to staffing and retaining human resources.

Effective: Summer 2008

Prerequisite:

**IMBA 545 Research for Marketing Decisions** (1) Marketing research concepts/applications dealing with gathering, processing, and interpretation of primary/secondary data in identifying the needs/wants of prospective consumers.

Effective: Fall 2001

Prerequisite:

**IMBA 550 Corporate Information Strategy** (3) Information technology supporting management decision making, operations, and creation of new products and services; electronic commerce in global markets.

Effective: Summer 2008

Prerequisite:

**IMBA 560 Corporate Innovative Strategies (3)** Formulation and implementation of a corporate innovation or technology strategy.

Effective: Summer 2008

Prerequisite:

**IMBA 561 Global Operations and Supply Chain Management (3)** Effective management of the flow of goods and services.

Effective: Summer 2008

Prerequisite:

**IMBA 562 Global Business Management (3)** Establishing and expanding businesses in global markets and managing multinational firm strategies and operations.

Effective: Summer 2008

Prerequisite:

**IMBA 573 Strategic Planning (3)** Application of knowledge in creating and sustaining competitive advantage; development of skills necessary for writing a strategic plan.

Effective: Summer 2008

Prerequisite:

**IMBA 574 Strategic Financial Decisions (3)** Advanced capital project analysis; evaluating levered investments; application of option valuation principles to strategic decisions.

Effective: Fall 2008

Prerequisite:

**IMBA 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2004

**IMBA 597 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2004

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## **Intern Agric Develop (INTAD)**

INTAD 820 **International Agricultural Development Seminar** (3-6 per semester/maximum of 6) Students will examine international agricultural development issues through observation of systems, methods, and policies.  
Effective: Summer 2013

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## International Affair (INTAF)

INTAF 501 **Water and Sustainable Development** (3) This course addresses the scientific theory and practical considerations necessary to manage water resources in an international sustainable development context.  
Effective: Summer 2013

INTAF 502 **Science, Technology, and International Policy** (3) Examines science and policy communities, importance of science and technology to international affairs, scientific issues likely to affect international policy.  
Effective: Summer 2013

INTAF 503 **Hazards, Disasters, and International Affairs** (3) Hotspots, tipping points, and international approaches to prepare for, respond to, and recover from hazards, disasters and complex humanitarian emergencies.  
Effective: Summer 2013

INTAF 590 **Colloquium** (3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 2010

INTAF 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 2008

INTAF 595 **Internship** (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 2008

INTAF 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2008

INTAF 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 2008

INTAF 597A **Domestic Influences on Foreign Policy** (3) This course will examine how domestic politics influences the formulation and implementation of foreign policy in the United States and other major powers. The role of lobbyists, ethnic groups, special interests, bureaucratic politics, and other factors will be considered.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

INTAF 597A **Development, Growth, and Institutions** (3) This course examines the reasons why different national realize diverse long run levels of welfare. Possible determinants of the differential outcomes include different rates of factor accumulation, rates of technological innovation, openness of economies, as well as geographical location. In addition, the course will consider the impact of institutions, including domestic institutions, international institutions, as well as multilateral forms of cooperations between economies. Types of institutions to be considered will include micro-level institutions (those that function most obviously at the individual agent level), as well as institutions that govern at more aggregate levels of society. The course will consider both relevant theory, but will place an emphasis on examining available data sources in order to test alternative explanations.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

INTAF 597B **Energy, International Security, and the Global Economy** (3) This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy in contemporary international affairs.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

INTAF 597B **Role of Intelligence in Contemporary International Relations** (3) This course will examine how intelligence is gathered and how it is used in the process of formulating foreign policy. It will consider the various types of intelligence that are gathered, what government agencies are involved, how the intelligence is analyzed and what impact this information has on policy makers.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

INTAF 597C **Politics of the Maintenance of International Peace and Security** (3) This course will examine the main characteristics of the relationships between States; their motivations and aims; conflicts between them, and how they are typically resolved or adjusted; the legal and political framework within which those relationships take place; the



underlying conflict between interests and principles; the question of whether or not States are interested in peace and security, as against 'winning'; the main threats to peace and security, both military and non-military; and the role of non-State actors, such as global corporations and terrorist groups.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTAF 597C Dynamics of International Economic Order: Law, Politics, and Power (3)** This course examines the cross-cutting relationship between political power and global economic governance. The course considers three inter-related sets of issues: first, how nation-states define international economic order through the creation of legal frameworks and rules-based regimes for cross-border trade, investment, and monetary relations; second, how shifts in the international distribution of economic and political power impact these frameworks and regimes; and third, how great powers-in the contemporary context more specifically, the United States (the emblematic established power) and China (the paradigmatic rising power) - approach global economic governance as part of their grand strategies to advance their interests and enhance their international position.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**INTAF 597D Introduction to Research Design (3)** This course provides an accessible approach to developing the research, empirical and analysis skills necessary for International Affairs careers and research. The approach is hands-on, with a focus on providing practical skills for evaluating real-world arguments and policies. The course has three objectives. First, to provide a background that prepares students for the required Multi-Sector and Quantitative Analysis (INTAF 803) core courses by giving them a solid foundation in research design and analysis. Second, to familiarize students with a variety of International Affairs methods (e.g. experiments, social networks, and data sources) not covered in other core-classes. Third, to provide law and other students sufficient knowledge of social science approaches to participate effectively in SIA courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTAF 597D Cultural Policy, Cultural Exchange (3)** This course looks at two central sources of the production of cultural identity: nation states and globalization. By studying state policy, cultural trade policy, and international agreements related to culture we will understand the various ways that identity has been constructed outside of everyday practice. After establishing this groundwork we will study how cultural identity is a contested terrain for both states and global capital. The cultural form of focus will be cinema but we will also study other media, public art, and education.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**INTAF 597E Strategy, Conflict, Peace (3)** This course provides the analytical tools required to understand strategic interaction between agents, be they individuals, firms, or states. The objective is to understand under what circumstances such interaction leads to cooperative outcomes (peace), when it issues in adversarial interaction (conflict), and what and why might be the optimal forms of strategy under such alternative conditions. The basis of the analysis will be game theory.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTAF 597E Law, Politics and the Practice of Diplomacy (3)** Diplomacy is an important mechanism for the conduct of relations amongst States. This course will define its structure and methods, as it has been practiced historically, and by reference to the politics and law which support it: such as the notion of the sovereignty, rights and duties of States; the obligation to settle disputes by peaceful means; and the pursuit of the interests of States. Attention will be given, particularly to its working methods: negotiations; the role of Foreign Ministries, Embassies and diplomats; and, international organizations, such as the United Nations and its Agencies. A critical appraisal will be made of: its utility in the modern era, the mythology which surrounds it; and ways in which it might be adjusted to increase its utility and cost effectiveness in the future. Much attention will be given, in the course, to practical examples of diplomatic actions and experiences.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**INTAF 597F The United States and the Middle East (3)** American engagement in the Middle East, one of the world's most important regions, is and will continue to be a powerful factor shaping the character of contemporary international affairs. To help students deepen their understanding of U.S. foreign policy and the modern Middle East, this course explores two related sets of issues: 1) the strategic challenges facing U.S. policymakers in the Middle East and how policymakers have sought to address these challenges; and 2) Middle Eastern responses to U.S. engagement in the region.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTAF 597I Hazards Disasters & International Affairs (3)** This course addresses the scientific and technical background of hazards (natural, technical, cultural) and disasters; considers the risk model, examines the disaster management cycle; and discusses costs and benefits of various actions in the international environment. The implications of disasters and complex humanitarian emergencies to national and international stability are considered using case study and theoretical approaches. The national and international hazard management and disaster response communities are examined (government, inter governmental organizations, non-government organizations, private industry). Disaster management plans are considered.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTAF 597K International Environmental Negotiations (3)** Major environmental issues with considerable controversy, uncertainty, or immediacy will be examined in detail (for example: climate change, pandemic flu virus, or a major natural disaster, etc.). After extended study in the substance of the topics, various negotiations techniques (positional, principled, and hybrid practical approaches), and the decision-making process in the international community, and a number of

short role playing activities and practice negotiations, a simulation game will be conducted based on one of the topics. Teams of students will take on the roles of nations, groups of nations, or extranational organizations (for example USA, China, India, Russia, EU, Group of 77, OPEC, UN, WHO, etc.). They will develop positions based on the most current scientific information, existing policy and their groups' interests. The game will progress through a series of moves to which they must respond with new policy positions and negotiated agreements.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

INTAF 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 2008

INTAF 598A **Member Journal of Law and International Affairs** (1) See handbook for description.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

INTAF 598B **Editor Journal of Law and International Affairs** (2) See handbook for description.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

INTAF 801 **Actors, Institutions, and Legal Frameworks in International Affairs** (3) Addresses the principal actors, institutions, and legal frameworks which operate in international relations.  
Effective: Summer 2008

INTAF 802 **Foundations of Diplomacy and International Relations Theory** (3) Addresses the central tenets of diplomacy and international relations and theories and concepts that underpin the study of international relations.  
Effective: Summer 2008

INTAF 803 **Multi-sector and Quantitative Analysis** (3) Introduces students to quantitative methods applicable to various issue areas, including international relations, economics, business, law, education, health, and environment.  
Effective: Summer 2008

INTAF 804 **Global Cultures and Leadership** (3) Introduces students to cultural theories and to an understanding of how socio-cultural beliefs may impede or accelerate social change.  
Effective: Fall 2011

INTAF 805 **International Economics: Principles, Policies, and Practices** (3) Addresses principles, policies, and practices in international trade and finance that are fundamental for understanding international economic relations.  
Effective: Summer 2008

INTAF 810 **Energy, International Security, and the Global Economy** (3) This course explores the economic, political, and strategic implications of ongoing trends in global energy markets, particularly oil and gas markets.  
Effective: Summer 2013

INTAF 811 **Estimative Analysis in International Strategy** (3) Analytical methods to estimate future conditions as they might influence international policy, negotiations, or strategic planning.  
Effective: Summer 2013

INTAF 813 **International Environmental Negotiations** (3) Major international environmental negotiation issues with considerable controversy, uncertainty, and/or immediacy will be examined in classroom with experiential learning situations.  
Effective: Fall 2013 Future: Fall 2013

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## International Bus (INT B)

INT B 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

INT B 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

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## International Business (I B)

**I B 403 International Business and National Policies** (3) Evaluation of national economic policies in the light of international economic theory; their impacts on operations of the international business firm.

Effective: Summer 2011

Prerequisite:

**I B 404 Contemporary Issues in International Business** (3) Investigation of issues in international business practice interpreted from the foundations of the social sciences. Topics will be chosen from contemporary issues in global business and economics.

Effective: Summer 2011

Prerequisite:

**I B 440 (US;IL) (PL SC 440, AFR 440) Globalization and Its Implications** (3) This course explores the socioeconomic implications of globalization.

Effective: Spring 2013

Prerequisite:

**I B 450 The Business Environment of Europe** (3) This course provides an overview of the economic, institutional, and regulatory environment in Europe at the EU and national levels.

Effective: Summer 2011

Prerequisite:

**I B 460 International Business in Emerging Nations** (3) An overview of international business strategies and economic environments of emerging nations with a specific focus on markets in China, India, and Southeast Asia.

Effective: Summer 2011

Prerequisite: Concurrent: I B 303

**I B 480 (R M 480) International Real Estate Markets** (3) International perspectives on real estate as property, evaluation of land use regulations, and differences in real estate markets across countries.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**I B 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2011

Prerequisite:

**I B 494H Honors Research Project** (1-3 per semester/maximum of 6) Supervised honors student research projects identified on an individual or small-group basis.

Effective: Summer 2011

Prerequisite:

**I B 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

**I B 497 Special Topics** (1-9) Formal courses given infrequently to explore in depth, a comparatively narrow subject interest.

Effective: Summer 2011

**I B 497A International Development in African Context** (3) Course delves into Africa's development prospects in the 21st Century, past and current issues in international business.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**I B 497B The Global Financial Crisis** (3) An overview of the growth of the financial industry in the U.S. economy and the globalization of financial markets. It will look at the role of government, consumers, mortgage companies, the rating agencies and the banking sector in the creation of the housing bubble. The impact of certain financial derivatives on the global economy in general and specific countries in particular will be explored. Through readings of key players involved in the crisis, it will identify risk management issues that are important to this case and look at proposed remedies designed to avoid future problems.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**I B 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2011

**I B 500 International Business Management** (3) Concepts and institutions affecting the international conduct of business; interface between nations and international firms; alternative policies businesses employ internationally.

Effective: Summer 2011

**I B 515 (R EST 515) Property Rights in a Global Economy** (2) Analysis of economic, financial, legal, and political factors

affecting international real estate decision making.  
Effective: Summer 2011

I B 555 (FIN 555) **Global Finance** (1-3) Analyze international business finance problems, impact of evolving international payment systems on business, financial management in modern multinational enterprise.  
Effective: Summer 2011  
Prerequisite:

I B 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2011

I B 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2011

I B 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2011

I B 599 (IL) **Foreign Study--International Business** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2011  
Prerequisite:

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## Internatl & Comp Law (INTER)

**INTER 950 International Air and Space Law (2)** This course will examine with an international perspective the legal status of national air space and outer space and the legal problems surrounding man's activities in these environments. The law governing international and domestic air transport will be surveyed, and the course will conclude with a look at law on the "high frontier."

Effective: Spring 2007

**INTER 951 Introduction to Transnational Law and Legal Issues (3)** This course will introduce the student to the nature of transnational law and to issues that lawyers will confront when legal issues transcend national borders. The course commences with an examination of the legal complexities of interactions (including economic transactions, civil litigation, and movement of people) in which national law, international law and private law may all simultaneously play a part. It examines the way in which private law, national law and international play a role in a number of different sorts of transactions, from simple organizations in regulating private behavior on a global basis.

Effective: Summer 2011

**INTER 952 Law of the Sea (2)** Address all central aspects of the law of the sea as a branch of public international law.

Effective: Summer 2007

**INTER 953 Law of Treaties (2)** Treaties are the foundation of public and private international law and national foreign affairs law. This course examines: historical development of law of treaties; concept of treaty; treaty as source of international and national law; stages of concluding treaty; reservations; accession to treaties, functions of depositary; publication of treaties; breach of treaty obligations; invalidity, termination, and suspension of treaties; denunciation and other withdrawal from treaties; treaties and jus cogens; treaties and customary rules of international law; treaties and third States; treaties and municipal law; interpretation of treaties; languages and authentic texts of treaties.

Effective: Summer 2011

**INTER 954 Foreign Investment in Russia and the CIS (2)** Addresses principal aspects of the legal framework for foreign investment in Russia and other CIS countries.

Effective: Summer 2007

**INTER 958 Comparative Constitutional & Public Law (3)** The principal objective of this course is to provide students with a greater understanding of how their country's body of constitutional law is shaped by history, institutions, and current values. The comparative project, by focusing on narrow differences between two very similar countries, allows students to move beyond an acceptance of basic premises of constitutional law as "natural" or "inherent." As an important dividend, students will gain basic knowledge of foundational concepts in the legal landscape of their country's largest trading partner, hopefully providing students with a comparative advantage in seeking employment with government offices and private firms whose clients engage in substantial cross-border transactions.

Effective: Summer 2011

**INTER 959 Russian Law (2)** This 2-credit course is concerned with the development of the law, legal system, and legal institutions of what is popularly known as Russia but also correctly and officially known as the Russian Federation within the boundaries presently occupied and, historically, within the boundaries of the Russian Empire. By "law" we mean formal legislation, customary rules, relevant international legal rules, legal doctrine, and anything else regarded by the Russian State or by Russian jurists as comprising part of the "law." For our purposes "legal institutions" encompasses all law enforcement agencies or any other agencies of the State or empowered by the state which are concerned with the law in any manner whatsoever, including educational institutions.

Effective: Summer 2011

**INTER 961 Asylum and Refugee Law (3)** This class surveys the laws of political asylum and related protection for those fleeing danger in their home countries. It examines asylum and refugee law and policy in the United States, and sets forth the legal grounds for barring someone from asylum. It also explores the politics driving immigration policy, including asylum and refugee policy, and the federal agencies that implement those policies.

Effective: Summer 2011

**INTER 965 Immigration Law (3)** This course is intended to provide students with a general knowledge of immigration law, including such critical subjects as the constitutional powers of the federal government over immigration matters, admission and exclusion, entry, deportation, and political asylum.

Effective: Summer 1999

**INTER 966 International Litigation and Arbitration (3)** This course is intended to acquaint students with the impact of globalization upon the process of litigation. It focuses upon the adjudicatory resolution of disputes created by international contracts and global business transactions through the standard legal trial process and arbitration. Various basic topics are treated, including (1) the certification and training of international lawyers; (2) the liability exposure of multinational enterprises; (3) the State as an actor in global commerce; (4) problems of comparative jurisdiction, service of process and evidence-gathering, proof of foreign law, and the enforcement of foreign judgements; (5) the extraterritorial application of national law; and (6) attempts to establish a transborder law and legal process. The course also provides a

thorough introduction to international arbitration and investor- state arbitration.  
Effective: Fall 2011

**INTER 968 Comparative Antitrust Law (3)** This course focuses on the antitrust law of the European Union and selected other jurisdictions. It will cover international mergers, monopolies, price fixing cartels, distribution restraints, and related topics. The course examines principles of comity and cooperation among international enforcers investigating cases with a multi-national impact. We also review the antitrust laws of other selected jurisdictions, focusing on proposed and recently enacted competition laws including those of selected new entrants to the European Union and China, and on laws of other jurisdictions with an important impact on U.S. firms such as Japan. Finally, the course will consider issues such as advising multi-national clients, obtaining discovery internationally, and litigating complex cases.  
Effective: Summer 2011

**INTER 969 International Organizations (2)** International organizations play an influential role in the world today. Just a few of the fields they address are peacemaking and peacekeeping, labor relations, food production and distribution, education, health, economic development, monetary affairs, international trade, civil aviation, tele-communications, protection of intellectual property and nuclear energy. This course will examine lawmaking and regulation by international organizations, the regulatory impact of governance by these organizations, issues of legal personality, membership, participation, rights of members and termination of membership, as well as enforcement and dispute settlement. Focus will be on the United Nations and its specialized agencies, including the World Health Organization, the Food and Agriculture Organization, UNESCO and the International Labor Organization.  
Effective: Summer 2002

**INTER 971 International Law (3)** This course introduces students to key concepts and doctrines of international law. It examines the sources of international law such as custom and treaty, the bases of international jurisdiction, issues of statehood, recognition and succession, nationality, international agreements, and United States participation in the international legal system. The course provides students with the basics needed for both public and private international law practice.  
Effective: Spring 2011

**INTER 973 Comparative Corporate Law (2)** This course attempts a comparative analysis of American and European approaches to the regulation of business enterprises operating in corporate form. The goal is to provide the student with a basic understanding of the fundamental, and perhaps fundamentally different, approaches taken by governments in the United States and in the European communities to the regulation of the corporation. The course materials concentrate on the formal sources of law and thereafter highlight some ways in which the difference in approach is manifested in actual regulation.  
Effective: Summer 2000  
Prerequisite:

**INTER 974 Civil Law From Empire to Union (3)** The most important issue of Civil Law today is its Worldview and its perspectives on Citizenship as well as on International Justice. In other words, particularities of the Civil Law sustain a worldview that stems from Roman Law-traditions and practices of the Roman Empire. These pertain to more recent legal developments taking place in a unifying Europe. The profiles of the major functionaries in today's Civil Law domain: judges, attorneys, EU civil servants and administrators mirror such traditions. This course is not restricted to a traditional comparative perspective. Means are provided for a correct and effective transnational communication between legal professionals. To study Civil Law and EU Law implies an approach, understanding and management of the electronic means to communicate with its citizens, institutions and courts. The EU website is an outstanding instrument to understand the structures within lawyers must operate.  
Effective: Summer 2011

**INTER 975 History of the Western Legal Tradition (3)** This course will provide an overview of Western legal systems in ancient, medieval, early modern and modern times.  
Effective: Summer 2010

**INTER 976 Maritime Law (3)** Initial consideration of peculiarly American Admiralty jurisdiction and practice, after which a survey of substantive rules of the general maritime law respected by shipping and trading nations is essayed. Carriage of goods by water (including bills of lading, charter parties, and general average), collisions, salvage, and seafarers' personal injuries are treated as discrete subjects with warranties of seaworthiness, applicability of multilateral treaties, harmonizing effects of worldwide London insurance markets, and modern English precedent being recurring themes.  
Effective: Spring 2002

**INTER 984 International Commercial Arbitration (3)** By some measures up to 90% of all international and transnational contracts include agreements to resolve disputes between the parties through arbitration. For all its success, the international arbitration system is not a simple organism. It is the product of a complex interaction of national laws, contractual agreements, specialized procedural rules, and international treaties, customs and norms. The system is designed to balance party autonomy with the sovereign and transnational regulatory interests that are implicated in disputes. This course explores the amalgam of sources that undergrid the international arbitration system, as well as the strategic considerations, practical skills and policy implications that are involved.  
Effective: Summer 2011

**INTER 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 2006

**INTER 997A Energy, International Security, and the Global Economy (3)** This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy in contemporary international affairs.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTER 997A Transnational Law (3)** The course centers on issues that lawyers and policymakers confront when legal and related policy activities transcend national borders and trigger alternative or supplemental governance systems. Students will be introduced to the methodology of transnational law, the sources of law, the system characteristics of transnational law, and specific policy and practice focus of the field, which all touch on emerging issues of globalization. The course commences with an examination of framework issues in transnational law, including distinguishing features of this field and relationship to domestic law, international and comparative law. The bulk of the course then examines transnational public and private law systems, including the Rome Statute (transnational criminal law), transnational constitutional frameworks, international finance, human rights governance systems, international private standard setting, and systems of soft law governance.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**INTER 997B Introduction to Research Design (3)** This course provides an accessible approach to developing the research, empirical and analysis skills necessary for International Affairs careers and research. The approach is hands-on, with a focus on providing practical skills for evaluation real-world arguments and policies. The course has three objectives. First, to provide a background that prepares students for the required Multi-Sector and Quantitative Analysis (INTAF 803) core course by giving them a solid foundation in research design and analysis. Second, to familiarize students with a variety of International Affairs methods (e.g. experiments, social networks, and data sources) not covered in other core-classes. Third, to provide law and other students sufficient knowledge of social science approaches to participate effectively in SIA courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTER 997B Energy, International Security, and the Global Economy (3)** This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy and the international oil and gas industry; about the various types of contractual arrangements for cross-border investment in upstream oil and gas development and what the differences among these types of contractual agreements reflect regarding the shifting balance of power between resource-owning national governments and foreign investors; and about why and how major energy market players shape their interactions on the basis of political and strategic calculations, along with commercial and economic considerations.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**INTER 997C International Environmental Negotiations (3)** Major environmental issues with considerable controversy, uncertainty, or immediacy will be examined in detail (for example: climate change, pandemic flue virus, or a major natural disaster, etc.). After extended study in the substance of the topics, various negotiations techniques (positional, principled, and hybrid practical approaches), and the decision-making process in the international community, and a number of short role playing activities and practice negotiations, a simulation game will be conducted based on one of the topics. Teams of students will take on the roles of nations, or extranational organizations (for example USA, China, India, Russia, EU, Group of 77, OPEC, UN, WHO, etc.). They will develop positions based on the most current scientific information, existing policy and negotiated agreements.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**INTER 997C International Dispute Resolution Colloquium (2)** While the proliferation of international courts and tribunals has been well documented, most study of this phenomenon has been truncated or partial. This colloquium will explore the development, system design, function, and effect of the full range of international tribunals and courts, including the International Court of Justice, regional international courts (such as the European Court of Justice, the European Court of Human Rights, and the Inter-American Court of Human Rights), international criminal tribunals, international investment and commercial arbitration, state-to-state arbitration, international claims tribunals (such as the Iran-U.S. Claims Tribunal and the Holocaust claims tribunals), as well as international claims in national courts. The format for the course will be as a colloquium, with guest speakers for each topic, with background reading and discussions developed and led by students.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

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## Intl Prop/Media Law (INTPR)

INTPR 950 **Communications Law** (2) This course will explore current issues in communications law including First Amendment constraints on the regulation of the content of telephone calls and television advertising, cable TV monopolies, and telecommunications regulations and deregulation. Course materials explore regulatory, constitutional, and antitrust law principles as they apply to broadcast, cable, and telecommunications activities.  
Effective: Fall 1998

INTPR 951 **Internet Law** (3) This course presents the range of legal issues arising from the emergence of cyberspace. The course considers how the law has reacted to challenges posed by the Internet as well as how the law is shaping its future. Specific areas covered include jurisdictional analysis, First Amendment/free speech, digital copyrights, trademarks and domain names, electronic privacy, e-commerce, and Internet governance.  
Effective: Spring 2008

INTPR 960 **Copyrights** (3) The course addresses the legal protection afforded to authors and artists under common law and statutory copyright. It considers the rights granted, procedure for their procurement, and protection through litigation. The course also deals with international rights, conveyancing, and interface with the antitrust laws.  
Effective: Fall 2009

INTPR 980 **Patent Law** (3) This course is an examination of the legal requirements for obtaining patent protection for an invention. The statutory foundations of United States patent law are examined through an analysis of patent prosecution practice and patent litigation. The course also considers United States patent practice in the context of international intellectual property law.  
Effective: Fall 2008

INTPR 982 **Licensing of Intellectual Property** (3) The retention of the intellectual property or the absolute transfer of such interests to other for purposes of economic exploitation is, however, declining in use and popularity. Rather, it has evolved that maximization of the holder's value in the intellectual property may, in some circumstances, be better achieved by sharing some of the rights, while retaining others. This is the topic of the course in the licensing of intellectual property. The offering explores the myriad business, legal, and negotiating issues involved in the drafting and use of intellectual property licensing agreements.  
Effective: Summer 2011  
Prerequisite:

INTPR 985 **Trademarks** (2) The law of trademarks is central to the concept of fair dealing in the commercial environment. The history of common law and statutory trademarks is explored as well as registration, conveyancing and foreign rights. The course deals with the duty of the merchant to compete honestly and remedies for failure to do so.  
Effective: Spring 2011

INTPR 997 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2008

INTPR 997A **Introduction to Intellectual Property Law** (3) This course will survey the protection of proprietary rights in inventions, writings, creative expression, trade secrets, and other intangible intellectual products by federal patent, copyright, trademark and unfair competition law, and by state trade secrecy and unfair competition law. A central theme will be the challenges to traditional legal paradigms posed by new technologies and the shift to an information-based economy. The course is intended for all students who anticipate having corporate clients and seek a basic understanding of the laws applicable to key assets of most businesses, as well as for students interested in becoming intellectual property specialists. This course does not replace (and is not a prerequisite for) Copyrights, Patent Law, Trademarks, or any other intellectual property course.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

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## **Intl Sust Dev Prj (IHSDP)**

IHSDP 995 **International Sustainable Development Project Law Clinic** (1-3 per semester/maximum of 7) The Clinic will partner with, among others, university-sponsored humanitarian engineering (HE) and social entrepreneurship (SE) programs, like Penn State's multidisciplinary HESE program, and with foreign entrepreneurs with sustainable business objectives (economic, environmental and social). Clinic students will work collaboratively in multidisciplinary teams with HESE students to develop, design, and implement humanitarian ventures in the developing world.  
Effective: Summer 2013

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## Italian (IT)

IT 412 **Theory and Practice of Translation** (3) Advanced practicum in Italian explores the technical, artistic, and practical applications of translation between Italian and American cultures.

Effective: Summer 2004

Prerequisite:

IT 415 **Dante** (3) Readings in the Divina Commedia and the related lesser works of Dante Alighieri.

Effective: Summer 2011

IT 422 **Topics in the Italian Renaissance** (3) Topics vary by year and may include "Theories of Love," "Magic, Witchcraft, Alchemy, and the Emergence of Modern Science," etc.

Effective: Fall 2005

Prerequisite:

IT 450 **Nineteenth-Century Italian Literature** (3) Italian romanticism, Verismo and neoclassicism, their origin and development in the novel, poetry, and drama.

Effective: Winter 1978

Prerequisite:

IT 460 **Twentieth-Century Italian Literature** (3) Modern and contemporary Italian prose, drama, and poetry.

Effective: Winter 1978

Prerequisite:

IT 475 **Modern Italian Literature and Cinema** (3) Focus on silent films, fascism, WWII, Resistance, Neorealism, and reactions against Neorealism.

Effective: Spring 2003

IT 480 **Italian Women Writers Through the Centuries** (3) Analysis of the works of women authors in their historical and literary contexts.

Effective: Spring 2005

Prerequisite:

IT 485 **Italian-American Cultural Studies** (3) In-depth exploration of Italian-American cultural contributions.

Effective: Spring 2005

Prerequisite:

IT 490 **Dante in Translation** (3) The reading of Dante's Divine Comedy and selected minor works.

Effective: Fall 1983

Prerequisite:

IT 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

IT 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

IT 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

IT 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

IT 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

IT 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1988

IT 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

IT 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

IT 801 **Fundamentals of Reading Italian for Research** (3) This course provides the fundamental skills for reading Italian prose to graduate students with special interests in conducting research using Italian materials.  
Effective: Spring 2010

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## Japanese (JAPNS)

JAPNS 401 (IL) **Level Three Japanese A** (4) Further acquisition of the four language skills in Japanese--reading, writing, speaking and listening comprehension.

Effective: Spring 2011

Prerequisite:

JAPNS 402 (IL) **Level Three Japanese B** (4) Exclusively for study abroad returnees. To further develop Japanese proficiency in speaking, listening, reading, and writing.

Effective: Spring 2011

Prerequisite:

JAPNS 403Y (IL) **Level Four Japanese A** (4) Continuation of JAPNS 402. Aims to improve students' proficiency in all four language skills, with a special emphasis on writing.

Effective: Fall 2012

Prerequisite:

JAPNS 404 (IL) **Level Four Japanese B** (3) Continuation of JAPNS 403Y. Aims to improve students' proficiency in all four language skills through content-based language learning.

Effective: Fall 2012 Ending: Summer 2013

Prerequisite:

JAPNS 404 (IL) **Level Four Japanese B** (4) Continuation of JAPNS 403Y. Aims to improve students' proficiency in all four language skills through content-based language learning.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

JAPNS 410 (IL) **Japanese Through Manga** (3) The course aims to expand students' knowledge and application of Japanese language beyond elementary and intermediate textbooks through the use of manga (graphic novels).

Effective: Summer 2013

Prerequisite:

JAPNS 421 (IL) **Courtly Japan** (3) Focused study of aristocratic society and culture of Heian period Japan.

Effective: Spring 2012

Prerequisite:

JAPNS 422 (IL) **War and the Warrior in Japan** (3) Survey of the role of warfare and the warrior in Japan, with attention to changing cultural settings. Taught in English.

Effective: Summer 2011

Prerequisite:

JAPNS 423 (IL) **Men, Women, and Animals** (3) Japanese history and culture through the lens of relations between men and women and between humans and animals.

Effective: Summer 2011

Prerequisite:

JAPNS 424 (IL) **Traveling Voices** (3) Transnational Writings of Japan: from Modern to Contemporary Eras .

Effective: Spring 2012

Prerequisite:

JAPNS 425 **Beyond Anime** (3) Selected works from the history of illustrated narrative from scrolls to chapbook, through film and anime; topics may vary. This seminar-style study of Japanese visual culture will help students see Japanese visual arts in terms that are local to Japanese aesthetics and through those that transcend local cultures.

Effective: Spring 2011

Prerequisite:

JAPNS 426 (HIST 474) **Early Modern Japan** (3) Japanese history from 1580 to 1880.

Effective: Spring 2013

Prerequisite:

JAPNS 450 (IL) **Introduction to Classical Japanese** (3) Basic patterns and structures of Classical Japanese from its development in the 6th century through usage in the 20th century.

Effective: Summer 2013

Prerequisite:

JAPNS 452 (IL) **Contemporary Japan: Cultures, Lifestyles, Trends** (3 per semester/maximum of 6) Survey of aspects of modern Japanese society; includes readings from Japanese newspapers, magazines, and fiction; topics may vary each semester.

Effective: Spring 2010

Prerequisite:

JAPNS 453 (IL) **Japanese Film** (3 per semester/maximum of 6) Selected films and directors representing various aspects of Japanese culture and cinema; topics may vary each semester.

Effective: Spring 2010

Prerequisite:

JAPNS 454 (IL) **Japanese Literature** (3 per semester/maximum of 6) Selected works from important Japanese texts representing genres such as autobiography, poetry, fiction, and drama; topics may vary each semester.

Effective: Spring 2010

Prerequisite:

JAPNS 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2010

JAPNS 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2010

JAPNS 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2010

JAPNS 496A **Japanese through Manga** (3) Expand students' knowledge and application of Japanese language beyond elementary and intermediate textbooks through the use of manga (graphic novels).

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

JAPNS 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 1995

JAPNS 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2010

JAPNS 499 (IL) **Foreign Study--Advanced Japanese** (1-15) Small group instruction in spoken and written modern Japanese at the advanced level.

Effective: Spring 2010

Prerequisite:

JAPNS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1997

JAPNS 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 2003

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## Jewish Studies (J ST)

J ST 401 (IL) (HIST 401) **Ancient Technologies and Socio-cultural History in the Ancient Levant** (3) Social and intellectual development in the Ancient Levant as they affected and were affected by technological development.  
Effective: Spring 2006  
Prerequisite:

J ST 405 (IL) (RL ST 405) **Ancient Jewish Traditions and Modern Food Movements** (3) Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times.  
Effective: Spring 2012

J ST 409Y (IL) (HIST 409Y, RL ST 407Y) **European Anti-Semitism from Antiquity to the Present** (3) Surveys the history of anti-Semitism in Europe from antiquity through the Middle Ages to the present.  
Effective: Summer 2005

J ST 410 (US;IL) (HIST 410, RL ST 410) **Jews in the Medieval World** (3) Trends in medieval Jewish society under Islam and Western Christendom.  
Effective: Spring 2006

J ST 411 (US;IL) (RL ST 411) **Jewish Studies** (3) Study of the life and thought of a particular period or movement in the history of Judaism.  
Effective: Spring 2006  
Prerequisite:

J ST 412 (RL ST 412) **American Judaism** (3) The development of Jewish religion and culture in America from the colonial era to the present.  
Effective: Summer 1999  
Prerequisite:

J ST 416 (HIST 416) **Zionist History 1890-1948** (3) History of Zionist thought and politics to the foundation of Israel 1948.  
Effective: Summer 1997

J ST 420 (ANTH 420) **Archaeology of the Near East** (3) Culture of the Near East and India from Paleolithic times through the Bronze Age.  
Effective: Spring 1999  
Prerequisite:

J ST 424H (HIST 424H, RL ST 424H) **Monotheism and the Birth of the West** (3) The birth of monotheism and its relation to social organization, the idea of individuality, and science.  
Effective: Fall 2012  
Prerequisite:

J ST 427 (ENGL 427) **Topics in Jewish American Literature** (3) An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.  
Effective: Spring 2009 Ending: Fall 2013  
Prerequisite:

J ST 427 (ENGL 427) **Topics in Jewish American Literature** (3 per semester/maximum of 9) An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

J ST 433 **Introduction to Jewish Music and Art** (3) Introduction to the study of Jewish music and art from antiquity to the present.  
Effective: Summer 2011  
Prerequisite:

J ST 434 **Media and the American Jewish Experience** (3) Study of United States Jewish history through film and accompanying written text.  
Effective: Summer 2011  
Prerequisite:

J ST 457 (US;IL) (ANTH 457, SOC 457) **Jewish Communities: Identity, Survival, and Transformation in Unexpected Places** (3) Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.  
Effective: Summer 2006  
Prerequisite:

J ST 468 **Modern Jewish Philosophy** (3) Explores the major figures in modern Jewish philosophy and their influences on contemporary philosophy.  
Effective: Summer 2012  
Prerequisite:

J ST 478 (RL ST 478) **Ethics After the Holocaust** (3) Explores the philosophical effects of the Holocaust for thinking about the primary question: Is ethics possible?

Effective: Summer 2012

Prerequisite:

J ST 480 (CAMS 480) **Greeks and Persians** (3) Development and achievements of the Achaemenid kingdom; relationships between Persians and Greeks.

Effective: Spring 2001

Prerequisite:

J ST 494 **Research Projects** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1998

J ST 494H **Research Projects** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

J ST 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 1998

Prerequisite:

J ST 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 1994

J ST 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1994

J ST 497A **Minorities and Israeli Cinema** (3) Since its early days, Israeli cinema has played a dual role: while serving as a means by which to forge a national identity it has also given voice to marginalized groups and undermined the imagined Israeli collective. This course explores some of the radical transformations Israel has gone through in the past few decades - transformations that have led to a much more pluralistic and diverse society - through their representations on the screen. It considers the representations of a range of racial, ethnic, religious, and sexual groups across Israeli's recent history and across its cinema.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

J ST 497A (CAMS 497A) **Paul the Apostle** (3) Intensive study, in historical, literary, and religious contexts, of the life and writings of one of the founders of Christianity. Considerable attention will be focused on the impact of Paul and his writings on the evolution of early Christianity.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

J ST 497B (HIST 497B) **The Holocaust** (3) This course for advanced undergraduate students will focus on the actual history and the historiography of the Holocaust. After discussion some of the most important studies about the Holocaust and the main historiography debates, we will look at the origins and the evolution of the "Final Solution." The class will touch on the function of the "Ghettos," the role of the mobile killing units, the extermination camps, and Jewish resistance.

Apart from discussion the historiography, we will work mostly with primary sources: documents created by the perpetrators, bystanders, and victims; files relating to postwar trials of perpetrators; photographs; representations of objects relating to the Holocaust; memoirs by survivors; interviews with survivors and bystanders. Students are expected to do extensive reading for this class and prepare oral presentations on their respective paper topic. The research paper for this course will be based largely on primary sources.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

J ST 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1998

J ST 499 (IL) **Foreign Studies** (12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

J ST 505 (HIST 505) **Biblical Historiography in its Ancient Setting** (3 per semester/maximum of 6) Methods of historical reconstruction in Biblical and other historiography from the earliest Mesopotamian records through those of the 6th century B.C.E.

Effective: Spring 1995

Prerequisite:

J ST 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1998



J ST 597 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1998

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## Kinesiology (KINES)

### PROFESSIONAL COURSES

The following courses are designed for the major in Kinesiology and related disciplines as designated in the various curricular programs. They are pedagogically oriented and do not fulfill the Health Sciences and Physical Education (GPE) component of General Education.

**KINES 400 Adapted Physical Education (3)** Basic concepts of planning and conducting physical education programs for children with physical, sensory, and/or intellectual impairments.

Effective: Fall 2001

Prerequisite:

**KINES 403 Emergency Medical Technology (4)** Theoretical and practical aspects of emergency medical techniques as applied in the pre-hospital environment.

Effective: Spring 1998

Prerequisite:

**KINES 404 Emergency Medical Technology Instructor (2)** Educational concepts and skills necessary to present instruction in emergency care; lesson planning, methods of instruction, and evaluation techniques.

Effective: Summer 1997

Prerequisite:

**KINES 410 Physical Growth and Motor Development (3)** Study of biologically programmed growth processes and environmental influences leading to attained adult form and biomechanical function.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**KINES 411 Introduction to Musculoskeletal Injury and Rehabilitation (3)** This course is designed to provide an overview of common musculoskeletal injuries and rehabilitation for pre-allied health and fitness professionals.

Effective: Summer 2011

Prerequisite:

**KINES 420 Psychosocial Dimensions of Physical Activity (3)** Discussion of theoretical and empirical findings, structuring a frame of reference for exploring man's involvement in physical activity.

Effective: Spring 2001

Prerequisite:

**KINES 421 Exercise Psychology (3)** Psychological antecedents and consequences of physical activity behaviors.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**KINES 421 Exercise Psychology (3)** Psychological antecedents and consequences of physical activity behaviors.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 422 Physical Activity Interventions (3)** Principles of designing, planning, and implementing theory- and evidence-based physical activity interventions.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**KINES 422 Physical Activity Interventions (3)** Principles of designing, planning, and implementing theory- and evidence-based physical activity interventions.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 423 Psychology of Sports Injuries (3)** Psychological causes and consequences of sports related injuries in athletes.

Effective: Spring 2008

Prerequisite:

**KINES 424 (US) (WMNST 424) Women and Sport (3)** An interdisciplinary approach to contemporary issues related to women and sport from historical, physiological, psychological, and sociological perspectives.

Effective: Spring 2013

Prerequisite:

**KINES 425W Physical Activity in Diverse Populations (3)** An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations.

Effective: Summer 2013

Prerequisite:

**KINES 427 (HD FS 427) Developmental Sport & Exercise Psychology (3)** Developmental changes in the antecedents and consequences of physical activity across the lifespan.

Effective: Spring 2008

Prerequisite:

**KINES 428 Motivation and Emotion in Movement (3)** Theories of motivational and emotional processes and their applications in movement settings.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**KINES 428 Motivation and Emotion in Movement** (3) Theories of motivational and emotional processes and their applications in movement settings.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 429 Psychology of Sport Performance** (3) Psychological theories of talent development and performance enhancement in sport.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

**KINES 429 Psychology of Sport Performance** (3) Psychological theories of talent development and performance enhancement in sport.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 434 Rehabilitation of Injuries to the Lower Extremities** (3) Theoretical foundation and laboratory experience in manual therapy techniques and therapeutic exercises for the lower extremities.

Effective: Fall 2006

Prerequisite: Concurrent: KINES 335 KINES 395F

**KINES 435 Rehabilitation of Injuries to the Trunk and Upper Extremities** (3) Theoretical foundation and laboratory experience in manual therapy techniques and therapeutic exercises for the trunk and upper extremities.

Effective: Fall 2006

Prerequisite: Concurrent: KINES 336 KINES 435 KINES 395G

**KINES 436 Therapeutic Modalities in Athletic Training** (4) Lecture and laboratory course exploring physiological principles and clinical evidence to the use of therapeutic modalities in athletic training.

Effective: Fall 2006

Prerequisite: Concurrent: KINES 336 KINES 435 ; KINES 395G

**KINES 438W Administration and Issues in Athletic Training** (3) Theoretical and practical aspects for management of an Athletic Training professional practice and identifying contemporary issues related to the profession.

Effective: Fall 2006

Prerequisite: Concurrent: KINES 395I

**KINES 439W Ethics in Sport and Sport Management** (3) Analysis of moral dilemmas in sport and sport management utilizing the tools of ethics.

Effective: Spring 2001

Prerequisite:

**KINES 440 Philosophy and Sport** (3) An examination of human nature from the perspective of our participation in sport.

Effective: Spring 2001

Prerequisite:

**KINES 441 (US) (AM ST 441) History of Sport in American Society** (3) Background, establishment, and growth of sport in America from colonial times to the present.

Effective: Fall 2007

Prerequisite:

**KINES 442 (IL) (CAMS 442) Sport in Ancient Greece and Rome** (3) An examination of the continuity of sport in ancient Greek and Roman societies.

Effective: Spring 2008

Prerequisite:

**KINES 443 (IL) The Modern Olympic Games** (3) An analysis of the modern Olympic Games from their inception through the current festival.

Effective: Spring 2006

Prerequisite:

**KINES 444 (US) History of Athletics in Higher Education** (3) Origin and development of athletics in American higher education from colonial times to the present.

Effective: Spring 2006

Prerequisite:

**KINES 445 Alcohol and Drug Education** (3) Principles of integration and coordination of alcohol and drug education programs for health education and other health related professions.

Effective: Spring 1998

Prerequisite:

**KINES 446 (IL) History of Sport in the Modern World** (3) History of sport in modern world, ca. A.D. 1500 to present; concentrates on role of sport in societies outside United States.

Effective: Summer 2005

Prerequisite:

**KINES 447W Representing Sport in Popular Film** (3) Critical, contextual, and theoretical analyses of sport films focusing on popular narratives of social inequalities.

Effective: Spring 2013

Prerequisite:

**KINES 448 Coping with Life After Sport** (1) Psychosocial concerns affecting student-athletes as they enter the transition

period following sport disengagement, focusing on coping interventions.

Effective: Summer 2002

Prerequisite:

**KINES 452 Applied Cardiovascular Physiology (3)** In-depth study of cardiovascular regulation during postural, environmental, and exercise stress.

Effective: Spring 2010

Prerequisite:

**KINES 453 Environmental Physiology (3)** This course examines physiological function of humans at rest and during prolonged or maximal exercise in conjunction with environment stress (heat, cold, altitude, hyperbaria).

Effective: Spring 2013

Prerequisite:

**KINES 454 Women's Health and Exercise Across the Lifespan (3)** In-depth study of the physiological role of exercise in modulating the health of girls and women during different phases of the lifespan.

Effective: Summer 2010

Prerequisite:

**KINES 456 Physical Fitness Appraisal (4)** The basic components of physical fitness, how it can be measured, and how it can be developed.

Effective: Summer 1996

Prerequisite:

**KINES 457 Exercise Prescription and Case Studies (3)** Principles of exercise prescription; application of fitness appraisal based on current practices using evaluation and discussion of case studies.

Effective: Spring 2002

Prerequisite:

**KINES 460 Movement Disorders (3)** Major peripheral and central movement disorders and methods of their treatment.

Effective: Summer 1999

Prerequisite:

**KINES 461W Preparation for Research Project (2)** Planning and preparation for research project.

Effective: Fall 2006

Prerequisite:

**KINES 462W Research Project (2)** Completion of research topic.

Effective: Fall 2006

Prerequisite:

**KINES 463 Acquisition of Motor Skills (3)** Examination of principles of motor learning; the application of strategic factors such as: practice types, schedules, augmented information, and motivation.

Effective: Summer 2000

Prerequisite:

**KINES 464 Children's Physical Education Curriculum and Practicum (3)** Curriculum for elementary school physical education emphasizing the skill theme approach.

Effective: Fall 2006

Prerequisite:

**KINES 465 Neurobiology of Sensorimotor Stroke Rehabilitation (3)** This course is designed to expose students to the recent topics in motor stroke rehabilitation research through literature.

Effective: Spring 2011

Prerequisite:

**KINES 466 Assessment and Evaluation in Physical Education and Health Education (2)** Explores measurement as an important and distinct component in a variety of physical education and health education contexts.

Effective: Spring 2006

Prerequisite:

**KINES 468 Health Instruction in the School--Content and Method (3)** Methods, materials, and units of instruction.

Effective: Fall 2006

Prerequisite:

**KINES 469W Curriculum Development in Health and Physical Education (3)** The content and process of K-12 school health and physical education curriculum development for public school students.

Effective: Fall 2006

Prerequisite:

**KINES 481W Scientific Basis of Exercise for Older Adults (3)** Study of age-associated physical changes and the effects of exercise on the aging process.

Effective: Spring 2001

Prerequisite:

**KINES 483 Motor Patterns of Children (3)** Development of motor patterns. Fundamentals of movement, basic motor skills, and adaptation of the body to external forces.

Effective: Summer 1996

Prerequisite:

**KINES 484 Advanced Biomechanics (3)** The use of advanced biomechanics to provide an in-depth understanding of the

principles which underpin human movement.

Effective: Spring 1999

Prerequisite:

**KINES 485 Science of Training Athletes (3)** Application of scientific data knowledge to analyze sport training.

Effective: Fall 1996

Prerequisite:

**KINES 486 Legal Issues in Sport (3)** Contemporary legal issues in sport and their implications for sport managers.

Effective: Summer 1996

Prerequisite:

**KINES 488 Mechanics of Locomotion (3)** This course examines the forces and motions characteristic of locomotion, with emphasis on walking, the most common human activity.

Effective: Summer 2002

Prerequisite:

**KINES 492W Programming for Business and Agencies (3)** Fundamentals of program development applied to corporate and private physical fitness businesses.

Effective: Fall 2006

Prerequisite:

**KINES 493 Principles and Ethics of Coaching (3)** Integration of the practical and theoretical knowledge necessary for effective coaching through classroom and field experiences.

Effective: Fall 2006

Prerequisite:

**KINES 494H Senior Honors Thesis (1-6)** Independent study directed by a faculty supervisor that culminates in the production of a thesis.

Effective: Summer 2008

Prerequisite:

**KINES 495A Practicum in Student Teaching (12)** Supervised teaching of health and physical education in K-12 public schools with seminars focused on transition from student to professional.

Effective: Fall 2006

Prerequisite:

**KINES 495B Field and/or Research Practicum in Kinesiology (6)** Participation under supervision in a field or research practicum.

Effective: Fall 2006

Prerequisite:

**KINES 495C Exercise Science Practicum (3 per semester/maximum of 6)** Participation under supervision in a health and fitness setting.

Effective: Fall 2006

Prerequisite:

**KINES 495D Expanded Field and/or Research Practicum in Kinesiology (1-6)** Additional participation under supervision in a field or research practicum.

Effective: Spring 2006

Concurrent: KINES 495B

**KINES 495F Field Practicum in Athletic Training (3)** Participation under supervision in a field practicum.

Effective: Summer 1996

Prerequisite:

**KINES 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 1996

**KINES 496A Independent Study Athletic Training (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**KINES 496A Independent Study Athletic Training (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496A Independent Study Athletic Training (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496B Independent Study Biomechanics (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**KINES 496B Independent Study Biomechanics (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496B Independent Study Biomechanics (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496C Independent Study Exercise Physiology (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 496C Independent Study Exercise Physiology (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496C Independent Study Exercise Physiology (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496D Independent Study History and Philosophy of Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 496D Independent Study History and Philosophy of Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496D Independent Study History and Philosophy of Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496E Independent Study Teaching and Coaching (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 496E Independent Study Motor Control (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496E Independent Study Motor Control (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496F Independent Study Psychology of Movement and Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 496F Independent Study Psychology of Movement and Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496F Independent Study Psychology of Movement and Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496G Independent Study Teaching and Coaching (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 496G Independent Study Teaching and Coaching (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496G Independent Study Teaching and/or Coaching (1-18)** Creative projects, including research and design, that

are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 496H Kinesiology Honors Independent Study** (1-9 per semester/maximum of 18) For non-thesis independent study/research by Schreyer Honors College scholars.  
Effective: Summer 2013

**KINES 496K Independent Study Applied Kinesiology** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 496K Independent Study Applied Kinesiology** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 496K Independent Study Applied Kinesiology** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1996

**KINES 497A Advanced Anatomy** (3) This course is designed to provide students with an established anatomy background (i.e. completed KINES 202) or an equivalent course or served as a teaching assistant in an anatomy course lab) the basic concepts and applications of human cadaver dissection. The content of the course will be divided into the following three units: 1) Proper dissection techniques, dissection tools, preparation and preservation of a human cadaver, biohazard and safety measures related to human cadaver dissection and waste removal. 2) Lower extremity cadaver dissection including skin, subcutaneous tissue, muscle, bone, and neurovascular structures 3) Upper extremity cadaver dissection including skin, subcutaneous tissue, muscle, bone, and neurovascular structures.  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**KINES 497A Genetics and Human Performance** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 497A Application of Math to Movement Science** (3) This course is to introduce you to the following: How mathematics can be used to provide insight into the movement sciences; and how various mathematical techniques can be used to analyze data from the human movement sciences.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**KINES 497B Exercise is Medicine** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**KINES 497B Exercise Medicine** (3) Reviews the scientific evidence underlying the need for and effectiveness of exercise/physical activity in preventing, treating/managing several of today's most prevalent chronic diseases.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**KINES 497C Physical Activity in Diverse Populations** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**KINES 497C Physical Activity in Diverse Populations** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**KINES 497C Physical Activity in Diverse Populations** (3) An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations. Includes examination of issues related to race, ethnicity, geography, income status, and other social factors across the lifespan for promoting physical activity through public health strategies. This is a writing intensive class.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**KINES 497D High School Athletics - Administration and Coaching** (3) Examination and full disclosure of the role and responsibilities of the interscholastic athletic director.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 497D Special Topics in Kinesiology (3)** This course is designed as a capstone experience in junior and senior kinesiology majors who have completed most of their core kinesiology coursework. Students in this course will apply knowledge gained in earlier courses to analyze and draw conclusions about challenging and sometimes controversial topics related to the study of human movement.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 497E Sport Management (3)** Study of contemporary sport management issues.

Effective: Summer 2013 Ending: Summer 2013

**KINES 497E Ergogenic Aids (3)** Students will describe and evaluate the evidence base for agents and practices used to improve aerobic power, strength, body composition, metabolism and thermoregulation as they relate to exercise and physical activity.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 497F Physical Activity and Public Health (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**KINES 497F Physical Activity and Public Health (3)** An examination of the role of physical activity in public health. Includes introduction to basic epidemiology, measurement, dose-response relationships, chronic disease prevention, and population level strategies for promoting physical activity in communities through policy and environmental strategies.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 497G Motor Control (3)** Within this course, the students will get an in-depth knowledge of the mechanisms underlying the neural control and coordination of voluntary movements. The course will include lectures on the history of movement studies, classical research, and main current theories in the field of motor control. These will include theories based on ideas of motor programming and internal models, control with muscle activation patterns, equilibrium-point control, optimization dynamics systems, and theory synergies.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**KINES 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1996

**KINES 498A EMS Assistant Instructor (1)** This course is designed to prepare students to assist in teaching practical sessions of an EMS course. Students should understand that experience is desirable when teaching EMS students. No amount of book knowledge can replace real life experience in the EMS setting.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 498B EMS Teaching Practicum (1-2)** This course is intended to allow the student to experience of a precepted teaching challenge in EMS training programs. The student will experience the rewards of planning, preparing, demonstrating and evaluating the knowledge, skills and aptitudes learned in the EMS Assistant Instructor or EMT Instructor Course. Upon completion the student should be able to teach any of the curriculum packages in which they are clinically competent.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 498C Introduction to Ambulance Operations (1)** This course is designed to train volunteer members of the University Ambulance Service (UAS) in the policies, procedures, and protocols of UAS, EMS Department, Seven Mountains EMS Council, and the Centre County Emergency Communications Centre as they apply to the working EMT. The course is meant to act as a continuity of training specific to UAS and will require on-the-job training to supplement the course. Students are responsible for having a working knowledge of all UAS policies and procedures, and state EMS protocols, including those not expressly covered in class.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 498D EVOC (1)** Within the context of presenting a comprehensive emergency vehicle driver training program, this course is designed to present the necessary classroom, competency course training, and testing for new and existing emergency vehicle drivers. The program will verify proficiency in the knowledge and understanding of, as well as the practical application to, emergency vehicle driving.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 498E EMS Field Practicum (1-2)** This program is intended to provide the newly certified EMT or end of course EMT student an opportunity to apply and build upon their EMS systems knowledge to function effectively within local, out of hospital care systems. The student will function as an EMT in a controlled environment paired with a preceptor through all aspects of the nine phases of an EMS call.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013



**KINES 498F ALS Assistant Technology** (1) This course focuses on the skills necessary to recognize mechanisms of injury, perform an organized time-efficient assessment, prioritize and perform critical interventions, appropriately package, and transport the trauma patient.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Spring 2011

**KINES 530 Experimental Design and Methodology in Kinesiology** (3) Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in Kinesiology.

Effective: Spring 1999

Prerequisite:

**KINES 531 Issues in Athletic Training** (3) Analysis of professional/academic issues related to athletic training; includes medical considerations, legal and professional developments, and current research.

Effective: Spring 2000

**KINES 532 Pathoetiology of Musculoskeletal Injuries** (3) In-depth study of physiological, mechanical, and neuromuscular mechanisms of common musculoskeletal injuries with applications for injury prevention, evaluation, and treatment.

Effective: Summer 2000

Prerequisite:

**KINES 551 Seminar in Motor Control** (3) The course will address contemporary theories and methods in motor control as reflected in recently published scientific papers.

Effective: Fall 2011

**KINES 565 Neurophysiological Basis of Movement** (3) The basic understanding of neurophysiological structures and mechanisms involved in the generation of human voluntary movement.

Effective: Spring 1997

**KINES 566 Psychophysiology of Movement** (3) Basic concepts and principles of psychophysiology and their application for analyses of human movements.

Effective: Summer 1997

**KINES 567 (PHSIO 567) Advanced Exercise Physiology** (3) Physiological changes during exercise with emphasis on the effects of physical conditioning and training.

Effective: Fall 1996

Prerequisite:

**KINES 574 Modeling in Biomechanics** (3) Examination of the philosophies and tools used in biomechanical modeling and the insights into the musculo-skeletal system these provide.

Effective: Spring 2000

Prerequisite:

**KINES 575 Experimental Methods in Biomechanics and Motor Control** (3) Introduces the theory and practice behind the primary experimental methods used in biomechanics and motor control.

Effective: Summer 2005

Prerequisite:

**KINES 577 (PHSIO 577) Cardiovascular Physiology** (3) In-depth study of the heart and circulatory system with emphasis on the effects of exercise on cardiovascular function.

Effective: Fall 1997

Prerequisite:

**KINES 578 (PHSIO 578) Physiology and Mechanical Behavior of Skeletal Tissues** (3) In-depth examination of the structure, composition, and material behavior of the basic skeletal tissues, including bone, cartilage, tendon, and ligament.

Effective: Spring 1999

Prerequisite:

**KINES 579 Advanced Biomechanics of Human Motion** (3) Biomechanical foundation of human movement and injury prevention.

Effective: Summer 1997

Prerequisite:

**KINES 588 Scientific Writing in Kinesiology** (3) Instruct students in writing grant proposals, abstracts, manuscripts, and effective presentations in their respective scientific fields of study in Kinesiology.

Effective: Spring 2005

**KINES 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

Effective: Fall 1996

**KINES 590B Exercise Physiology Colloquium** (1 per semester/maximum of 4) Continuing colloquia in exercise physiology which consists of individual lectures by outside speakers, students and faculty.  
Effective: Spring 2013

**KINES 594 Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2008

**KINES 594F Research Readings Psychology of Movement and Sport** (1) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 594F Research Readings - Psychology of Movement and Sport** (1) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 596 Individual Studies** (1-9) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1996

**KINES 596A Independent Study Athletic Training** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 596A Independent Study Athletic Training** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 596A Individual Study Athletic Training** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 596B Independent Study Biomechanics** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 596B Independent Study Biomechanics** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 596B Independent Study Biomechanics** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 596C Individual Study Exercise Physiology** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 596C Independent Study Exercise Physiology** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 596C Independent Study Exercise Physiology** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 596D Independent Study History and Philosophy of Sport** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 596D Independent Study History and Philosophy of Sport** (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 596D Independent Study History and Philosophy of Sport (1-18)** Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 596E Independent Study Motor Control (1-18)** Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 596E Independent Study Motor Control (1-18)** Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 596E Independent Study Motor Control (1-18)** Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 596F Independent Study Psychology of Movement and Sport (1-18)** Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013 Ending: Summer 2013

**KINES 596F Independent Study Psychology of Movement and Sport (1-18)** Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 596F Independent Study Psychology of Movement and Sport (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 597 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 1996

**KINES 597B Skeletal Muscle Form and Function (3)** Examination of muscle structure, physiology, and mechanics at levels ranging from proteins to whole muscle to multi-joint systems, with emphasis on muscle adaptation and models of muscle force generation.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**KINES 597G Gender and Sport (3)** A critical analysis sport and physical culture, specifically as they relate to gender, sexualities, and active bodies. Students will consider contemporary and historical issues informed by a range of theoretical groundings.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**KINES 597K Advanced Theories of Games and Play (3)** To critically evaluate classical and contemporary philosophic literature in the nature and value of games and play.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**KINES 600 Thesis Research (1-15)** No description.  
Effective: Fall 1996

**KINES 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1996

**KINES 602 Supervised Experience in College Teaching (1-2 per semester, maximum of 6)** Preparation and presentation of materials in lecture and laboratory classes under the supervision of a full time faculty member.  
Effective: Fall 1996  
Prerequisite:

**KINES 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1996

**KINES 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1996

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## Labor & Employment Law (LABOR)

**LABOR 962 Employment Law Survey Part I - Basic Common Law and Workplace Health and Safety** (3) This course will cover: common law employment doctrines, including at-will employment, contract and tort erosions of at-will employment, employee duties, including the duty of loyalty and trade secrets, noncompetition agreements, and rights to employee inventions and workplace injuries, including workers compensation, OSHA, and criminal and tort approaches to promoting a safe workplace.

Effective: Summer 2011 Ending: Summer 2013

**LABOR 962 The Employment Relationship** (3) This course covers common law employment doctrines (at-will employment, contract and tort erosions of at-will employment, employee duties, including the duty of loyalty and trade secrets), noncompetition agreements, and employee rights in inventions, and workplace injuries (including workers compensation, OSHA, and criminal and tort approaches to promoting a safe workplace.)

Effective: Fall 2013 Future: Fall 2013

**LABOR 963 Employment Law Survey Part II - Privacy, Wage, ERISA, Anti-Discrimination Law** (3) This course will cover workplace privacy issues, including free speech and political protections, and defamation and related torts; anti-discrimination laws; and wage, hour, and benefits legislation, including unemployment compensation; the WARN Act, the Family and Medical Leave Act; and NLRA issues commonly encountered in the unorganized workplace.

Effective: Summer 2011 Ending: Fall 2013

**LABOR 963 Workplace Regulation** (3) This course covers workplace privacy issues, including free speech and political protections, and defamation and related torts; anti-discrimination laws; and wage, hour, and benefits legislation, including unemployment compensation; the WARN Act, the Family and Medical Leave Act; and NLRA issues commonly encountered in the unorganized workplace.

Effective: Spring 2014 Future: Spring 2014

**LABOR 964 Employment Discrimination** (3) This course will provide an overview of significant doctrinal issues in employment discrimination law, and will seek to develop students' skills through a rigorous examination of statutory law, regulations and court decisions. It will introduce students to the fundamental legal theories underlying the substantive coverage of the most significant federal equal employment opportunity laws, and legal issues regarding their application.

Effective: Summer 2011

**LABOR 965 Worker's Compensation Law** (3) This course will explore the history and development of, public policy considerations for, and state and federal systems for delivery of medical and wage benefits to injured workers.

Effective: Spring 2012

**LABOR 966 The Law of Employee Benefits** (3) Employe-provided pension and health care programs play a critical role in the lives of individuals, families, and communities. They also affect corporations, financial markets, and the economy as a whole. Employee benefit programs are, in short, an important staple of modern law practice. This course surveys the Employee Retirement Income Security Act and relevant portions of the Internal Revenue Code. Classes examine what benefit plans must do regarding reporting and disclosure, accrual, vesting, funding, and fiduciary standards. The course covers health care reform, the shift from defined benefit to defined contribution programs, and the effect of stock market volatility on benefit programs. Throughout the semester, students examine the policy goals underpinning federal benefits law. The course surveys major issues in ERISA litigation, including that statute's claims and remedies provisions, as well as its preemption of state law.

Effective: Summer 2012

**LABOR 970 Labor Law** (3) This course is an extended study of the federal National Labor Relations Act focusing on the right to form and join labor organizations, strikes, boycotts and picketing, collective bargaining, and the enforcement of collective bargaining agreements.

Effective: Fall 1998

**LABOR 997 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 2008

**LABOR 997A Survey of Employment Law** (3) This course presents a broad survey of both the common law rules and major statutes that govern the relationship between employers and employees. Students will learn about the evolution of the law governing the workplace, and about the interplay of State and Federal laws and regulations commonly encountered by attorneys practicing employment law. The topics covered include the legal nature of the employment relationship, employment at-will and its limitations, compensation for workplace injuries, workder safety, wage and hour laws, employee privacy, noncompetition agreements, the protection of trade secrets, and the arbitration of employment related disputes.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013



## Labor and Industrial Relations (L I R)

L I R 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1988

L I R 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1988

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## Landscape Architecture (LARCH)

LARCH 400 **Introduction to Design and Theory (IUG)** (5) Introductory landscape architectural design and applied theory for IUG students.

Effective: Summer 1998

Prerequisite: Concurrent: LARCH 400A

LARCH 414 **Design and Theory V: Advanced Landscape Architectural Design** (5 per semester/maximum of 15) Review of landscape architectural theories and issues; supports development of comprehensive design study and/or independent honors (Thesis-Based) design projects. LARCH Majors only.

Effective: Spring 2007

Prerequisite:

LARCH 424 **Design Theory Seminar** (3 per semester/maximum of 9) Inquiry-based reading and discussion of design theory literature relevant to contemporary landscape architecture issues. Topics vary each semester.

Effective: Spring 2012

Prerequisite:

LARCH 431 **Landscape Architectural Design Implementation III** (3) Introduces the principles and techniques of stormwater management and drainage design, including instruction in proper construction documentation, calculations and estimations. For Landscape Architecture majors only.

Effective: Spring 2012

Prerequisite:

LARCH 450 **Geodesign: Geospatial Technology for Design** (3) Interactive geodesign and digital design studio.

Effective: Fall 2012

LARCH 494H **Research Projects - Honors** (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2012

LARCH 495 **Internship** (1-13) Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.

Effective: Fall 1981

Prerequisite:

LARCH 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

LARCH 496H **Independent Studies - Honors** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2012

LARCH 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

LARCH 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

LARCH 499A (IL) **Design Theory Seminar** (1) Inquiry-based reading and discussion of design theory literature relevant to the focus and content of the associated design studio course, LARCH 499B. LARCH majors only.

Effective: Spring 2007

Prerequisite: Concurrent: LARCH 499B LARCH 499C LARCH 499D

LARCH 499B (IL) **Design and Theory VI: Contemporary/International Landscape Architectural Design Issues** (5) Study of and design for sites, programs, and social groups associated with ongoing contemporary landscape architectural concerns. LARCH majors only.

Effective: Spring 2012

Prerequisite: Concurrent: LARCH 499A LARCH 499C LARCH 499D

LARCH 499D (IL) **Contemporary/International Special Topics** (3) Special topics related to, and study in conjunction with 499B. Landscape Architecture majors only.

Effective: Spring 2012

Prerequisite: Concurrent: LARCH 499B

LARCH 499E (IL) **People and Protected Areas** (3) LARCH 499E is a three-credit seminar that aims to introduce students to key issues associated with communities, community design, biodiversity conservation, and the interface of people and conservation in the vicinity of Udzungwa Mountains National Park in south-central Tanzania. The format of the course is reading and discussion, where students read assigned literature and then contribute to discussions led by faculty, both to

demonstrate their understanding of the reading assignments and to begin to explore key issues introduced by those readings. Students also write two papers, the first examining the interface of rural land use planning, community design, and biodiversity conservation; and the second focusing on biodiversity conservation in the context of human settlement near Udzungwa Mountains National park. Student evaluation is based on seminar participation and the two papers.  
Effective: Summer 2013 Ending: Summer 2013

**LARCH 499F (IL) Studio: Community Design in the Vicinity of Udzungwa Mountains National Park (5)** LARCH 499F is a five-credit course that focuses on student research projects associated with communities along the eastern boundary of Udzungwa Mountains National Park. We have purposefully maintained a general definition for the course to allow students to design projects that best suit their interests and skills. For example, some students may focus on evaluating existing village configurations and propose new designs that help villagers better meet their daily needs. Other students, in turn, may focus on developing a more marketable park that attracts larger numbers of visitors who stay in or near the park for longer periods of time - generating more income that ultimately will find its way, in part, to local communities.  
Effective: Summer 2013 Ending: Summer 2013

**LARCH 499G (IL) Colloquium: The Contribution of Service-Learning to Students and Community (1)** LARCH 499G is a one-credit course designed to enable students to reflect on what for most will be their first opportunity to visit and work in rural East Africa. It involves the development of daily journals to record reflections on their evolving awareness of Tanzania and the challenges that people and conservation face in this less-developed country. The journals provide a foundation for reflections about one or more issues that interest each - maybe (though not necessarily) something close to the focus of the specific education abroad experience involved (e.g., the relationship between people and protected areas in south-central Tanzania), maybe international development in general, or maybe another topic. The journals also should be important personally: in all likelihood, this six-week period will expose students to places, people, and challenges that they have never seen in person.  
Effective: Summer 2013 Ending: Summer 2013

**LARCH 500 Environmental and Ecological Conditions in Regional Landscape (1)** Landscape architectural field trips within the Centre Region.  
Effective: Summer 1996  
Prerequisite:

**LARCH 501 Research and Writing in Landscape Architecture (3)** Landscape architectural research methods and writing techniques.  
Effective: Fall 2009

**LARCH 502 Intellectual History and Theory of Landscape Architecture (3)** Introductory theory seminar covering the intellectual history of landscape architecture and theoretical contributions from related disciplines.  
Effective: Spring 2009

**LARCH 510 Graduate Seminar in Landscape Architecture (3)** Landscape architectural theory exploration through readings and discussions.  
Effective: Fall 2011  
Prerequisite:

**LARCH 515 Design and Theory I: Introduction (5)** Introductory landscape architectural design and applied theory for MLA students.  
Effective: Summer 2011

**LARCH 520 Design and Theory II: Introduction to Issues of Place (5)** Studio design with a focus in addressing issues of nature and culture.  
Effective: Spring 2012  
Prerequisite:

**LARCH 530 Design and Theory III: Landscape Systems (5)** An introduction to regional planning, management, and design.  
Effective: Spring 2012  
Prerequisite:

**LARCH 531 Option Studio I (4)** Studio inquiry in community and urban design.  
Effective: Spring 2006  
Prerequisite:

**LARCH 540 Design and Theory IV: Site and Community Design (5)** Large site and Community Design.  
Effective: Spring 2012  
Prerequisite:

**LARCH 541 OPTION STUDIO II (4)** Continued studio inquiry in community and urban design.  
Effective: Spring 2012  
Prerequisite:

**LARCH 550 Graduate Studio IV (7)** Landscape architectural research or research and design inquiry.  
Effective: Summer 1996 Ending: Fall 2013  
Prerequisite:



**LARCH 550 Master of Landscape Architecture Project Studio** (6) The final capstone studio for students completing the Master of Landscape Architecture.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**LARCH 560 Landscape Architecture Inquiry** (1-9) Research, planning, and/or design inquiry into landscape architectural issues.  
Effective: Summer 1996  
Prerequisite:

**LARCH 590 Colloquium** (1-3 per semester/maximum of 6) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1988

**LARCH 596 Independent Studies** (1-9) Independent study opportunities open for graduate students covering topics which fall outside the scope of formal courses (non thesis).  
Effective: Spring 2009

**LARCH 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

**LARCH 599 Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2006

**LARCH 599E People and Protected Areas** (3) LARCH 599E is a three-credit seminar that aims to introduce students to key issues associated with communities, community design, biodiversity conservation, and the interface of people and conservation in the vicinity of Udzungwa Mountains National Park in south-central Tanzania. The format of the course is reading and discussion, where students read assigned literature and then contribute to discussions led by faculty, both to demonstrate their understanding of the reading assignments and to begin to explore key issues introduced by those readings. Students also write two papers, the first examining the interface of rural land use planning, community design, and biodiversity conservation; and the second focusing on biodiversity conservation in the context of human settlement near Udzungwa Mountain National Park. Student evaluation is based on seminar participation and the two papers.  
Effective: Summer 2013 Ending: Summer 2013

**LARCH 599F Studio: Community Design in the Vicinity of Udzungwa Mountains National Park** (5) LARCH 599F is a five-credit course that focuses on student research projects associated with communities along the eastern boundary of Udzungwa Mountains National Park. We have purposefully maintained a general definition for the course to allow students to design projects that best suit their interests and skills. For example, some students may focus on evaluating existing village configurations and propose new designs that help villagers better meet their daily needs. Other students, in turn, may focus on developing a more marketable park that attracts larger numbers of visitors who stay in or near the park for longer periods of time--gathering more income that ultimately will find its way, in part, to local communities.  
Effective: Summer 2013 Ending: Summer 2013

**LARCH 599G Colloquium: The Contribution of Service-Learning to Students and Community** (1) LARCH 599G is a one-credit course designed to enable students to reflect on what for most will be their first opportunity to visit and work in rural East Africa. It involves the development of daily journals to record reflections on their evolving awareness of Tanzania and the challenges that people and conservation face in this less-developed country. The journals provide a foundation for reflections about one or more issues that interest each--maybe (though not necessarily) something close to the focus of the specific education abroad experience involved (e.g., the relationship between people and protected areas in south-central Tanzania), journals also should be important personally: In all likelihood, this six-week period will expose students to places, people, and challenges that they have never seen in person.  
Effective: Summer 2013 Ending: Summer 2013

**LARCH 600 Thesis Research (On Campus)** (1-15) No description.  
Effective: Spring 1988

**LARCH 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Opportunity for students to obtain supervised and graded teaching experience.  
Effective: Spring 1988

**LARCH 610 Thesis Research (Off Campus)** (1-15) No description.  
Effective: Spring 1988

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## Language and Literacy Education (LL ED)

**LL ED 400 Teaching Reading in the Elementary School (3)** Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development.  
Effective: Spring 2007 Ending: Fall 2013

Prerequisite: Concurrent: LL ED 401 LL ED 402 for EK ED majors

**LL ED 400 Teaching Reading in the Elementary School (3)** Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development.  
Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: LL ED 401 LL ED 402 for CEAED majors

**LL ED 401 Teaching Language arts in Elementary School (3)** Principles, problems, materials, and techniques involved in teaching speaking, listening, writing, and reading in the elementary school.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite: Concurrent: LL ED 400 LL ED 402 for EK ED majors

**LL ED 401 Teaching Language arts in Elementary School (3)** Principles, problems, materials, and techniques involved in teaching speaking, listening, writing, and reading in the elementary school.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: LL ED 400 LL ED 402 for CEAED majors

**LL ED 402 Teaching Children's Literature (3)** Survey of children's literature with an emphasis on the importance of literature in the development of the elementary school curriculum.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite: Concurrent: LL ED 400 LL ED 401 for EK ED majors.

**LL ED 402 Teaching Children's Literature (3)** Survey of children's literature with an emphasis on the importance of literature in the development of the elementary school curriculum.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: LL ED 400 LL ED 401 for CEAED majors

**LL ED 411 Teaching Language Arts in Secondary Schools I (3)** Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools.

Effective: Spring 1994

Prerequisite: Concurrent: LL ED 420

**LL ED 412W Teaching Language Arts in Secondary Schools II (3)** Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools.

Effective: Summer 2010 Ending: Fall 2013

Prerequisite: Concurrent: C I 412W

**LL ED 412W Teaching Language Arts in Secondary Schools II (3)** Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: C I 412W

**LL ED 420 Adolescent Literature and Literacy (3)** Exploration of adolescent literacy and curricular designs for using the diversity of cultural voices in adolescent literature in secondary schools.

Effective: Spring 1992

Concurrent: LL ED 411

**LL ED 445 Teaching English in Bilingual/Dialectal Education (3)** Theories, techniques, materials for teaching English speaking, reading, and writing to bilingual and nonnative speakers in elementary and secondary schools.

Effective: Summer 2011

**LL ED 450 Content Area Reading (3)** Study of reading skills and materials for specific content areas; diagnostic and instructional procedures for classroom teachers.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite:

**LL ED 450 Content Area Reading (3)** Study of reading skills and materials for specific content areas; diagnostic and instructional procedures for classroom teachers.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**LL ED 462 The Art of the Picturebook 3** An in-depth study of picturebooks as art objects providing aesthetic experiences and contributing to our aesthetic development in literacy education.

Effective: Summer 2009

Prerequisite:

**LL ED 465 Fantasy Literature for Children (3)** A study of fantasy literature for children looking at a variety of fantasy stories and examining them from different perspectives.

Effective: Summer 2010

Prerequisite:

**LL ED 480 Media Literacy in the Classroom (3)** Exploration of media languages and literacy in classrooms, learning in an

electronic age; issues, ideas, and teaching strategies.

Effective: Spring 2005

Concurrent: LL ED 411 LL ED 420

LL ED 495 **School Practicum in Reading** (1-18) Supervised practicum providing field experiences at any grade level, with opportunities to assume various teaching roles.

Effective: Spring 1992

Prerequisite:

LL ED 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1992

LL ED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 1992

LL ED 497A **CEAED PK-4 Literacy Block** (15) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013 Ending: Summer 2013

LL ED 497A **CEAED PK-4 Literacy Block** (15) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

LL ED 497A **CEAED PK-4 Literacy Block** (15) Course serves as block until CEAED students are registered by Department for appropriate section of LL ED 400, 401, 402, A ED 303 and MUSIC 241.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

LL ED 497B **CEAED 4-8 Literacy Block** (9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

LL ED 497C **Elementary Education Literacy Block** (15) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

LL ED 497F **Spelling Development and Word Study** (3) Exploration of spelling development, vocabulary, phonemic awareness, word study and how the integration of these facilitate fluent reading and writing.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

LL ED 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 1992

LL ED 498C **Meeting the Needs of Culturally and Linguistically Diverse Students** (3) The focus is to implement methods consistent with critically reflective practices that support effective teaching and enhance student learning.

Effective: Summer 2013 Ending: Summer 2013

LL ED 500 **The Reading and Writing Classroom** (3) Analysis of reading and writing processes and the development of integrated language arts programs for elementary schools.

Effective: Summer 1993

Prerequisite:

LL ED 501 **Teaching Writing in Elementary and Secondary Schools** (3) In depth examination of writing development and the development of writing components of language arts programs K-12.

Effective: Summer 1993

Prerequisite:

LL ED 502 **Studies in Literature for Children** (3) Study of various genres of children's literature from various critical perspectives; emphasis on role of literature in children's lives.

Effective: Summer 1992

Prerequisite:

LL ED 503 (ENGL 503) **Research Methods in Composition** (3) Introduction to the issues and methods of empirical research in composition.

Effective: Fall 1993

LL ED 512 **Teaching Language, Literacy, and Literature in Secondary Schools** (3) Collaborative inquiry into the curricular design and experience of language, literacy, media, and literature in adolescents' personal and social lives.

Effective: Summer 2010

Prerequisite:

**LL ED 520 Literature for Adolescents (3)** Critical study of adolescent literature, its diversity of cultural voices, and designs for its use in secondary school classrooms.

Effective: Summer 1992

Prerequisite:

**LL ED 541 Adolescent and Children's Literature Related to Ethnic and Social Issues (3)** Literature, K-12; study of literary symbolism, ethnic literature, issues, e.g., sex, death, adoption, divorce in trade books.

Effective: Summer 1993

Prerequisite:

**LL ED 542 (CI ED 542) Issues in Literacy Education (3 per semester/maximum of 6)** Discussion of philosophical, sociological, historical, and curricular issues in literacy education.

Effective: Fall 1997

**LL ED 544 Cross-Cultural Research in Bilingual Education (3)** Analysis of cross-cultural research methodology in bilingual education.

Effective: Spring 1993

Prerequisite:

**LL ED 545 LITERACY AND LANGUAGE ASSESSMENT FOR INSTRUCTIONAL DECISIONS (3)** Diagnosis of reading difficulties; genesis of reading problems; achievement, diagnostic, and capacity tests; application in simulation activities.

Effective: Summer 1993

Prerequisite:

**LL ED 550 Theory and Practicum in Assessment and Remediation of Reading Difficulties (3)** Links theory and practice in supervised practicum involving design and analysis of appropriate assessment and instructional procedures for elementary and secondary students.

Effective: Fall 1993

Prerequisite:

**LL ED 560 (ADTED 560) Teaching Reading to College Students and Adults (3)** Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

Effective: Spring 1993 Ending: Fall 2013

Prerequisite:

**LL ED 561 Cultural Pluralism in Children's and Adolescent Literature (3)** Reading/discussing literature from multicultural/critical multicultural lenses and how this impacts literacy.

Effective: Summer 2012

**LL ED 563 Myths and Folktales in Children's Literature (3)** An in-depth study of myths and folktales shared with children and how these stories are remade and disseminated today.

Effective: Spring 2010

Prerequisite:

**LL ED 565 Analysis of Theory and Practice in Bilingual Education Program (3)** Classroom analysis, observation, and research of instructional procedures, materials, and evaluation strategies used in bilingual education.

Effective: Summer 2011

Prerequisite:

**LL ED 566 Bilingual Education and the Hispanic Child (3)** Analysis of the research and literature related to teaching bilingual Hispanic students; examines problems, issues, and strategies.

Effective: Spring 1993

Prerequisite:

**LL ED 567 Politics of Bilingual Education (3)** To critically analyze the contemporary and historical political context of an education that is bilingual and bicultural.

Effective: Spring 2000

**LL ED 568 Doing Research in Children's Literature (3)** An examination of research traditions used to frame research in children's literature studies and preparation to write the master's paper.

Effective: Summer 2010

Prerequisite:

**LL ED 577 (C I 577) Multicultural Issues in Literacy Education (3)** Explores research questions, and theoretical frameworks, and analyzes multicultural issues in popular media in the context of American schools.

Effective: Spring 1997

Prerequisite:

**LL ED 580 (C I 580) Media Literacy, Language, and Literacy in Schools (3)** Theories of media literacy, issues of non-print technology in language and literacy.

Effective: Spring 1997

Prerequisite:

**LL ED 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1996

LL ED 594 **Research in Language and Literacy Education** (3) Cooperative design and study of research in language and literacy education.

Effective: Spring 1993

Prerequisite:

LL ED 595A **Practicum: Remedial Procedures and Diagnosis** (3-6) Advanced practicum; diagnostic testing and remedial instruction of more severe types of reading disability; supervisory experiences, if appropriate.

Effective: Summer 1993

Prerequisite:

LL ED 595B **Advanced Practicum in Bilingual Education** (1-6) Advanced internship in curriculum, supervision, and instruction in a bilingual education setting.

Effective: Spring 1993

Prerequisite:

LL ED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1993

LL ED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1993

LL ED 597G **Write for Children** (3) Course in creative writing for those who wish to write for children. Workshop style class provides opportunity to discover, explore, experiment and develop skills for writing in a variety of genres for young readers.

Effective: Summer 2013 Ending: Summer 2013

LL ED 597G **Write for Children** (3) Course in creative writing for those who wish to write for children. Workshop style class provides opportunity to discover, explore, experiment and develop skills for writing in a variety of genres for young readers.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

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## Languages (LANG)

LANG 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.  
Effective: Spring 2007

LANG 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2007

LANG 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Spring 2007

LANG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2007

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## Latin (LATIN)

Knowledge of Greek or Latin not required. See also CLASSICS AND ANCIENT MEDITERRANEAN STUDIES and GREEK.

**LATIN 402 Republican Literature** (3-12) Selected works by Plautus, Lucretius, Catullus, Cicero (content varies).

Effective: Summer 1995

Prerequisite:

**LATIN 403 Augustan Age Literature** (3-12) Selected works by Virgil, Horace, Propertius, Tibullus, Ovid, Livy (content varies).

Effective: Summer 1995

Prerequisite:

**LATIN 404 Silver Age Literature** (3-12) Selected works by Petronius, Seneca, Tacitus, Juvenal, Martial, Pliny the Younger (content varies).

Effective: Summer 1995

Prerequisite:

**LATIN 420 Medieval Latin Literature** (3-6) Survey of Medieval Latin literature.

Effective: Spring 1995

Prerequisite:

**LATIN 450W History of Latin** (3) History of the Latin language and its speakers, from their origins to the 2nd century C.E.

Effective: Summer 1994

Prerequisite:

**LATIN 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**LATIN 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**LATIN 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**LATIN 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**LATIN 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**LATIN 510 Latin Seminar** (3-6) No description.

Effective: Winter 1978

**LATIN 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2000

**LATIN 599 (IL) Foreign Studies** (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

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## **Law (LAW)**

LAW 903 **Visiting Away Semester** (1-17) Student approved by the law school to visit away for the semester. Course work successfully completed will transfer as progress toward the law degree.  
Effective: Summer 2008

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## **Law Research Doctora (SJDLW)**

SJDLW 900 **SJD Dissertation** (1-12) SJD Dissertation.  
Effective: Fall 2012

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## Ldrshp Development (LEAD)

**LEAD 501 Leadership Across the Lifespan (3)** Analysis and application of models, theories and strategies for developing an individual's full leadership potential at different life stages.  
Effective: Summer 2004

**LEAD 519 (BUSAD 519) Developing Creative High Performance Organizations (3)** This course focuses on how to create high performing organizations based on models provided by business, science and the arts.  
Effective: Spring 2007  
Prerequisite:

**LEAD 555 (BUSAD 555) Full Range Leadership Development (3)** Development of behavioral skills associated with outstanding leadership of individuals, teams, and organizations through advanced information technology, experimental exercises, and case analysis.  
Effective: Spring 2011  
Prerequisite:

**LEAD 556 (BUSAD 556) Diversity Leadership (3)** Analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.  
Effective: Fall 2005  
Prerequisite:

**LEAD 557 Leadership Models and Methods (3)** Design, analysis and application of leadership models and research methods for solving organizational problems.  
Effective: Summer 2010  
Prerequisite:

**LEAD 561 Dynamic Communication in Leadership Contexts (3)** Articulating and promoting a vision; facilitating interaction and communicating with groups; theory and techniques of persuasion.  
Effective: Fall 2005  
Prerequisite:

**LEAD 562 Strategic Leadership (3)** Executive-level leadership of larger systems and organizations. Impact of developing human, intellectual, social, structural, financial and reputational capital as strategic tools.  
Effective: Summer 2004  
Prerequisite:

**LEAD 582 (BUSAD 582) Social Entrepreneurship and Community Leadership (3)** This course will provide an opportunity for students to explore concepts of developing and leading businesses that create social value.  
Effective: Fall 2011  
Prerequisite:

**LEAD 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2005

**LEAD 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2005

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## Linguistics (LING)

LING 402 **Syntax I** (3) Principles of grammatical analysis in the generative framework; an overview of syntactic structures across languages.  
Effective: Fall 2001

LING 404 **Phonology I** (3) The analysis of the sound systems of human languages; focus on common phonological processes across languages and on phonetics-phonology interface.  
Effective: Fall 2001

LING 429 (PSYCH 426) **Language and Thought** (3) Relations between language and cognition; cognitive implications of normal and impaired language development; cognition and bilingualism.  
Effective: Spring 2007  
Prerequisite:

LING 446 (PSYCH 427) **L1 Acquisition** (3) How children learn their first language; psycholinguistic aspects of lexical, syntactic, semantic, and phonological development.  
Effective: Spring 2010  
Prerequisite:

LING 447 **Bilingualism** (3) Explores the social and psychological aspects of bilingualism; topics include languages in contact, transference, maintenance, and loss.  
Effective: Fall 2001

LING 448 **Sociolinguistics** (3) Issues in the study of language in its sociocultural context; analysis of social dialects and speech styles.  
Effective: Fall 2001

LING 449 **Semantics I** (3) The study of meaning in human language; methods of analysis; study of sense, reference, compositionality, quantification, presupposition, and sentence-level meaning.  
Effective: Fall 2001

LING 457 (PSYCH 457) **Psychology of Language** (3) Overview of psychological research and theory on language processes, including speech perception, word recognition, meaning representation, comprehension, and language acquisition.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

LING 493 **Field Methods** (3) Primary linguistic investigation of a language different from English; field work with a native speaker; data gathering; linguistic analysis.  
Effective: Fall 2001

LING 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1994

LING 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

LING 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

LING 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.  
Effective: Fall 1983

LING 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.  
Effective: Fall 1992

LING 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

LING 500 **Syntax II** (3) Advanced topics in syntactic analysis and theory.

Effective: Spring 2002

LING 502 **Historical Linguistics** (3) Principles of comparative linguistics; language families; reconstruction of lost languages.

Effective: Spring 2002

LING 504 **Phonology II** (3) Advanced topics in phonological analysis and theory.

Effective: Spring 2002

LING 520 (PSY 520) **Seminar in Psycholinguistics** (3 per semester/maximum of 9) Consideration of theoretical and research issues relevant to psychological aspects of language sounds, syntax and semantics, and other cognitive support.

Effective: Spring 2004

LING 521 **Proseminar in the Language Science of Bilingualism** (3) This course provides a cross-disciplinary overview of language science approaches to bilingualism and second language learning.

Effective: Spring 2010

LING 522 **Proseminar in Professional Issues in Language Science** (3) This course addresses issues of professional development in the language sciences with special attention to cross-disciplinary research.

Effective: Spring 2010

LING 525 **Experimental Research Methods in Psycholinguistics** (3) This course provides an overview of experimental research techniques used in language science.

Effective: Spring 2010

LING 548 **Sociolinguistics** (3) Study of social and linguistic aspects of language change, varieties, policy, social inequality, language communities, language, society, and thought.

Effective: Spring 2002

LING 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

LING 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

LING 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

LING 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 1983

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## Lit/Dispt Res/Skills (SKILS)

**SKILS 950L Advocacy I (4)** Advocacy I teaches pretrial and trial skills through a combination of lecture, written and oral courtroom exercises, and videotape review.

Effective: Fall 2007

Prerequisite:

**SKILS 950R Advocacy I** Advocacy I teaches pretrial and trial skills through a combination of lecture, written and oral courtroom exercises, and videotape review.

Effective: Fall 2007

Prerequisite:

**SKILS 951 Advocacy II (3)** Students synthesize the individual trial skills learned in Advocacy I by preparing and conducting an entire case, from the initial interview of the client through a trial on the merits. Each case is tried before a jury and judge from a Pennsylvania or federal court. All trials are videotaped in their entirety.

Effective: Summer 2013

**SKILS 952 Strategic Legal Research (3)** This course is designed to provide students with an advanced understanding of ways lawyers use primary and secondary legal research sources and finding tools to successfully represent their clients. An emphasis is placed on the development of effective legal research strategies that take into account choice of format (e.g., the relative advantages and disadvantages of print and electronic sources), cost/benefit analysis of format choice, evolving approaches by law firms and private practitioners to billable research hours, use of computerized tools to organize research results, and presentation of research results to case supervisors. Course content will be presented in a hybrid format consisting of two hours per week of in-class meetings with the remaining credit to be completed by coursework outside scheduled class time through online and written assignments.

Effective: Fall 2012

Prerequisite:

**SKILS 954 Pretrial Advocacy (2)** Students work with case files through written exercises and classroom simulations to gain a thorough understanding of the procedural rules and advocacy tools used in the pretrial stages of litigation. The course grade is based upon class participation and the written exercises.

Effective: Summer 2013

**SKILS 955 Evidence (3)** This course presents evidence in trials under the Federal Rules of Evidence, at common law and in equity and with reference to administrative bodies. The reasoning from which rules arise in areas including relevancy, competency, privilege, examination of witnesses, writing, the hearsay rule and its exceptions, burden of proof, presumptions, judicial notice, and constitutional evidence problems is also addressed.

Effective: Fall 2006

**SKILS 957 Client Counseling (2)** This course introduces students to the dynamics of a productive attorney-client relationship, the goals of interviewing and counseling, and structures and techniques that can be used to achieve those goals. The focus is on developing students' skills in interviewing and counseling. Instruction consists of assigned reading, problem-solving exercises, group discussion, and practice through simulations. Client Counseling is one of the core courses for the Certificate in Dispute Resolution and Advocacy. Preference is given to students seeking the Certificate in Dispute Resolution and Advocacy.

Effective: Summer 2011

**SKILS 958 Conflict of Laws (3)** How do we resolve problems when the substantive law or procedural rules of states or nations conflict? For example, if Hawaii enacts a statute permitting same-sex marriages, must other states recognize such a marriage? If an American-owned factory explodes in India, may the injured pursue claims under American tort law? The course will provide a review of jurisdictional concepts introduced earlier in first-year courses, introduce choice of law issues for multistate or multinational transactions or events, and examine the influence of the United States Constitution on the reach of a state's judicial decisions or legislation outside the state.

Effective: Fall 1998

**SKILS 959 Mediation (3)** This course examines the legal and ethical issues involved in mediation and develops students' skills as mediators and as attorneys representing clients in the process.

Effective: Fall 2004

Prerequisite:

**SKILS 960 Negotiation/Mediation (3)** This course combines the law and ethics of negotiation, mediation and settlement with economic and psychological bargaining theory and regular hands-on practice in representing clients in negotiation and mediation. Bargaining theory (including distributive and integrative bargaining), relevant socio-psychological research, negotiation and mediation ethics, the law of settlement, and the basics of contract drafting are all introduced. Instruction consists of assigned reading, a series of simulations and exercises (including drafting a resulting contract), written negotiation planning and self-evaluation, feedback, and group discussion.

Effective: Summer 2011

**SKILS 962 The U.S. Law of Arbitration (3)** This course provides an introduction to the domestic law and practice of arbitration. It assesses the statutory and decisional law basis for arbitration, especially the provisions of the Federal

Arbitration Act. It investigates the central doctrinal issues in the field: the enforceability of unilaterally-imposed arbitration agreements, the arbitrability of statutory rights - in particular, civil rights matters, and the use of contract to establish the law of arbitration between the arbitrating parties. Emphasis is placed upon practical problems that have emerged in the practice of arbitration law: the selection of arbitrators, the use of discovery and evidence-gathering in arbitral proceedings, and the content of arbitration agreements. The course also addresses the new uses of arbitration in the consumer, health, and employment fields.  
Effective: Spring 2010

**SKILS 964 Intensive Legal Writing and Drafting (2)** This course develops students' skills in common legal writing formats other than memos and briefs. Not intended as a remedial course, this course rather provides an opportunity for students to sharpen legal writing skills with an emphasis on clarity and precision of expression. Weekly writing assignments include a few fully drafted documents (e.g., short will, a short contract, a statute), as well as letters, short pleadings, jury instructions, and other short pieces. Students will concentrate on re-writing and editing their work.  
Effective: Summer 2011  
Prerequisite:

**SKILS 965 Federal Courts (3)** This course addresses the relationship of federal courts to administrative agencies and state courts.  
Effective: Fall 2005

**SKILS 966 Arbitration Workshop (3)** The first part is the drafting of arbitral clauses in a variety of circumstantial settings (maritime, labor, commercial, consumer, and employment) in regard to CPR best practices standards and addressing the authority of the arbitrators and the configuration of the arbitral procedure. This process would take several sessions. The second branch would be to view and then construct an arbitration pursuant to one or several of the arbitral clauses. This would require the conduct and architecture of an arbitral trial along with the protocol for its management, both with the arbitrators and the parties. This would take some time as well. Third, the students would be asked to participate in a statutory drafting workshop that reflects their experiences in the two previous branches. They would be asked to evaluate the UNCITRAL Model Law and several national laws of arbitration and arrive at a new and better model law.  
Effective: Summer 2011  
Prerequisite:

**SKILS 967 Federal Court Practice (2)** This course introduces contemporary issues in several topical areas of particular interest to litigating in federal courts. The course topics are varied, with the unifying theme being that each topic possesses either particular prominence or exclusive jurisdiction within the country's federal court system. These topics include: the history and organization of the federal courts, the courts' relationship with Congress, the practical dynamics of federal procedure, strategic considerations involved in a litigant's choice of federal court, employment discrimination, federal criminal matters, sentencing, civil rights cases, and habeas.  
Effective: Fall 2011

**SKILS 968 Written Advocacy and Judicial Opinions (3)** The bulk of advocacy is in the form of written submissions to the courts, and the vast majority of judicial decisions are written. In order to advocate effectively, lawyers must communicate their arguments clearly and persuasively to the courts. In order to resolve cases and establish useful precedent, judges must communicate their reasoning clearly and authoritatively. This course will explore both forms of written communication and develop the writing skills associated with each.  
Effective: Summer 2012  
Prerequisite:

**SKILS 969 Legal Journalism (2)** Students will learn journalistic writing styles to prepare them to contribute accurate and accessible legal information and analysis to general interest and legal trade media as legal analysts or professional journalists. For legal trade publication work, the emphasis will be on readability and appropriate depth for a professional audience. Students will learn journalistic standards of truth and interviewing techniques for print and broadcast media. Live broadcast techniques, including live interview hosting, will also be covered.  
Effective: Summer 2013

**SKILS 971 Scholarly Writing Workshop (1)** This course provides students with the framework for developing a thesis, conducting research, and producing a significant scholarly paper. In an interactive workshop setting, students will discuss progress and receive feedback from faculty and fellow students on: (1) identification and refinement of a thesis; (2) developing and implementing a research plan; (3) appropriate use of authority, including legal citation form; and (4) developing and refining a critical perspective and scholarly argument. Students must be concurrently enrolled in a seminar (SEM) course or an independent study (PERSP 996) of at least two credit hours.  
Effective: Fall 2014 Future: Fall 2014  
Concurrent: SEM course at least 2 credits or PERSP 996 for at least 2 credits

**SKILS 982 Pennsylvania Practice (2)** This class will acquaint the student with civil procedure at the state trial court level. Using Pennsylvania as the model, the course traces a civil case from service of process to trial and includes discussion of venue, pleadings, discovery and dispositive motions. The course also deals with other important aspects of civil practice including statutes of limitation, comparative negligence, compulsory arbitration and settlement.  
Effective: Summer 2011

**SKILS 983 Writing and Editing for Lawyers (2)** The goal of the course is to improve the legal reading, writing, and editing skills of students. The course will reinforce rules of grammar, punctuation, sentence structure, usage, voice, tone, style, and organization. The emphasis will be on the application of these rules in the context of legal writing. Students will learn how to craft sentences that are accurate, brief, clear, precise, and sometimes persuasive.  
Effective: Summer 2011 Ending: Summer 2013

Prerequisite:

**SKILS 983 Writing and Editing for Lawyers (2)** The goal of the course is to improve the legal reading, writing, and editing skills of students. The course will reinforce rules of grammar, punctuation, sentence structure, usage, voice, tone, style, and organization. The emphasis will be on the application of these rules in the context of legal writing. Students will learn how to craft sentences that are accurate, brief, clear, precise, and sometimes persuasive.  
Effective: Fall 2013 Future: Fall 2013

**SKILS 986 Remedies (3)** Remedial devices focusing on the theory and application of legal and equitable relief are analyzed comparatively. The course covers the procedural and substantive law elements of damages, specific performance, injunctions, declaratory judgments, reformation, rescission, and restitution.  
Effective: Fall 1998

**SKILS 987 Writing Workshop (2)** The goal of this course is to improve the legal writing and editing skills of students. By engaging in the process of directed writing and editing, students will learn to write clearly, succinctly, precisely, and sometimes persuasively. Emphasis will be given to organization and integration of procedural and substantive aspects of cases.  
Effective: Summer 2011  
Prerequisite:

**SKILS 988 Legal Problems of Indigents (2)** This course is an introduction to law relevant to assisting people in poverty including law addressing public benefits, housing, consumer issues, custody, domestic violence, and private rights of action. It will also address realities of existence for people in poverty and consider historical and policy perspectives. Finally, the course will focus on some practical skills, and students will participate in mock hearings and/or mock interviews.  
Effective: Spring 2011

**SKILS 997 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2008

**SKILS 997A Scholarly Writing Workshop (1)** This course provides students with the framework for development a thesis, conducting research, and producing a significant scholarly paper. In an interactive workshop setting, students will discuss progress and receive feedback from faculty and fellow students on: (1) identification and refinement of a thesis; (2) developing and implementing a research plan; (3) appropriate use of authority, including legal citation form; and (4) developing and refining a critical perspective and scholarly argument. Students must be concurrently enrolled in a seminar course or an independent study of at least two credit hours.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**SKILS 997A Spanish and Bilingual Communication in Law Practice (2)** Designed for students who want to improve their ability to understand and communicate with native Spanish-speaking colleagues and clients in a legal setting. Includes practical reading, speaking, and writing exercises using real documents from Spanish-speaking courts, practicing attorneys, and statutory law. Also encompasses an introduction to research resources, citation norms, and other tools related to practicing law in Spanish, and will include discussions of regional variations in law and language in the Spanish legal world and the ethics and responsibilities for non-native speakers practicing law in Spanish.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

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## Literature (LIT)

LIT 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

LIT 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## **Lithuanian (LITH)**

LITH 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

LITH 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## **Man-Environment Relations (M E R)**

**M E R 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

**M E R 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**M E R 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**M E R 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Provide an opportunity for a supervised and graded experience for graduate students in teaching undergraduate courses in man-environment relations.  
Effective: Fall 1983  
Prerequisite:

**M E R 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**M E R 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Management (MANGT)

**MANGT 510 Project Management (3)** A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment.

Effective: Fall 2000

Prerequisite:

**MANGT 515 Cost and Value Management (3)** A problem-based course that emphasizes project cost control and teaches students to apply techniques to control projects in business.

Effective: Summer 2002

Prerequisite:

**MANGT 520 Planning and Resource Management (3)** A problem-based course that addresses techniques for planning the project development process, including securing resources and resource management.

Effective: Summer 2002

Prerequisite:

**MANGT 525 Commercial Law and Project Procurement (3)** A problem-based course that addresses elements of commercial law and procurement practices and their implications for project management.

Effective: Spring 2005

Prerequisite:

**MANGT 531 Organizations (3)** An examination of organizational theories and processes of organizational behavior.

Effective: Spring 1986

**MANGT 535 Interpersonal and Group Behavior (3)** A human relations-based course that identifies the significant challenges that managing individuals on project teams represents.

Effective: Summer 2003

Prerequisite:

**MANGT 540 Strategy: Corporate, Business and Project (3)** A problem-based course that focuses on linking projects to overall corporate strategy.

Effective: Summer 2003

Prerequisite:

**MANGT 545 Project Team Leadership (3)** This course focuses on development of team leadership skills and the ability to solve team problems related to human interaction.

Effective: Summer 2010

Prerequisite:

**MANGT 575 Management of Projects (3)** A problem-based capstone course that integrates the themes necessary to appreciate the overall challenge of project management.

Effective: Summer 2003

Prerequisite:

**MANGT 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**MANGT 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

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## Management (MGMT)

**MGMT 400 Organization Development** (3) A study of organizational change and methodologies related with change and improvement. Examination of planned change on processes, strategies, people and culture in organizations.

Effective: Spring 2008

Prerequisite:

**MGMT 401 Contemporary Issues in Management** (3) Advanced treatment of topics of current managerial significance. Issues examined will differ by instructor, section, and semester. Consult departmental office.

Effective: Spring 2008

Prerequisite:

**MGMT 402 Experiences in Organizational Relations** (3) An experiential approach to study of behavior in organizations, applying concepts and theories of management to interpersonal situations.

Effective: Spring 2008

Prerequisite:

**MGMT 409 Project Management for Engineers** (3) The course provides a real-time experience to students in engineering and engineering technology in project management with a focus on leadership behavior and decision making.

Effective: Spring 2008

Prerequisite:

**MGMT 410 Project Management** (3) A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment.

Effective: Spring 2008

Prerequisite:

**MGMT 415 Project Portfolio Management and Organizations** (3) An advanced course in project management focusing on portfolio planning and control within the context of specific organizational challenges.

Effective: Summer 2013

Prerequisite:

**MGMT 418 Project Planning and Resource Management** (3) Advanced course in project management focusing on a more in-depth approach to project planning and scheduling and resource management.

Effective: Summer 2013

Prerequisite:

**MGMT 420 Negotiation and Conflict Management** (3) An exploration of the sources of interpersonal conflict and strategies of resolution in the managerial context.

Effective: Fall 2010

Prerequisite:

**MGMT 424 Interpersonal Relationships in Organizations** (3) Developing individual skills in interpersonal and group settings and experience-based and conceptual training in relating effectively to other people.

Effective: Spring 2008

Prerequisite:

**MGMT 425 (ENGR 425, IST 425) New Venture Creation** (3) Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors.

Effective: Spring 2011

Prerequisite:

**MGMT 426 (IST 426, ENGR 426) Invention Commercialization** (3) Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology.

Effective: Spring 2011

Prerequisite:

**MGMT 427 Managing an Entrepreneurial Start-Up Company** (3) Exploration of the tensions and experiences of starting and growing a new company.

Effective: Spring 2011

Prerequisite:

**MGMT 431 Entrepreneurship and Small Business Management** (3) Entrepreneurship, new ventures, and management of small firms.

Effective: Spring 2008

Prerequisite:

**MGMT 432 Small Business Field Study** (3) Supervised field study with a small firm.

Effective: Spring 2008

Prerequisite:

**MGMT 433 Leadership and Team Building** (3) Team-based learning approach to developing conceptual knowledge, skills sets, and personal competencies needed for leading and managing organizations.

Effective: Spring 2008

Prerequisite:

**MGMT 440 Advanced Human Resource Management** (3) In depth study of human resource management and personnel administration functions and processes.

Effective: Spring 2008

Prerequisite:

**MGMT 441 Organizational Staffing and Development (3)** This course focuses on the skills and methods managers need to manage staffing and development activities in organizations.

Effective: Spring 2011

Prerequisite:

**MGMT 443 Performance Management (3)** This course focuses on skills and methods managers need to enhance the contribution of employees to organizational performance and effectiveness.

Effective: Spring 2011

Prerequisite:

**MGMT 445 (US) Managing Differences in Organizations (3)** This course focuses on developing knowledge and skills for dealing with demographic, functional, occupational and identity-based differences within and among organizations.

Effective: Spring 2008

Prerequisite:

**MGMT 450 Labor Management Relations (3)** Study of the key concepts and processes involved in current American labor/management relations.

Effective: Spring 2008

Prerequisite:

**MGMT 451W Business, Ethics, and Society (3)** Advanced examination of social, ethical, legal, economic, equity, environmental, public policy, and political influences on managerial decisions and strategies.

Effective: Spring 2004

Prerequisite:

**MGMT 453 Creativity and Innovation (3)** Analysis of the process of innovation in organizations and of how creativity and other variables influence the process.

Effective: Summer 2007

Prerequisite:

**MGMT 461 (IL) International Management (3)** Examines issues of nations and cultures including motivation, communication, negotiation, leadership, ethics and social responsibility, and women in management.

Effective: Spring 2008

Prerequisite:

**MGMT 466 Organizational Learning and Knowledge Management (3)** Examination of the social processes through which organizations continuously develop, acquire, interpret, and apply information and knowledge for performance enhancement and continuous improvement.

Effective: Spring 2008

Prerequisite:

**MGMT 471 Strategic Management (3)** Issues that influence the competitive performance of the firm are identified and examined.

Effective: Spring 2004

Prerequisite:

**MGMT 471W Strategic Management and Business Policy (3)** Study of strategic management and business policy formulation and implementation processes.

Effective: Spring 2008

Prerequisite:

**MGMT 475W Strategic Product Development (3)** Study of an organization, industry, and evaluation of the introduction to a new product. Preparation of proposal for industry product.

Effective: Summer 2008

Prerequisite:

**MGMT 476 Product Realization Capstone (3)** Study of an organization, industry, and evaluation of the introduction of a new product. Preparation of proposal for industry product.

Effective: Summer 2008

Prerequisite:

**MGMT 483 Compliance and Fairness in Organizations (3)** Compliance with employment laws with respect to managing human resources and fair treatment in employer-employee relationships.

Effective: Summer 2007

Prerequisite:

**MGMT 489 Seminar in Management (3)** A capstone course in management for students of high academic achievement. Emphasis on in-depth research of current interest.

Effective: Spring 2008

Prerequisite:

**MGMT 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2003

**MGMT 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**MGMT 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

**MGMT 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1989

**MGMT 496A Contemporary Issues in Management (1-6)** Develop short reports on contemporary issues importing the management function including employee segmentation analysis the impact of health care reform act, H.R. compliance and technology.

Effective: Summer 2013 Ending: Summer 2013

**MGMT 496B Advanced Human Resources Management (1-6)** Strategic Compensation: A human resource management approach. Three exams will constitute final grade.

Effective: Summer 2013 Ending: Summer 2013

**MGMT 496C Supply Chain Business Process Analysis with ERP Technologies (3)** Research business process analysis technologies which enable corporations to report, analyze, predict and improve their supply chain processes.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**MGMT 496D Introduction to Human Resources (1-6)** Introduction to the strategic planning and implementation of human resource management, including staffing, development, and appraisal and rewards.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**MGMT 496E Organizational Theory (1-6)** Analyzing the organization (the same work in Jone's "Organizational Theory, Design, and Change") to analyze FMC Technologies concluding in a 20 page report.

Effective: Summer 2013 Ending: Summer 2013

**MGMT 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1989

**MGMT 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2003

**MGMT 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2007

**MGMT 501 Behavioral Science in Business (3)** Application of behavioral science concepts and analytical methods to problems in business organizations. Analysis of administrative behavior and decision making.

Effective: Fall 1989

**MGMT 507 Positive Organizational Behavior and Wellbeing (3)** Exploration of positive organizational behavior and wellbeing concepts for developing the "human sustainability" factor in organizations.

Effective: Spring 2013

**MGMT 520 Team Facilitation (2)** To gain an in-depth understanding of team dynamics and develop skills for facilitating teams to achieve effective performance.

Effective: Summer 2002

**MGMT 521 Complex Negotiations (2)** Develop concepts and strategies for analyzing and conducting multiparty negotiations.

Effective: Spring 2003

**MGMT 523 Organizational Change: Theory and Practice (3)** Analysis of research, theory, and practice in dynamics of organizational change. Research literature reviewed for evaluation of concepts and methods.

Effective: Fall 1989

**MGMT 528 Seminar in Organizational Behavior (3)** Current theoretical and research issues applicable to the study of individual and group behavior within organizational settings.

Effective: Fall 1989

**MGMT 531 Strategy Implementation and Organizational Change** (2) Assess gap between current organization and that needed to implement new strategy or execute change; identify process for closing gap.  
Effective: Summer 2002

**MGMT 534 Leadership and Change in Organizations** (2) Understanding yourself as a leader, particularly as a leader in organizations and especially a leader of organizations undergoing change.  
Effective: Summer 2008

**MGMT 535 The Upper Echelons Perspective: Theory and Research** (3) To learn to evaluate and conduct research on top executives and their influence on organizational strategy, structure and performance.  
Effective: Summer 2004  
Prerequisite:

**MGMT 538 Seminar in Organization Theory** (3) Current theoretical and research issues applicable to the study of design and management of complex organizations.  
Effective: Fall 1989

**MGMT 539 Seminar in Organizational Social Networks** (3) Learn theory, concepts and methods for research on organizational social networks.  
Effective: Summer 2004  
Prerequisite:

**MGMT 541 Human Resource Management** (3) An in-depth examination of the strategic planning and implementation of human resource management, including staffing, development, appraisal, and rewards.  
Effective: Summer 1990

**MGMT 551 Growth and Innovation Strategy** (2) Identify opportunities for growth and profitability through technological and organizational innovations and market independently or with strategic partners.  
Effective: Summer 2002  
Prerequisite:

**MGMT 558 Seminar in Organizational Decision Making** (3) An in-depth examination of decision making, including bounded rationality, political behaviors, choice and post-decision processes.  
Effective: Spring 1990

**MGMT 561 Global Strategy and Organization** (1-3) Course focuses on three major aspects of international business: competitive strategy, organization design, and management processes.  
Effective: Fall 2008  
Prerequisite:

**MGMT 565 Power and Influence** (2) Provides a pragmatic and ethical framework for analyzing the sources of power in organizations and its effective use.  
Effective: Summer 2008

**MGMT 571 Strategic Management** (3) This capstone course provides analysis and application of strategy concepts and techniques in business organizations.  
Effective: Spring 2002  
Prerequisite:

**MGMT 573 Corporate Innovation Strategies** (3) Survey of managerial issues involved in formulating and implementing a corporate innovation or technology strategy.  
Effective: Summer 1991

**MGMT 578 Seminar in Corporate Strategy** (3) Current theoretical and research issues applicable to the study of corporate strategy formulation and implementation.  
Effective: Fall 1989

**MGMT 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 1989

**MGMT 591 Organizational Research Design** (3) Experience in designing research for organizational science, to maximize the validity of eventual conclusions; methodological choices, constraints, and compromises (tradeoffs).  
Effective: Summer 2004  
Prerequisite:

**MGMT 592 Qualitative Research Methods** (3) This course provides students with an introduction to and experience with qualitative research methods employed in organizational contexts.  
Effective: Summer 2004  
Prerequisite:

**MGMT 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1989

**MGMT 597 Special Topics (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1989

**MGMT 597A Developing Global Leaders: European Management Perspectives (3)** The increase in both diversity and globalization in business require managers to develop cross-cultural competence to work effectively in a European Management setting. This course develops students' global understanding for working, following, and leading in European organizations. It explores how human resource management processes and organizational dynamics in European countries such as France, Germany and Switzerland differ from practices in the United States. This course will help managers and organizational leaders make sense of French, German, Swiss, and other European cultures in order to prepare global leaders for work in highly diverse, intercultural environments. The goal is to better understand how culture impacts the whole management process when working in Europe. Several case studies--describing both successful and unsuccessful practices--will be presented.  
Effective: Summer 2013 Ending: Summer 2013

**MGMT 597B Team Facilitation Labs (1)** Lab to work with 1st Year Teams.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MGMT 599 (IL) FOREIGN STUDY--MANAGEMENT (1-12)** Full-yime graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

**MGMT 600 Thesis Research (1-15)** No description.  
Effective: Fall 1989

**MGMT 601 PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.**  
Effective: Summer 1991

**MGMT 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) COURSE INVOLVES SERVING AS A TEACHING ASSISTANT IN A SPECIFIED UNDERGRADUATE COURSE UNDER THE SUPERVISION OF A FACULTY MEMBER. REQUIRES PLANNING, DISCUSSION, AND APPLICATION OF ITS APPROACH.**  
Effective: Spring 1991

**MGMT 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1989

**MGMT 611 PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.**  
Effective: Summer 1991

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## Management Information Systems (M I S)

**M I S 538 Decision Support Systems** (3) Analysis of information requirements for planning, decision making, and performance measurement in organizations.

Effective: Spring 2006

Prerequisite:

**M I S 538 Management of MIS** (3) Organizational issues in managing computer-based information systems.

Effective: Spring 2006

Prerequisite:

**M I S 590 Management Information Systems Colloquium** (1-3) This seminar will deal with current research areas dealing with the development and management of management information systems within organizations.

Effective: Spring 2006

Prerequisite:

**M I S 596 Individual Studies** (1-9) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1992

**M I S 597 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**M I S 599 (IL) Foreign Study--Management and Information Systems** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

Prerequisite:

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## **Management Science and Information Systems (MS&IS)**

MS&IS 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1998

MS&IS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1998

MS&IS 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1998

MS&IS 599 (IL) **Foreign Study--Management Science and Information Systems** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

MS&IS 602 **Supervised Experience in College Teaching** 1-3 per semester/maximum of 6 No description.  
Effective: Spring 1998

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## Management-CI (MNGMT)

**MNGMT 505 Managing Human Resources** (3) Issues in human resource management including recruitment and selection, employee development, performance management, employee and labor relations, and employee safety.  
Effective: Spring 2001  
Prerequisite:

**MNGMT 511 Organizational Behavior** (2) Individual and group behavior in organizations; motivation, performance and rewards, job satisfaction, decision processes, conflict resolution; job and organizational design.  
Effective: Summer 2004  
Prerequisite:

**MNGMT 514 Organizational Learning** (2) Structural, strategic, technical, and ecological approaches, including institutional, resource dependence, and discontinuous improvement models; evaluating and institutionalizing learning.  
Effective: Summer 2004  
Prerequisite:

**MNGMT 515 (P ADM 515) Labor Management Relations** (3) Labor relations issues; collective bargaining agreement, negotiations, and administration; legal framework of collective bargaining; labor relations in larger social context.  
Effective: Fall 2011  
Prerequisite:

**MNGMT 520 Organizational Transformation** (3) Treats methods, practices, and theory of organizational empowerment, quality management, process redesign, re-engineering, restructuring, and planned change.  
Effective: Spring 2005  
Prerequisite:

**MNGMT 522 Operations and Supply Chain Management** (3) Design, development, management of manufacturing systems in a supply chain context; tools, techniques, and applications at tactical and strategic levels.  
Effective: Spring 2005  
Prerequisite:

**MNGMT 523 Service Operations Management** (3) Design, development, and management of service systems. Tools and techniques for non-manufacturing operations at tactical and strategic levels.  
Effective: Summer 2004  
Prerequisite:

**MNGMT 545 Employment Law for Business** (3) The regulation of the employer-employee relationship, discrimination in employment, and the employment environment with respect to managing human resources.  
Effective: Summer 2004  
Prerequisite:

**MNGMT 570 Leadership Development** (3) Experientially based skill-building for development of managerial and leadership competencies.  
Effective: Spring 2012

**MNGMT 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 2009

**MNGMT 596 Individual studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1999

**MNGMT 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1999

**MNGMT 897 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2007

**MNGMT 897A Special Topics: Fixed Income** (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2013 Ending: Summer 2013

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## **Manufacturing Sys Eng (MFGSE)**

**MFGSE 520 Analytical Techniques in Manufacturing and Design** (3) Applied statistics, QC, SPC, design for experiments, six sigma, design tolerance and process optimization.

Effective: Fall 2000

Prerequisite:

**MFGSE 550 Design for Manufacturability I** (3) Introduction to DFM, a review of enabling technologies and the systematic use of quality tools during the DFM process.

Effective: Fall 2000

Prerequisite:

**MFGSE 580 Masters Project** (1-3) Manufacturing capstone or technology study utilizing both manufacturing and management skills.

Effective: Fall 2000

Prerequisite:

**MFGSE 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2000

**MFGSE 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Fall 2000

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## Marketing (MKTG)

**MKTG 410 Personal Selling** (3) Principles underlying the selling process and practical application of these principles to selling situations.

Effective: Spring 2008

Prerequisite:

**MKTG 420 Direct Marketing** (3) Applies principles of marketing management to the direct marketing of products by mail, telephone, print, and broadcast media.

Effective: Spring 2002

Prerequisite:

**MKTG 422 Advertising and Sales Promotion Management** (3) Perspectives and models of the key decisions involved in managing advertising and sales promotion campaigns.

Effective: Spring 2008

Prerequisite:

**MKTG 426 Business Marketing** (3) Developing marketing strategies and programs. The course emphasizes the special nature of the business and organizational markets.

Effective: Spring 2002

Prerequisite:

**MKTG 428 Advanced Sales Management** (3) Approaches to planning, organizing, staffing, training, directing, and controlling the sales force in support of marketing objectives.

Effective: Spring 2008

Prerequisite:

**MKTG 437 Advanced Retailing and Merchandise Management** (3) Analyzing planning and controlling the retail merchandising effort, including procurement, resource selection, vendor relations, product presentation, inventory control.

Effective: Spring 2002

Prerequisite:

**MKTG 440 Services Marketing** (3) Marketing theory and methods applied to profit and nonprofit service industries such as health care, finance, transportation, tourism, arts and consulting.

Effective: Spring 2002

Prerequisite:

**MKTG 443 Sports Marketing** (3) This course will focus on how companies develop, execute and measure marketing strategies and tactics to use sports teams, families, leagues and other organizations to market their products and services domestically and internationally to consumers and business partners. The course will examine the marketing strategies employed by sports teams and leagues.

Effective: Summer 2010

Prerequisite:

**MKTG 445 (IL) Global Marketing** (3) Role of international marketing in the global environment; political, economic, geographic, historical, cultural conditions; developing and implementing international marketing strategies.

Effective: Spring 2008

Prerequisite:

**MKTG 450W Marketing Strategy** (3) Market-oriented problems of the firm; identification and selection of market opportunities; formulation of competitive strategies; marketing policies and programs.

Effective: Spring 2008

Prerequisite:

**MKTG 475 Innovation and Product Management** (3) This course is an application-oriented interdisciplinary course on new product development concepts, and innovation management.

Effective: Spring 2011

Prerequisite:

**MKTG 476 Sales Management** (3) Application of modern management principles to field sales force planning, organization, and administration; selection, training, and compensation plans.

Effective: Spring 2008

Prerequisite:

**MKTG 478 Services Marketing Management** (3) Conceptual understanding of services and the analytical tools that are used in solving strategic services marketing problems.

Effective: Spring 2008

Prerequisite:

**MKTG 485 Business-to-Business Marketing** (3) Application of marketing principles to commercial enterprises, industrial firms, government, and other non-profit institutions.

Effective: Spring 2008

Prerequisite:

**MKTG 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2003

**MKTG 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2008

**MKTG 495 Internship** (1-18) Supervised off campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

**MKTG 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**MKTG 496A Use of Yammer in Higher Education** (3) Investigates how yammer affects teamwork, communication, and collaboration among two students teams.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**MKTG 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**MKTG 497A Sports Marketing Models and Analytics** (3) This course offers instruction on the current application of quantitative models in the growing field of research and analytics in sports marketing.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**MKTG 497B Sports Business** (3) This course is designed to introduce you to the major activities of one of the nation's largest industries = sports. These will include matters related to management structures in professional, intercollegiate, and international sports. Additional aspects of sports business such as facility management, sociological aspects or concerns (e.g. gender and race), and sports consumer behavior will be explored. This course will provide an overview of the business aspect of sports and help develop skills to think critically about current issues and topics in the sports world.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**MKTG 497C Intermediate Social Media Marketing** (3) This course familiarizes students with the current technologically-centered tools and techniques available to marketers for building brand recognition, brand liking, and increasing the number of customers. These technology tools and platforms include but not limited to: Facebook, LinkedIn, Twitter, YouTube, Google+, Pinterest, Foursquare, Friendster, Technorati, Blogs, Vlogs, Podcats, Hootsuite, Radian6, various search engines, and QR codes. These social media tools can be used to find, reach, connect, and automate marketing messages to efficiently and effectively build relationships, stronger brands and loyalty. These technologies may be utilized with or without a fully realized marketing automation structure, allowing ideas to be shared on a global platform.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MKTG 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2003

**MKTG 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2007

**MKTG 500 Marketing Management** (3) Development of a marketing management focus, including market analysis, competition analysis, and decisions in pricing, product, promotion, and distribution channels.

Effective: Spring 2002

Prerequisite:

**MKTG 512 Consumer and Market Behavior** (3) Application of buyer behavior concepts from the behavioral sciences, including utility, culture, life cycle, personality, attitudes, learning, decision making.

Effective: Fall 1983

Prerequisite:

**MKTG 513 Market Research** (3) User-oriented analysis of marketing research process, including problem definition, design, data collection, data analysis, interpretation, and presentation.

Effective: Fall 1983

Prerequisite:

**MKTG 515 Business Marketing** (3) Study of marketing of goods and services to business, institutions, and government. Focus on organizational buying, market planning and analysis, and development of marketing mix.

Effective: Summer 1984

Prerequisite:

**MKTG 516 Product Development and Management (3)** Marketing and product strategies for new and old products are covered in this course.

Effective: Fall 1987

Prerequisite:

**MKTG 518 Global Marketing (3)** Role of international marketing in the global business environment; development of marketing plans and implementation strategies under differing socio-economic conditions.

Effective: Spring 2012

Prerequisite:

**MKTG 521 Scientific Marketing Analysis and Implementation (2)** An introduction to the tools used, rationale for, and the practice and implementation of a variety of current marketing techniques.

Effective: Spring 2003

Prerequisite:

**MKTG 532 Brand Management (2)** To examine and understand the processes of building, designing, measuring, and maintaining brand equity.

Effective: Summer 2002

Prerequisite:

**MKTG 533 Business Marketing (2)** Study of marketing of goods and services to business, institutions, and government.

Effective: Summer 2002

Prerequisite:

**MKTG 534 Integrated Market Communications (2)** Provides the frameworks for thinking, tools, language, and skills for strategic management of integrated market communications.

Effective: Summer 2002

Prerequisite:

**MKTG 541 Consumer Behavior (2)** Introduce theories and concepts from psychology, sociology, economics, and other disciplines that are useful in understanding and marketing to consumers.

Effective: Summer 2002

Prerequisite:

**MKTG 542 New Product Development and Management (2)** Identify business opportunity, understand potential customer needs, and develop a new product from concept to virtual prototype.

Effective: Summer 2002

Prerequisite:

**MKTG 543 (EBIZ 543) e-Marketing (2)** Using the Internet and related technologies to enhance and transform marketing functions and processes.

Effective: Spring 2012

**MKTG 551 Theoretical Perspectives on Buyer Behavior (3)** Review of marketing and social sciences research related to understanding consumer and market behavior.

Effective: Fall 1983

**MKTG 554 Research Methods in Marketing (3)** Philosophical, methodological, and measurement issues involved in designing, conducting, analyzing, and interpreting research in marketing.

Effective: Fall 1983

**MKTG 555 Marketing Models (3)** Topics in the model building approach to marketing decision making, focusing on current research issues.

Effective: Spring 2012

**MKTG 556 Marketing Management (3)** To explore the conceptual and applied dimensions of marketing management.

Effective: Summer 2008

Prerequisite: Concurrent: MKTG 555

**MKTG 571 Marketing Strategy (2)** Examines business-level marketing issues and solutions to problems in competitive business environments.

Effective: Summer 2002

Prerequisite:

**MKTG 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2008

**MKTG 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**MKTG 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**MKTG 597A Special Topics in Consumer Behavior (3)** The purpose of this graduate seminar is to investigate special topics in consumer behavior. The class will be organized in a way that allows you to 1) gain an in-depth understanding of important areas of consumer behavior research identified by faculty; 2) gain exposure to various faculty in marketing and their research values and styles; and 3) develop and advance your own research interests. The course will focus on special topics that are prominent or receiving increasing attention in the literature (e.g., aesthetics, hedonics, financial decision-making, non-conscious processes, identity, culture, consumption/experience and satisfaction). In addition, students will have the opportunity to identify topics of interest and lead seminars with faculty guidance. (In addition to tailoring the course content to student interests, the latter is also intended to provide students with hands-on experience at leading a PhD.-level discussion.)  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MKTG 597B Sustainable Marketing (3)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MKTG 599 (IL) Foreign Study--Marketing (1-12)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

**MKTG 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**MKTG 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Summer 1983

**MKTG 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** No description available.  
Effective: Fall 1982

**MKTG 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

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## Marketing-Bd (MRKTG)

MRKTG 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

MRKTG 597 **special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1987

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## Marketing-CI (MRKT)

MRKT 513 **Marketing Management: Structures and Processes** (2) This course examines concepts, techniques, and developments of strategic marketing plans and programs within domestic and international market environments.  
Effective: Summer 2004

Prerequisite:

MRKT 514 **Marketing Management: Relationships and Institutions** (2) Examination of relationships formation with customers and distribution channels; traditional and on-line marketing issues.

Effective: Summer 2004

Prerequisite:

MRKT 570 **Marketing Strategy and Planning** (3) Analysis of management's marketing problems, including marketing analyses, pricing, channels of distribution, promotion, competition, product strategies, and marketing research.

Effective: Spring 2011

Prerequisite:

MRKT 571 **Consumer Behavior** (3) Factors influencing buyer behavior; contributions of the behavioral sciences to the study of selected phenomena.

Effective: Spring 2005

Prerequisite:

MRKT 572 **Marketing Research** (3) Management information needs, evaluation of research proposals and findings, methods of data collection and analysis, integration of research and decisions.

Effective: Spring 2005

Prerequisite:

MRKT 585 **Business-to-Business Marketing** (3) Marketing of products and services to other businesses and organizations including strategy, planning, research, communications, pricing, distribution, and global issues.

Effective: Spring 2005

Prerequisite:

MRKT 586 **Internet Marketing** (3) Concepts, techniques, and applications of Internet marketing; buyer behavior; Web site design; marketing plans; legal, ethical, and international environments.

Effective: Summer 2004

Prerequisite:

MRKT 587 **Global Marketing** (3) Exploration of strategic marketing planning concepts and techniques from a global perspective within diverse overseas market environments.

Effective: Spring 2005

Prerequisite:

MRKT 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2009

MRKT 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1999

MRKT 597 **Special topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1999

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## Materials (MATL)

MATL 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1992

MATL 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1992

MATL 597 **Special Topics** (1-9) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 1991

MATL 600 **Thesis Research** (1-15) No description.  
Effective: Spring 1992

MATL 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1992

MATL 602 **SUPERVISED EXPERIENCE IN COLLEGE TEACHING** (1-3 PER SEMESTER, MAXIMUM OF 6) NO DESCRIPTION.  
Effective: Summer 1991

MATL 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1992

MATL 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1992

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## Materials Science and Engineering (MATSE)

**MATSE 400 Crystal Chemistry** (3) Principles of crystal chemistry applied to structures, structural defects and properties of organic, inorganic, intermetallic, and metallic crystals.

Effective: Summer 2007

Prerequisite:

**MATSE 401 Thermodynamics of Materials** (3) Review of equilibrium thermodynamics and applications to metallurgical and material systems.

Effective: Fall 2012

Prerequisite:

**MATSE 402 Materials Process Kinetics** (3) A treatment of process kinetics including chemical reaction kinetics and momentum, energy and mass transport.

Effective: Fall 2012

Prerequisite:

**MATSE 403 (BIOE 443) Biomedical Materials** (3) Describe properties of materials and composites and their in vivo interactions.

Effective: Spring 2007

Prerequisite:

**MATSE 404 (IL) (BIOE 444) Surfaces and the Biological Response to Materials** (3) Focus is on the special properties of surfaces as an important causative and mediating agent in the biological response to materials.

Effective: Summer 2007

Prerequisite:

**MATSE 409 (NUC E 409) Nuclear Materials** (3) Nuclear reactor materials: relationship between changes in material properties and microstructural evolution of nuclear cladding and fuel under irradiation.

Effective: Summer 2002

Prerequisite:

**MATSE 410 Phase Relations in Materials Systems** (3) Phase rule; construction and interpretations of equilibrium diagrams; importance of nonequilibrium in materials.

Effective: Fall 2006

Prerequisite: Concurrent: MATSE 201 MATSE 400 MATSE 430

**MATSE 411 Processing of Ceramics** (3) Principles of ceramic processing, including powder preparation and characterization, forming operations, and the basic phenomena underlying these operations.

Effective: Fall 2005

Prerequisite:

**MATSE 412 Thermal Properties of Materials** (3) Generation of high temperatures, measurement of temperature, heat transfer and furnace design, thermal stability of ceramic materials, applied thermodynamics.

Effective: Fall 2005

Prerequisite: Concurrent: MATSE 401

**MATSE 413 Solid-State Materials** (3) Structures of metallic, ionic, and covalent solids, amorphous materials, and surfaces; electronic structure; electronic properties of solids and their manipulation.

Effective: Spring 2001

Prerequisite:

**MATSE 415 Introduction to Glass Science** (3) Composition, melting, fabrication, properties, and uses of glass; combinations of glass with metals and other materials.

Effective: Summer 2002

Prerequisite:

**MATSE 417 (E SC 417) Electrical and Magnetic Properties** (3) Electrical conductivity, dielectric properties, piezoelectric and ferroelectric phenomena; magnetic properties of ceramics.

Effective: Spring 2007

Prerequisite:

**MATSE 419 Computational Materials Science and Engineering** (3) Introduction to computational material science and engineering. Overview of the computational methods for materials, from atomistic to the continuum scale.

Effective: Spring 2012

Prerequisite:

**MATSE 421 Corrosion Engineering** (3) Industrial forms of corrosion and preventive methods, and their description in terms of basic thermodynamic and kinetic considerations.

Effective: Summer 2007

Prerequisite:

**MATSE 422 Thermochemical Processing** (3) Physico-chemical aspects of high temperature extraction and processing of metals and alloys. Design and evaluation of processes and process options.

Effective: Summer 2002

Prerequisite:

**MATSE 424 Materials Selection and Design** (1) Introduction to the selection and design of materials for structural

applications.

Effective: Summer 2002

Prerequisite:

**MATSE 425 Processing of Metals** (3) Modern methods of shaping metals in liquid and solid states: casting, joining, powder and deformation processing. Design of new technology.

Effective: Fall 2006

Prerequisite:

**MATSE 426 (MN PR 426) Aqueous Processing** (3) A study of the chemical and engineering principles pertinent to metal processing in aqueous systems: hydrometallurgical extraction, plating, materials preparation.

Effective: Fall 2009

Prerequisite:

**MATSE 430 Materials Characterization** (3) Elements of crystallography and the characterization of crystalline and non-crystalline materials using x-ray diffraction, electron microscopic, and other instrumental techniques.

Effective: Spring 2001

Prerequisite:

**MATSE 435 Optical Properties of Materials** (3) Electromagnetic spectrum, interaction of light with materials, color, thin film optical coatings, electro-, integrated and nonlinear optics.

Effective: Spring 1996

Prerequisite:

**MATSE 436 Mechanical Properties of Materials** (3) Fundamental relationships between structure and mechanical behavior of materials.

Effective: Fall 2012

Prerequisite:

**MATSE 440 (E MCH 440) Nondestructive Evaluation of Flaws** (3) Methods and limitations of nondestructive evaluation of mechanical flaws; optical, acoustical, electromagnetic, x-ray, radiography, thermography, and dye techniques.

Effective: Spring 2008

Prerequisite:

**MATSE 441 Polymeric Materials I** (3) Manufacture of industrially significant polymers together with discussion of their major chemical, physical, and mechanical properties.

Effective: Fall 2012

Prerequisite:

**MATSE 443 Introduction to the Materials Science of Polymers** (3) Introduction to the nature and structure of high polymers. Characteristics of polymers and polymer systems.

Effective: Fall 2012

Prerequisite:

**MATSE 444 Solid State Properties of Polymeric Materials** (3) Structure/property relationships in the bulk solid state of polymers. Characterization of bulk properties and structure.

Effective: Spring 2003

Prerequisite:

**MATSE 445 Thermodynamics, Microstructure, and Characterization of Polymers** (3) The properties of individual polymer chains. Theoretical and experimental techniques pertaining to the characterization of polymeric microstructure.

Effective: Fall 2002

Prerequisite:

**MATSE 446 Mechanical and Electrical Properties of Polymers and Composites** (3) The mechanical (viscoelastic) and electric properties of polymers and poly-based composites.

Effective: Spring 2003

Prerequisite:

**MATSE 447 Rheology and Processing of Polymers** (3) This course deals with the fluid mechanics, rheology, and processing of polymeric materials.

Effective: Fall 2002

Prerequisite:

**MATSE 448 (CH E 442) Polymer Processing Technology** (3) Basic principles of polymer melt processing are reviewed and subsequently applied to the most important industrial processing operations.

Effective: Spring 2006

Prerequisite:

**MATSE 450 (E SC 450) Synthesis and Processing of Electronic and Photonic Materials** (3) The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

Effective: Fall 2005

Prerequisite:

**MATSE 455 Properties and Characterization of Electronic and Photonic Materials** (3) Materials characterization in general; electrical properties of crystals, contacts, films; optical properties of single phase materials, waveguide, and multilayer stacks.

Effective: Fall 2005

Prerequisite:

**MATSE 460 Introductory Laboratory in Materials (1)** An introduction to comparative physical properties and characteristics of various materials including mechanical, electrical thermal, and structure/ morphology.

Effective: Spring 2001

Prerequisite:

**MATSE 462 General Properties Laboratory in Materials (1)** An introduction to comparative physical properties of various materials including mechanical, thermal electrical properties and the measurement of said properties.

Effective: Spring 2005

Prerequisite:

**MATSE 463 Characterization and Processing of Electronic and Photonic Materials Laboratory (1)** Provides experience with key processing methods for EPM materials and advanced characterization methods for EPM materials and simple device structures.

Effective: Spring 2009

Prerequisite: Concurrent: MATSE 450 MATSE 455

**MATSE 468 Ceramics Laboratory III (1)** Cermaic processing and powder characteristics.

Effective: Spring 2009

Prerequisite:

**MATSE 471 Metallurgy Laboratory I (1)** A laboratory integrating experimental aspects of material contained in MATSE 402, 413, and 410, e.g. phase diagram determination, solidification micro- structures, etc.

Effective: Fall 2005

Prerequisite:

**MATSE 472 Metallurgy Laboratory II (1)** Application of principles of mechanical metallurgy, pyroprocessing, corrosion and metal processing.

Effective: Fall 2006

Prerequisite:

**MATSE 473 Polymeric Materials Laboratory--Synthesis (1)** Principles and practices of polymerization, including condensation, free radical (bulk, solution, suspension, emulsion), ionic, and Zeigler-Natta procedures.

Effective: Spring 2003

Prerequisite:

**MATSE 474 Polymeric Materials Laboratory--Characterization (1)** Principles and practices involved in determination of properties, structure and morphology, employing thermal, mechanical, spectroscopic, viscometric and computer techniques.

Effective: Spring 2003

Prerequisite:

**MATSE 475 (E SC 475) Particulate Materials Processing (3)** Fundamentals of processing particulate materials including production, characterization, handling, compaction, and sintering of metal, carbide, intermetallic, and composite powders.

Effective: Spring 2008

Prerequisite:

**MATSE 483 (E SC 483) Simulation and Design of Nanostructures (3)** Introduction to computer simulation techniques and their applications at the physical/life sciences interface.

Effective: Fall 2007

Prerequisite:

**MATSE 484W (IL) International Internship in Materials: Research Definition and Methodology (3)** A course focused on international research, specific design and methodology, facilitated through the International Internship in Materials and Program.

Effective: Summer 2006

Prerequisite:

**MATSE 485W (IL) International Internship in Materials: Experimentation and Documentation (3)** A course focused on international research, specifically experimentation and documentation, facilitated through the International Internship in Materials Program.

Effective: Summer 2006

Prerequisite:

**MATSE 492W Materials Engineering Methodology and Design (3)** Designed to familiarize students with the literature and technology developments in the use of, and design with, materials in industrial applications.

Effective: Fall 2005

Prerequisite:

**MATSE 493W Materials Science and Engineering Multidisciplinary Capstone Design Project (3)** This course focuses on multidisciplinary industry-sponsored and community service-based design projects offered in conjunction with the College of Engineering's Learning Factory.

Effective: Summer 2012

Prerequisite:

**MATSE 494M Research and Design Senior Project (1-3)** Continuation of a research problem in materials culminating in a bound thesis describing the work.

Effective: Fall 2007

**MATSE 494W Research and Design Senior Project (1-3)** Continuation of a research problem in materials culminating in a

bound thesis describing the work.  
Effective: Spring 2006

**MATSE 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1994

**MATSE 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 1994

**MATSE 497B Materials Sustainability and Life Cycle Assessment** (3) Materials sustainability as measured by life cycle assessment and practiced by designers, engineers and scientists.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MATSE 497C Microstructure Design of Structural Materials** (3) The focus of this course is on understanding the microstructure development and design of structural materials including steel, titanium, aluminum, nickel-based alloys, zirconia, and silicon nitrides. The course will begin with understanding the basic physical metallurgy concepts of the ferrous and nonferrous metals and applying these principles to understanding their processing/structure/property relationships. Specifically, the alloying principles, phase transformation behavior, and transformation kinetics for each metal system will be considered in detail. Heat treatment practices (annealing, normalizing, tempering, aging, and precipitation hardening) and their effects on the microstructure and mechanical properties of each of these metals will also be studied. The course will also examine the microstructure development of the ceramic materials zirconia and silicon nitride, and how manipulation of these microstructures controls mechanical properties.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MATSE 501 Thermodynamics of Materials** (3) Application of thermodynamics to materials equilibria and processes, including solution theory, electrochemical processes, capillarity, and the effect of stresses.  
Effective: Spring 2004  
Prerequisite:

**MATSE 503 Kinetics of Materials Processes** (3) Introduction to application of transition state theory and mass transfer to the kinetics of materials and mineral processes.  
Effective: Summer 2007  
Prerequisite:

**MATSE 505 Irreversible and Statistical Thermodynamics of Materials** (3) Introduction to statistical and irreversible thermodynamics as applied to chemical and materials systems.  
Effective: Spring 2007  
Prerequisite:

**MATSE 506 Interfacial Electrochemical Processes** (3) Survey of thermodynamic and kinetic fundamentals of electrochemical processes at interfaces.  
Effective: Spring 2006

**MATSE 507 (BIOE 517) Biomaterials Surface Science** (3) Special properties of surfaces as an important causative and mediating agent in the biological response to materials.  
Effective: Fall 2003

**MATSE 508 (BIOE 508) Biomedical Materials** (3) Properties and methods of producing metallic, ceramic, and polymeric materials used for biomedical applications.  
Effective: Spring 2003

**MATSE 510 (CH E 510) Surface Characterization of Materials** (3) Physical and chemical principles of characterization techniques widely used in materials science, chemistry and engineering.  
Effective: Spring 2013

**MATSE 511A Powder X-Ray Diffraction** (1) Compound identification, lattice parameter measurement, and other applications of the powder diffraction method.  
Effective: Spring 2012

**MATSE 511B (GEOSC 511B) Transmission Electron Microscopy** (1) Principles and practice of transmission electron microscope operation. Students undertake individual projects.  
Effective: Spring 2005

**MATSE 511E Scanning Electron Microscopy** (1) Principles and practice of scanning electron microscope operation. Students undertake individual projects.  
Effective: Spring 2012

**MATSE 511G Analytical Electron Microscopy** (1) Modern analytical electron microscope techniques: scanning transmission electron microscopy; electron energy loss spectroscopy; energy dispersive analysis of x-rays.  
Effective: Spring 2012  
Prerequisite:

**MATSE 512 (GEOC 512) Principles of Crystal Chemistry** (3) Relation of structure to ionic size and nature; influence of pressure and temperature on structure; chemical-structural defects, crystalline solutions, phase-transitions.  
Effective: Spring 2004

**MATSE 514 Characterization of Materials** (3) Classical and new (microprobe, scanning microscope, magnetic resonance, and Mossbauer) techniques for the characterization of composition, structure, defects, and surfaces.  
Effective: Fall 2003

**MATSE 518 Wetting Properties of Materials: Theory and Practice** (3) Fundamentals of water wetting phenomenon are developed with special emphasis on thermodynamics of absorption and adhesion.  
Effective: Summer 2004

**MATSE 523 (NUC E 523) Environmental Degradation of Materials in Nuclear Power Plants** (3) Degradation of materials performance when exposed to the combination of high temperature, neutron irradiation, and aggressive electrochemistry found in nuclear reactors.  
Effective: Spring 2011  
Prerequisite:

**MATSE 530 X-Ray Crystallography and Diffraction** (3) Reciprocal lattices and the Ewald sphere construction; crystal structure determination by powder and single crystal techniques; space groups.  
Effective: Fall 2003  
Prerequisite:

**MATSE 531 Transmission Electron Microscopy** (3) Diffraction pattern analysis and simple contrast theory applied to the structures of materials; analytical techniques in the microscope.  
Effective: Fall 2003

**MATSE 535 Geometrical Crystallography** (3) Derivation of lattices, types, point groups, and space groups; and group theory applied to crystallography and spectroscopy.  
Effective: Spring 2003

**MATSE 540 Crystal Anisotropy** (3) Symmetry aspects of crystals and physical properties. Matrix and tensor methods.  
Effective: Spring 2003  
Prerequisite:

**MATSE 542 Polymeric Materials: The Solid State** (3) Introduction to the fundamental concepts necessary to understand solid state structure and properties of polymer materials.  
Effective: Summer 2004  
Prerequisite:

**MATSE 543 (CHEM 543) Polymer Chemistry** (3) This graduate course discusses recent advances in polymer chemistry that leads to new polymeric materials with interesting structures and properties.  
Effective: Spring 2005  
Prerequisite:

**MATSE 544 Computational Materials Science of Soft Materials** (3) Pursue applications of computational modeling methods to soft materials; explore use of these methods to different research areas.  
Effective: Summer 2009

**MATSE 547 Thermophysical Properties of Ceramics** (3) Heat capacity, heat of fusion, thermal conductivity, and thermal expansion in relation to macroscopic measurements and basic atomic concepts applied to ceramic materials.  
Effective: Spring 2003

**MATSE 548 Dielectric and Other Electroceramics** (3) Preparation and properties of ceramic semiconductors, dielectrics, and magnetic materials.  
Effective: Spring 2003

**MATSE 552 Sintering of Ceramics** (3) Design and interpretation of ceramic microstructures through an understanding of the physics and chemistry of sintering and grain growth.  
Effective: Spring 2003  
Prerequisite:

**MATSE 555 (PHYS 555) Polymer Physics I** (3) Introduction to the fundamental concepts needed to understand the physics applicable to polymer melts, solutions and gels.  
Effective: Spring 2006

**MATSE 560 (MN PR 507) Hydrometallurgical Processing** (3) Fundamental physico-chemical factors underlying the



aqueous extraction and recovery of metals and nonmetals from ores, minerals, and scrap metal.

Effective: Fall 2003

Prerequisite:

**MATSE 561 Metal Electrode Reactions (2-3)** Evaluation of electrode reaction mechanisms and kinetics at metal/electrolyte interfaces relevant to corrosion and industrial electrolyte processes.

Effective: Spring 2003

Prerequisite:

**MATSE 562 Solid to Solid Phase Transformations (3)** Mechanisms and rate-determining factors in solid-phase reactions in metals; diffusion processes, nucleation theory, precipitations from solid solution, eutectoid decomposition and order-disorder phenomena.

Effective: Spring 2003

**MATSE 563 (E MCH 534) Micromechanisms of Fracture (3)** Mechanisms of fracture and their relationship to loading conditions, environment, flow behavior, processing history, and microstructure.

Effective: Spring 2003

Prerequisite:

**MATSE 564 (E MCH 535) Deformation Mechanisms in Materials (3)** Deformation of crystalline/amorphous solids and relationship to structure; elastic, viscoelastic and plastic response over a range of temperatures and strain rates.

Effective: Fall 2004

Prerequisite:

**MATSE 565 Metals in Electronics (3)** Processing and performance of metals in electronics, covering electrical resistivity, metal film deposition, metal/semiconductor contacts, interconnects, and electronic packaging.

Effective: Summer 2002

**MATSE 570 (EME 570) Catalytic Materials (3)** Preparation and characterization of solid catalytic materials and the relationships between their surface, defect, and electronic properties and catalytic activity.

Effective: Fall 2008

Prerequisite:

**MATSE 575 Functional Polymeric Materials (3)** In-depth discussions of structure/property relationships in functional polymers and modern concepts of polymerization methods.

Effective: Spring 2006

**MATSE 580 Computational Thermodynamics (3)** The integration of fundamental principles and advanced computational approaches in the thermodynamics of materials, including hands-on computation, theory and application.

Effective: Summer 2007

Prerequisite:

**MATSE 581 Computational Materials Science II: Continuum, Mesoscale Simulations (3)** This course will focus on computational techniques and fundamentals of phase transformation simulations on the continuum, mesoscale level.

Effective: Spring 2008

Prerequisite:

**MATSE 582 Materials Science and Engineering Professional Development (1)** This course covers ethical conduct of research, pathways of professional development and strategies and tools for research.

Effective: Fall 2012

**MATSE 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 2004

**MATSE 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2004

**MATSE 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 2003

**MATSE 597A Quantum Mechanics for Material Scientists and Engineers (3)** Introduction to the concepts of quantum mechanics and application to problems in materials science with emphasis on solid state materials.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATSE 597A Polymers in Energy Research (3)** This course focuses on current research involving how polymers are used in energy applications such as batteries and solar cells.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MATSE 597C (EGEE 597C) Nanoscale Energy and Environmental Engineering (3)** The course will cover the synthesis,

characterization and applications of nanomaterials to energy generation, storage, conversion, conservation, control and environmental engineering. Selected topics in nanomaterial toxicity and production/process/product economics will be included.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATSE 598 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 2003

**MATSE 600 Thesis Research** (1-15) No description.

Effective: Spring 2004

**MATSE 601 Ph.D. Dissertation Full-Time** (0) No description.

Effective: Spring 2004

**MATSE 602 Supervised experience in college teaching** (1-3 per semester/maximum of 6) Supervised assistance with the teaching program in metallurgy.

Effective: Spring 2004

**MATSE 611 Ph.D. Dissertation Part-Time** (0) No description.

Effective: Spring 2007

**MATSE 897 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2008

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## Mathematics (MATH)

**MATH 401 Introduction to Analysis I** (3) Review of calculus, properties of real numbers, infinite series, uniform convergence, power series. Students who have passed Math. 403 may not schedule this course.

Effective: Fall 1983

Prerequisite:

**MATH 403 Classical Analysis I** (3) Topology of  $R^n$ , compactness, continuity of functions, uniform convergence, Arzela-Ascoli theorem in the plane, Stone-Wierstrass theorem.

Effective: Spring 1996

Prerequisite:

**MATH 403H Honors Classical Analysis I** (3) Development of a thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces.

Effective: Spring 2010

Prerequisite:

**MATH 404 Classical Analysis II** (3) Differentiation of functions from  $R^n$  to  $R^m$ , implicit function theorem, Riemann integration, Fubini's theorem, Fourier analysis.

Effective: Fall 1985

Prerequisite:

**MATH 405 Advanced Calculus for Engineers and Scientists I** (3) Vector calculus, linear algebra, ordinary and partial differential equations. Students who have passed MATH 411 or 412 may not take this course for credit.

Effective: Spring 1994

Prerequisite:

**MATH 406 Advanced Calculus for Engineers and Scientists II** (3) Complex analytic functions, sequences and series, residues, Fourier and Laplace transforms. Students who have passed MATH 421 may not take this course for credit.

Effective: Spring 1994

Prerequisite:

**MATH 408 Advanced Calculus** (3) Differential and integral calculus of functions of several variables, line and surface integrals, infinite series, series of functions, power series.

Effective: Spring 2007

Prerequisite:

**MATH 411 Ordinary Differential Equations** (3) Linear ordinary differential equations; existence and uniqueness questions; series solutions; special functions; eigenvalue problems; Laplace transforms; additional topics and applications.

Effective: Fall 1983

Prerequisite:

**MATH 412 Fourier Series and Partial Differential Equations** (3) Orthogonal systems and Fourier series; derivation and classification of partial differential equations; eigenvalue function method and its applications; additional topics.

Effective: Spring 2009

Prerequisite:

**MATH 414 (STAT 414) Introduction to Probability Theory** (3) Probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Students may take only one course from MATH(STAT) 414 and 418 for credit.

Effective: Fall 2001

Prerequisite:

**MATH 415 (STAT 415) Introduction to Mathematical Statistics** (3) A theoretical treatment of statistical inference, including sufficiency, estimation, testing, regression, analysis of variance, and chi-square tests.

Effective: Fall 1989

Prerequisite:

**MATH 416 (STAT 416) Stochastic Modeling** (3) Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.

Effective: Spring 1984

Prerequisite:

**MATH 417 Qualitative Theory of Differential Equations** (3) Linear differential equations, stability of stationary solutions, ordinary bifurcation, exchange of stability, Hopf bifurcation, stability of periodic solutions, applications.

Effective: Spring 2009

Prerequisite:

**MATH 418 (STAT 418) Introduction to Probability and Stochastic Processes for Engineering** (3) Introduction to probability axioms, combinatorics, random variables, limit laws, and stochastic processes. Students may take only one course from MATH(STAT) 414 and 418 for credit.

Effective: Fall 2011

Prerequisite:

**MATH 419 (PHYS 419) Theoretical Mechanics** (3) Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions.

Effective: Spring 2007

Prerequisite:

**MATH 421 Complex Analysis (3)** Infinite sequences and series; algebra and geometry of complex numbers; analytic functions; integration; power series; residue calculus; conformal mapping, applications.

Effective: Summer 1993

Prerequisite:

**MATH 422 Wavelets and Fourier Analysis: Theory and Applications (3)** Fundamental mathematical issues of the theory of wavelets for senior undergraduate and graduate students in mathematics, engineering, physics, and computer science.

Effective: Summer 2000

Prerequisite:

**MATH 425 Introduction to Operations Research (3)** Nature of operations research, problem formulation, model construction, deriving solution from models, allocation problems, general linear allocation problem, inventory problems.

Effective: Spring 2012

Prerequisite:

**MATH 426 Introduction to Modern Geometry (3)** Plane and space curves; space surfaces; curvature; intrinsic geometry of surfaces; Gauss-Bonnet theorem; covariant differentiation; tensor analysis.

Effective: Spring 1994

Prerequisite:

**MATH 427 Foundations of Geometry (3)** Euclidean and various non-Euclidean geometries and their development from postulate systems. Students who have passed MATH 427 may not schedule MATH 471.

Effective: Spring 1994

Prerequisite:

**MATH 428 Geometry for Teachers (1)** Research in mathematics education using ideas from Euclidean and non-Euclidean geometry. Students who have passed MATH 471 may not schedule MTHBD 478.

Effective: Spring 2007

Prerequisite:

**MATH 429 Introduction to Topology (3)** Metric spaces, topological spaces, separation axioms, product spaces, identification spaces, compactness, connectedness, fundamental group.

Effective: Spring 1994

Prerequisite:

**MATH 430 Linear Algebra and Discrete Models I (3)** Vector spaces, linear transformations, matrices determinants, characteristic values and vectors, systems of linear equations, applications to discrete models.

Effective: Spring 2010

Prerequisite:

**MATH 431 Linear Algebra and Discrete Models II (3)** Vector spaces and linear transformations, matrices, determinants, characteristic values and vectors, systems of linear equations, applications to discrete models.

Effective: Spring 2007

Prerequisite:

**MATH 435 Basic Abstract Algebra (3)** Elementary theory of groups, rings, and fields. Students who have passed MATH 435 may not schedule MATH 470.

Effective: Spring 2010

Prerequisite:

**MATH 436 Linear Algebra (3)** Vector spaces and linear transformations, canonical forms of matrices, elementary divisors, invariant factors; applications. Students who have passed MATH 436 may not schedule MATH 441.

Effective: Fall 1983

Prerequisite:

**MATH 437 Algebraic Geometry (3)** Study of curves in the plane defined by polynomial equations  $p(x,y) = 0$ . Projective equivalence, singular points, classification of cubics.

Effective: Spring 2009

Prerequisite:

**MATH 441 Matrix Algebra (3)** Determinants, matrices, linear equations, characteristic roots, quadratic forms, vector spaces. Students who have passed Math 436 may not schedule this course.

Effective: Fall 1985

Prerequisite:

**MATH 444 Mathematical Statistics and Applications I (3)** Distributions of random variables, special distributions, limiting distributions, sampling, statistical inference, point and interval estimation, orthogonal polynomials, and least squares.

Effective: Spring 2007

Prerequisite:

**MATH 445 Mathematical Statistics and Applications II (3)** Further topics in point estimation, statistical hypotheses, other statistical tests, nonparametric methods.

Effective: Spring 2007

Prerequisite:

**MATH 446 Introduction to Applied Statistics I (3)** Descriptive statistics, probability theory, discrete and continuous probability distributions, statistical inferences for means and proportions.

Effective: Spring 2007

Prerequisite:

**MATH 447 Introduction to Applied Statistics II** (3) Regression, correlation, analysis of variance, contingency tables, nonparametric methods, time series, index numbers.

Effective: Spring 2007

**MATH 449 Applied Ordinary Differential Equations** (3) Differential and difference equations and their application to biology, chemistry, and physics; techniques in dynamical systems theory.

Effective: Spring 2007

Prerequisite:

**MATH 450 Mathematical Modeling** (3) Constructing mathematical models of physical phenomena; topics include pendulum motion, polymer fluids, chemical reactions, waves, flight, and chaos.

Effective: Spring 2007

Prerequisite:

**MATH 451 (CMPSC 451) Numerical Computations** (3) Algorithms for interpolation, approximation, integration, nonlinear equations, linear systems, fast FOURIER transform, and differential equations emphasizing computational properties and implementation. Students may take only one course for credit from MATH 451 and 455.

Effective: Spring 2008

Prerequisite:

**MATH 455 (CMPSC 455) Introduction to Numerical Analysis I** (3) Floating point computation, numerical rootfinding, interpolation, numerical quadrature, direct methods for linear systems. Students may take only one course for credit from MATH 451 and MATH 455.

Effective: Spring 2008

Prerequisite:

**MATH 456 (CMPSC 456) Introduction to Numerical Analysis II** (3) Polynomial and piecewise polynomial approximation, matrix least squares problems, numerical solution of eigenvalue problems, numerical solution of ordinary differential equations.

Effective: Spring 2008

Prerequisite:

**MATH 457 Introduction to Mathematical Logic** (3) Propositional logic, first-order predicate logic, axioms and rules of inference, structures, models, definability, completeness, compactness.

Effective: Summer 2011

Prerequisite:

**MATH 461 (PHYS 461) Theoretical Mechanics** (3) Continuation of Math.(Phys.) 419. Theoretical treatment of dynamics of a rigid body, theory of elasticity, aggregates of particles, wave motion, mechanics of fluids.

Effective: Fall 1986

Prerequisite:

**MATH 465 Number Theory** (3) Elements, divisibility of numbers, congruences, residues, and forms.

Effective: Spring 2009

Prerequisite:

**MATH 467 (CMPSC 467) Factorization and Primality Testing** (3) Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

Effective: Spring 1995

Prerequisite:

**MATH 468 Mathematical Coding Theory** (3) Shannon's theorem, block codes, linear codes, Hamming codes, Hadamard codes, Golay codes, Reed-Muller codes, bounds on codes, cyclic codes.

Effective: Fall 1983

Prerequisite:

**MATH 470 Algebra for Teachers** (3) An introduction to algebraic structures and to the axiomatic approach, including the elements of linear algebra. Designed for teachers and prospective teachers. Students who have passed Math 435 may not schedule this course.

Effective: Fall 1988

Prerequisite:

**MATH 471 Geometry for Teachers** (4) Problem solving oriented introduction to Euclidean and non-Euclidean geometries; construction problems and geometrical transformations via "Geometer's Sketchpad" software. Intended primarily for those seeking teacher certification in secondary mathematics. Students who have passed MATH 427 may not schedule this course.

Effective: Spring 1996

Prerequisite:

**MATH 475W (US;IL) History of Mathematics** (3) A global survey of the history of mathematics as viewed as a human response to cultural, political, economic, and societal pressures.

Effective: Spring 2012

Prerequisite:

**MATH 479 (PHYS 479) Special and General Relativity** (3) Mathematical description, physical concepts, and experimental tests of special and general relativity.

Effective: Spring 2007

Prerequisite:

**MATH 482 Mathematical Methods of Operations Research (3)** Survey of linear and nonlinear programming; mathematics of optimization; queues; simulation.

Effective: Spring 2007

Prerequisite:

**MATH 484 Linear Programs and Related Problems (3)** Introduction to theory and applications of linear programming; the simplex algorithm and newer methods of solution; duality theory.

Effective: Spring 1987

Prerequisite:

**MATH 485 Graph Theory (3)** Introduction to the theory and applications of graphs and directed graphs. Emphasis on the fundamental theorems and their proofs.

Effective: Spring 1987

Prerequisite:

**MATH 486 Mathematical Theory of Games (3)** Basic theorems, concepts, and methods in the mathematical study of games of strategy; determination of optimal play when possible.

Effective: Spring 2006

Prerequisite:

**MATH 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1995

**MATH 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**MATH 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2007

Prerequisite:

**MATH 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**MATH 496A Mathematical Models in Biology (1-6)** Covers mathematical modeling in Biology; there are two major components: analytical modeling techniques and computational modeling techniques.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**MATH 496B Elementary Combinatorics (1-6)** Fundamental techniques of enumeration and construction of combinatorial structures, permutations, recurrences, inclusion-exclusion, permanents, 0, 1-, matrices, Latin squares, combinatorial designs.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**MATH 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**MATH 497A Number Theory in the Spirit of Ramanujan (4)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 497B Elements of Functional Analysis (4)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 497C The Winding Number in Topology and Geometry (and the rest of Mathematics) (4)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 497D MASS Interdisciplinary Seminar (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 497E MASS Colloquium (1)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**MATH 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1992

**MATH 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

**MATH 501 Real Analysis** (3) Lebesgue measure theory. Measurable sets and measurable functions. Lebesgue integration, convergence theorems.  $L_p$  spaces. Decomposition and differentiation of measures. Convolutions. The Fourier transform.  
Effective: Spring 2013  
Prerequisite:

**MATH 502 Complex Analysis** (3) Complex numbers. Holomorphic functions. Cauchy's theorem. Meromorphic functions. Laurent expansions, residue calculus. Conformal maps, topology of the plane.  
Effective: Spring 2013  
Prerequisite:

**MATH 503 Functional Analysis** (3) Banach spaces and Hilbert spaces. Dual spaces. Linear operators. Distributors, weak derivatives. Sobolev spaces. Applications to linear differential equations.  
Effective: Spring 2013  
Prerequisite:

**MATH 504 Analysis in Euclidean Space** (3) The Fourier transform in  $L_1$  and  $L_2$  and applications, interpolation of operators, Riesz and Marcinkiewicz theorems, singular integral operators.  
Effective: Spring 1992  
Prerequisite:

**MATH 505 Mathematical Fluid Mechanics** (3) Kinematics, balance laws, constitutive equations; ideal fluids, viscous flows, boundary layers, lubrication; gas dynamics.  
Effective: Spring 1992  
Prerequisite:

**MATH 506 Ergodic Theory** (3) Measure-preserving transformations and flows, ergodic theorems, ergodicity, mixing, weak mixing, spectral invariants, measurable partitions, entropy, Ornstein isomorphism theory.  
Effective: Spring 1992  
Prerequisite:

**MATH 507 Dynamical Systems I** (3) Fundamental concepts; extensive survey of examples; equivalence and classification of dynamical systems, principal classes of asymptotic invariants, circle maps.  
Effective: Spring 1992  
Prerequisite:

**MATH 508 Dynamical Systems II** (3) Hyperbolic theory; stable manifolds, hyperbolic sets, attractors, Anosov systems, shadowing, structural stability, entropy, pressure, Lyapunov characteristic exponents and non-uniform hyperbolicity.  
Effective: Spring 1992  
Prerequisite:

**MATH 511 Ordinary Differential Equations I** (3) Existence and uniqueness, linear systems, series methods, Poincaré-Bendixson theory, stability.  
Effective: Spring 1992  
Prerequisite:

**MATH 512 Ordinary Differential Equations II** (3) Floquet theory, regular and singular boundary value problems, Green's functions, eigenfunction expansions.  
Effective: Spring 1992  
Prerequisite:

**MATH 513 Partial Differential Equations I** (3) First order equations, the Cauchy problem, Cauchy-Kowalevski theorem, Laplace equation, wave equation, heat equation.  
Effective: Spring 1992  
Prerequisite:

**MATH 514 Partial Differential Equations II** (3) Sobolev spaces and Elliptic boundary value problems, Schauder estimates. Quasilinear symmetric hyperbolic systems, conservation laws.  
Effective: Spring 1992  
Prerequisite:

**MATH 515 Classical Mechanics and Variational Methods** (3) Introduction to the calculus of variations, variational formulation of Lagrangian mechanics, symmetry in mechanical systems, Legendre transformation, Hamiltonian mechanics, completely integrable systems.  
Effective: Spring 1992  
Prerequisite:

**MATH 516 Stochastic Processes** (3) Markov chains; generating functions; limit theorems; continuous time and renewal processes; martingales, submartingales, and supermartingales; diffusion processes; applications.  
Effective: Summer 1995

Prerequisite:

**MATH 517 (STAT 517) Probability Theory (3)** Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

Effective: Summer 2000

Prerequisite:

**MATH 518 (STAT 518) Probability Theory (3)** Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

Effective: Fall 1983

Prerequisite:

**MATH 519 (STAT 519) Topics in Stochastic Processes (3)** Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.

Effective: Fall 1984

Prerequisite:

**MATH 521 Complex Analysis: Theory and Applications I (3)** Conformal mappings, Schwarz-Cristoffel transformations, Dirichlet and Neumann problems, electrostatics and fluid flow, transform methods, asymptotic methods, Runge approximation theorems.

Effective: Spring 1992

Prerequisite:

**MATH 523 Numerical Analysis I (3)** Approximation and interpolation, numerical quadrature, direct methods of numerical linear algebra, numerical solutions of nonlinear systems and optimization.

Effective: Summer 2002

Prerequisite:

**MATH 524 Numerical Linear Algebra (3)** Matrix decompositions. Direct method of numerical linear algebra. Eigenvalue computations. Iterative methods.

Effective: Spring 2013

Prerequisite:

**MATH 527 Metric and Topological Spaces (3)** Metric spaces, continuous maps, compactness, connectedness, and completeness. Topological spaces, products, quotients, homotopy, fundamental group, simple applications.

Effective: Spring 2013

Prerequisite:

**MATH 528 Differentiable Manifolds (3)** Smooth manifolds, smooth maps, Sard's theorem. The tangent bundle, vector fields, differential forms, integration on manifolds. Foliations. De Rham cohomology; simple applications. Lie groups, smooth actions, quotient spaces, examples.

Effective: Spring 2013

Prerequisite:

**MATH 529 Algebraic Topology (3)** Manifolds, Poincare duality, vector bundles, Thom isomorphism, characteristic classes, classifying spaces for vector bundles, discussion of bordism, as time allows.

Effective: Spring 1992

Prerequisite:

**MATH 530 Differential Geometry (3)** Distributions and Frobenius theorem, curvature of curves and surfaces, Riemannian geometry, connections, curvature, Gauss-Bonnet theorem, geodesic and completeness.

Effective: Spring 1992

Prerequisite:

**MATH 531 Differential Topology (3)** DeRham's theorem, geometry of smooth mappings, critical values, Sard's theorem, Morse functions, degree of mappings, smooth fiber bundles.

Effective: Spring 1992

Prerequisite:

**MATH 533 Lie Theory I (3)** Lie groups, lie algebras, exponential mappings, subgroups, subalgebras, simply connected groups, adjoint representation, semisimple groups, infinitesimal theory, Cartan's criterion.

Effective: Spring 1992

Prerequisite:

**MATH 534 Lie Theory II (3)** Representations of compact lie groups and semisimple lie algebras, characters, orthogonality, Peter-Weyl theorem, Cartan-Weyl highest weight theory.

Effective: Spring 1992

Prerequisite:

**MATH 535 Linear Algebra (3)** Vector spaces. Linear transformations. Bilinear forms. Canonical forms for linear transformations. Multilinear algebra.

Effective: Spring 2013

Prerequisite:

**MATH 536 Abstract Algebra (3)** Groups. Sylow's theorems. Rings. Ideals, unique factorization domains. Finitely generated modules. Fields. Algebraic and transcendental field extensions, Galois theory.

Effective: Spring 2013

Prerequisite:

**MATH 537 Field Theory (3)** Finite and infinite algebraic extensions; cyclotomic fields; transcendental extensions; bases of transcendence, Luroth's theorem, ordered fields, valuations; formally real fields.



Effective: Fall 1983

Prerequisite:

**MATH 538 Commutative Algebra (3)** Topics selected from Noetherian rings and modules, primary decompositions, Dedekind domains and ideal theory, other special types of commutative rings or fields.

Effective: Winter 1978

Prerequisite:

**MATH 542 Group Theory I (3)** Topics selected by instructor from abelian, solvable, and nilpotent groups; finite presentations; free products; group extensions; group representations.

Effective: Fall 1983

Prerequisite:

**MATH 547 Algebraic Geometry I (3)** Affine and projective algebraic varieties; Zariski topology; Hilbert Nullstellensatz; regular functions and maps; birationality; smooth varieties normalization; dimension.

Effective: Spring 1992

Prerequisite:

**MATH 548 Algebraic Geometry II (3)** Topics may include algebraic curves, Riemann-Roch theorem, linear systems and divisors, intersection theory, schemes, sheaf cohomology, algebraic groups.

Effective: Spring 1992

Prerequisite:

**MATH 550 (CSE 550) Numerical Linear Algebra (3)** Solution of linear systems, sparse matrix techniques, linear least squares, singular value decomposition, numerical computation of eigenvalues and eigenvectors.

Effective: Summer 1996

Prerequisite:

**MATH 551 (CSE 551) Numerical Solution of Ordinary Differential Equations (3)** Methods for initial value and boundary value problems; convergence and stability analysis, automatic error control, stiff systems, boundary value problems.

Effective: Summer 1996

Prerequisite:

**MATH 552 (CSE 552) Numerical Solution of Partial Differential Equations (3)** Finite difference methods for elliptic, parabolic, and hyperbolic differential equations; solutions techniques for discretized systems; finite element methods for elliptic problems.

Effective: Summer 1996

Prerequisite:

**MATH 553 (CSE 553) Introduction to Approximation Theory (3)** Interpolation; remainder theory; approximation of functions; error analysis; orthogonal polynomials; approximation of linear functionals; functional analysis applied to numerical analysis.

Effective: Summer 1996

Prerequisite:

**MATH 554 Approximation Theory (3)** Approximation in normed spaces; existence, uniqueness, characterization, computation of best approximations; error bounds; degree of approximation; approximation of linear functionals.

Effective: Spring 1992

Prerequisite:

**MATH 555 (CSE 555) Numerical Optimization Techniques (3)** unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar's algorithm, global optimization, parallelism in optimization.

Effective: Summer 1996

Prerequisite:

**MATH 556 (CSE 556) Finite Element Methods (3)** Sobolev spaces, variational formulations of boundary value problems; piecewise polynomial approximation theory, convergence and stability, special methods and applications.

Effective: Summer 1996

Prerequisite:

**MATH 557 Mathematical Logic (3)** The predicate calculus; completeness and compactness; Godel's first and second incompleteness theorems; introduction to model theory; introduction to proof theory.

Effective: Spring 1992

Prerequisite:

**MATH 558 Foundations of Mathematics I (3)** Decidability of the real numbers; computability; undecidability of the natural numbers; models of set theory; axiom of choice; continuum hypothesis.

Effective: Spring 1992

Prerequisite:

**MATH 559 Recursion Theory I (3)** Recursive functions; degrees of unsolvability; hyperarithmetic theory; applications to Borel combinatorics. Computational complexity. Combinatory logic and the Lambda calculus.

Effective: Summer 2011

Prerequisite:

**MATH 561 Set Theory I (3)** Models of set theory. Inner models, forcing, large cardinals, determinacy. Descriptive set theory. Applications to analysis.

Effective: Spring 1992

Prerequisite:

**MATH 565 Foundations of Mathematics II (3)** Subsystems of second order arithmetic; set existence axioms; reverse mathematics; foundations of analysis and algebra.

Effective: Spring 1992

Prerequisite:

**MATH 567 Number Theory I (3)** Congruences, quadratic residues, arithmetic functions, partitions, classical multiplicative ideal theory, valuations and p-adic numbers; primes in arithmetic progression, distribution of primes.

Effective: Spring 1994

Prerequisite:

**MATH 568 Number Theory II (3)** Congruences, quadratic residues, arithmetic functions, partitions, classical multiplicative ideal theory, valuations and p-adic numbers; primes in arithmetic progression, distribution of primes.

Effective: Spring 1994

Prerequisite:

**MATH 569 Algebraic Number Theory I (3)** Dedekind rings; cyclotomic and Kummer extensions; valuations; ramification, decomposition, inertial groups; Galois extensions; locally compact groups of number theory.

Effective: Spring 1992

Prerequisite:

**MATH 570 Algebraic Number Theory II (3)** Topics chosen from class field theory; integral quadratic forms; algebraic and arithmetic groups; algebraic function of one variable.

Effective: Spring 1992

Prerequisite:

**MATH 571 Analytic Number Theory I (3)** Improvements of the prime number theorem, L-functions and class numbers, asymptotic and arithmetic properties of coefficients of modular forms.

Effective: Spring 1994

Prerequisite:

**MATH 572 Analytic Number Theory II (3)** Distribution of primes, analytic number theory in algebraic number fields, transcendental numbers, advanced theory of partitions.

Effective: Spring 1992

Prerequisite:

**MATH 574 Topics in Logic and Foundations (3-6 per semester)** Topics in mathematical logic and the foundations of mathematics.

Effective: Spring 1992

Prerequisite:

**MATH 577 (M E 577) Stochastic Systems for Science and Engineering (3)** The course develops the theory of stochastic processes and linear and nonlinear stochastic differential equations for applications to science and engineering.

Effective: Summer 1998

Prerequisite:

**MATH 578 (M E 578) Theory & Applications of Wavelets (3)** Theory and physical interpretation of continuous and discrete wavelet transforms for applications in different disciplines.

Effective: Spring 2012

Prerequisite:

**MATH 580 Introduction to Applied Mathematics I (3)** A graduate course of fundamental techniques including tensor, ordinary and partial differential equations, and linear transforms.

Effective: Fall 2003

Prerequisite:

**MATH 581 Introduction to Applied Mathematics II (3)** A graduate course of fundamental techniques including Ordinary, Partial, and Stochastic Differential Equations, Wavelet Analysis, and Perturbation Theory.

Effective: Summer 2003

Prerequisite:

**MATH 582 Introduction to C\* Algebra Theory (3)** Basic properties of C\* algebras, representation theory, group C\* algebras and crossed products, tensor products, nuclearity and exactness.

Effective: Summer 2006

Prerequisite:

**MATH 583 Introduction to K-Theory (3)** K-theory groups for compact spaces and C\*-algebras. Long exact sequences, Bott periodicity, index theory and the Pimsner-Voiculescu theorem.

Effective: Summer 2006

Prerequisite:

**MATH 584 Introduction to von Neumann Algebras (3)** Comparison of projections, traces, tensor products, ITPFI factors and crossed products, the Jones index, modular theory, free probability.

Effective: Summer 2006

Prerequisite:

**MATH 585 Topics in Mathematical Modeling (3)** Introduction to mathematical modeling, covering the basic modeling and common mathematical techniques for problems from physical, biological and social sciences.

Effective: Summer 2012

Prerequisite:

**MATH 588 (CSE 588) Complexity in Computer Algebra (3)** Complexity of integer multiplication, polynomial

multiplication, fast Fourier transform, division, calculating the greatest common divisor of polynomials.

Effective: Spring 2008

Prerequisite:

**MATH 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**MATH 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**MATH 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**MATH 597A Nonlinear PDEs** (3) The course will cover topics in the theory of nonlinear PDEs, mainly from Part III of Evan's book. In particular: - Variational methods. The Euler- Lagrange equation, Coercivity, lower semicontinuity, weak solutions. Regularity of solutions. Critical points, the mountain pass theorem, and existence of solutions to semilinear elliptic PDEs. - Fixed point methods. Schauder's fixed point. - Monotonicity methods. Upper and lower solutions. - Hamilton-Jacobi equations. Viscosity solutions. Relations with optimal control theory and the principle of dynamic programming. - Introduction to hyperbolic systems of conservation laws. Weak solutions. Rankine-Hugoniot equations. Entropy admissibility conditions. The Riemann problem.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 597B q-series and Partitions** (3) In the course, the topics to be covered include partition function  $p(n)$ , congruences for  $p(n)$  and  $\tau(n)$ , the Rogers-Ramanujan identities, partition rank and crank, Eisenstein series, theta functions, and basic hypergeometric functions.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 597C Numerical Methods for Stochastic Differential Equations** (3) The course is about numerical methods for the solution of differential equations involving random input and stochastic sources. Main topics include: Basic concepts of random variables and stochastic processes, differential equations involving random terms, simulation of Brownian motion, numerical methods for Ito stochastic differential equations, basic strong and weak convergence analysis, spectral representations of random fields, methods for stochastic PDEs, methods for estimating rare events, methods for quantifying uncertainties.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MATH 598 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1994

**MATH 599 (IL) Foreign Studies** (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

**MATH 600 Thesis Research** (1-15) No description.

Effective: Fall 1983

**MATH 601 Ph.D. Dissertation Full-Time** (0) No description.

Effective: Winter 1978

**MATH 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Teaching of mathematics undergraduate recitation classes with senior faculty instruction supervision.

Effective: Fall 1983

**MATH 610 Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

**MATH 611 Ph.D. Dissertation Part-Time** (0) No description.

Effective: Winter 1978

NOTE: Courses in computer science and statistics are listed separately.

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## Mathematics Education (MTHED)

**MTHED 411 Teaching Secondary Mathematics I** (3) Conditions for learning mathematics; problem solving; subject matter types; curriculum; learning goals; nature and history of mathematics at secondary level  
Effective: Spring 2007

Prerequisite: Concurrent: MTHED 427

**MTHED 412W Teaching Secondary Mathematics II** (3) Assessing learning and instruction; methods of evaluation and grading; long-term planning; accommodating needs of diverse learners; connecting theory and practice.  
Effective: Summer 2010

Prerequisite: Concurrent: C I 412W C I 495C

**MTHED 420 Teaching Mathematics in the Elementary Schools** (3) Strategies for teaching mathematics at the elementary school level; analysis of the philosophy and content of contemporary programs of instruction.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite: Concurrent: C I 495A or C I 495B ; SCIED 458 SS ED 430W

**MTHED 420 Teaching Mathematics in the Elementary Schools** (3) Strategies for teaching mathematics at the elementary school level; analysis of the philosophy and content of contemporary programs of instruction.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: C I 495A or C I 495B ; SCIED 458 SS ED 430W

**MTHED 424 Contemporary School Mathematics Programs** (3) In-depth analysis of school mathematics programs and the factors and forces influencing them; contemporary curriculum developments.

Effective: Summer 2010

Prerequisite:

**MTHED 427 Teaching Mathematics in Technology-Intensive Environments** (3) Interaction among pedagogy, content, and technology in mathematics teaching and learning in technology-intensive environments; secondary, early college curricula; laboratory experience.

Effective: Spring 2007

Prerequisite: Concurrent: MTHED 411

**MTHED 430 Students' Mathematical Thinking** (3 per semester, maximum of 6) Develop abilities in planning, conducting, and interpreting mathematics interviews to gain an understanding of students' thinking processes and current knowledge.

Effective: Summer 1994

Prerequisite:

**MTHED 431 Data Analysis in Secondary School Mathematics** (3) Intense development of foundations of data analysis for secondary mathematics as a process using statistical concepts for predictions and inferences.

Effective: Summer 2006

Prerequisite:

**MTHED 432 Mathematical Modeling in Secondary School Mathematics** (3) Students work from teaching and curricular perspective to explore and apply school and undergraduate mathematics to model real-world phenomena.

Effective: Summer 2006

Prerequisite:

**MTHED 433 Function Concept in Secondary School Mathematics** (3) This course develops the concept of function as an essential topic that underlies and connects school and collegiate mathematics.

Effective: Summer 2006

Prerequisite:

**MTHED 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**MTHED 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**MTHED 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**MTHED 501 Foundations of Mathematics Education I: Learning** (3) This course focuses on understanding and application of theories of mathematical thinking and learning in research and practice.

Effective: Summer 2007

Prerequisite:

**MTHED 502 Foundations of Mathematics Education II: Teaching** (3) Teaching is the object of study encountered through connections among classical and contemporary theories of teaching and research on teaching.

Effective: Summer 2007

Prerequisite:

**MTHED 503 Foundations of Mathematics Education III: Curriculum** (3) Study of mathematics curriculum blends historical trends and current issues with research literature and techniques to study effects of innovations.

Effective: Summer 2007

Prerequisite:

**MTHED 504 Foundations of Mathematics IV: Teacher Development and Policy** (3) Nature and study of teacher education and professional development programs and projects coupled with policy and impact in mathematics education.

Effective: Summer 2007

Prerequisite:

**MTHED 520 Analysis of Research in Mathematics Education** (3) Survey of the status of knowledge about mathematics learning and instruction, K-12; analysis of research procedures; instruments for evaluating research.

Effective: Summer 2010

Prerequisite:

**MTHED 523 Projects in Mathematics Education Research, Curriculum Development, and Evaluation** (1-3 per semester, maximum of 24) Conceptualizing, designing, conducting, and reporting mathematics education research, curriculum development and/or evaluation projects.

Effective: Spring 1997

Prerequisite:

**MTHED 525 Research Participation in School Mathematics Curriculum Construction** (3) Development of theoretical bases for the construction of instructional materials in mathematics; research participation in preparing and testing curriculum materials.

Effective: Fall 1983

**MTHED 527 Research on the Use of Technology in Mathematics Education** (3) Reviewing, critiquing, designing, and conducting research on mathematics learning and teaching in technology intensive environments.

Effective: Spring 1997

Prerequisite:

**MTHED 530 Mathematical Thinking at the Secondary and Early College Levels** (3) Exploring and applying theories of advanced mathematical thinking; reviewing, conducting research on mathematical thinking at secondary and early college levels.

Effective: Spring 1997

Prerequisite:

**MTHED 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1996

**MTHED 595 Advanced Clinical Internship in Mathematics Learning** (3) Supervised internship in advanced procedures for the implementation of diagnostic/prescriptive approaches as a strategy for improving mathematics learning.

Effective: Spring 1987

Prerequisite:

**MTHED 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**MTHED 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

**MTHED 597A Connections Between Mathematics and Mathematics Education** (3) Course connects college-level mathematics with secondary school mathematics in terms of curriculum content and research on teaching and learning.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MTHED 597A Research Design in Mathematics Education** (3) This course will engage students in developing an understanding of research techniques and methodologies commonly used in mathematics education research.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

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## **Md Clerkship Island-Hy (MCLKS)**

MCLKS 701 **Advanced Clinical Diagnostics** (1) Advanced instruction for third-year medical students in laboratory medicine, neurology, ophthalmology, radiology and motivational interviewing.

Effective: Summer 2005

Prerequisite:

MCLKS 702 **Clinical Therapeutics** (1) Skill development: discussion of end of life issues; pain management; clinical pharmacology including use of antibiotics, nutrition, cost of medical care and reducing medical errors.

Effective: Summer 2005

Prerequisite:

MCLKS 704 **Improving Healthcare** (1) Skill development: discussion of end of life issues; pain management; medical literature evaluation' effective utilization and improvement of medical systems.

Effective: Fall 2008

Prerequisite:

MCLKS 705 **Transition to Internship** (1) Provide review of clinical skills prior to internship training, and introduce new skills in team building, education and time management.

Effective: Spring 2009

Prerequisite:

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## Mechanical Engineering (M E)

**M E 400 Thermodynamics of Propulsion and Power Systems** (3) Analysis and modeling of propulsion and power systems, including combustion, compressible flow through nozzles, chemical equilibrium, and moist air systems.  
Effective: Fall 2007

Prerequisite:

**M E 401 Refrigeration and Air Conditioning** (3) Theoretical principles, design, performance, and selection of various refrigeration and air-conditioning systems; building heat and cooling loads; solar heating.

Effective: Fall 2007

Prerequisite:

**M E 402 Power Plants** (3) A study of fossil-fuel steam generation and utility plants, including cogeneration, gas turbine, and combined cycles.

Effective: Fall 2007

Prerequisite:

**M E 403 Polymer Electrolyte Fuel Cell Engines** (3) Introduction to Fundamentals of Polymer Electrolyte Fuel Cells (PEFCs). Includes fundamentals of electrochemistry, thermodynamics, fluid mechanics, heat transfer materials, and manufacturing issues of PEFCs. A brief survey of other fuel cell types is also included.

Effective: Spring 2011

Prerequisite: Concurrent: M E 410 or equivalent

**M E 404 Gas Turbines** (3) Thermodynamic cycles relating to gas turbines; analysis and performance of compressors, combustion chambers, single- and multi-stage turbines; recent developments.

Effective: Fall 2007

Prerequisite:

**M E 405 Indoor Air Quality Engineering** (3) Prediction of the motion of contaminants (both gaseous particulate) in gas streams; analysis of ventilation systems and air pollution control systems; comparison of experimental sampling techniques.

Effective: Fall 2007

Prerequisite:

**M E 406 (NUC E 406) Introduction to Statistical Thermodynamics** (3) Statistical description of systems composed of large numbers of particles in the context of classical and quantum mechanics; basic concepts of probability theory and thermodynamics as they relate to statistical mechanics.

Effective: Fall 2007

Prerequisite:

**M E 408 Energy Systems** (3) Theory, analysis, design, selection, and application of energy conversion systems.

Effective: Fall 2011

Prerequisite:

**M E 410 Heat Transfer** (3) Thermal energy transfer mechanisms: conduction (steady, transient), convection (internal, external), radiation; lumped parameter method; heat exchangers; introduction to numerical methods.

Effective: Spring 2011

Prerequisite:

**M E 411 Heat-Exchanger Design** (3) Thermal design and application of different heat-exchanger types, including surface selection and design optimization.

Effective: Fall 2007

Prerequisite:

**M E 420 Compressible Flow I** (3) Introductory compressible flow (gas dynamics), mathematical background, and physical concepts of isentropic flow, shock waves, expansion waves, and applications.

Effective: Fall 2007

Prerequisite:

**M E 421 Viscous Flow Analysis and Computation** (3) Apply analytical and computational methods to solve the differential equations describing fluid flow. Incompressible external flows past objects and internal flows in pipes and ducts are some problems considered.

Effective: Spring 2011

Prerequisite:

**M E 422 Principles of Turbomachinery** (3) Application of Newton's laws of motion and basic laws of thermodynamics to analysis of fluid flow in turbomachinery.

Effective: Fall 2007

Prerequisite:

**M E 427 Incompressible Aerodynamics** (3) Analysis of lift and drag using potential flow theory, effects of viscosity on potential flow calculations, wind tunnel testing.

Effective: Fall 2007

Prerequisite:

**M E 428 Applied Computational Fluid Dynamics** (3) Introduction to theory and application of computational techniques for solving fluid flow and heat transfer.

Effective: Fall 2011

Prerequisite:

**M E 430 (EGEE 430) Introduction to Combustion (3)** Concepts related to laminar and turbulent premixed and nonpremixed combustion with applications to propulsion and stationary systems.

Effective: Fall 2009

Prerequisite:

**M E 431 Internal Combustion Engines (3)** Thermodynamic aspects of internal combustion engine design and performance; two- and four-stroke cycle, supercharged and non-supercharged, diesel and spark-ignition types.

Effective: Fall 2007

Prerequisite:

**M E 432 Rocket Propulsion (3)** Design and performance of rocket propulsion components and systems; thermodynamics, solid and liquid fuels, heat transfer, materials, controls, and instrumentation.

Effective: Fall 2007

Prerequisite:

**M E 433 Fundamentals of Air Pollution (3)** Natural and man-made sources of pollution; atmospheric dispersion; biological and health effects; control systems; legislation and regulations.

Effective: Fall 2007

Prerequisite:

**M E 440W Mechanical Systems Design Project (3)** Design and analysis of mechanical components and systems. Application of fundamental design and analysis methods to open ended engineering problems.

Effective: Fall 2007

Prerequisite:

**M E 441W Thermal Systems Design Project (3)** Design of thermal systems through component design and/or selection, system simulation and optimization. Assessment of system economics and energy efficiency.

Effective: Fall 2007

Prerequisite:

**M E 442W Advanced Vehicle Design I (2)** Part one of a two course sequence; applications of design and analysis methods to open-ended advanced transportation vehicles. Two semester course; satisfies Senior Design or ME Technical Elective requirements (when combined with M E 443W).

Effective: Summer 2010

Prerequisite: Concurrent: M E 410

**M E 443W Advanced Vehicle Design II (1)** Part two of a two course sequence; applications of design and analysis methods to open-ended advanced transportation vehicles. Two semester course; satisfies Senior Design or ME Technical Elective requirements (when combined with M E 442W).

Effective: Summer 2010

Prerequisite:

**M E 444 Engineering Optimization (3)** Problem formulation, algorithms and computer solution of various engineering optimization problems.

Effective: Spring 2010

Prerequisite:

**M E 445 Microcomputer Interfacing for Mechanical Engineers (4)** Interfacing of electro-mechanical systems to microcomputers for data acquisition, data analysis and digital control.

Effective: Fall 2007

Prerequisite:

**M E 446 (NUC E 446) Reliability and Risk Concepts in Design (3)** Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications.

Effective: Spring 2011

Prerequisite:

**M E 448 Engineering Design Concepts (3)** Engineering design and modelling, engineering economic analysis techniques, technical communication skills, project planning and design.

Effective: Fall 2011

Prerequisite:

**M E 449 Mechanical Design Projects (3)** Group or individual design projects in the areas of mechanical engineering.

Effective: Fall 2007

Prerequisite:

**M E 450 Modeling of Dynamic Systems (3)** Modeling and analysis of dynamic interactions in engineering systems. Classical and state variable methods; digital simulation; stability and dynamic response.

Effective: Fall 2007

Prerequisite:

**M E 452 Vehicle Road Dynamics (3)** Investigations of three-dimensional dynamics and design into the study of vehicle dynamics including tire forces, suspension, and stability.

Effective: Fall 2012

Prerequisite:

**M E 455 Automatic Control Systems (3)** Dynamic analysis of systems involving automatic control of position, speed,



power, flow, pressure, temperature, and other physical quantities.

Effective: Fall 2007

Prerequisite:

**M E 456 (I E 456) Industrial Robot Applications (3)** Introduction to robotics, with emphasis on robot selection, programming, and economic justification for manufacturing applications.

Effective: Spring 2011

Prerequisite:

**M E 460 Advanced Machine Design Problems (3)** Special machine design problems in unusual types of springs; gear problems and involutometry; cam design and application; multiple diameter shaft deflections and ball bearings.

Effective: Fall 2007

Prerequisite:

**M E 461 (E MCH 461) Finite Elements in Engineering (3)** Computer modeling and fundamental analysis of solid, fluid, and heat flow problems using existing computer codes.

Effective: Spring 2011

Prerequisite:

**M E 462 Lubrication in Machine Design (3)** Lubricants and lubrication with applications to design aspects of machines and mechanisms including bearings, gears, cams, and automotive engines.

Effective: Fall 2007

Prerequisite:

**M E 465 Introduction to Manufacturing Laboratory (1)** A laboratory-based introduction to manufacturing processes including material removal, forming, casting and joining for metals and non-metals.

Effective: Fall 2011

Prerequisite:

**M E 467 Applied Finite Element Analysis (3)** Review of matrix algebra; discretization; finite element formulation; application of finite element computer codes.

Effective: Fall 2011

Prerequisite:

**M E 468 Engineering for Manufacturing (3)** Manufacturability, the selection of the most effective materials and processes, and quality assurance.

Effective: Spring 2009

Prerequisite:

**M E 469 Metallic Manufacturing Processes (3)** Principles of metal working and introduction to current theories; analysis of deformation, joining, and metal removal processes.

Effective: Fall 2011

Prerequisite:

**M E 470 (E MCH 470) Analysis and Design in Vibration Engineering (3)** Application of Lagrange's equations to mechanical system modeling, multiple-degree-of-freedom systems, experimental and computer methods; some emphasis on design applications.

Effective: Spring 2008

Prerequisite:

**M E 471 Noise Control in Machinery (3)** Nature of noise sources in machine elements and systems. Propagation and reduction of noise. Effects of noise on man.

Effective: Fall 2007

Prerequisite:

**M E 480 Mechanism Design and Analysis (3)** Design and analysis of mechanical linkages including kinematic synthesis and dynamic analysis. Linkages for a variety of applications are considered.

Effective: Spring 2011

Prerequisite:

**M E 481 Introduction to Computer-Aided Analysis of Machine Dynamics (3)** Techniques and formulations for computer based kinematic and dynamic analyses of machines.

Effective: Spring 2011

Prerequisite:

**M E 491 Bioengineering Applications of Mechanical Engineering (3)** Application of mechanical engineering knowledge in the context of life sciences.

Effective: Fall 2011

Prerequisite:

**M E 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**M E 494H Senior Thesis (1-9)** Students must have approval of a thesis adviser before scheduling this course.

Effective: Spring 2007

Prerequisite:

**M E 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Fall 2007

Prerequisite:

**M E 496 Independent Studies (1-18)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**M E 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**M E 497A Bioinspired Interfacial Engineering (3)** The course will discuss how natural creatures utilize micro/nanoengineered material interfaces to interact with fluids/solids to achieve engineering functions.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**M E 497K (NUC E 497K) Thermal-Hydraulics of Two-Phase Flow in Energy Systems (3)** This course provides students with fundamental knowledge necessary for thermal-hydraulic analysis of single-phase and two-phase flow systems. The power reactor will be employed as a generic example of the thermal-hydraulic energy systems. In single-phase flow analysis, the one-dimensional thermal- hydraulic system analysis method, which is often employed by the industry's system analysis code, will be introduced for normal and off-normal plant operating conditions.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**M E 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2008

**M E 504 Advanced Engineering Thermodynamics (3)** Pure and applied thermodynamics including its application to advanced engineering problems; collateral reading and discussion of the classical works on the subject.

Effective: Fall 2007

**M E 505 Design of Air Pollution Control Systems (3)** Advanced principles of design drawn from professional literature, including mechanical collectors, electrostatic precipitators, filters, scrubbers, and industrial ventilation systems.

Effective: Fall 1983

Prerequisite:

**M E 512 Heat Transfer--Conduction (3)** One- and two-dimensional conduction heat transfer for steady state and transient systems with varying boundary conditions.

Effective: Fall 1983

**M E 513 Heat Transfer--Convection (3)** Laminar and turbulent flow heat transfer in natural and forced convection systems.

Effective: Fall 1983

**M E 514 Heat Transfer--Radiation (3)** Thermal radiation fundamentals; specular and diffuse systems; differential and integral methods; numerical techniques; industrial applications.

Effective: Fall 1983

**M E 515 Two-Phase Heat Transfer (3)** Heat transfer processes involving evaporation, boiling, and condensation.

Effective: Winter 1978

**M E 517 Techniques for Heat Transfer Enhancement (3)** Study of advanced concepts in convective and two-phase heat transfer, with emphasis on techniques of heat transfer enhancement.

Effective: Fall 2007

Prerequisite:

**M E 520 Compressible Flow II (3)** Two-dimensional subsonic flow; similarity rules; theory of characteristics; supersonic and hypersonic flows; nonsteady flow; oblique shock waves.

Effective: Fall 2007

Prerequisite:

**M E 521 Foundations of Fluid Mechanics I (3)** First semester of core sequence in fluid mechanics; Navier-Stokes equations, potential flow, low Re flow, laminar boundary layers.

Effective: Fall 2007

Prerequisite:

**M E 522 Foundations of Fluid Mechanics II (3)** Second semester of core sequence in fluid mechanics; continuation of boundary layers, stability, transition, turbulence, turbulent boundary layers, turbulence models.

Effective: Summer 1990

Prerequisite:

**M E 523 Numerical Solutions Applied to Heat Transfer and Fluid Mechanics Problems (3)** Application of finite difference methods to the study of potential and viscous flows and conduction and convection heat transfer.

Effective: Fall 2007

**M E 524 (AERSP 524) Turbulence and Applications to CFD: DNS and LES (3)** First of two courses: Scalings, decompositions, turbulence equations; scale representations, Direct and Large-Eddy Simulation; modeling; pseudo-spectral methods; 3 computer projects.

Effective: Spring 2011

Prerequisite:

**M E 525 (AERSP 525) Turbulence and Applications to CFD: RANS (3)** Second of two courses: Scalings, decomposition, turbulence equations; Reynolds Averaged Navier Stokes (RANS) modeling; phenomenological models; 3 computer projects.

Effective: Spring 2011

Prerequisite:

**M E 526 (AERSP 526) Computational Methods for Shear Layers (3)** Study of numerical solution methods for steady and unsteady laminar or turbulent boundary-layer equations in two and three dimensions.

Effective: Fall 2007

Prerequisite:

**M E 527 (AERSP 527) Computational Methods in Transonic Flow (3)** Numerical solution of partial differential equations of mixed type, with emphasis on transonic flows and separating boundary layers.

Effective: Fall 2007

Prerequisite:

**M E 530 Fundamentals of Combustion (3)** Theoretical formulations and methods of solution of engineering problems and physical/chemical processes in various propulsion systems.

Effective: Fall 2007

**M E 531 Species Measurements in Combustion Systems (1-3)** Study of modern instrumentation techniques for determination of species concentrations in combustion systems.

Effective: Fall 2007

**M E 532 Turbulent and Two-Phase Combustion (3)** Fundamentals of chemically reacting turbulent flows in homogeneous systems including turbulent flames, spray combustion, ignition, reacting boundary layers.

Effective: Fall 2007

Prerequisite:

**M E 533 Solid Propellant Combustion (3)** Introduction to phenomena of solid propellant combustion, analytical techniques for modeling propellant ignition and combustion behavior, experimental methods.

Effective: Fall 2007

Prerequisite:

**M E 535 (AERSP 535) Physics of Gases (3)** An introduction to kinetic theory, statistical mechanics, quantum mechanics, atomic and molecular structure, chemical thermodynamics, and chemical kinetics of gases.

Effective: Spring 2010

**M E 537 Laser Diagnostics for Combustion (3)** A study of laser-based techniques for measuring gas temperature and concentration in chemically reacting flows.

Effective: Summer 1990

Prerequisite:

**M E 546 (I E 546) Designing Product Families (3)** Product families, product platforms, mass customization, product variety, modularity, commonality, robust design, product architectures.

Effective: Summer 2013

Prerequisite:

**M E 547 (EDSGN 547, I E 547) Designing for Human Variability (3)** Statistics, optimization and robust design methodologies to design products and environments that are robust to variability in users.

Effective: Summer 2009

**M E 550 (E E 550) Foundations of Engineering Systems Analysis (3)** Analytical methods are developed using the vector space approach for solving control and estimation problems; examples from different engineering applications.

Effective: Fall 2012

Prerequisite:

**M E 554 Digital Process Control (3)** Analysis and design of control systems with digital controllers, including PID, finite settling time, state feedback, and minimum variance algorithms.

Effective: Fall 2007

Prerequisite:

**M E 555 Automatic Control Systems (3)** Advanced problems and techniques in the design of automatic control systems with emphasis on stability, controller design, and optimum performance.

Effective: Winter 1978

Prerequisite:

**M E 556 (I E 556) Robotic Concepts (3)** Analysis of robotic systems; end effectors, vision systems, sensors, stability and control, off-line programming, simulation of robotic systems.

Effective: Fall 1983

Prerequisite:

**M E 558 (E E 584) Robust Control Theory (3)** Fundamentals of Robust Control Theory with emphasis on stability and performance analysis and design.

Effective: Spring 2008

Prerequisite:

**M E 559 (E E 587) Nonlinear Control and Stability (3)** Design of nonlinear automatic control systems; phase-plane methods; describing functions; optimum switched systems; Liapunov stability; special topics in stability.

Effective: Spring 2008

Prerequisite:

**M E 560 (E MCH 500) Solid Mechanics (3)** Introduction to continuum mechanics, variational methods, and finite element formulations; application to bars, beams, cylinders, disks, and plates.

Effective: Fall 2007

**M E 561 Structural Optimization Using Variational and Numerical Methods (3)** Shape and size optimization of elastic structures, continuous and discrete solution methods and numerical algorithms, design of compliant mechanisms.

Effective: Summer 2004

Prerequisite:

**M E 563 (E MCH 563) Nonlinear Finite Elements (3)** Advanced theory of semidiscrete formulations for continua and structures; emphasizes dynamic and nonlinear problems.

Effective: Spring 1996

Prerequisite:

**M E 564 Elastic and Dynamic Stability of Structures (3)** An introduction to the concept and analysis methods of structural stability; structures under static/dynamic loading and high speed conditions.

Effective: Spring 2008

Prerequisite:

**M E 565 Optimal Design of Mechanical and Structural Systems (3)** Application of numerical optimization techniques to design mechanical and structural systems; design sensitivity analysis.

Effective: Summer 1988

**M E 571 (AERSP 571, E MCH 571) Foundations of Structural Dynamics and Vibration (3)** Modeling approaches and analysis methods of structural dynamics and vibration.

Effective: Fall 2007

Prerequisite:

**M E 572 Experimental Modal Analysis (3)** The development of structural dynamic models from experimental data, analytical and experimental vibration, analysis methods, laboratory techniques.

Effective: Fall 2007

Prerequisite:

**M E 573 (ACS 573) Designing Quiet Structures (3)** Course integrates structural dynamics, acoustics and optimization into unified method for designing quiet structures virtually for early product development.

Effective: Fall 2007

Prerequisite:

**M E 577 (MATH 577) Stochastic Systems for Science and Engineering (3)** The course develops the theory of stochastic processes and linear and nonlinear stochastic differential equations for applications to science and engineering.

Effective: Summer 1998

Prerequisite:

**M E 578 (MATH 578) Theory and Applications of Wavelets (3)** Theory and physical interpretation of continuous and discrete wavelet transforms for applications in different engineering disciplines.

Effective: Spring 2012

Prerequisite:

**M E 580 Advanced Dynamics of Machines (3)** Linear and torsional vibrations in and balancing of rotating and reciprocating machinery; exact analysis of stresses produced by these and other dynamic forces in machine parts.

Effective: Spring 2008

Prerequisite:

**M E 581 Simulation of Mechanical Systems (3)** Introduces computational fundamentals, including digital logic; programming language, basic numerical analysis and data processing, as applied to mechanical simulation techniques.

Effective: Fall 2007

Prerequisite:

**M E 582 Mechanism Synthesis (3)** Geometrical and algebraic methods for synthesizing planar and spatial mechanisms, dynamics of spatial mechanism.

Effective: Fall 2007

**M E 590 Colloquium (1)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2009

**M E 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**M E 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

**M E 597A Electrochemical Engine Fundamentals** (3) Theory and practice of battery and fuel cell systems for vehicle electrification, renewable energy storage, and smart grids.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**M E 597A Atomistic-scale Simulation Methods for Engineers** (3) Theory and software related to various atomistic-scale simulations methods and demonstrate engineering applications.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**M E 597B Optimal Control of Energy Systems** (3) Optimal control theory and application to energy generation, storage, transmission, and management systems.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**M E 597C Battery Systems Engineering** (3) Dynamic modeling, analysis, design, estimation, and control of battery systems.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**M E 597D Materials for Energy Conversion and Storage** (3) This course examines materials related to energy conversion and storage techniques, including fuel cells and batteries. The course will consist of lecture, lab activities, and projects.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**M E 597E Mechatronics** (3) This class will facilitate hands-on investigation and learning of mechatronic systems via a problem-based approach. The course material will consist of lectures, lab activities, and major projects focused on the myriad areas of mechatronics.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**M E 597F Vehicle Hardware in the Loops Method** (3) This course is required for the Graduate Automotive Technology Education (GATE) Program in High Power, In-Vehicle Energy Storage.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**M E 597K In-vehicle High-Power Energy Storage** (3) One of two required core courses in the Penn State Graduate Automotive Technology Education (GATE) curriculum leading to a GATE certificate.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**M E 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**M E 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**M E 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) For graduate students helping to teach the beginning thermodynamics course, M.E. 22. Must have taken M.E. 504.  
Effective: Fall 1983

**M E 603 Foreign Academic Experience** (1 per semester/maximum of 12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Fall 2002

**M E 610 Thesis Research Off Campus** (1-15) No Description.  
Effective: Fall 1983

**M E 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## **Medical Ethics Profe (MEP)**

MEP 721 **Medical Ethics and Professionalism** (3) This course provides an introduction to bioethics and professionalism and provides a framework for understanding ethical issues in medicine.

Effective: Summer 2009

Prerequisite: Concurrent: CAR 722 REN 728 PLM 726 GI 729

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## Medical Home Curricu (MHC)

MHC 797 **Medical Home Longitudinal Curriculum - Pilot** (2) Medical Home Longitudinal Curriculum (3rd year pilot course).

Effective: Summer 2011

Prerequisite:

MHC 797A **Medical Home Longitudinal Advanced Elective** (5) The Medical Home Longitudinal Advanced Elective will provide continuity experiences for students to learn and witness the natural progression of illnesses, develop treatment options over time in a team format, as well as develop empathetic healing relationship with patients.

Effective: Summer 2011

Prerequisite:

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## **Medical Triag&Resusc (MEDTR)**

MEDTR 743 **Triage and Resuscitation** (5) This course provides knowledge and skills necessary for recognition and initial management of the patient with a potentially life-threatening illness or injury.

Effective: Spring 2010

Prerequisite:

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## Medicine-Hy (MED)

**MED 700 Clinical Clerkship in Medicine** (15) To provide supervised clinical experience in the management of patients with acute and chronic illness.

Effective: Winter 1978

Prerequisite:

**MED 715 Clinical Elective in Infectious Disease** (5-10) Principles of human-host defense mechanism, host-parasite interactions, manifestations of various infections, systematic approach to problem solving, rational use of antibiotics.

Effective: Winter 1978

Prerequisite:

**MED 721 Cardiology Elective for 3rd Year Students** (5) Students learn non-invasive and invasive cardiology procedures, then work as clinical clerks on an in-patient cardiology service.

Effective: Spring 2010

Prerequisite:

**MED 722 Medicine Acting Internship** (5) Active participation on an advanced level in the diagnosis and management of patients admitted to the General Internal Medicine Services. More responsibility for decision-making and patient management is afforded subinterns than clinical clerks.

Effective: Spring 2009

Prerequisite:

**MED 723 Clinical Elective in Gastroenterology** (5-15) A program in clinical gastroenterology to expose student to basic GI physiology, pathophysiology, and management of gastrointestinal and liver problems.

Effective: Winter 1978

Prerequisite:

**MED 724 Clinical Elective in Hematology** (5-15) Provides students with the basic understanding of the fundamental problems of hematology.

Effective: Winter 1978

Prerequisite:

**MED 725 Clinical Elective in Medical Oncology** (5-15) Introduces students to cancer chemotherapy and immunotherapy with emphasis on workings of lymphoma and solid tumor patients.

Effective: Winter 1978

Prerequisite:

**MED 727 Elective in Pulmonary Medicine** (5-15) A clinical program in pulmonary medicine with emphasis in pulmonary physiology, pathophysiology, and patient diagnosis and management.

Effective: Winter 1978

Prerequisite:

**MED 728 Clinical Program in Nephrology** (5-10) Problems in clinical nephrology with emphasis placed on a pathophysiologic approach. Introduction to renal biopsy, peritoneal dialysis, and hemodialysis.

Effective: Spring 1992

**MED 733 Cardiology Acting Internship** (5) Advanced training in cardiovascular pathophysiology and diseases for fourth-year students functioning as acting interns.

Effective: Spring 2009

Prerequisite:

**MED 734 Clinical Elective in Endocrinology** (5-15) Expose students to a large number of clinical endocrine problems, familiarize them with diagnostic laboratory procedures used in evaluating patients.

Effective: Winter 1978

Prerequisite:

**MED 736 Clinical Management of Obesity** (5) This course provides exposure to the multifaceted area of obesity management, including diabetes, bariatric surgery, medical management and pediatrics

Effective: Fall 2008

Prerequisite:

**MED 738 Clinical Elective in Cardiology--Consultation Service** (5) Students evaluate and follow in-patients on general non-cardiology services with cardiac problems referred to the Cardiology Consult Service.

Effective: Spring 1997

Prerequisite:

**MED 742A Allergy and Immunology Clinical Elective for 3rd Year Students** (2.5) Allergy and Immunology Clinical Elective for 3rd year students.

Effective: Spring 2009

Prerequisite:

**MED 745 Geriatric Elective** (5) Students will perform assessments and develop care plans for hospitalized elders who are transitioning to home or long-term care setting.

Effective: Fall 2008

Prerequisite:

**MED 747 (PED 747) Pediatric Allergy, Asthma and Immunology Elective (5)** This course provides exposure to basic concepts for diagnosis and management of children and adults with allergic and immunologic diseases and respiratory and cutaneous abnormalities.

Effective: Fall 2012

Prerequisite:

**MED 748 Adult Rheumatology Elective (5)** This course provides exposure to concepts utilized in the diagnosis and management of rheumatic diseases in adults.

Effective: Spring 2009

Prerequisite:

**MED 749 Medical Intensive Care Acting Internship (4th year) (5)** Senior students assume Acting Intern responsibilities for Medical ICU level patients. This intense training is recommended for highly motivated students interested in a "hands-on" experience in the critical care unit.

Effective: Spring 2009

Prerequisite:

**MED 757 Hematology-Oncology Subinternship (5)** Students will function as acting interns in the inpatient hematology/oncology unit under the direction of senior housestaff fellows and faculty.

Effective: Spring 1993

Prerequisite:

**MED 796 Medicine Individual Studies (5)** Clinical or laboratory research on a selected topic by special arrangement with member of faculty who will act as preceptor.

Effective: Spring 2009

Prerequisite:

**MED 796A Medicine Individual Studies for 3rd Year (2.5)** Medicine individual studies for 3rd year.

Effective: Spring 2009

**MED 797 Medicine Special Topics (5)** Advanced clinical training in internal medicine or subspecialty --neurology, cardiology, clinical pharmacology, hematology, gastroenterology, endocrinology, pulmonary medicine, renal disease.

Effective: Spring 2010

Prerequisite:

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## Medieval Studies (MEDVL)

MEDVL 411 (IL) (HIST 411) **Medieval Britain** (3) Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

Effective: Spring 2006

Prerequisite:

MEDVL 411U (IL) (HIST 411U) **Medieval Britain** (3) Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

MEDVL 413 (IL) (HIST 413) **Medieval Celtic Studies** (3) Celtic civilization from antiquity to the end of the middle ages.

Effective: Spring 2006

Prerequisite:

MEDVL 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

MEDVL 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

MEDVL 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 2002

Prerequisite:

MEDVL 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 1995

MEDVL 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1995

MEDVL 499 (IL) **Foreign Studies** (12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

MEDVL 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2002

MEDVL 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2002

MEDVL 595 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 2002

MEDVL 596 **Individual Studies** (1-9) Creative projects, including nonthesis research that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2002

MEDVL 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2002

MEDVL 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2002

MEDVL 599 (IL) **Foreign Studies** (1-12 per semester; maximum of 24) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

MEDVL 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2002

MEDVL 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2002

MEDVL 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Students experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Summer 2002

MEDVL 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2002

MEDVL 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2002

MEDVL 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2002

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## Meteorology (METEO)

**METEO 410 Advanced Topics in Weather Forecasting** (3) Exploring highly specialized topics and techniques in weather forecasting that span from mesoscale to planetary spatial scales and short-term to long-range time scales.

Effective: Spring 2004

Prerequisite:

**METEO 411 Synoptic Meteorology Laboratory** (4) Techniques of analyzing synoptic scale weather situations; introduction to weather forecasting.

Effective: Spring 2004

Prerequisite:

**METEO 413 Map Analysis** (3) Analysis of actual surface weather observations, with emphasis on the Norwegian cyclone model, missing or bad data, and mesoscale phenomena.

Effective: Fall 2002

Prerequisite:

**METEO 414 Mesoscale Meteorology** (4) A survey of conceptual models and analysis techniques for mesoscale atmospheric features.

Effective: Summer 1996

Prerequisite:

**METEO 415 Forecasting Practicum** (3) Modern techniques in weather analysis and forecasting.

Effective: Spring 2011

Prerequisite:

**METEO 416 Advanced Forecasting** (3) Competitive, simulated, operational, real-time forecasting is covered.

Effective: Spring 1998

Prerequisite:

**METEO 418W Topics in Mesoscale Meteorology** (3) Topics in mesoscale meteorology will be investigated in an independent study environment through computer-based modules, papers, and semester project.

Effective: Fall 1995

Prerequisite:

**METEO 419 Air Quality Forecasting** (3) Issues relating to the prediction and dispersion of air pollutants as discussed.

Effective: Summer 2010

Prerequisite:

**METEO 421 Atmospheric Dynamics** (4) Balanced and unbalanced flows, vorticity, circulation and potential vorticity, an introduction to wave dynamics and stability analysis, and a quantitative discussion of the general circulation.

Effective: Fall 2009

Prerequisite: Concurrent: METEO 431 MATH 251 PHYS 212

**METEO 422 Advanced Atmospheric Dynamics** (3) Survey of advanced dynamical topics including instabilities, numerical modeling, and others of current interest.

Effective: Fall 2009

Prerequisite:

**METEO 431 Atmospheric Thermodynamics** (3) Classical thermodynamics applied to both the dry and the moist atmosphere.

Effective: Spring 2001

Prerequisite:

**METEO 434 Radar Meteorology** (3) Fundamental operating principles of radars, with application to observation of meteorological phenomena.

Effective: Fall 2001

Prerequisite: Concurrent: METEO 414

**METEO 436 Radiation and Climate** (3) Elements of earth-sun geometry, radiative transfer, photochemistry, remote sensing of the atmosphere, physical climatology, climate forcing.

Effective: Spring 2013

Prerequisite: Concurrent: METEO 431

**METEO 437 Atmospheric Chemistry and Cloud Physics** (3) Properties of aerosols and clouds, cloud nucleation and precipitation processes, atmospheric electricity, cloud and precipitation chemistry, biogeochemical cycles.

Effective: Spring 2013

Prerequisite:

**METEO 440W Principles of Atmospheric Measurements** (3) Theory and practices used in measurement and analysis of meteorological variables.

Effective: Fall 2010

Prerequisite:

**METEO 446 Laboratory in Atmospheric Physics II** (1) Experimental practices in cloud and aerosol physics, atmospheric electricity, atmospheric chemistry, radar meteorology.

Effective: Spring 1991

Prerequisite:

**METEO 451 Introduction to Physical Oceanography** (3) Air-sea interaction, wind-driven and thermohaline circulations, upwelling, El Nino, waves, and tides.  
Effective: Spring 2007  
Prerequisite:

**METEO 452 Tropical Meteorology** (3) Atmospheric processes in the tropics; mass, heat, energy, momentum, and water vapor budgets, cumulus convection, hurricanes and other disturbances.  
Effective: Fall 1983  
Prerequisite:

**METEO 454 Introduction to Micrometeorology** (3) Physical processes and their measurement in the lowest layers of the atmosphere; application to hydrology, plant systems, and air pollution.  
Effective: Fall 2009  
Prerequisite:

**METEO 455 Atmospheric Dispersion** (3) The basic principles of atmospheric flow, introduction to the modeling of turbulent diffusion, and the use of EPA dispersion models.  
Effective: Spring 2011  
Prerequisite:

**METEO 460 Weather Risk and Financial Markets** (3) This course will introduce the role that weather plays as a source of financial and operational risk for businesses, market and other institutions.  
Effective: Spring 2012  
Prerequisite:

**METEO 465 Middle Atmosphere Meteorology** (3) A topical survey of physical, chemical, and dynamical processes at work in the stratosphere and mesosphere (middle atmosphere).  
Effective: Spring 1988  
Prerequisite:

**METEO 466 Planetary Atmospheres** (3) A survey of planetary atmospheres and the chemical and physical processes by which they form and evolve.  
Effective: Spring 2001  
Prerequisite:

**METEO 469 From Meteorology to Mitigation: Understanding Global Warming** (3) Introduction to global warming and climate change: the basic, science, projected impacts, and approaches to mitigation.  
Effective: Summer 2010  
Prerequisite:

**METEO 470 Climate Dynamics** (3) The fundamental principles that govern Earth's climate and their relevance to past and future climate change.  
Effective: Fall 2012  
Prerequisite:

**METEO 471W Observing Meteorological Phenomena** (3) Teaching the observational and interpretative skills needed to read the sky.  
Effective: Spring 1999  
Prerequisite:

**METEO 473 Application of Computers to Meteorology** (3) Application of statistical and numerical methods to practical problems in meteorology.  
Effective: Spring 2008  
Prerequisite:

**METEO 474 Computer Methods of Meteorological Analysis and Forecasting** (3) Distribution of scalars and vectors; sampling; regression and correlation in two and three dimensions; time series, statistical forecasting; forecast verification.  
Effective: Summer 2010  
Prerequisite:

**METEO 477 (E E 477) Fundamentals of Remote Sensing Systems** (3) The review of fundamental physical properties leads into discussions of various techniques, including imaging, spectroscopy, radiometry, and active sensing.  
Effective: Spring 2008  
Prerequisite:

**METEO 480M Undergraduate Research** (3) A research thesis will be prepared. A written and oral presentation required.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**METEO 480M Undergraduate Research** (3) A research thesis will be prepared. A written and oral presentation required.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**METEO 480W Undergraduate Research** (3) A research thesis will be prepared. A written and oral presentation required.  
Effective: Summer 1991  
Prerequisite:

**METEO 481 Weather Communications I** (3) Multi-instructor weather communications survey including forecasting, science teaching and writing, television and radio broadcasting, climate studies, forensics, industrial applications.  
Effective: Spring 2004

Prerequisite:

**METEO 482 Weather Communications II (3)** Multi-instructor workshop designed to mimic real-life applications of weather communications in industry, broadcasting, the courtroom, and the classroom.

Effective: Spring 2002

Prerequisite:

**METEO 483 Weather Communications III (3)** Individualized course designed for in-depth study of weather communications in industry, broadcasting, the courtroom and/or the classroom.

Effective: Spring 2002

Prerequisite:

**METEO 486 Pennsylvania Climate Studies (1-2 per semester/maximum of 3)** An overview of the Pennsylvania State Climate Office and an introduction to various aspects of its operations.

Effective: Spring 2011

Prerequisite:

**METEO 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2010

**METEO 495A Meteorology Communications Internship (3 per semester/maximum of 6)** Internship focusing on communication of weather forecasts or other meteorological information.

Effective: Summer 2010

Prerequisite:

**METEO 495B Meteorology Private Sector Internship (3 per semester/maximum of 6)** Internship focusing on meteorological problems and applications pursued by private sector companies.

Effective: Summer 2010

Prerequisite:

**METEO 495C Meteorological Operations Internship (3 per semester/maximum of 6)** Internship focusing on time-sensitive meteorological applications such as weather or climate forecasts that are produced.

Effective: Summer 2010

Prerequisite:

**METEO 495D Meteorological International Internship (3 per semester/maximum of 6)** Meteorological internship in an international setting.

Effective: Summer 2010

Prerequisite:

**METEO 495E Meteorological Off-Campus Research Internship (3 per semester/maximum of 6)** Off-campus meteorological internship focusing on a research project.

Effective: Summer 2010

Prerequisite:

**METEO 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**METEO 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**METEO 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**METEO 501 Atmospheric Phenomena (3)** Overview of the complex interactions within the atmosphere, ranging from molecular to global scale.

Effective: Spring 1998

**METEO 511 The Weather From Global to Micro Scales (3)** Conceptual models and underlying physics for weather phenomena on scales from the global general circulation to turbulence.

Effective: Fall 2010

Prerequisite:

**METEO 512 Topics in Synoptic Meteorology (3)** Application of atmospheric dynamics to the diagnosis and prediction of synoptic-scale weather.

Effective: Spring 2011

Prerequisite:

**METEO 516 Mesoscale Forecasting (3)** Competitive, simulated, operational, real-time forecasting is covered.

Effective: Summer 2005

Prerequisite:



**METEO 520 Geophysical Fluid Dynamics** (3) Fundamentals of fluid dynamics with an emphasis on basic concepts that are important for atmospheric and oceanic flows.

Effective: Spring 2009

Prerequisite:

**METEO 521 Dynamic Meteorology** (3) An overview of the major large-scale atmospheric motions of weather and climate.

Effective: Spring 1996

Prerequisite:

**METEO 523 Modeling the Climate System** (3) An introduction to the mathematical description and modeling of atmospheric and oceanic motions.

Effective: Summer 2005

**METEO 526 Numerical Weather Prediction** (3) Finite difference and spectral methods, barotropic and baroclinic models, filtered and primitive equation models, synoptic-scale and mesoscale models.

Effective: Fall 1983

Prerequisite:

**METEO 527 Atmospheric Wave Motion** (3) From classical and physical hydrodynamics to the numerical prediction of wave motion in a baroclinic atmosphere.

Effective: Spring 1988

Prerequisite:

**METEO 529 Mesoscale Dynamics** (3) A survey of concepts of mesoscale systems including frontogenesis, symmetric instability, mountain waves, wave CISK, and frontal waves.

Effective: Spring 1988

Prerequisite:

**METEO 531 Atmospheric Thermal Physics** (3) Advanced treatment of thermodynamic principles as they relate to atmospheric cloud physics, radiation and dynamics.

Effective: Fall 2010

**METEO 532 Chemistry of the Atmosphere** (3) Review of chemical principles in gaseous and multiphase environments; characteristics of key atmospheric components and chemical systems in the lower and middle atmosphere.

Effective: Summer 2007

Prerequisite:

**METEO 533 Cloud Physics** (3) Overview of cloud systems; theories of phase changes in clouds and micro-physical mechanisms of precipitation formation; cloud electrification.

Effective: Fall 1993

Prerequisite:

**METEO 535 Radiative Transfer** (3) Fundamentals of electromagnetic radiation and its interaction with matter; radiation and climate, atmospheric remote sensing, and observable atmospheric optical phenomena.

Effective: Spring 1996

**METEO 538 Atmospheric Convection** (3) Properties of shallow and deep atmospheric convection and interactions between convection, the boundary layer, and larger-scale weather systems.

Effective: Summer 1995

**METEO 554 Atmospheric Turbulence** (3) An introduction to the physics, structure, modeling, representation, and measurement of atmospheric turbulence.

Effective: Spring 1996

Prerequisite:

**METEO 563 Bioclimatology** (3) Climatic phenomena in their relation to life.

Effective: Fall 1988

**METEO 565 Physics of the Upper Atmosphere** (3) Graduate version of material that is covered in METEO 465.

Effective: Fall 1983

Prerequisite:

**METEO 574 Atmospheric Dynamics Seminar** (1-3 per semester/maximum of 15) A weekly seminar course that focuses on current and past research problems in dynamic meteorology and oceanography.

Effective: Spring 1988

**METEO 575 Climate Dynamics Seminar** (1-3 per semester/maximum of 15) Review of evolving climate dynamics and earth system science, including ongoing departmental research.

Effective: Spring 1988

**METEO 580 Communication of Meteorological Research** (1) Methods for effective written and oral presentation of meteorological research are reviewed.

Effective: Spring 1994

**METEO 581 Topics in Atmospheric Chemistry** (1-3 per semester/maximum of 15) Discussion of recent research papers in, and concepts pertinent to, acidic deposition, photochemical air pollution, and global chemical budgets.  
Effective: Spring 1988

**METEO 582 Ice and Snow Physics** (1-3 per semester/maximum of 15) Structure of ice and its electrical, optical, mechanical, and surface properties; snow formation in the atmosphere.  
Effective: Fall 1991

**METEO 588 Oceans and Climate Seminar** (2) A focussed discussion on some aspect of the ocean's role in the climate system. Theme to vary from semester to semester.  
Effective: Spring 2012

**METEO 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1988

**METEO 591 Development and Ethics in the Atmospheric Sciences** (1) Provide a forum for discussion of scholarship and research integrity as well as critical components of professional development.  
Effective: Fall 2010

**METEO 592 Research Proposal Preparation in the Atmospheric Sciences** (1) This course familiarizes graduate students with research rigor, proposals, and processes.  
Effective: Fall 2010

**METEO 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**METEO 596A Numerical Methods for Geophysical Fluid Dynamics** (3) Course covers fundamentals of numerical methods applied to partial differential equations with emphasis on the equations governing geophysical fluid flows.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**METEO 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**METEO 597A Dynamic Oceanography** (3) A study of the dynamic processes in the earth's oceans and how they are modeled.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**METEO 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**METEO 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**METEO 602 Supervised Experiences in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Fall 1983

**METEO 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**METEO 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

**METEO 801 Understanding Weather Forecasting for Educators** (3) Fundamental principles of synoptic and physical meteorology, remote sensing and data analysis in the setting of mid-latitude weather forecasting.  
Effective: Summer 2008

**METEO 802 Fundamentals of Tropical Forecasting for Educators** (3) Applying atmospheric principles to the tropics, with an emphasis on the development, structure, prediction, and destructive impact of hurricanes.  
Effective: Summer 2008  
Prerequisite:

**METEO 803 Fundamentals of Mesoscale Weather Forecasting for Educators** (3) Applying atmospheric principles to

small-scale weather systems, with an emphasis on the conceptual modeling and short-range prediction of severe thunderstorms.

Effective: Summer 2008

Prerequisite:

**METEO 804 Special Topics in Weather Forecasting for Educators (3)** Exploring specialized weather forecasting topics and techniques spanning from mesoscale to planetary spatial scales and short-term to long-range time scales.

Effective: Summer 2008

Prerequisite:

**METEO 897 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2007

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## Microbiology-Hy (MICRO)

MICRO 550 **Medical Microbiology** (2) Principles of medical microbiology: host-parasite relationships; structure and function of viruses, bacteria, and fungi as agents causing human disease.  
Effective: Fall 1984

MICRO 551 **Medical Microbiology** (3) Principles of medical microbiology: host-parasite relationships; structure and function of viruses, bacteria, and fungi as agents causing human disease.  
Effective: Fall 1984  
Prerequisite:

MICRO 553 **Science of Virology** (4) Replication of viruses and effects on host cells, including oncogenic properties of viruses and cellular growth and survival pathways disrupted.  
Effective: Fall 2011

MICRO 554 **Principles of Immunology** (2) Study of immune response. Nature of antigens, structure, function of antibodies, hypersensitivity, transplantation and tumor immunology, autoimmunity, and immunosuppression.  
Effective: Fall 1983

MICRO 560 **Concepts in Immunology** (4) Selected lectures/readings in advanced immunological concepts; emphasis on lymphocyte function and applications to anti-viral/tumor immunity.  
Effective: Fall 2011  
Prerequisite:

MICRO 572 **Literature Reports** (1 per semester) Weekly analysis of current literature in microbiology.  
Effective: Fall 1983

MICRO 581 **Immunology A: Basic Concepts in Innate and Adaptive Immunity** (1) Discuss innate immune mechanisms and the basic concepts and molecular/ cellular components of adaptive immune system.  
Effective: Fall 2007

MICRO 582 **Immunology B: Adaptive Immunity** (1) Discuss adaptive immune mechanisms.  
Effective: Fall 2007  
Prerequisite:

MICRO 583 **Viral Vectors** (1) Use and design of viral vectors in research and use in gene therapy; exploration of viral vector strengths and limitations.  
Effective: Fall 2007  
Prerequisite:

MICRO 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

MICRO 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

MICRO 597 **Special Topics** (1-9) Formal courses on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

MICRO 600 **Thesis Research** (1-15) No description.  
Effective: Summer 1983

MICRO 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 1983

MICRO 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Teaching students laboratory techniques and tests that are used to identify microorganisms and to aid in the diagnosis of disease.  
Effective: Spring 2005

MICRO 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1983

MICRO 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1983

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## **Mineral Engr Mgmt (M E M)**

M E M 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1994

M E M 599 (IL) **Foreign Studies** (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005

M E M 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

M E M 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## Mineral Processing (MN PR)

MN PR 401 **Mineral Process Engineering** (3) Unit operations for processing particulate materials: comminution, screening, classification, slurry pumping, thickening, filtration, etc.; application to mineral processing plant design.  
Effective: Spring 2001  
Prerequisite:

MN PR 413 **Mineral Processing Laboratory** (1) A laboratory study of the chemical and physical principles involved in practical mineral processing operations.  
Effective: Spring 1999  
Prerequisite:

MN PR 424 **Coal Preparation** (3) Unit operations, flowsheets, and testing methods used in preparation of coal.  
Effective: Spring 1999  
Prerequisite:

MN PR 425 **Interfacial Phenomena and Flotation** (3) Surface and interfacial phenomena related to flotation agglomeration, flocculation, and dispersion of particles. Application to mineral separation and related processes.  
Effective: Fall 2009  
Prerequisite:

MN PR 426 (MATSE 426) **Aqueous Processing** (3) A study of the chemical and engineering principles pertinent to metal processing in aqueous systems: hydrometallurgical extraction, plating, materials preparation.  
Effective: Fall 2009  
Prerequisite:

MN PR 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1999

MN PR 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 1999

MN PR 505 **Physical Separations in Mineral Processing** (3) Intensive study of theory and applications of gravity, magnetic, electrostatic, centrifugal, and other methods of mineral processing.  
Effective: Spring 1999  
Prerequisite:

MN PR 507 (MATSE 560) **Hydrometallurgical Processing** (3) Fundamental physico-chemical factors underlying the aqueous extraction and recovery of metals and nonmetals from ores, minerals, and scrap metal.  
Effective: Spring 2003  
Prerequisite:

MN PR 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1999

MN PR 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1999

MN PR 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1999

MN PR 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1999

MN PR 600 **Thesis Research** (1-15) No description.  
Effective: Spring 1999

MN PR 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1999

MN PR 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in development of instructional materials, organizing and conducting lectures and laboratories and evaluating students in undergraduate level courses (1-499).  
Effective: Spring 1999

MN PR 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1999

MN PR 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1999

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## Mining (MNG)

**MNG 401 Introduction to Mining Operations** (1) An introduction to underground and surface mining methods; selection of extraction equipment; relevant auxiliary operations. Not intended for Mining Engineering majors.  
Effective: Spring 2008  
Prerequisite:

**MNG 404 Mine Materials Handling Systems** (2) Analysis and design of materials-handling systems in mining, such as belt conveyors, locomotives, and hoisting.  
Effective: Spring 2011

**MNG 410 Underground Mining** (3) Underground mine design; extraction techniques; description of auxiliary operations as they relate to the mining methods.  
Effective: Fall 2012  
Prerequisite:

**MNG 411 Mine Systems Engineering** (2) Applied operations research and systems methods for decision making in mine operations; time and systems studies to improve productivity.  
Effective: Spring 1999  
Prerequisite:

**MNG 412 Mineral Property Evaluation** (3) Ore reserve estimation using statistics and geostatistics, mine cost estimation, engineering economy concepts applied to mineral deposits.  
Effective: Spring 1999  
Prerequisite:

**MNG 422 Mine Ventilation and Air Conditioning** (3) Quality, quantity, and temperature-humidity control of the mine atmosphere; general mine environmental control.  
Effective: Fall 2007  
Prerequisite:

**MNG 441 Surface Mining Systems and Design** (3) Design of surface mining for noncoal and coal minerals; emphasis on quarry and strip mining planning parameters: unit operations, systems, haulroads, draglines, spoil stability, reclamation, legal requirements, and health and safety.  
Effective: Spring 1999  
Prerequisite:

**MNG 451W Mining Engineering Project** (1-5) Independent and integrative design and report of specific mine evaluation, layout, equipment selection, environmental control, permitting, and financial analysis.  
Effective: Spring 1999  
Prerequisite:

**MNG 460 Mine Maintenance Engineering** (3) Mine maintenance system design; maintenance planning and management; safety and cost analysis of maintenance programs.  
Effective: Spring 1999

**MNG 470 Mining and Geologic Structures** (3) Study of geologic structures and their impacts on mining operations.  
Effective: Summer 2009  
Prerequisite:

**MNG 497 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 2008

**MNG 515 Mine Systems Simulation** (3) Principles and practices of probabilistic and deterministic simulation in the analysis of operating systems related to mills and mines.  
Effective: Spring 1999  
Prerequisite:

**MNG 541 Surface Mine Equipment Selection Analysis** (3) Design analysis and selection criteria for principal surface mine equipment, their interaction in operation, and auxiliary equipment requirements.  
Effective: Spring 1999  
Prerequisite:

**MNG 554 Rock Mechanics Design** (3) Engineering design process; design of mines, tunnels, slopes, and underground chambers; guided design concept; creativity and innovation; group design project.  
Effective: Spring 1999  
Prerequisite:

**MNG 590 (F SC 590, P N G 590, EME 590) Colloquium** (1-3) Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.  
Effective: Spring 2009

**MNG 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual

basis and which fall outside the scope of formal courses.  
Effective: Spring 1999

**MNG 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1999

**MNG 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1999

**MNG 599 (IL) Foreign Study (1-12 maximum of 24)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005

**MNG 600 Thesis Research (1-15)** No description.  
Effective: Spring 1999

**MNG 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Spring 1999

**MNG 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Spring 1999

**MNG 611 Ph.D. Dissertation Part Time (0)** No description.  
Effective: Spring 1999

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## **Mngmt Info Sysrms-Bd (MISBD)**

MISBD 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

MISBD 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

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## **Molecular Medicine (M M)**

M M 596 **Individual Studies** (1-4 per semester/maximum of 36) M M Individual Studies.  
Effective: Fall 2012

M M 597 **Special Topics** (1-3 per semester/maximum of 36) Special topics within the Molecular Medicine Graduate program.  
Effective: Fall 2012

M M 600 **Thesis Research** (1-9 per semester/maximum of 36) Laboratory work on thesis project.  
Effective: Summer 2012

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## **Molecular Toxicology (M T)**

M T 596 **Individual Studies** (1-3 per semester/maximum of 6) Laboratory Rotations for first year students.  
Effective: Summer 2012

M T 600 **Thesis Research** (1-9 per semester/maximum of 36) Laboratory work on thesis project.  
Effective: Summer 2012

M T 601 **Thesis Preparation** (0) MT full time thesis preparation.  
Effective: Summer 2012

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## Mstr Law Courses (LLMLW)

**LLMLW 900 Introduction to U.S. Legal Systems (2)** To develop a good foundation for the LL.M. student's other course work, this course introduces the United States court system, the role of the Constitution in the United States legal system, and other foundation materials in United States law. The goal is to introduce students to distinctive aspects and/or fundamental principles in U.S. law. Enrollment in this course is limited to LL.M. candidates.

Effective: Fall 2011

Concurrent: LLMLW 901

**LLMLW 901 LLM Legal Analysis, Writing and Research (2)** This course explores U.S. common law analytic methods and discourse. Students will analyze cases and statutes to solve client problems. Students will draft objective memoranda and other documents to communicate their legal analysis in writing. Students will also learn the basics of U.S. legal research.

Effective: Fall 2011

**LLMLW 902 Advanced LLM Legal Analysis Writing & Research (2)** Building on the LL.M. Legal Analysis, Writing and Research course, students will develop common law communication and research skills in the persuasive writing/advocacy context. Students will also develop effective client letter writing skills in a U.S. legal setting. The final portion of the course will contract drafting.

Effective: Spring 2012

Prerequisite:

**LLMLW 903 Introduction to Common Law Analysis and Language (2)** This course introduces students to fundamental concepts of U.S. common law analysis and methods. The course will explore the role cases play within a common law system, including how they interact with other sources of law, as well as the methods common law lawyers use to analyze cases. Students will apply this knowledge to solve real legal problems while at the same time building language skills for clear legal communications.

Effective: Fall 2012 Ending: Summer 2013

**LLMLW 903 Introduction to Common Law Analysis and Language (2)** This course introduces students to fundamental concepts of U.S. common law analysis and methods. The course will explore the role cases play within a common law system, including how they interact with other sources of law, as well as the methods common law lawyers use to analyze cases. Students will apply this knowledge to solve real legal problems while at the same time building language skills for clear legal communications.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**LLMLW 904 US Common Law Methods (2-4)** The course is for LL.M. students who speak English as a second language. It serves as a companion to a substantive law course, e.g., Constitutional Law I. Students will build skills in analyzing cases, applying case holdings to hypothetical facts and understanding the material presented in the substantive law course. Also, students will learn and practice skills necessary for success in law school, e.g., preparation of effective case briefs, class notes, and course outlines.

Effective: Summer 2013

**LLMLW 905 LL.M. Scholarly Writing Workshop (1)** This course provides LL.M. students with the framework for developing a thesis, conducting research and producing a significant scholarly paper. In an interactive workshop setting, students will discuss progress, and receive feedback from faculty and fellow students on: (1) identification and refinement of a thesis; (2) developing and implementing a research plan; (3) appropriate use of authority, including legal citation form; (4) developing and refining a critical perspective and scholarly argument. Exemplary papers selected by faculty may be published in the law school's digital repository.

Effective: Spring 2013

Concurrent: LL.M. students must be concurrently enrollend in a Penn State Law Seminar (SEM) course or an independent study (PERSP 996) of at least two credits with a law faculty supervisor.

**LLMLW 906 U.S. Constitutional Law and Analysis (4)** This course will examine the roles of the U.S. executive, legislative and judicial branches as well as individual and civil rights under the U.S. Constitution. It will also introduce LLM-level international students to analytical methods commonly used by U.S. lawyers with focus on U.S. constitutional law.

Effective: Summer 2013 Ending: Summer 2013

**LLMLW 906 U.S. Constitutional Law and Analysis (3)** This course will examine the roles of the U.S. executive, legislative and judicial branches in determining the limits of individual and civil rights under the U.S. Constitution. It will also introduce LLM-level international students to analytical methods commonly used by U.S. lawyers with a focus on U.S. constitutional law. The goals of the course are to introduce students to U.S. constitutional law and to provide them with the analytical and English language skills necessary to succeed in a U.S. law school.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**LLMLW 907 Introduction to U.S. Business Associations and Commercial Law (3)** This course will examine common forms of bussness entities in the U.S. and the legal structure in which the entities operate. The course will introduce commercial law frequently encountered in business, including sales, negotiable instruments, and secured transactions. The course will require analysis of case law and statutory interpretation.

Effective: Summer 2013

Prerequisite:

LLMLW 997 **Special Topics** (4) Special Topics  
Effective: Spring 2012

LLMLW 997A **Foundations of U.S. Business Law** (2) This course explores the sources and core concepts of U.S. business and commercial law including the common law of contractual obligation, sale of goods, secured finance, and payment systems under the Uniform Commercial Code, business entity law, and competition law. It also considers how lawyers facilitate business transactions and add value to their clients' business operations. Students will read and discuss cases and statutes, and will practice negotiating business disputes and drafting agreements.  
Effective: Summer 2013 Ending: Summer 2013

LLMLW 997B **Foundations to US Common Law and Language** (2) This course will introduce students to how U.S. lawyers analyze and communicate about client problems. Because legal language is rooted in the law and legal system of the U.S., the vehicle of our work will be common law legal analysis. From our classroom work and assignments, students will build skills in: (1) Active listening and speaking in class discussions, (2) Understanding U.S. legal materials, and (3) U.S. legal analysis and legal writing.  
Effective: Summer 2013 Ending: Summer 2013

LLMLW 997C **Foundations of US Constitutional Law** (2) This course explores the foundations of the American system of government under the Constitution. Students will read and discuss seminal opinions of the United States Supreme Court which interpret the powers and limitations of the three branches of government (executive, judicial, and legislative) and the rights of individuals that the Constitution protects in criminal and civil proceedings. Throughout the course, students will engage in common law legal analysis, and will practice their skills in a series of exercises on issues of constitutional law designed to build analytical ability and English language writing and speaking skills.  
Effective: Summer 2013 Ending: Summer 2013

Last Import from UCM: July 13, 2013 3:00 AM

## **Muscul Medicine-Hy (MSC)**

MSC 727 **Musculoskeletal Medicine** (3) Interdisciplinary - Medical Education

Effective: Spring 2003

Prerequisite:

Last Import from UCM: July 13, 2013 3:00 AM



## Music (MUSIC)

Individual instruction in technique, literature, and pedagogy is offered in six categories covering eighteen instruments:

BRASS: Trumpet, French horn, trombone, euphonium, tuba

KEYBOARD: Piano, organ

STRINGS: Violin, viola, violoncello, doublebass

WOODWINDS: Flute, oboe, clarinet, bassoon, saxophone

PERCUSSION

VOICE

For each instrument individual instruction is offered to different types of students at different levels:

Primary instrument: Student in B.A. (Music) and B.S. (Music Ed) Levels I-VII

Performance instrument: Students in B.Mus. Level I-VII

Secondary instrument: Nonmajor students or others using this as secondary instrument.

The courses are designated according to a particular pattern for identification on the student's transcript and in the *Schedule of Classes*. Applied music fees are required for individualized instruction: \$175 for a 1-credit course; \$250 for a 2-credit course; \$250 for a 3-credit course. Examples of listings:

Course Abbrev	Number & Suffix	Instrument	Type of Student	Level	Credit	Fee
BRASS	100J	TRUMPET:	Secondary:		1	\$175
	110J	TRUMPET:	Secondary:		2	\$250
BRASS	120J	TRUMPET:	Primary:	Level I	2	\$250
	170J	TRUMPET:	Primary:	Level II	2	\$250
BRASS	200J	TRUMPET:	Primary:	Level III	2	\$250
	270J	TRUMPET:	Primary:	Level IV	2	\$250
BRASS	320J	TRUMPET:	Primary:	Level V	2	\$250
	370J	TRUMPET:	Primary:	Level VI	2	\$250
BRASS	420J	TRUMPET:	Primary:	Level VII	2	\$250
	470J	TRUMPET:	Primary:	Level VIII	2	\$250
BRASS	130J	TRUMPET:	Performance:	Level I	3	\$250
	180J	TRUMPET:	Performance:	Level II	3	\$250
BRASS	230J	TRUMPET:	Performance:	Level III	3	\$250
	280J	TRUMPET:	Performance:	Level IV	3	\$250
BRASS	330J	TRUMPET:	Performance:	Level V	3	\$250
	380J	TRUMPET:	Performance:	Level VI	3	\$250
BRASS	430J	TRUMPET:	Performance:	Level VII	3	\$250
	480J	TRUMPET:	Performance:	Level VIII	3	\$250

MUSIC 400J **Solo Recital** (1) Required recital for Performer's Certificate.

Effective: Fall 2012

Prerequisite:

MUSIC 412 **Jazz Pedagogy** (2) The development of advanced skills in pedagogy for teaching jazz bands.

Effective: Summer 1994

Prerequisite:

MUSIC 414 **String Pedagogy** (1-2) The development of skills in pedagogy for teaching strings.

Effective: Spring 1992

Prerequisite:

MUSIC 415 **Woodwind Pedagogy** (1-2) The development of skills in pedagogy for teaching woodwinds.

Effective: Spring 1992

Prerequisite:

**MUSIC 416 Brass Pedagogy (1-2)** The development of skills in pedagogy for teaching brass.

Effective: Spring 1992

Prerequisite:

**MUSIC 417 Percussion Pedagogy (1-2)** The development of advanced skills in pedagogy for teaching percussion.

Effective: Summer 1992

Prerequisite:

**MUSIC 418 Voice Pedagogy (2)** Analysis of techniques of teaching voice and studies of related music literature and pedagogical writings.

Effective: Spring 2004

Prerequisite:

**MUSIC 419 Piano Pedagogy I (2)** Analysis of beginning teaching methods and teaching strategies for children.

Effective: Spring 1997

Prerequisite:

**MUSIC 420 Song Writing and Recording (3)** Song composition, arranging and recording in a variety of style genres.

Effective: Spring 2011

Prerequisite:

**MUSIC 421 Jazz Combo Class (1)** Study and performance of small group jazz.

Effective: Summer 1994 Ending: Summer 2013

Prerequisite:

**MUSIC 421 Jazz Combo Class (1 per semester/maximum of 8)** Study and performance of small group jazz.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**MUSIC 422 Jazz Harmony and Arranging (3)** Analysis and composition of jazz tunes and chord progressions; instrumental and vocal arranging in the jazz idiom.

Effective: Fall 1983

Prerequisite:

**MUSIC 424 Piano Pedagogy II (2)** Analysis of techniques of teaching intermediate-early advanced level piano and studies of music literature and pedagogical writings.

Effective: Spring 1997

Prerequisite:

**MUSIC 425 Advanced Voice Pedagogy (2)** Analysis of techniques of teaching voice, supervised teaching, studies of studio materials and related topics.

Effective: Spring 2004

Prerequisite:

**MUSIC 429 Aural Review for Graduate Students (1)** An intensive review of the aural skills required for a theoretical understanding of 18th- and 19th-century music.

Effective: Summer 1994

Prerequisite:

**MUSIC 431 ADVANCED TONAL ANALYSIS (2-3)** Advanced techniques of musical analysis.

Effective: Fall 1996

Prerequisite:

**MUSIC 432 Graduate Review of Twentieth-Century Analysis (2-3)** The theory and analysis of style in music of the twentieth century.

Effective: Fall 1997

Prerequisite:

**MUSIC 433 Advanced Analysis of Twentieth Century Music (2-3)** In-depth studies of selected twentieth-century repertoires and/or analytical models.

Effective: Summer 1996

Prerequisite:

**MUSIC 435 Score Reading (1)** Introduction in score reading at the keyboard.

Effective: Spring 1991

Prerequisite:

**MUSIC 441W Emphasis in Elementary General and Choral Music (3)** Selection and application of materials, methods, teaching and assessment strategies for elementary general and choral music settings.

Effective: Spring 2011

Prerequisite:

**MUSIC 442W Capstone Experience in Middle School General and Choral Music (3)** Capstone experience to teaching in general and choral middle school settings.

Effective: Fall 2007 Ending: Summer 2013

Prerequisite:

**MUSIC 442W Emphasis in Secondary General Music (3)** Emphasis in teaching in secondary general music settings.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**MUSIC 444W Emphasis in Elementary and Intermediate Band** (3) Examination and application of teaching strategies and materials for students planning to teach band in the elementary and middle schools.

Effective: Spring 2011

Prerequisite:

**MUSIC 445W Emphasis in High School Band** (3) Examination and application of teaching strategies and materials for students planning to teach high school bands.

Effective: Spring 2011

Prerequisite:

**MUSIC 446W Emphasis in Strings and Orchestra** (3) Development of teaching techniques for instructing elementary and secondary string/orchestra student musicians for music education majors.

Effective: Spring 2011

Prerequisite:

**MUSIC 450 Teaching Marching Band** (2) Traditional and contemporary drill design principles, show development strategies, instructional techniques, and organizational procedures involved in teaching marching band.

Effective: Fall 2007

Prerequisite:

**MUSIC 451 Computer Programming for Musicians** (3 per semester/maximum of 12) In-depth study of music programming techniques.

Effective: Spring 2011

Prerequisite:

**MUSIC 452 Computer Music Synthesis** (3) Use of sound synthesis software for music creation.

Effective: Spring 2013

Prerequisite:

**MUSIC 453 Recording Studio Training** (1) Training in how to use a professional multi-track recording studio.

Effective: Summer 2013

Prerequisite:

**MUSIC 455 Technology in Music** (1-3:1.5:1.5) Survey of how musical information is stored and processed in computer systems.

Effective: Spring 2008

Prerequisite:

**MUSIC 458 Electronic Music Composition** (3) An introduction to the art of composition in the electronic audio medium.

Effective: Spring 2011

Prerequisite:

**MUSIC 460 Teaching Musical Cultures** (2) Exploration of the world's musical cultures and the implication of and procedures for teaching multicultural music. Limited to upper division music majors or permission of program.

Effective: Summer 2006

Prerequisite:

**MUSIC 461W Studies in Music History: Antiquity to 1600** (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from antiquity to 1600, with emphasis on writing and research.

Effective: Fall 2010

Prerequisite:

**MUSIC 462W Studies in Music History: 1550-1750** (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from 1550-1750, with emphasis on writing and research.

Effective: Fall 2010

Prerequisite:

**MUSIC 463W Studies in Music History: 1700-1900** (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from 1700-1900, with emphasis on writing and research.

Effective: Fall 2010

Prerequisite:

**MUSIC 464W Studies in Music History: 1850-Present** (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from 1850 to the present, with emphasis on writing and research.

Effective: Fall 2010

Prerequisite:

**MUSIC 465 Advanced Conducting I** (3) Advanced instruction in conducting; conducting techniques specific to instrumental or choral music; emphasis on score study and rehearsal technique.

Effective: Summer 1994

Prerequisite:

**MUSIC 466 Advanced Conducting II** (2 per semester/maximum of 8) Standard scores of symphonies, tone poems, operas, oratorios, and shorter vocal and instrumental works studied from the viewpoint of the conductor.

Effective: Spring 1995

Prerequisite:

**MUSIC 467 Opera Workshop** (1-3 per semester/maximum of 6) History, analysis, and production of operas from sixteenth century to present.

Effective: Spring 2001

Prerequisite:

**MUSIC 468 Acting for Singers** (2 per semester/maximum of 4) To help students develop authentic and specific characters/portrayals on stage through physical and emotional awareness.

Effective: Fall 2008

Prerequisite:

**MUSIC 471 Structural and Sixteenth-Century Counterpoint** (2) Advanced species counterpoint and its application to the sixteenth-century style.

Effective: Fall 1983

Prerequisite:

**MUSIC 472 Eighteenth-Century Counterpoint** (2) Imitative and nonimitative counterpoint in the style of Bach.

Effective: Fall 1983

Prerequisite:

**MUSIC 473J Composition VII** (3) Composition instruction for fourth-year composition majors.

Effective: Fall 2012

Prerequisite:

**MUSIC 474J Composition VIII** (3) Composition instruction for fourth-year composition majors.

Effective: Fall 2012

Prerequisite:

**MUSIC 476W B.A. Senior Project** (3) A semester project appropriate to student's option in B.A. program (e.g., research paper, performance with program notes, or related paper).

Effective: Spring 1992

Prerequisite:

**MUSIC 478 Vocal Literature** (3) Introduction to the literature for solo voice in opera, oratorio, cantata, art song, and chamber music from the baroque to the present.

Effective: Spring 1997

Prerequisite:

**MUSIC 480 Opera Literature** (3) Studies in the development of the opera from 1600 to the present, treating both libretto and music.

Effective: Spring 1997

Prerequisite:

**MUSIC 481 Keyboard Literature** (3) Studies in the development of keyboard music and instruments; a survey of all eras using listening, analysis, and performance.

Effective: Spring 1997

Prerequisite:

**MUSIC 483 Seminar in Voice Pedagogy** (2) Survey of literature relevant to the teaching of voice from historical sources through recent pedagogical scholarship.

Effective: Spring 2004

Prerequisite:

**MUSIC 485 Chamber Music Literature** (3) Survey of chamber music for strings, winds, and brass instruments from the mid-16th century to the present day.

Effective: Spring 1997

Prerequisite:

**MUSIC 487 Orchestral Literature** (3) Survey of orchestral literature.

Effective: Spring 1997

Prerequisite:

**MUSIC 488 Studies in the Major Performance Area** (1-2) Selected studies in music literature specific to the student's major performance area. Will include research, analysis and performance.

Effective: Spring 2011

**MUSIC 489 Studio and Recital Accompaniment** (1 per semester/maximum of 4) Advanced keyboard accompaniment of student soloists in the studio and in public performance under faculty supervision.

Effective: Fall 1983

Prerequisite:

**MUSIC 493 Sonata Duos** (1 per semester/maximum of 4) Preparation for performance of advanced sonata literature for various individual instruments with keyboard.

Effective: Fall 1983

Prerequisite:

**MUSIC 494 Research Topics** (1-3 per semester/maximum of 6) Supervised research leading to senior thesis or project.

Effective: Fall 2012

**MUSIC 494H Research Topics** (1-3 per semester/maximum of 6) Supervised research leading to senior thesis or project.

Effective: Fall 2012

**MUSIC 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  
Effective: Spring 2013

**MUSIC 495A Student Teaching: General Music (5-7)** Observation and teaching under supervision.  
Effective: Fall 2001  
Prerequisite: Concurrent: MUSIC 442

**MUSIC 495B Student Teaching: Choral Music (5-7)** Observation and teaching under supervision.  
Effective: Fall 2001  
Prerequisite: Concurrent: MUSIC 443

**MUSIC 495C Student Teaching: Instrumental Music (5-7)** Observation and teaching under supervision.  
Effective: Fall 2001  
Prerequisite: Concurrent: MUSIC 444

**MUSIC 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**MUSIC 496H Independent Studies - Honors (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2011

**MUSIC 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

**MUSIC 497A Survey Music History (3)** For graduate students who need remedial work in music history.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MUSIC 497A Survey Music History (3)** For graduate students who need remedial work in music history.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 497B IENSEMBLE (1)** Theoretical, compositional, and application of i technology.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MUSIC 497B Clarinet Literature (1-2)** Selected studies in music literature specific to the clarinet. Will include research, analysis, and performance.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 497C Review of Harmony/Analysis (2)** Devoted to in-depth study of tonal harmony and analysis, beginning with a review of diatonic progressions and continuing with chromatic harmony.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MUSIC 497C Business of Music (1)** Survey of topics related to a career in music performance-including auditions, competition, finances, work abroad, etc. Guest lecturers included.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 497D Double Bass Excerpts (1)** This course is designed to study in depth a series of double bass excerpts from the standard orchestral and opera repertoire. We will look at how to prepare a mock audition behind a screen at the end of the semester.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MUSIC 497D Horn Literature (1)** Selected studies in music literature specific to the french horn. Will include research, analysis, and performance.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 497E Double Bass Excerpts (1)** This course is designed to study in depth a series of double bass excerpts from the standard orchestral and opera repertoire. We will look at how to prepare a mock audition behind a screen at the end of the semester.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 497F Viola Literature (1)** An introduction to excerpts from the viola parts of standard orchestral literature required for professional orchestral auditions.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 497G Viola Orchestral Excerpts (1)** An introduction to excerpts from the viola parts of standard orchestral literature required for professional orchestral auditions.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**MUSIC 498A Film Music (3)** A central premise of this course is that music mediates and manipulates our perceptions of the visual image. Accordingly, we will develop both the eye and ear as we carefully consider the influential role music plays in cinematic narratives of Hollywood films. This course is not a history of film music, although our approach will in some respects be historic. Our purpose is to gain an understanding of the role of music in film, to observe various approaches to the use of music in film, and to examine how music interacts with the other elements of the sound track (sound effects and dialogue) that, in turn, accompanies and interacts with the movie's visual component to create a compelling and satisfying work of art.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**MUSIC 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Spring 2007

**MUSIC 500 Introduction to Music Reference and Research Materials (2)** A study of musicological reference and research materials in English and Western European languages, with exercises in their use.

Effective: Fall 1983

**MUSIC 505 symphonic Wind Ensemble (1 per semester, maximum of 4)** Rehearsal and performance of wind repertoire and concert band literature.

Effective: Spring 1993

Prerequisite:

**MUSIC 507 Philharmonic Orchestra (1 per semester, maximum of 4)** Orchestra rehearsal and performance.

Effective: Spring 1993

Prerequisite:

**MUSIC 508 Chamber Orchestra (1 per semester, maximum of 4)** Chamber orchestra rehearsal and performance.

Effective: Spring 1993

Prerequisite:

**MUSIC 519 Graduate Seminar in Intermediate Piano Pedagogy (2)** Graduate seminar in intermediate teaching repertoire and strategies for piano from the Baroque to the 21st century.

Effective: Summer 2008

Prerequisite:

**MUSIC 520 Chamber Music for Strings (1 per semester, maximum of 4)** Preparation for performance of (advanced) chamber music literature involving primarily stringed instruments--quartets and quintets.

Effective: Spring 1993

Prerequisite:

**MUSIC 521 Chamber Music for Woodwinds (1 per semester, maximum of 4)** Preparation for performance of (advanced) chamber music literature involving primarily woodwind instruments--quartets and quintets.

Effective: Spring 1993

Prerequisite:

**MUSIC 522 Chamber Music for Brass (1 per semester, maximum of 4)** Preparation for performance of (advanced) chamber music literature involving primarily brass instruments--quartets and quintets.

Effective: Spring 1993

Prerequisite:

**MUSIC 523 Sonata Duos (1 per semester, maximum of 4)** Preparation for performance of (advanced) sonata literature for various individual instruments with keyboard.

Effective: Spring 1993

Prerequisite:

**MUSIC 524 Graduate Seminar in Advanced Piano Pedagogy (2)** Graduate seminar in advanced repertoire, history of piano pedagogy, and strategies for piano from the Baroque to the 21st century.

Effective: Summer 2008

Prerequisite:

**MUSIC 531 Analytical Techniques (3)** Twentieth-century theories of tonal music other than Schenker; emphasis on motivic, thematic, metric, and rhythmic analysis.

Effective: Spring 1992

Prerequisite:

**MUSIC 532 Schenkerian Analysis (3)** An intensive introduction to the analytical method developed by the Twentieth-century Austrian theorist and musicologist, Heinrich Schenker.

Effective: Summer 2011

Prerequisite:

**MUSIC 533 The Pedagogy of Undergraduate Theory and History (2)** A study of approaches to the teaching and learning of music theory (written and aural skills) and history.  
Effective: Summer 1995  
Prerequisite:

**MUSIC 535J Composition (1-4)** Composition of vocal, instrumental, and electronic media and preparation of compositions for performance.  
Effective: Spring 2013  
Prerequisite:

**MUSIC 560J Choral Conducting (2 per semester/maximum of 16)** Study of choral conducting techniques, comprehensive score analysis, and supervised rehearsal and performance practicum.  
Effective: Spring 2013  
Prerequisite:

**MUSIC 561J Orchestral Conducting (2 per semester, maximum of 16)** Study of orchestral conducting technique, comprehensive score analysis, and supervised rehearsal and performance practicum.  
Effective: Summer 2013  
Prerequisite:

**MUSIC 562J Band/Wind Ensemble Conducting (2 per semester/maximum of 16)** Study of band and wind ensemble conducting, comprehensive score analysis, and supervised rehearsal and performance practicum.  
Effective: Spring 2013

**MUSIC 565 Studio and Recital Accompaniment (1 per semester, maximum of 4)** Keyboard accompaniment of student soloists in the studio and in public performance, under faculty supervision.  
Effective: Spring 1993  
Prerequisite:

**MUSIC 572 Seminar in Musicology (3 per semester/maximum of 9)** Research in selected areas of music history.  
Effective: Fall 1983

**MUSIC 573 Integrative Seminar in Music Theory and History (3 per semester/maximum of 9)** Special topics (composer, style, genre) taught from both theoretical and historical perspectives.  
Effective: Fall 2000  
Prerequisite:

**MUSIC 574 Seminar in Music Theory (3)** Study of analytical techniques, aesthetics, writings, in music theory, music cognition, musical sketches, and mathematical models taught from a theory perspective.  
Effective: Summer 2012  
Prerequisite:

**MUSIC 575 Integrative Conducting Seminar (1 per semester/maximum of 2)** A seminar for choral, orchestral, and band/wind ensemble graduate conducting majors, taught by conducting faculty in all three areas.  
Effective: Summer 1998

**MUSIC 580 Studies in Orchestral Literature (2 per semester/maximum of 8)** Selected studies in orchestral literature from the seventeenth century to the present.  
Effective: Spring 2013

**MUSIC 582 Studies in Band/Wind Ensemble Literature (2 per semester/maximum of 8)** Selected studies in band and wind ensemble literature from the Renaissance to the present.  
Effective: Spring 2013

**MUSIC 583 Studies in Choral Literature (2 per semester, maximum of 8)** Selected studies in choral literature of all types from the Renaissance to the present.  
Effective: Fall 2012

**MUSIC 585 Graduate Seminar in Keyboard Music 1710 to 1820 (2)** Seminar in music for keyboards (organ, harpsichord, pianoforte) from the early works of J.S. Bach (c. 1710) to late Beethoven.  
Effective: Summer 2008  
Prerequisite:

**MUSIC 586 Graduate Seminar in Piano Music 1820-1920 (2)** Seminar in music for pianoforte from the early works of Schubert, circa 1820, to Rachmaninoff (Romantic and post-Romantic).  
Effective: Summer 2008  
Prerequisite:

**MUSIC 587 Graduate Seminar in Piano Music 1890-Present (2)** Seminar in modern music for pianoforte from the early works of Debussy (circa 1890) to the present day.  
Effective: Summer 2008  
Prerequisite:

**MUSIC 588 Seminar in Music Literature of the Major Performance Area (1-3)** Selected studies in music literature

specific to the student's major performance area. Will include research, analysis, and performance.  
Effective: Summer 1991

**MUSIC 589 Seminar in Piano Pedagogy** (2) Selected variable topics in piano pedagogy; includes research, performance and discussion of appropriate literature, and class participation.  
Effective: Summer 1992  
Prerequisite:

**MUSIC 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1995

**MUSIC 594 Master's Paper Research** (1-6) Investigation of a specific problem in music or music education.  
Effective: Fall 1983

**MUSIC 595 Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 1994  
Prerequisite:

**MUSIC 595A Internship in Piano Pedagogy** (1) Piano performance and pedagogy majors observe experienced teachers and gain supervised teaching experience. Gradually assume responsibility for the lessons of one or two students.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**MUSIC 595B Internship in College Teaching** (2) Identify goals for undergraduate courses in general music; develop and structure learning experiences in music for students in higher education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**MUSIC 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**MUSIC 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 1987

**MUSIC 597A Philosophy of Music Education** (3) Philosophy of music education will focus on both major and minor philosophical premises in music education including historical works, current philosophies, and new directions for the future of this field. This course contains a significant amount of reading and preparation for discussion.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MUSIC 597B Philosophy of Music Education** (3) Covers a majority of popular philosophical approaches including aesthetic and praxial. This course is intended to fulfill the required philosophy course work of the Ph.D. degree in music education.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**MUSIC 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**MUSIC 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**MUSIC 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience for teaching assistants in music.  
Effective: Fall 1983

**MUSIC 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

**MUSIC 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

**MUSIC 801J Doctoral Solo Recital (DMA)** (2 per semester/maximum of 4) Culminating solo recital(s) of artist-level repertoire; may be repeated with different repertoire.  
Effective: Spring 2013  
Prerequisite:



**MUSIC 802J DMA Lecture-Recital Monograph** (1) Preparation of a monograph to be text of the DMA lecture-recital; must be approved prior to performance.

Effective: Fall 2012

Prerequisite:

**MUSIC 803J Performance of the DMA Lecture-Recital** (2) Performance of the D.M.A. lecture-recital (the lecture monograph to be pre-approved as MUSIC 802).

Effective: Fall 2012

Prerequisite:

**MUSIC 804J Chamber Music Recital (DMA)** (1 per semester/maximum of 2) Recital devoted to chamber music (including song groups or cycles for voice and piano). May be repeated.

Effective: Spring 2013

Prerequisite:

**MUSIC 805J DMA Final Recital** (3) Final, culminating solo recital of artist-level repertoire; independently prepared.

Effective: Fall 2012

Prerequisite:

**MUSIC 810 Choral Ensemble** (1 per semester/maximum of 4) Rehearsal and performance of choral music.

Effective: Spring 2012

**MUSIC 811 Instrumental Ensemble** (1 per semester/maximum of 6) Rehearsal and performance of instrumental music.

Effective: Summer 2012

**MUSIC 891J Graduate Degree Performance** (1) A juried recital performance for students majoring in performance, composition, or conducting.

Effective: Spring 2013

Prerequisite:

**MUSIC 896 Individual Studies** (1-9 per semester/maximum of 18) Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

Last Import from UCM: July 13, 2013 3:00 AM

## Music - Brass (BRASS)

**BRASS 420J Trumpet: Primary VII (2)** Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 421J French Horn: Primary VII (2)** Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 422J Trombone: Primary VII (2)** Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 423J Euphonium: Primary VII (2)** Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983

Prerequisite:

**BRASS 424J Tuba: Primary VII (2)** Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983

Prerequisite:

**BRASS 430J Trumpet: Performance VII (3)** Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

Effective: Fall 1983

Prerequisite:

**BRASS 431J French Horn: Performance VII (3)** Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

Effective: Fall 1983

Prerequisite:

**BRASS 432J Trombone: Performance VII (3)** Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

Effective: Fall 1983

Prerequisite:

**BRASS 433J Euphonium: Performance VII (3)** Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

Effective: Fall 1983

Prerequisite:

**BRASS 434J Tuba: Performance VII (3)** Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Effective: Fall 1983

Prerequisite:

**BRASS 470J Trumpet: Primary VIII (2)** Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 471J French Horn: Primary VIII (2)** Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 472J Trombone: Primary VIII (2)** Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 473J Euphonium: Primary VIII (2)** Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 474J Tuba: Primary VIII (2)** Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

**BRASS 480J Trumpet: Performance VIII (3)** Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

Effective: Fall 1983  
Prerequisite:

**BRASS 481J French Horn: Performance VIII (3)** Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

Effective: Fall 1983  
Prerequisite:

**BRASS 482J Trombone: Performance VIII (3)** Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

Effective: Fall 1983  
Prerequisite:

**BRASS 483J Euphonium: Performance VIII (3)** Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

Effective: Fall 1983  
Prerequisite:

**BRASS 484J Tuba: Performance VIII (3)** Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Effective: Fall 1983  
Prerequisite:

**BRASS 500J Trumpet: Secondary (1)** Individual instruction in trumpet one-half hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 501J French Horn: Secondary (1)** Individual instruction in French horn one-half hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 502J Trombone: Secondary (1)** Individual instruction in trombone one-half hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 503J Euphonium: Secondary (1)** Individual instruction in euphonium/baritone one-half hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 504J Tuba: Secondary (1)** Individual instruction in tuba one-half hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 510J Trumpet: Secondary (2)** Individual instruction in trumpet one hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 511J French Horn: Secondary (2)** Individual instruction in French horn one hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 512J Trombone: Secondary (2)** Individual instruction in trombone one hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 513J Euphonium: Secondary (2)** Individual instruction in euphonium/baritone one hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 514J Tuba: Secondary (2)** Individual instruction in tuba one hour per week.

Effective: Fall 1983  
Prerequisite:

**BRASS 530J Trumpet: Performance (4 per semester/maximum of 16)** Individual instruction in trumpet one hour per week. For graduate trumpet performance majors.

Effective: Fall 1986  
Prerequisite:

**BRASS 531J French Horn: Performance (4 per semester/maximum of 16)** Individual instruction in French Horn one hour per week. For graduate French horn performance majors.

Effective: Fall 1986  
Prerequisite:

**BRASS 532J Trombone: Performance (4 per semester/maximum of 16)** Individual instruction in trombone one hour per week. For graduate trombone majors.

Effective: Fall 1986  
Prerequisite:

**BRASS 533J Euphonium: Performance (4 per semester, maximum of 16)** Individual instruction in euphonium one hour per week. For graduate euphonium majors.

Effective: Spring 1992  
Prerequisite:

**BRASS 534J Tuba: Performance** (4 per semester/maximum of 16) Individual instruction in tuba two sessions per week. For graduate tuba performance majors.

Effective: Fall 1986

Prerequisite:

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## Music - Keyboard (KEYBD)

KEYBD 420J **Piano: Primary VII** (2) Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

KEYBD 430J **Piano: Performance VII** (3) Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

Effective: Fall 1983

Prerequisite:

KEYBD 470J **Piano: Primary VIII** (2) Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

KEYBD 480J **Piano: Performance VIII** (3) Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

Effective: Fall 1983

Prerequisite:

KEYBD 500J **Piano: Secondary** (1) Individual instruction in piano one-half hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

KEYBD 501J **Organ: Secondary** (1) Individual instruction in pipe organ one-half hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

KEYBD 510J **Piano: Secondary** (1) Individual instruction in piano one hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

KEYBD 530J **Piano: Performance** (4 per semester/maximum of 16) Individual instruction in piano one hour per week. For graduate piano performance majors.

Effective: Fall 1986

Prerequisite:

KEYBD 580J **Piano Performance Doctoral/Artist Level** (4) One-hour weekly piano lessons with jury examination at end of each semester; repeatable course; four semesters required.

Effective: Summer 2008

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## Music - Percussion (PERCN)

PERCN 420J **Percussion: Primary VII** (2) Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

PERCN 430J **Percussion: Performance VII** (3) Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

Effective: Fall 1983

Prerequisite:

PERCN 470J **Percussion: Primary VIII** (2) Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

PERCN 480J **Percussion: Performance VIII** (3) Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

Effective: Fall 1983

Prerequisite:

PERCN 500J **Percussion: Secondary** (1) Individual instruction in percussion one-half hour per week.

Effective: Fall 1983

Prerequisite:

PERCN 510J **Percussion: Secondary** (2) Individual instruction in percussion one hour per week.

Effective: Fall 1983

Prerequisite:

PERCN 530J **Percussion: Performance** (4 per semester/maximum of 16) Individual instruction in percussion one hour per week. For graduate percussion performance majors.

Effective: Fall 1986

Prerequisite:

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## Music - String (STRNG)

STRNG 420J **Violin: Primary VII** (2) Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 421J **Viola: Primary VII** (2) Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 422J **Violoncello: Primary VII** (2) Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 423J **Double Bass: Primary VII** (2) Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 430J **Violin: Performance VII** (3) Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 431J **Viola: Performance VII** (3) Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 432J **Violoncello: Performance VII** (3) Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 433J **Double Bass: Performance VII** (3) Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 470J **Violin: Primary VIII** (2) Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 471J **Viola: Primary VIII** (2) Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 472J **Violoncello: Primary VIII** (2) Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 473J **Double Bass: Primary VIII** (2) Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

Effective: Fall 1983  
Prerequisite:

STRNG 480J **Violin: Performance VIII** (3) Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 481J **Viola: Performance VIII** (3) Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 482J **Violoncello: Performance VIII** (3) Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

Effective: Fall 1983  
Prerequisite:

STRNG 483J **Double Bass: Performance VIII** (3) Individual instruction in double bass one hour per week. For B.Mus.

double bass performance majors.

Effective: Fall 1983

Prerequisite:

**STRNG 500J Violin: Secondary (1)** Individual instruction in violin one-half hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 501J Viola: Secondary (1)** Individual instruction in viola one-half hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 502J Violoncello: Secondary (1)** Individual instruction in violoncello one-half hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 503J Double Bass: Secondary (1)** Individual instruction in double bass one-half hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 510J Violin: Secondary (2)** Individual instruction in violin one hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 511J Viola: Secondary (2)** Individual instruction in viola one hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 512J Violoncello: Secondary (2)** Individual instruction in violoncello one hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 513J Double Bass: Secondary (2)** Individual instruction in double bass one hour per week. For students who qualify.

Effective: Fall 1983

Prerequisite:

**STRNG 530J Violin: Performance (4 per semester/maximum of 16)** Individual instruction in violin one hour per week. For graduate violin performance majors.

Effective: Fall 1986

Prerequisite:

**STRNG 531J Viola: Performance (4 per semester/maximum of 16)** Individual instruction in viola one hour per week. For graduate viola performance majors.

Effective: Fall 1986

Prerequisite:

**STRNG 532J Violoncello: Performance (4 per semester/maximum of 16)** Individual instruction in violoncello one hour per week. For graduate violoncello performance majors.

Effective: Fall 1986

Prerequisite:

**STRNG 533J Double Bass: Performance (4 per semester/maximum of 16)** Individual instruction in double bass one hour per week. For graduate double bass performance majors.

Effective: Fall 1986

Prerequisite:

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## Music - Voice (VOICE)

VOICE 412J **Musical Theatre Voice V** (2) Individual instruction in voice. Intended for Theatre BFA in Music Theatre students.

Effective: Fall 2006

Prerequisite:

VOICE 420J **Voice: Primary VII** (2) Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

VOICE 430J **Voice: Performance VII** (3) Individual instruction in voice one hour per week. For B.Mus. voice performance majors.

Effective: Fall 1983

Prerequisite:

VOICE 462J **Musical Theatre Voice VI** (2) Individual instruction in voice. Intended for Theatre BFA in Music Theatre students.

Effective: Fall 2006

Prerequisite:

VOICE 470J **Voice: Primary VIII** (2) Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983

Prerequisite:

VOICE 480J **Voice: Performance VIII** (3) Individual instruction in voice one hour per week. For B.Mus. voice performance majors.

Effective: Fall 1983

Prerequisite:

VOICE 500J **Voice: Secondary** (1) Individual instruction in voice one-half hour per week.

Effective: Fall 1983

Prerequisite:

VOICE 510J **Voice: Secondary** (2) Individual instruction in voice one hour per week.

Effective: Fall 1983

Prerequisite:

VOICE 530J **Voice: Performance** (4 per semester/maximum of 16) Individual instruction in voice one and one-half hours per week. For graduate voice performance majors.

Effective: Fall 1986

Prerequisite:

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## Music - Woodwinds (WWNDS)

WWNDS 420J **Flute: Primary VII** (2) Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 421J **Oboe: Primary VII** (2) Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 422J **Clarinet: Primary VII** (2) Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 423J **Bassoon: Primary VII** (2) Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 424J **Saxophone: Primary VII** (2) Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 430J **Flute: Performance VII** (3) Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 431J **Oboe: Performance VII** (3) Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 432J **Clarinet: Performance VII** (3) Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 433J **Bassoon: Performance VII** (3) Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 434J **Saxophone: Performance VII** (3) Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 470J **Flute: Primary VIII** (2) Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 471J **Oboe: Primary VIII** (2) Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 472J **Clarinet: Primary VIII** (2) Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 473J **Bassoon: Primary VIII** (2) Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 474J **Saxophone: Primary VIII** (2) Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

Effective: Fall 1983  
Prerequisite:

WWNDS 480J **Flute: Performance VIII** (3) Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

Effective: Fall 1983

Prerequisite:

WWNDS 481J **Oboe: Performance VIII** (3) Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

Effective: Fall 1983

Prerequisite:

WWNDS 482J **Clarinet: Performance VIII** (3) Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

Effective: Fall 1983

Prerequisite:

WWNDS 483J **Bassoon: Performance VIII** (3) Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

Effective: Fall 1983

Prerequisite:

WWNDS 484J **Saxophone: Performance VIII** (3) Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

Effective: Fall 1983

Prerequisite:

WWNDS 500J **Flute: Secondary** (1) Individual instruction in flute one-half hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 501J **Oboe: Secondary** (1) Individual instruction in oboe one-half hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 502J **Clarinet: Secondary** (1) Individual instruction in clarinet one-half hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 503J **Bassoon: Secondary** (1) Individual instruction in bassoon one-half hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 504J **Saxophone: Secondary** (1) Individual instruction in saxophone one-half hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 510J **Flute: Secondary** (2) Individual instruction in flute one hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 511J **Oboe: Secondary** (2) Individual instruction in oboe one hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 512J **Clarinet: Secondary** (2) Individual instruction in clarinet one hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 513J **Bassoon: Secondary** (2) Individual instruction in bassoon one hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 514J **Saxophone: Secondary** (2) Individual instruction in saxophone one hour per week.

Effective: Fall 1983

Prerequisite:

WWNDS 530J **Flute: Performance** (4 per semester/maximum of 16) Individual instruction in flute one and one-half hour per week. For graduate flute performance majors.

Effective: Fall 1986

Prerequisite:

WWNDS 531J **Oboe: Performance** (4 per semester/maximum of 16) Individual instruction in oboe one hour per week. For graduate oboe performance majors.

Effective: Fall 1986

Prerequisite:

WWNDS 532J **Clarinet: Performance** (4 per semester/maximum of 16) Individual instruction in clarinet one hour per week. For graduate clarinet performance majors.

Effective: Fall 1986

Prerequisite:

WWNDS 533J **Bassoon: Performance** (4 per semester/maximum of 16) Individual instruction in bassoon one hour per week. For graduate bassoon performance majors.

Effective: Fall 1986

Prerequisite:

WWNDS 534J **Saxophone: Performance** (4 per semester/maximum of 16) Individual instruction in saxophone one hour per

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week. For graduate saxophone performance majors.

Effective: Fall 1986

Prerequisite:

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## Music Education (MU ED)

MU ED 440 **Music Learning and Development** (2) Psychological principles related to music learning processes and applications of those to teaching music.

Effective: Spring 2010

Prerequisite:

MU ED 540 **Reflective Practice and Inquiry I** (2) This course will develop students' reflection in and on teaching through gaining understanding of systematic inquiry and reflection paradigms.

Effective: Spring 2010

MU ED 541 **Developing Music Curricula** (2) Introduction to the process for developing music curricula for grades K-12 that reflects current theories/research data as well as state/national guidelines.

Effective: Fall 2009

MU ED 545 **Psychological Foundations of Musical Behavior** (3) Study of psychoacoustical effects of musical stimuli; emphasis on responses affecting learning musical ability, musical taste, and aesthetic reactions.

Effective: Fall 2009

MU ED 546 **Assessment of Music Learning** (2) Exploration of the unique processes, techniques, and challenges involved in the assessment of music learning.

Effective: Fall 2009

MU ED 547 **Mentoring Novice Teachers** (1 per semester/maximum of 2) Strategies for mentoring novice music teachers in peer teaching experiences and in K-12 school field experiences.

Effective: Summer 2010

MU ED 550 **Reflective Practice and Inquiry II** (2) This course will use systematic inquiry and reflection to assist students' in understanding the relevance of research methods in music education.

Effective: Spring 2010

Prerequisite:

MU ED 555 **Doctoral Seminar in Music Education** (1 per semester, maximum of 6) Forum for the discussion of problems in theory and design encountered in individual and group research projects.

Effective: Fall 2009

Prerequisite:

MU ED 557 **Readings in the History of American Music Education** (2) Intensive reading course on the history of American music education and the social, theological, and educational influences on the profession.

Effective: Fall 2009

MU ED 559 **Contemporary Issues in Music Education** (1-2) Consideration of the current political and pedagogical issues that influence curriculum development, teaching, and administration of K-12 music programs.

Effective: Fall 2009

MU ED 895 **Practicum in Music Teaching** (1 per semester/maximum of 4) Field experiences in music teaching for graduate students in music education.

Effective: Summer 2012

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## **Neural & Behav Sci (NBS)**

NBS 725 **Neural and Behavioral Science** (13) Organized around the neural and behavioral sciences; builds on Year I knowledge.

Effective: Fall 1998

Prerequisite:

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## Neuroscience-Hy (NEURO)

NEURO 511 (ANAT 511) **Neurobiology II** (3) Structure and physiology of central and peripheral nervous system, including specific sense organs.

Effective: Summer 1987

Prerequisite:

NEURO 512 **Comparative Neuroanatomy** (4) This course elucidates the structural organization of the nervous system and describes the evolutionary principles that guide brain development.

Effective: Fall 2013 Future: Fall 2013

NEURO 515 (ANAT 515) **Developmental Neurobiology** (2) Development of the nervous system in all its aspects.

Effective: Fall 1986

NEURO 520 **Cellular and Molecular Neuroscience** (3) An introduction to neurons, glia, and the molecular basis of brain function.

Effective: Fall 1998

NEURO 521 **Systems Neuroscience** (3) An introduction to the major neural systems and their integrative functions.

Effective: Spring 2007

NEURO 522 **Seminars in Neuroscience I** (2) Study at the cellular, molecular, and metabolic level of selected subjects in neuroscience.

Effective: Spring 2007

NEURO 523 **Seminars in Neuroscience II** (2) Study at the cellular, molecular, and metabolic level of selected subjects in neuroscience.

Effective: Spring 2007

NEURO 530 **Professional Development and Responsible Conduct in Science** (1) An introduction to the professional skills necessary for careers in biomedical sciences.

Effective: Spring 1999

NEURO 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

Effective: Spring 1987

NEURO 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Spring 1987

NEURO 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

NEURO 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

NEURO 597A **Introduction to Neuroscience Research** (2) This course will provide an introduction to neuroscience research and its relevance to neurological research. The course meets every Tuesdays 2-5, Wednesday 6-9 and Fridays 12-3 and will consist of lectures, laboratory (human brain specimens, microscope slides, models and radiology), patient demonstrations and group discussions. Fundamentals of techniques used in research like various forms of microscopy and morphometry, histology, immunohistochemistry, microdialysis, stereotactic surgery, cell culture, electrophysiology, signal processing, tracer injections, brain imaging, optogenetics, behavioral assessments, drug treatments, stem cells, gene therapy and use of recombinant technology in neurosciences will be covered .

Effective: Summer 2013 Ending: Summer 2013

NEURO 597A **Neuroscience Seminar** (2) This course examines issues in neuroscience related to the research presented by invited speakers in the Neuroscience Seminar Series. This course is for first-year neuroscience students.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

NEURO 600 **Thesis Research** (1-15) No Description.

Effective: Spring 1987

NEURO 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Spring 1987

NEURO 610 **Thesis Research Off Campus** (1-15) No Description.  
Effective: Spring 1987

NEURO 611 **Ph. D. Dissertation Part-Time** (0) No Description.)  
Effective: Spring 1987

NEURO 740 **Neurology Clerkship** (5) To teach the principles and skills underlying the recognition and management of the neurologic diseases that a general medical practitioner is most likely to encounter in practice.  
Effective: Summer 2006  
Prerequisite:

NEURO 796 **Neurology Individual Studies** (5) Neurology individual studies.  
Effective: Spring 2009  
Prerequisite:

NEURO 796A **Neurology Individual Studies for 3rd Year** (2.5) Neurology individual studies 3rd year.  
Effective: Spring 2009

NEURO 797 **Neurology Special Topics** (5) Neurology Special Topics.  
Effective: Spring 2009  
Prerequisite:

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## **Neurosurgery (NSURG)**

**NSURG 750 Neurosurgery Acting Internship** (5) Neurosurgery Acting Internship.

Effective: Spring 2010

Prerequisite:

**NSURG 750A Neurosurgery Elective for 3rd Year Medical Students** (2.5) Neurosurgery Elective for 3rd Year Medical Students.

Effective: Spring 2010

Prerequisite:

**NSURG 796 Neurosurgery Individual Studies** (5) Neurosurgery Individual Studies.

Effective: Spring 2010

Prerequisite:

**NSURG 796A Neurosurgery Individual Studies 3rd Year** (2.5) Neurosurgery Individual Studies for 3rd Year Medical Students.

Effective: Spring 2010

Prerequisite:

**NSURG 797 Neurosurgery Special Topics** (5) Neurosurgery Special Topics.

Effective: Spring 2010

Prerequisite:

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## Nuclear Engineering (NUC E)

NUC E 401 **Introduction to Nuclear Engineering** (3) Fundamental concepts of nuclear engineering, including fission, reactor theory, shielding, and radioisotopes; intended for other than nuclear engineering students.

Effective: Fall 2001

Prerequisite:

NUC E 403 **Advanced Reactor Design** (3) Physical principles and computational methods for reactor analysis and design. Multigroup diffusion theory; determination of fast and thermal group constants; cell calculations for heterogeneous core lattices.

Effective: Fall 1983

Prerequisite:

NUC E 405 (CHEM 406) **Nuclear and Radiochemistry** (3) Theory of radioactive decay processes, nuclear properties and structure, nuclear reactions, interactions of radiation with matter, biological effects of radiation.

Effective: Spring 2007

Prerequisite:

NUC E 406 (M E 406) **Introduction to Statistical Thermodynamics** (3) Statistical description of systems composed of large numbers of particles in the context of classical and quantum mechanics; basic concepts of probability theory and thermodynamics as they relate to statistical mechanics.

Effective: Fall 2007

Prerequisite:

NUC E 408 **Radiation Shielding** (3) Radiation sources in reactor systems; attenuation of gamma rays and neutrons; point kernel methods; deep penetration theories; Monte Carlo methods.

Effective: Spring 1985

Prerequisite:

NUC E 409 (MATSE 409) **Nuclear Materials** (3) Nuclear reactor materials: relationship between changes in material properties and microstructural evolution of nuclear cladding and fuel under irradiation.

Effective: Spring 2003

Prerequisite:

NUC E 420 **Radiological Safety** (3) Ionizing radiation, biological effects, radiation measurement, dose computational techniques, local and federal regulations, exposure control.

Effective: Spring 1997

Prerequisite:

NUC E 428 **Radioactive Waste Control** (3) Nature, sources, and control of radioactive wastes; theory and practice of disposal processes.

Effective: Spring 1997

Prerequisite:

NUC E 430 **Design Principles of Reactor Systems** (3) Nuclear power cycles; heat removal problems; kinetic behavior of nuclear systems; material and structural design problems.

Effective: Fall 2007

Prerequisite:

NUC E 431W **Nuclear Reactor Core Design Synthesis** (4) Technical and economic optimization of nuclear systems.

Effective: Spring 1994

Prerequisite:

NUC E 446 (M E 446) **Reliability and Risk Concepts in Design** (3) Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications.

Effective: Spring 2011

Prerequisite:

NUC E 450 **Radiation Detection and Measurement** (3) Theory and laboratory applications of radiation detectors, including proton, neutron, charged particle detectors, NIM devices, and pulse-height analysis.

Effective: Spring 2001

Prerequisite:

NUC E 451 **Experiments in Reactor Physics** (3) Acquisition and processing of nuclear and atomic data; application to nucleonic phenomena of importance in nuclear engineering.

Effective: Spring 2008

Prerequisite:

NUC E 470 **Power Plant Simulation** (3) Basic knowledge necessary for intelligent simulation and interpretation of simulations of transients in nuclear power plants.

Effective: Fall 2007

Prerequisite:

NUC E 490 (AERSP 490, E E 471) **Introduction to Plasmas** (3) Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

Effective: Spring 2008

Prerequisite:

NUC E 494H **Senior Thesis** (1-9) Students must have approval of a thesis adviser before scheduling this course.

Effective: Spring 2007

Prerequisite:

NUC E 496 **Independent studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

NUC E 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

NUC E 497A **Fundamentals of Nuclear Engineering** (3) An intensive course providing introduction to Nuclear Engineering to undergraduate co-op students, non-NucE graduate, and returning students.

Effective: Summer 2013 Ending: Summer 2013

NUC E 497A **Fundamentals of Nuclear Engineering** (1) An intensive course providing introduction to Nuclear Engineering to undergraduate co-op students, non-NucE graduate, and returning students.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

NUC E 497A **Fundamentals of Nuclear Engineering** (3) An intensive course providing introduction to Nuclear Engineering to undergraduate co-op students, non-NucE graduate, and returning students.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

NUC E 497D **Radiation Detection Measurement Lab** (1) Theory and laboratory applications of radiation detectors, including proton, neutron, charged particle detectors, NIM devices, and pulse-height analysis.

Effective: Summer 2013 Ending: Summer 2013

NUC E 497K (M E 497K) **Thermal-Hydraulics of Two-Phase Flow in Energy Systems** (3) This course provides students with fundamental knowledge necessary for thermal-hydraulic analysis of single-phase and two-phase flow systems. The power reactor will be employed as a generic example of the thermal-hydraulic energy systems. In single-phase flow analysis, the one-dimensional thermal-hydraulic systems analysis method, which is often employed by the industry's system analysis code, will be introduced for normal and off-normal plant operating conditions.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

NUC E 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2008

NUC E 501 **Reactor Engineering** (3) Thermal hydraulic fundamentals applied to power reactors, thermal analysis of fuel elements and two-phase heat transfer in heated channels.

Effective: Spring 1992

Prerequisite:

NUC E 502 **Reactor Core Thermal-Hydraulics** (3) In-depth analysis of the reactor core thermal hydraulics; computational methods and practical applications.

Effective: Fall 2010

Prerequisite:

NUC E 505 **Reactor Instrumentation and Control** (3) Reactor control principles; classical control methods; operational control problems; control simulation using modern mainframe and microcomputer software packages; reactor instrumentation.

Effective: Spring 1992

Prerequisite:

NUC E 506 **Nuclear Chemistry** (3) Energetics, kinematics, and models of nuclear reactions; nuclear processes as chemical probes, mossbauer effect and perturbed angular correlation spectroscopy.

Effective: Summer 1991

NUC E 511 **Nuclear Reactor Kinetics and Dynamics** (3) Analytical kinetics and dynamics modeling for reactivity-induced transients; reactor accident kinetics methods for simple and complex geometries; experimental methods.

Effective: Spring 2011

Prerequisite:

NUC E 512 **Nuclear Fuel Management** (3) Nuclear fuel inventory determination and economic value through the fuel cycle. Emphasis on calculational techniques in reactor, optimization, and design.

Effective: Fall 1983

Prerequisite:

NUC E 521 **Neutron Transport Theory** (3) Derivation of Boltzmann equation for neutron transport; techniques of approximate and exact solution for the monoenergetic and spectrum regenerating cases.

Effective: Fall 1986

Prerequisite:

NUC E 523 (MATSE 523) **Environmental Degradation of Materials in Nuclear Power Plants** (3) Degradation of materials performance when exposed to the combination of high temperature, neutron irradiation, and aggressive electrochemistry found in nuclear reactors.

Effective: Spring 2011

Prerequisite:

NUC E 525 **Monte Carlo Methods** (3) Fundamentals of the probability theory and statistics, analog and non-analog Monte Carlo methods and their applications, random processes, and numbers.

Effective: Summer 1993

Prerequisite:

NUC E 530 **Parallel/Vector Algorithms for Scientific Applications** (3) Development/analysis of parallel/vector algorithms (finite-differencing of PDEs and Monte Carlo methods) for engineering/scientific applications for shared and distributed memory architectures.

Effective: Spring 2008

Prerequisite:

NUC E 540 (AERSP 540) **Theory of Plasma Waves** (3) Solutions of the Boltzmann equation; waves in bounded and unbounded plasmas; radiation and scattering from plasmas.

Effective: Spring 2012

Prerequisite:

NUC E 541 **Plasma Theory** (3) Advanced topics in kinetic theory, fluctuation theory, microinstability, and turbulence.

Effective: Spring 2012

Prerequisite:

NUC E 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1991

NUC E 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

NUC E 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

NUC E 597F **Nuclear Fusion** (3) Production of energy from controlled thermonuclear fusion. Nuclear fusion reactions, plasma physics, magnetic and inertial confinement, and fusion reactor technology.

Effective: Summer 2013 Ending: Summer 2013

NUC E 597F **Nuclear Fusion** (3) Production of energy from controlled thermonuclear fusion. Nuclear fusion reactions, plasma physics, magnetic and inertial confinement and fusion reactor technology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

NUC E 597G **Nuclear Fuel Cycle Primer with Emphasis on Safety, Safeguards and Security** (3) Nuclear fuel cycle, safety, security and safeguards and 3S approach; IAEA international safeguards; economic and political dimensions of the nuclear fuel cycle.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

NUC E 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

NUC E 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 1983

NUC E 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Graduate assistants receive credit for teaching lower level courses while under the direct supervision of a graduate faculty member.

Effective: Fall 1983

Prerequisite:

NUC E 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

NUC E 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1983



## Nursing (NURS)

**NURS 401 (IL) Concepts of Health** (3) Exploration of current and ancient concepts of health and their respective modes of intervention.

Effective: Fall 2008

Prerequisite:

**NURS 402 (US;IL) Holistic Health** (3) Examination of emerging conceptualizations of health and therapy based on a holistic view of human beings.

Effective: Fall 2008

Prerequisite:

**NURS 403 School Health and Emergency Care of Children and Adolescents** (3) Techniques for higher-level care for school health and emergency situations and application-based education.

Effective: Spring 2010

Prerequisite:

**NURS 404 Cardiac Dysrhythmias: Interpretation, Treatment, and Nursing Management** (1) An introductory course with a focus on dysrhythmia recognition and interpretation of abnormal 12-lead electrocardiograms (EKG, ECG).

Effective: Fall 2008

Prerequisite:

**NURS 405A Nursing Care of the Adult Client with Complex Health Problems: Part A** (4) In-depth study of care of patients with acute and complex health problems, utilizing evidence based practice.

Effective: Fall 2012

Prerequisite:

**NURS 405B Nursing Care of the Adult Client with Complex Health Problems: Part B** (4) In-depth study of care of patients with acute and complex health problems, utilizing evidence based practice.

Effective: Fall 2012

Prerequisite:

**NURS 407 Drugs of Abuse and Mental Health Issues** (3) Examines the health care needs across the lifespan of clients who have an alcohol or other drug disorder.

Effective: Fall 2008

Prerequisite:

**NURS 408 Clinical Application of Pharmacological Concepts** (1) Study of the application of pharmacological concepts to the clinical setting.

Effective: Spring 2011

Prerequisite:

**NURS 409 Introduction to Forensic Nursing** (3) Provides an introduction to the forensic health sciences, forensic nursing, and the nursing role in the scientific investigation of violence.

Effective: Spring 2011

Prerequisite:

**NURS 410 Forensic Evidence Collection and Preservation** (3) Examines forensic nurse's role recognizing injuries/patterns of injury. Evidence collection procedures are examined from collection to courtroom presentation.

Effective: Spring 2013

Prerequisite:

**NURS 411 Seminar in Forensic Nursing** (3) Seminar to discuss current topics, trends and research related to forensic nursing.

Effective: Spring 2013

Prerequisite:

**NURS 415 (US;IL) Community and Family Health Nursing** (4) Therapeutic nursing care and health promotion concepts to families, groups and populations in the community.

Effective: Fall 2012

Prerequisite:

**NURS 417 (US;IL) Family and Community Health Concepts** (4) Study of the concepts of family and community based nursing care emphasizing multicultural influences on health practices.

Effective: Fall 2008

Prerequisite:

**NURS 420 Mental Health Nursing** (4) Emphasizes clinical application of mental health theory in nursing care of patients with acute and chronic mental health problems.

Effective: Fall 2012

Prerequisite:

**NURS 430 Organization and Administration for the Nurse Manager** (3) Introduction to organizational theory and principles of practice in the administration of nursing services and patient care.

Effective: Spring 2013

Prerequisite:

**NURS 431 Data Management for Nurse Managers** (3) Analysis of information systems to manage nursing service

organizations; includes financial management, the budgeting processes, and productivity measurement.

Effective: Spring 2013

Prerequisite:

**NURS 432 Nursing Management of Human Resources (3)** Human resource management and related factors in nursing service organizations.

Effective: Spring 2013

Prerequisite:

**NURS 433 Seminar for Nurse Managers (3)** Course focuses on the application of management principles in the role of the nurse manager.

Effective: Spring 2013

Prerequisite:

**NURS 440 Trauma/Critical Care Nursing (3)** Focuses on the impact of and the nursing care of persons experiencing acute trauma and/or critical illness.

Effective: Spring 2011

Prerequisite:

**NURS 450A Professional Role Development III: Leadership and Management (2)** Study of leadership roles and various styles of nursing management and their implications for the professional nurse.

Effective: Fall 2012

Prerequisite:

**NURS 450B Professional Role Development III: Clinical Capstone (3)** Senior level clinical capstone course that emphasizes the integration and application of theory and evidence based practice.

Effective: Fall 2012

Prerequisite:

**NURS 452 (US) (BB H 452, WMNST 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

Effective: Fall 2008 Ending: Summer 2013

Prerequisite:

**NURS 452 (US) (BB H 452, WMNST 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**NURS 458 Ethical Challenges in Healthcare Informatics (3)** A case based collaboratory designed for the exploration and analysis of the ethical dilemmas facing healthcare informatics practitioners.

Effective: Spring 2011

**NURS 459 Legal and Professional Issues in School Nursing (3)** Legal and professional issues of school nurses and delivery impact of health care in school environment.

Effective: Spring 2010

Prerequisite:

**NURS 460 Advanced Concepts in Clinical Nursing Informatics (3)** An exploration of clinical informatics tools to support informatics practice.

Effective: Summer 2012

Prerequisite: Concurrent: NURS 458

**NURS 461 Perioperative Nursing (4)** Comprehensive introduction regarding fundamental principles and practices of the Operating Room Nurse when managing the care of the surgical patient.

Effective: Summer 2011

Prerequisite:

**NURS 462 Psychotropic Drugs and Children/Adolescents (1)** Study of psychotropic medications used to treat children and adolescents, including indications, actions, adverse reactions and implications for school nurses.

Effective: Summer 2011

Prerequisite:

**NURS 463 Compassionate Counseling for Children/Adolescents Dealing with Dying, Death, Other Life Crises (3)**

Explores issues involving dying, death and life crises which occur in today's world and affect school communities.

Effective: Spring 2013

Prerequisite:

**NURS 464 (US;IL) Dying and Death (3)** Explores attitudes toward death and dying; concept of grief; responsibilities to the dying person and the family.

Effective: Fall 2008

Prerequisite:

**NURS 465 Health Concepts for Adults with Complex Health Care Needs (3)** In-depth study and application of the theoretical principles and roles of adult clients and families with complex healthcare needs.

Effective: Spring 2011

Prerequisite:

**NURS 467 Medication Update and Health Teaching Interventions for School Nurses (1)** Study of current pharmacologic concepts, including health teaching, prescribed for acute and chronic conditions commonly encountered in school nursing.

Effective: Summer 2011

Prerequisite:

**NURS 468 Client Education Strategies for Nurses and Other Health Care Providers (3)** Explores current and emerging roles of client education in the knowledge era.

Effective: Summer 2011

Prerequisite:

**NURS 470 Autism Spectrum Disorders: Care Overview (1)** Overview of autism spectrum disorders including resources related to children with autism spectrum disorders.

Effective: Spring 2013

Prerequisite:

**NURS 471 Issues in Bullying for Health Professionals (1)** Explores the impact of bullying on individuals, schools, teachers, families, of the target and the bully.

Effective: Summer 2012

Prerequisite:

**NURS 472 Relational Aggression in the Healthcare Setting (3)** An exploration of research and interventions for relational aggression in the healthcare setting.

Effective: Summer 2013

Prerequisite:

**NURS 475 Integrated Concepts in Nursing Practice (3)** Project-based capstone course for application of nursing concepts to health promotion/disease prevention in populations.

Effective: Spring 2011

Prerequisite:

**NURS 492 Emergency Care and Safety (3)** A comprehensive first aid course designed to provide knowledge of prehospital emergency care at the First Responder level.

Effective: Fall 2008

Prerequisite:

**NURS 494H Honors Thesis (1-6 per semester/maximum of 6)** Independent honors research project related to student's interests directed by faculty supervisor and culminating in production of thesis.

Effective: Summer 2010

Prerequisite:

**NURS 495 Nursing Study in Specialized Setting (1-12)** Designed to provide student with in-depth study and practice in clinical specialty area of choice.

Effective: Fall 2008

Prerequisite:

**NURS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2008

**NURS 496A Nurse Residency 1 (1)** This course is the first in a series of three being offered at PSHMC for registered nurses interested in becoming preceptors for nursing students and new staff nurses.

Effective: Summer 2013 Ending: Summer 2013

**NURS 496A Nurse Residency 1 (1)** This course provides the foundational information needed in developing the role of the nurse preceptor.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NURS 496B Nurse Residency II (2)** This course is the second in a series of three being offered at PSHMC for registered nurses interested in becoming preceptors for nursing students and new staff nurses.

Effective: Summer 2013 Ending: Summer 2013

**NURS 496B Nurse Residency 2 (2)** This course provides advanced knowledge needed in developing the role of the nurse preceptor.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NURS 496C Trauma Nursing (1-6)** Comprehensive course in the care of post trauma events.

Effective: Summer 2013 Ending: Summer 2013

**NURS 496C Behavioral Health Services (1-6)** Exploring behavioral health services in the greater erie community.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NURS 496D Handwashing in Schoolage Children (1-6)** Transmission of disease by school children.

Effective: Summer 2013 Ending: Summer 2013



**NURS 496D Wound Care Management and Certification** (1-6) In-depth study on wound care management and certification.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**NURS 496E Trauma Nursing** (1-6) UPMC Hamot offered trauma course, earned 35.8 ceus passed post test, received ceu certificate.

Effective: Summer 2013 Ending: Summer 2013

**NURS 496E Trauma Nursing Comprehensive Course in the Care of Post Trauma Events** (1-6) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NURS 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2008

**NURS 497A Neurological Assessment Skills for the School of Nurse** (1) Basic review of neurological system and offers specific information on seizures and concussion injuries related to the school age child.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**NURS 497A Ethical and Legal Context of Nursing** (3) This course will explore the legal and ethical dimensions of clinical nursing practice and research.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NURS 497A Business of Nursing** (3) Teaches students basic business principles as they apply to nursing and health related entrepreneur.

Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

**NURS 497B Complexity Science, Health and Education** (3) Provides an introduction to Complexity Science; its interdisciplinary presence in basic science, social science, education, management, and healthcare professions; and its specific relevance for transformation in nursing.

Effective: Summer 2013 Ending: Summer 2013

**NURS 497B Complexity Science, Health, and Education** (3) Provides an introduction to Complexity Science; its interdisciplinary presence in basic science, social science, education, management, and healthcare professions; and its specific relevance for transformation in nursing.

Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

**NURS 497B Ethical and Legal Context of Nursing** (3) Explores the legal and ethical dimensions of clinical nursing practice and research.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**NURS 497C Nurse Preceptorship** (3) This course provides practical application of the theories of precepting in the clinical setting.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NURS 497D Relational Aggression in the Healthcare Setting** (3) This course considers the emerging research related to relational aggression, bullying and power structures within the healthcare setting. Concepts of leadership, mentoring, assertiveness training and other options are explored as tools to address the issue of relational aggression.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**NURS 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2008

**NURS 499 (IL) Foreign Study--Nursing** (1-9) Study of nursing issues in a foreign country.

Effective: Fall 2008

**NURS 501 Issues in Nursing and Health Care** (3) Analysis and evaluation of the health care system with emphasis on health policy and economic issues affecting nursing practice.

Effective: Fall 2008

**NURS 502 Advanced Health Assessment of Adult Populations** (3) Advanced nursing assessment and diagnosis of physical, psychosocial and developmental health for adults and families across the adult age spectrum.

Effective: Spring 2012

**NURS 502A Advanced Health Assessment of Pediatric Populations** (1) Advanced nursing assessment and diagnosis of physical, psychosocial and development health for individuals and families across the pediatric age spectrum.

Effective: Fall 2011

Concurrent: NURS 502

**NURS 503 Pathophysiology** (3) Integration of advanced physiology, genetics, and pathophysiology as related to specific disease entities and alterations in functioning.

Effective: Fall 2008

**NURS 504 Pharmacologic Therapy** (3) Use of pharmacologic therapies in advanced practice nursing.

Effective: Fall 2008

**NURS 508 Perspectives in Population-Based Health** (3) Theories and strategies for promoting health in community aggregates with emphasis on vulnerable and underserved populations of diverse backgrounds.

Effective: Fall 2008

**NURS 510 Theoretical Foundations of Nursing** (3) Current conceptual and theoretical models in nursing including relationship to practice and research in development of nursing science.

Effective: Fall 2008 Ending: Fall 2013

**NURS 510 Theoretical and Scientific Foundations of Advanced Nursing Practice** (3) Examines the relationship of nursing theories to the development of nursing science, as well as current scientific advances that guide nursing practice and research.

Effective: Spring 2014 Future: Spring 2014

**NURS 512 Nursing Research** (3) A nursing research course with emphasis on research design, data collection methods, and evaluation of research studies.

Effective: Fall 2008 Ending: Summer 2013

Prerequisite:

**NURS 512 Nursing Research** (3) A nursing research course with emphasis on research design, data collection methods, and evaluation of research studies.

Effective: Fall 2013 Future: Fall 2013

**NURS 522 Comprehensive Assessment of the Older Adult** (3) Advanced nursing assessment of biological, physical, clinical, functional, cognitive, psychological, and social changes associated with aging.

Effective: Summer 2009

Prerequisite:

**NURS 523 Interventions for Common Health Problems in Older Adults** (3) Discussion of common acute and chronic health problems experienced by older adults and development of evidence-based interventions for management.

Effective: Fall 2011

Prerequisite:

**NURS 527 Promoting Healthy Lifestyles in the School-Age Population** (3) This course will focus on promoting health lifestyles for the school age population.

Effective: Summer 2011

**NURS 580 Epistemology of Nursing Science** (3) Examines the development and organization of nursing knowledge; nursing theories are critically analyzed in relationship to the substantive structure of nursing science.

Effective: Fall 2008

Prerequisite:

**NURS 581 Developing Theoretical Constructs Relevant to Nursing** (3) This course provides experience in concept analysis as one mechanism facilitating the development of nursing knowledge.

Effective: Fall 2008

Prerequisite:

**NURS 582 Scientific Basis for Nursing Practice** (3) Critical appraisal of the scientific basis of selected areas of nursing practice.

Effective: Fall 2008

Prerequisite:

**NURS 583 Advanced Seminar in Nursing Science** (3) Intense interactive seminar for synthesizing prior content into the design of dissertation research.

Effective: Fall 2008

Prerequisite:

**NURS 585 Qualitative Methods in Health Research** (3) Provides an overview of advanced qualitative research methodologies useful in the conduct of social and behavioral health research.

Effective: Spring 2012

**NURS 586 Quantitative Methods in Health Research (3)** An overview of methodological considerations specific to quantitative health research.

Effective: Spring 2012

Prerequisite:

**NURS 587 Ethics in Nursing Research (1)** Provides the theoretical and practical knowledge needed to design and conduct ethically responsible social and behavioral health research.

Effective: Fall 2008

Prerequisite:

**NURS 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2008

**NURS 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2008

**NURS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2008

**NURS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 2008

**NURS 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Fall 2008

**NURS 600 Thesis Research (1-15)** No description.

Effective: Fall 2008

**NURS 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 2008

**NURS 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Provides an opportunity for supervised and graded teaching experience in undergraduate nursing courses.

Effective: Fall 2008

**NURS 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 2008

**NURS 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Fall 2008

**NURS 818 Clinical Nurse Specialist I: Concepts and Theory (4)** Development of a conceptual foundation for advanced nursing practice as a Clinical Nurse Specialist.

Effective: Spring 2012

Prerequisite:

**NURS 819 Clinical Nurse Specialist II: Analysis and Application (4)** Analysis and application of nursing interventions for individuals, families, and aggregate groups in varied health care delivery settings.

Effective: Summer 2012

Prerequisite:

**NURS 821 Nurse Practicum: Clinical Nurse Specialist (4-8 per semester/maximum of 8)** Integration and synthesis of specialty knowledge and theories into the CNS role.

Effective: Summer 2012

Prerequisite:

**NURS 823 Interventions for Common Health Problems in the Adult/Older Adult (4)** Discussion of common health problems experienced by adults/older adults and development of evidence-based interventions for management.

Effective: Fall 2011

Prerequisite:

**NURS 840 Nursing Education Theories and Strategies (3)** Theoretical foundation and evidence-based strategies for nursing education.

Effective: Summer 2012

**NURS 841 Assessment and Evaluation in Nursing Education (3)** Methods for assessment, measurement, and evaluation of student learning in academic and clinical settings.

Effective: Summer 2012

Prerequisite:

**NURS 842 Curriculum and Program Development in Nursing Education (3)** Curriculum design and evaluation, educational program development, and accreditation.

Effective: Summer 2012

Prerequisite:

**NURS 843 Synthesis and Application of the Nurse Educator Role (4)** Practicum in the application of the nurse educator role in academic and healthcare settings.

Effective: Summer 2012

Prerequisite:

**NURS 845 Healthcare Economics and Policy for Nurse Administrators (3)** Concepts of healthcare economics and policy for nurse administrators

Effective: Fall 2012

**NURS 846 Leadership Concepts and Theories for Nurse Administrators (3)** Concepts and theories of leadership for nurse administrators.

Effective: Summer 2012

**NURS 847 Human Resource and Work Force Issues for Nurse Administrators (3)** Human resource management and work force issues for nurse administrators.

Effective: Summer 2012

Prerequisite:

**NURS 848 Synthesis and Application of the Nurse Administrator Role (4)** Practicum in the application of the nurse administrator role in health care settings.

Effective: Summer 2012

Prerequisite:

**NURS 860 Adult Gerontology Acute Care Nurse Practitioner Role I (3)** Acute Care Nurse Practitioner role across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions to restore or maximize health.

Effective: Summer 2012

Prerequisite: Concurrent: NURS 862

**NURS 861 Adult Gerontology Acute Care Nurse Practitioner Role II (3)** Continuation of Acute Care Nurse Practitioner role across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions to restore or maximize health.

Effective: Summer 2012

Prerequisite: Concurrent: NURS 863

**NURS 862 Adult Gerontology Acute Care Nurse Practitioner Practicum I (4)** Adult Gerontology Acute Care Nurse Practitioner practicum with patients across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

Effective: Summer 2012

Prerequisite: Concurrent: NURS 860

**NURS 863 Adult Gerontology Acute Care Nurse Practitioner Practicum II (4)** Adult Gerontology Acute Care Nurse Practitioner practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

Effective: Summer 2012

Prerequisite: Concurrent: NURS 861

**NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (6)** Adult Gerontology Acute Care Nurse Practitioner integrative practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

Effective: Summer 2012 Ending: Summer 2013

Prerequisite:

**NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)** Adult Gerontology Acute Care Nurse Practitioner integrative practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**NURS 865 Pharmacology for Acute Care Nurse Practitioners (1)** Principles of clinical pharmacology as applied to management of complex acute, critical, and chronically ill adult and older adult patients.

Effective: Summer 2012

Concurrent: NURS 504

**NURS 866 Health Assessment of the Adult Gerontology Population in Acute Care (1)** Physical assessment and diagnostics for physical and psychosocial health of adult and older adult individuals and families with acute and critical illness.

Effective: Summer 2012

Concurrent: NURS 502

**NURS 870 Nurse Practitioner Role with Healthy Individuals and Families (3)** Nurse Practitioner role to promote health, prevent illness, and manage common acute/episodic health problems across the adult-older adult age spectrum.

Effective: Spring 2012

Prerequisite: Concurrent: NURS 872 or NURS 872A

**NURS 871 Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems (3)** Nurse Practitioner role with individuals and families to maximize health and manage complex and/or chronic health problems.

Effective: Spring 2012

Prerequisite: Concurrent: NURS 873 or NURS 873A

**NURS 872 Family Nurse Practitioner Practicum I (3)** Family Nurse Practitioner practicum with individuals and families across the life span experiencing common acute/episodic health problems.

Effective: Spring 2012

Prerequisite: Concurrent: NURS 870 NURS 875

**NURS 872A Adult Gerontology Primary Care Nurse Practitioner Practicum I (4)** Adult Gerontology Primary Care Nurse Practitioner practicum with individuals and families across the adult/older adult age spectrum experiencing common acute/episodic health problems.

Effective: Fall 2011

Prerequisite: Concurrent: NURS 870

**NURS 873 Family Nurse Practitioner Practicum II (4)** Family Nurse Practitioner practicum with individuals and families across the life span experiencing complex and/or chronic health problems.

Effective: Spring 2012

Prerequisite: Concurrent: NURS 871

**NURS 873A Adult Gerontology Primary Care Nurse Practitioner Practicum II (4)** Adult Gerontology Primary Care Nurse Practitioner practicum with individual/families across the adult/older adult age spectrum experiencing complex and/or chronic health problems.

Effective: Fall 2011

Prerequisite: Concurrent: NURS 871

**NURS 874 Family Nurse Practitioner Integrative Practicum (6)** Family Nurse Practitioner integrative practicum with communities and individuals/families across the life span experiencing health and illness.

Effective: Fall 2012 Ending: Summer 2013

Prerequisite:

**NURS 874 Family Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)** Family Nurse Practitioner integrative practicum with communities and individuals/families across the life span experiencing health and illness.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**NURS 874A Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (6)** Adult Gerontology Primary Care Nurse Practitioner integrative practicum with communities and individuals/families experiencing health and illness.

Effective: Fall 2012 Ending: Summer 2013

Prerequisite:

**NURS 874A Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)** Adult Gerontology Primary Care Nurse Practitioner integrative practicum with communities and individuals/families experiencing health and illness.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**NURS 875 Nurse Practitioner Role with Children and Families (2)** Nurse Practitioner role with children and their families to promote health, prevent illness, and manage acute or chronic health problems.

Effective: Spring 2012

Prerequisite: Concurrent: NURS 576

**NURS 876 Family Nurse Practitioner Practicum with Pediatric Populations (2)** Family Nurse Practitioner practicum with pediatric populations/families during health or experiencing acute and chronic health problems.

Effective: Spring 2012

Prerequisite: Concurrent: NURS 870 NURS 872

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## Nutrition (NUTR)

**NUTR 400 Introduction to Nutrition Counseling (1)** No description.

Effective: Fall 1998

Prerequisite:

**NUTR 401 Nutrition Clinic Practicum (1-3)** To provide qualified nutrition students with the opportunity to practically apply nutrition counseling skills in a supervised environment.

Effective: Spring 2002

Prerequisite:

**NUTR 407 Nutrition for Exercise and Sports (3)** Interactions between nutrition, food selection, and timing of eating as they apply to exercise training and recreational physical activity.

Effective: Summer 2012

Prerequisite:

**NUTR 421 (US;IL) Food Culture and Health Trends (3)** Social-political, historic, and geographic roots of food patterns, featuring specific cuisine areas and nutritional disease patterns; includes foods laboratory.

Effective: Summer 2005

Prerequisite:

**NUTR 425 (IL) Global Nutrition Problems: Health, Science, and Ethics (3)** Examines causes of malnutrition and health problems in low-income countries; explores international cultures and ethical issues related to hunger.

Effective: Spring 2013

Prerequisite:

**NUTR 430 (IL) (S T S 430) Global Food Strategies: Problems and Prospects for Reducing World Hunger (3)**

Technological, social, and political solutions to providing basic food needs; food resources, population, and the environment; current issues.

Effective: Summer 2005

**NUTR 445 Nutrient Metabolism I (3)** Nutrients, their sources, metabolism, interrelationships and requirements with focus on carbohydrates, lipids, and proteins.

Effective: Spring 2001

Prerequisite:

**NUTR 446 Nutrient Metabolism II (3)** Continuation of NUTR 445; nutrients, their sources, metabolism, inter-relationships and requirements with focus on vitamins and minerals.

Effective: Summer 1994

Prerequisite:

**NUTR 451 Nutrition throughout the Life Cycle (3)** Application of basic principles of nutrition to nutritional and physiological needs throughout the life cycle from prenatal to aging.

Effective: Spring 2001

Prerequisite:

**NUTR 452 Nutritional Aspects of Disease (3)** Disturbances in metabolism related to human disease processes; principles of nutrition in therapy.

Effective: Spring 1995

Prerequisite:

**NUTR 453 Diet in Disease (3)** Nutrient and energy controlled diet programs. Implications for nutrition counseling and education.

Effective: Spring 1995

Prerequisite:

**NUTR 456 (US) Community Nutrition (3)** Programs and policies of nutrition-related activities of community agencies; factors pertinent to nutrition education; relationship of cultural and social identity to foods and nutrition.

Effective: Fall 2012

Prerequisite:

**NUTR 490W Nutrition Seminar (3)** Use of selected materials from the scientific literature to prepare a term paper and an oral report.

Effective: Spring 1995

Prerequisite:

**NUTR 494H Senior Honors Thesis (1-6)** Independent study related to a student's interests directed by a faculty supervisor and culminating in the production of a thesis.

Effective: Summer 2006

Prerequisite:

**NUTR 495 Advanced Field Experience in Nutrition (1-6)** Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity is required.

Effective: Spring 2001

Prerequisite:

**NUTR 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an

individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1992

**NUTR 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 1992

**NUTR 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1992

**NUTR 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

**NUTR 501 Regulation of Nutrient Metabolism I (4)** Integration of nutritional, biomedical, biochemical, physiological, and hormonal processes involved in carbohydrate, lipid, and protein metabolism.  
Effective: Fall 2012  
Prerequisite:

**NUTR 502 Regulation of Nutrient Metabolism II (3)** Complementary to NUTR 501 with an emphasis on metabolic roles of vitamin and mineral elements.  
Effective: Fall 2012  
Prerequisite:

**NUTR 506 (AN SC 506) Ruminology (3)** Physiological, biochemical, and microbiological activities occurring within the rumen and the relation of rumen function to animal response.  
Effective: Fall 2012  
Prerequisite:

**NUTR 508 (PHSIO 508) Critical Readings in Molecular Nutrition (1.5 per semester/maximum of 6)** Understanding of approaches, methods and current concepts in molecular biology and nutrition through critical readings of current primary literature.  
Effective: Summer 2013  
Concurrent: NUTR 445 or NUTR 446

**NUTR 511 Maternal and Infant Nutrition (2)** Physiological and psychosocial factors affecting human nutritional needs and feeding practices during the life cycle stages of pregnancy, lactation, and infancy.  
Effective: Fall 2012 Ending: Fall 2013  
Prerequisite:

**NUTR 511 Maternal and Child Nutrition (3)** Role of nutrition in female fertility, during pregnancy and lactation, as well as during infancy and early childhood.  
Effective: Spring 2014 Future: Spring 2014

**NUTR 513 Atherosclerosis and Nutrition (2)** The etiology and pathophysiology of atherosclerotic cardiovascular disease, with emphasis on nutritionally-related aspects.  
Effective: Fall 2012  
Prerequisite:

**NUTR 514 (VB SC 514) Prostaglandins and Leukotrienes (3)** Biochemical, physiological, and nutritional aspects of arachidonic acid and related essential fatty acid metabolism. Structure-activity relationships of prostaglandins, prostacyclins, thromboxanes, and leukotrienes.  
Effective: Fall 2012  
Prerequisite:

**NUTR 515 Mathematical Modeling in Nutrition (2)** Study of the theory and application of mathematical modeling of the tracer and tracee kinetics of nutrients and their metabolites in animals and man.  
Effective: Fall 2012  
Prerequisite:

**NUTR 520 Readings in Nutrition (1 per semester/maximum of 2)** Readings and reports of selected topics in nutrition.  
Effective: Spring 2013

**NUTR 532 (HD FS 532) Childhood Obesity (3)** This course addresses how genetic predispositions, behavioral and environmental factors affect children's obesity risk and examines strategies for obesity prevention.  
Effective: Spring 2012

**NUTR 533 (HD FS 533) Adult Obesity (3)** Important current and emerging topics in obesity research relevant to government policy and general public education; emphasis on adult obesity.  
Effective: Spring 2012

**NUTR 551 Seminar in Nutrition (1-6)** Selected topics and recent advances in nutrition.  
Effective: Fall 2012

**NUTR 581 Regulation of Nutrient Metabolism I** (4) Integration of nutritional, biomedical, biochemical, physiological, and hormonal processes involved in carbohydrate, lipid, and protein metabolism.

Effective: Fall 2012

Prerequisite:

**NUTR 583 Nutritional Epidemiology** (3) Epidemiological principles and methodology to study nutritional determinants of disease.

Effective: Fall 2012

Prerequisite:

**NUTR 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 2012

**NUTR 595A Application of Community Nutrition -- Internship** (3) Application and integration of community nutrition theories in a practicum environment under the supervision of preceptors in community agencies.

Effective: Fall 2012

Prerequisite:

**NUTR 595B Application of Food Service Management -- Internship** (3) Application and integration of food service management principles and motivation theories in a practicum environment under the supervision of preceptor.

Effective: Fall 2012

**NUTR 595C Dietetic Enrichment Experience - Dietetic Internship** (1) The enrichment experience is designed for interns to plan and implement a rotation of interest in the nutrition field.

Effective: Fall 2012

Prerequisite:

**NUTR 595D Application Clinical Nutrition -- Internship** (6) Application and integration of clinical nutrition theories in a practicum environment under the supervision of preceptor who is a registered dietitian.

Effective: Fall 2012

**NUTR 595E Introduction to Nutrition Research -- Internship** (1) Introduction of nutrition research to assist in the understanding of planning and conducting research studies in a variety of nutrition research laboratories.

Effective: Fall 2012

**NUTR 595F Professional Portfolio Internship** (1) Designing and completing a professional portfolio to assist in the employment process in the field of dietetics.

Effective: Fall 2012

**NUTR 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2012

**NUTR 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 2012

**NUTR 597B Eating and Weight Disorders** (2) This seminar will review and discuss historical theories and current literature on eating and weight disorders.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NUTR 597D Critical Readings in Molecular Nutrition** (1.5) Critical Readings in Molecular Nutrition uses a guided readings approach to critically evaluate current topics in molecular nutrition.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NUTR 597G Readings in Ingestive Behavior** (1) Students lead discussion of original research in the field of ingestive behavior with a focus on food intake in particular.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**NUTR 597G Critical Readings in Molecular Nutrition** (1.5) Critical Readings in Molecular Nutrition uses a guided readings approach to critically evaluate current topics in molecular nutrition.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**NUTR 597I Nutritional Immunology** (3) Role of nutritional factors in the modulation of inflammation and immunity, with a focus on infectious disease, auto immunity and cancer.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014



NUTR 597K (FD SC 597K) **Food Addiction: Fact or Fiction?** (3) Original literature using both human subjects and animal models relevant to the topic of food addiction will be discussed.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

NUTR 600 **Thesis Research** (1-15) No description.  
Effective: Fall 2012

NUTR 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 2012

NUTR 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Provides an opportunity for a supervised and graded experience for graduate students in teaching undergraduate courses in nutrition.  
Effective: Summer 2012

NUTR 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 2012

NUTR 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2012

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## Obstet/Gynecology-Hy (OBGYN)

OBGYN 700 **Obstetrics and Gynecology** (10) Required clerkship providing supervised clinical experience in obstetrics and gynecology.

Effective: Winter 1978

Prerequisite:

OBGYN 701 **OBGYN Externship/Subinternship** (5) An elective to provide advanced clinical experience involving community hospital OB/GYN, ambulatory OB/GYN, or selected subspecialties.

Effective: Summer 1985

Prerequisite:

OBGYN 710 **Clinical Gynecologic Oncology** (5) Active participation in evaluation and management of patients with gynecologic malignancies.

Effective: Summer 1988

Prerequisite:

OBGYN 720 **Ambulatory and Adolescent Gynecology Elective** (5) This course involves active participation in a community outpatient obstetric and gynecology practice.

Effective: Spring 2009

Prerequisite:

OBGYN 720A **Reproductive Endocrinology & Infertility Elective** (2.5) This course provides exposure to basic concepts of diagnosis and management of infertility, and of reproductive endocrinologic disorders of women including hyperandrogenicity and anovulation.

Effective: Summer 2006

Prerequisite:

OBGYN 721 **Clinical Endocrinology/Infertility** (5) Active participation in evaluation and management of outpatient/endocrinology/ infertility problems.

Effective: Spring 1989

Prerequisite:

OBGYN 722 **Clinical Perinatal Medicine Elective** (5) Management of women with pregnancies complicated by maternal and/or fetal disease will be learned in a high-risk pregnancy environment.

Effective: Spring 1990

Prerequisite:

OBGYN 722A **Perinatology Elective** (2.5) This course provides exposure to basic concepts of management of high risk pregnancies and medical complications of pregnancy.

Effective: Summer 2006

Prerequisite:

OBGYN 796 **OB/GYN Individual Studies** (5) A forum for collaborative research on an individual basis in areas of obstetrics and gynecology, including reproductive biology and endocrinology.

Effective: Spring 2009

Prerequisite:

OBGYN 796A **OB/GYN Individual Studies for 3rd Year** (2.5) OBGYN individual studies for 3rd year.

Effective: Spring 2009

OBGYN 797 **OB/GYN Special Topics** (5) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 2009

Prerequisite:

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## Operations Managemnt (OPMGT)

OPMGT 510 **Operations Management** (3) Integration and application of decision making to operational and policy problems within the business firm.  
Effective: Fall 1993

OPMGT 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 1992

OPMGT 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1992

OPMGT 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 1992

OPMGT 599 (IL) **Foreign Study--Operations Management** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2005  
Prerequisite:

OPMGT 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Fall 1992

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## **Operations Mmgt-Bd (OPMAN)**

OPMAN 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

OPMAN 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1987

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## **Operations Research (O R)**

O R 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

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## Ophthalmology (OPHTH)

OPHTH 760 **Ophthalmology Elective** (5) This course is designed to provide a broad experience in ophthalmology for any students, regardless of their future career goals.

Effective: Fall 2008

Prerequisite:

OPHTH 796 **Ophthalmology Individual Studies** (5) Ophthalmology Individual Studies

Effective: Spring 2010

Prerequisite:

OPHTH 796A **Ophthalmology Individual Studies 3rd Year** (2.5) Ophthalmology Individual Studies for Year 3 Medical Students.

Effective: Spring 2010

Prerequisite:

OPHTH 797 **Ophthalmology Special Topics** (5) Ophthalmology Special Topics

Effective: Spring 2010

Prerequisite:

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## Orthopaedics (ORTHO)

**ORTHO 710 Adult Orthopaedics for Third Year Students (5-15)** An in-depth experience in general adult orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

Effective: Summer 2002

Prerequisite:

**ORTHO 711 Pediatric Orthopaedics for Third Year Students (5)** An in-depth experience in pediatric orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

Effective: Summer 2002

Prerequisite:

**ORTHO 730 Adult Orthopaedics Acting Internship (5)** An in-depth experience in general adult orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

Effective: Spring 2009

Prerequisite:

**ORTHO 731 Pediatric Orthopaedics Acting Internship (5)** An in-depth experience in pediatric orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

Effective: Spring 2009

Prerequisite:

**ORTHO 740 Rehabilitation Medicine Elective (5)** An in-depth experience in rehabilitation medicine providing clinical experience in both the outpatient clinics and the inpatient unit.

Effective: Summer 2009

Prerequisite:

**ORTHO 741 York-Orthopedic Sports Medicine Elective 3rd or 4th Year Elective (5)** Course provides 4 week exposures to basic concepts for diagnosis and management of sports related injuries and conditions.

Effective: Fall 2010

Prerequisite:

**ORTHO 741A York-Orthopedic Sports Medicine Elective (3rd Year) (2.5)** Course provides 2 week exposure to basic concepts for diagnosis and management of sports related injuries and conditions

Effective: Fall 2010

Prerequisite:

**ORTHO 796 Orthopaedics Individual Studies Elective (5)** Creative projects including non-thesis research supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2002

Prerequisite:

**ORTHO 796A Orthopaedics Individual Studies for 3rd Year (2.5)** Orthopaedics individual studies for 3rd year students.

Effective: Spring 2009

**ORTHO 797 Orthopaedics Special Topics Elective (5)** Formal courses given on a topical or special interest subject which may be offered infrequently and/or offered off-campus.

Effective: Summer 2002

Prerequisite:

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## **P-Based Learn Fac-Hy (PBL)**

**PBL 720 Case Development in Medical Education (5)** This course will teach the major steps in creating a clinical case scenario.

Effective: Spring 2009

Prerequisite:

**PBL 743 Problem-based Learning Facilitation (5)** Development of skills in facilitation of small group learning (PBL) and introductory understanding of educational theory supporting PBL.

Effective: Fall 2008

Prerequisite:

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## Pathology-Hy (PATH)

PATH 520 **Biology of Neoplasia** (5) Detailed examination of the initiation and pathogenesis of animal neoplasms with emphasis on the relationship to human neoplasia.

Effective: Spring 2004

Prerequisite:

PATH 590 **Colloquium** (1) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

Effective: Spring 2006

PATH 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

PATH 770 **Anatomic Pathology** (1-15) Study of tissues received daily by the surgical pathology laboratory. Students will assist in and then perform autopsies under supervision.

Effective: Fall 2008

PATH 796 **Pathology Individual Studies** (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2009

Prerequisite:

PATH 796A **Pathology Individual Studies for 3rd Year** (2.5) Pathology individual studies for 3rd year students.

Effective: Spring 2009

PATH 797 **Pathology Special Topics** (5) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 2009

Prerequisite:

PATH 801 (AGBIO 801) **Veterinary Infectious Disease Diagnostic and Surveillance Systems** (3) This course provides knowledge of diagnostic and surveillance systems used to detect infectious diseases and protect against animal agricultural biological attack.

Effective: Summer 2010

Prerequisite:

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## Pediatrics-Hy (PED)

**PED 700 Pediatric Clinical Clerkship** (10) Clinical experience in the management of the newborn, of the normal infant, and children with acute and chronic illness.

Effective: Winter 1978

Prerequisite:

**PED 710 Pediatric Hematology/Oncology Acting Internship** (5) Clinical and laboratory evaluation and treatment of hematologic and oncologic diseases in children. Conferences and rounds. One detailed topic review.

Effective: Spring 2009

Prerequisite:

**PED 710A Pediatric Hematology/Oncology Elective (3rd year)** (2.5) This course provides exposure to the pediatric cancer patient and the field of Pediatric Oncology by closely following several patients through their full range of illness experiences.

Effective: Summer 2006

Prerequisite:

**PED 715 Infectious Disease** (5-10) Principles of host defense mechanisms, parasite interactions, manifestations of infections in children, systematic approach to the problem-solving, rational use of antibiotics.

Effective: Winter 1978

Prerequisite:

**PED 720 Pediatric Endocrinology** (5) Clinical applications of basic endocrine concepts, gland functions, and effects upon growth; evaluation of endocrine tests in disease states.

Effective: Winter 1978

Prerequisite:

**PED 726 Clinical Genetics** (5-10) Mendelian and molecular principles of human genetics; genetic bases of human disease, quantitative human genetics, prenatal diagnosis, genetic counseling.

Effective: Summer 1991

**PED 727 Neonatology Acting Internship** (5) Acting Internship emphasizing physiology of the newborn infant; concepts, practice, and procedures of intensive perinatal life support.

Effective: Spring 2009

Prerequisite:

**PED 728 Pediatrics--Milton Hershey School Elective** (5) This is an outpatient exposure to primary care medical problems of children in grades K-4 through 12.

Effective: Spring 1990

Prerequisite:

**PED 739 Pediatric Cardiology Elective with Global Health Experience** (5) This course provides exposure to basic concepts for diagnosis and management of children with cardiovascular diseases and cardiac abnormalities with a global health experience.

Effective: Spring 2012

Prerequisite:

**PED 740 Pediatric Cardiology Elective (4th year)** (5) This course provides exposure to basic concepts for diagnosis and management of children with cardiovascular diseases and cardiac abnormalities.

Effective: Spring 2012

Prerequisite:

**PED 741 Pediatric Pulmonary and Sleep Medicine Elective** (5) This course provides experience in basic concepts of the pathophysiology and clinical management of children with respiratory conditions and sleep neurobehavioral abnormalities.

Effective: Spring 2012

Prerequisite:

**PED 742 Pediatric Developmental & Behavioral Elective** (5) This course provides exposure to basic concepts for diagnosis and management of children with behavior problems and developmental delays.

Effective: Fall 2012

Prerequisite:

**PED 745 (SURG 745) Pediatric Cardiothoracic Surgery Elective** (5) This fourth-year elective provides an introduction to the operative repair and peri-operative management of simple and complex congenital heart disease.

Effective: Summer 2009

Prerequisite:

**PED 747 (MED 747) Pediatric Allergy, Asthma and Immunology Elective** (5) This course provides exposure to basic concepts for diagnosis and management of children and adults with allergic and immunologic diseases and respiratory and cutaneous abnormalities.

Effective: Fall 2012

Prerequisite:

**PED 750 Pediatric Nephrology/Diabetes** (5-10) Outpatient and inpatient clinical concepts/diagnosis and management of

children with acute and chronic renal disease or renal electrolyte abnormalities.

Effective: Summer 1990

Prerequisite:

**PED 750A Pediatric Nephrology Elective (3rd year) (2.5)** This course provides exposure to basic concepts for diagnosis management of children with kidney disease or fluid/electrolyte abnormalities.

Effective: Summer 2006

Prerequisite:

**PED 751 Pediatrics, Child Abuse Pediatrics Elective (5)** This course provides the student with an exposure to the assessment and management of children alleged to be abused or neglected, the manifestations of child abuse and neglect, and the interface between medicine and other agencies (Child Protection, law enforcement, and legal professionals).

Effective: Fall 2012

Prerequisite:

**PED 765 Pediatric Neurology (5-10)** Rounds, conferences, and clinics and experience in electroencephalography, electromyography, neuroradiology, neuro-ophthalmology, psychometric testing, and otolaryngology, as clinically appropriate.

Effective: Fall 2008

Prerequisite:

**PED 770 Pediatric Critical Care Medicine Acting Internship (5)** Experience in pediatric critical care medicine.

Effective: Spring 2009

Prerequisite:

**PED 780 Pediatrics Acting Internship (5)** Reinforces and expands the principles of inpatient pediatric care for fourth-year medical students motivated to perform as acting interns.

Effective: Spring 2009

Prerequisite:

**PED 796 Pediatric Individual Studies (5)** Individually supervised creative projects, including basic or clinical pediatric research.

Effective: Spring 2009

Prerequisite:

**PED 796A Pediatric Individual Studies for 3rd Year Medical Students (2.5)** Pediatrics Individual Studies for 3rd Year Medical Students.

Effective: Spring 2010

Prerequisite:

**PED 797 Pediatrics Special Topics (5)** Basic or clinical electives in pediatrics at non-affiliated institutions.

Effective: Spring 2009

Prerequisite:

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## Perspectives (PERSP)

PERSP 949 **Higher Education Law** (3) This course examines the legal issues applicable to American colleges and universities. Topics include academic freedom and tenure, affirmative action in admissions decisions, intercollegiate athletics, issues of student privacy, sexual harassment, and intellectual property.  
Effective: Summer 2007

PERSP 951 **The Rise of the Administrative State** (3) This course will provide a survey of selected topics in the twentieth-century history of American law, with a focus on the rise of the modern administrative state. Among the topics expected to be covered: legal formalism and its progressive and legal-realist critiques; the rise of corporations; the labor and liability explosion; the New Deal and the rise of banking and securities regulation; and deregulation in the 1980s.  
Effective: Summer 2013

PERSP 972 **Sports and Public Policy** (3) The course introduces students to fundamental concepts of law, economics, and business strategy necessary to understand and evaluate legal doctrine and public regulatory policy with regard to professional and major intercollegiate sports.  
Effective: Spring 2011  
Prerequisite:

PERSP 973 **Biotechnology Law** (3) This course will provide students a comprehensive understanding of the legal issues posed by developments in genetic technologies. The course will provide an overview of the history and technical foundations of the field and examine the legal dimensions of biotechnology. Generally, the course will examine how the law reacts to legal problems that arise from new technologies and examine whether the law is capable of anticipating such problems and acting prospectively.  
Effective: Spring 2003

PERSP 978 **Native American Law** (3) This course has several segments covering such matters as federal and state power over Native American affairs; personal rights and liberties under tribal law; and the history of treaties with and legislation concerning Native Americans.  
Effective: Spring 2003

PERSP 979 **Animal Law** (3) In this course we will address how legal systems and administrative agencies make decisions that affect nonhuman animals. The course will focus on the origins, background, and evolution of animal law and address specific substantive areas involving animals such as the concept of animals as property; contract and tort issues related to animals, animal protection laws; constitutional law issues; animal exploitation and the government regulation of animals.  
Effective: Summer 2011

PERSP 982 **Economic Analysis of Law** (3) This course will introduce students to the economic analysis of law and legal issues. No prior training in economics is assumed, though students with such training are welcome to enroll. Students will be instructed in the nature of economic reasoning and will learn to use fundamental principles of economics to explain legal doctrines and solve legal problems. The course will focus primarily on a positive analysis, investigating whether legal doctrines can best be explained as attempts to promote efficiency, and only secondarily on the normative question of whether law ought to promote efficiency. After a brief survey of microeconomics, the course will address the major common law areas of property, contracts, torts, and criminal law as well as the legal process.  
Effective: Summer 2011

PERSP 994 **The Right To** (1) This minicourse will consider the notion of right in the context of personal choice. It will examine costs to individuation, both necessary and excessive, that are exacted in the process of establishing and perpetuating the uniformity and stability of legal and political regimes. Topics that will be considered include relative definitions of normalcy and privacy, physical characteristics and their exploitation, religious activities, prostitution, obscenity/pornography and personal expression, racial identity and discrimination, gambling, controlled substances, the use of force, and terrorism.  
Effective: Fall 1998

PERSP 995 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2007

PERSP 996 **Independent Study** (1-4) In this course the student, under the supervision of a full-time member of the faculty, will be permitted to do research and write a paper of a substantial nature on a significant subject.  
Effective: Summer 2011

PERSP 997 **Special Topics** (1-9) Special topics.  
Effective: Spring 2011

PERSP 997A **Information Privacy and Security Law** (3) As information technology advances, the legal issues surrounding

information privacy and security grow increasingly complicated. This course will explore information privacy and security issues arising from technological change and provide an overview of the current legal regime in the United States meant to address such issues. This overview will take into account constitutional, statutory, contract, and common law sources of information privacy and security law, at both the federal and state level.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PERSP 997A National Security Law (3)** This course examines the domestic and international legal framework governing the use of national security powers by the U.S. government. After examining the shared powers of the President, Congress, and the courts, the course will carefully examine the role of international law in U.S. national security decision-making; the use of force abroad; the law of armed conflict; intelligence collection both abroad and within the United States; and the challenges of detaining, interrogating, and prosecuting terrorist suspects. Throughout the course, consideration will be given to the appropriate balance between liberty and security, the proper allocation of power between the three branches of government, and the potential tension between national security objectives and international obligations.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PERSP 997B Energy Law and Policy - National and International (3)** This course is the introductory course in the regulation of energy in the United States. It also considers some of the international impact of U.S. energy policy. The course examines each significant form of energy (oil, natural gas, nuclear power, electricity, coal and renewables) in terms of the manner in which each form is regulated by various government institutions. To understand the various forms of regulation, we will also consider a substantial amount of economic, political and social/psychological information. Each segment of the course will be presented in terms of specific problems that participating students will help analyze and solve. At each stage of the course, we will consider the current policies and attempt to develop regulatory goals and positions that will improve those policies.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PERSP 999 Sports Law (3)** This course explores how various areas of the law impact the sports industry. The "law" that is used by most sports lawyers is principally the application of settled principles of other legal fields to the sports industry: contract law, labor law, tax law, products liability law, intellectual property law, etc. The Sports Law course, then focuses on important areas that provide the foundational principles that drive the outcome of most legal disputes arising in the sports industry. The course also examines on certain areas of the law such as antitrust, labor, and constitutional law, that have specific and unique applications to sports.  
Effective: Summer 2011

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## **Petrol & Min Engineer (P M E)**

P M E 590 **Colloquium** (1) Courses teaches students how to engineer their technical presentations.  
Effective: Spring 2006

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## Petroleum and Natural Gas Engineering (P N G)

**P N G 405 Rock and Fluid Properties** (3) Reservoir rock properties, rock and fluid properties (interaction between rock and fluids), flow behavior in reservoir, and fluid properties.

Effective: Spring 2002

Prerequisite:

**P N G 406 Rock and Fluid Laboratory** (1) Systematic study of oil reservoir rocks and fluids; their interrelation applied to petroleum engineering.

Effective: Spring 2001

Prerequisite: Concurrent: P N G 405

**P N G 410 Applied Reservoir Engineering** (3) Analysis and prediction of reservoir performance by use of material balance and steady and nonsteady state flow equations.

Effective: Spring 2001

Prerequisite:

**P N G 411 Introduction to Petroleum and Natural Gas Extraction** (1) Introduction to the design and implementation of the systems used in the extraction of oil and gas. Not intended for petroleum and natural gas engineering majors.

Effective: Spring 2001

Prerequisite:

**P N G 420 Applied Reservoir Analysis and Secondary Recovery** (4) Application of material balance equations/transient flow solutions to water influx problems; displacement theory as it applies to design/behavior of flooding.

Effective: Spring 2008

Prerequisite:

**P N G 425 Principles of Well Testing and Evaluation** (3) Mathematical basis for pressure analysis. Theory and practice of pressure testing techniques.

Effective: Spring 1999

Prerequisite:

**P N G 430 Reservoir Modeling** (3) The numerical simulation of petroleum reservoir processes by the use of models; scaling criteria and network flow.

Effective: Spring 2008

Prerequisite:

**P N G 440W Formation Evaluation** (3) Study of those methods used to evaluate the engineering properties of oil and gas bearing reservoir formations.

Effective: Spring 1999

Prerequisite:

**P N G 450 Drilling Design and Production Engineering** (3) Design and analysis of oil-field drilling operations and equipment.

Effective: Spring 2001

Prerequisite:

**P N G 451 Oil Well Drilling Laboratory** (1) Practice in well-control procedures. Measurement of drilling fluid properties.

Effective: Spring 2001 Ending: Fall 2013

Prerequisite: Concurrent: P N G 450

**P N G 451 Drilling Laboratory** (1) Practice in well-control procedures. Measurement of drilling fluid properties.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: P N G 450

**P N G 475 Petroleum Engineering Design** (3) Design and selection of mechanical components used in the production of fluids from subsurface reservoirs.

Effective: Spring 2001

Prerequisite:

**P N G 480 Production Process Engineering** (3) Analysis and evaluation of surface production processes, fluid separation, storage, measurement, treating, custody transfer, transmission, disposal, corrosion, and other operations.

Effective: Fall 2007 Ending: Fall 2013

Prerequisite:

**P N G 480 Production Process Engineering** (3) Analysis and evaluation of surface production processes, fluid separation, storage, measurement, treating, custody transfer, transmission, disposal, corrosion, and other operations.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**P N G 482 Production Engineering Laboratory** (1) Measurement and analyses of the physical and chemical properties of hydrocarbon fluid systems in a production environment.

Effective: Fall 2007 Ending: Fall 2013

Prerequisite: Concurrent: P N G 480

**P N G 482 Production Engineering Laboratory** (1) Measurement and analyses of the physical and chemical properties of hydrocarbon fluid systems in a production environment.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: P N G 480

**P N G 489 Engineering Evaluation of Oil and Gas Properties (3)** Application of present worth and rate-of-return analysis; reserve calculations; decline curve analysis; uncertainty and risk analysis to engineering project design and evaluation.

Effective: Spring 2011

Prerequisite:

**P N G 490 Introduction to Petroleum Engineering Design (1)** Introduction to the concepts of engineering design as applied to petroleum and natural gas projects.

Effective: Spring 2011 Ending: Fall 2013

Prerequisite:

**P N G 490 Introduction to Petroleum Engineering Design (1)** Introduction to the concepts of engineering design as applied to petroleum and natural gas projects.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**P N G 491 Reservoir Engineering Design (1)** Application of the concepts of reservoir and drilling engineering to petroleum engineering design projects.

Effective: Spring 2011

Prerequisite:

**P N G 492 Petroleum Engineering Capstone Design (1)** Integration of petroleum and natural gas engineering concepts to project design.

Effective: Fall 2001

Prerequisite:

**P N G 494 Thesis (1-6)** A problem in petroleum engineering involving review of the literature and experimental data obtained in the field or laboratory.

Effective: Spring 1999

**P N G 494H Thesis (1-6)** A problem in petroleum engineering involving review of the literature and experimental data obtained in the field or laboratory.

Effective: Fall 2007

**P N G 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Fall 2007

**P N G 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1999

**P N G 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 1999

**P N G 501 Steady State Flow in Porous Media (3)** The formulation and analytical solution of the problems of steady state fluid flow in porous media.

Effective: Spring 1999

**P N G 502 Unsteady Flow in Porous Media (3)** The formulation and analytical solution of the transient fluid flow in porous media.

Effective: Spring 1999

Prerequisite:

**P N G 511 Numerical Solution of the Partial Differential Equations of Flow in Porous Media (3)** Differencing schemes for the partial differential equations of single-phase flow; application to flow of gas and mixing in porous media.

Effective: Spring 1999

**P N G 512 Numerical Reservoir Simulation (3)** Mathematical analysis of complex reservoir behavior and combination drives; numerical methods for the solution of behavior equations; recent developments.

Effective: Spring 1999

**P N G 518 Design of Miscible Recovery Projects (3)** Theory and design of miscible methods of oil recovery, current field applications, including hydrocarbon, CO<sub>2</sub>, micellar/polymer, alkaline, and inert gas.

Effective: Spring 1999

**P N G 520 Phase Relations in Reservoir Engineering (3)** Phase relations as applied to condensate and retrograde condensate reservoirs and to other problems in petroleum production.

Effective: Spring 1999



P N G 530 **Natural Gas Engineering** (1-3) Flow in producing or storage reservoirs; gas well testing; transmission systems; storage cycle; current developments.

Effective: Spring 1999

Prerequisite:

P N G 590 (EME 590, F SC 590, MNG 590) **Colloquium** (1-3) Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

Effective: Spring 2009

P N G 595 **Internship** (1-15) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 2004

Prerequisite:

P N G 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1999

P N G 597 **Special Topics** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1999

P N G 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1999

P N G 600 **Thesis Research** (1-15) No description.

Effective: Spring 1999

P N G 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Spring 1999

P N G 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Spring 1999

P N G 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Spring 1999

NOTE: Courses in the use of X-ray diffraction, electron microscopy, and spectroscopy in petroleum and natural gas studies are listed under MATERIALS SCIENCE and GEOLOGICAL SCIENCES.

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## Pharmacology-Hy (PHARM)

PHARM 504 **Molecular Pharmacology II** (4) Continuation of PHARM 503.  
Effective: Spring 2011

PHARM 520 **Principles of Drug Action** (2) Detailed analysis of basic parameters governing drug actions.  
Effective: Winter 1978

PHARM 550 **Neuropharmacology** (3) An in-depth discussion on the mechanism and pharmacokinetics of various neuroactive drugs.  
Effective: Fall 2011

PHARM 551 **Anti-infective Therapeutics** (1) This course covers general principles related to pharmacology of major classes of antimicrobial agents.  
Effective: Summer 2011  
Prerequisite:

PHARM 552 **Integrated System Pharmacology** (1) This course covers principles related to pharmacology of major classes of drugs affecting the autonomic nervous, cardiovascular, pulmonary, and renal systems.  
Effective: Summer 2011  
Prerequisite:

PHARM 553 **Gastrointestinal and Immunomodulatory Therapeutics** (1) This course focuses on pharmacology of drugs affecting gastrointestinal disorders, drugs used in therapy of inflammatory diseases, and immunomodulatory drugs for organ transplantation therapy.  
Effective: Summer 2011  
Prerequisite:

PHARM 554 **Anticancer Therapeutics** (1) This course provides an understanding of general principles of the induction, prevention and treatment of cancer.  
Effective: Summer 2011  
Prerequisite:

PHARM 561 **Neuropharmacology** (2) This course introduces basic principles of human neuropharmacology, with primary emphasis on drugs active in the central nervous system.  
Effective: Summer 2011  
Prerequisite:

PHARM 562 **Endocrine Pharmacology** (2) This course presents basic principles of human endocrine pharmacology, emphasizing drugs active in the endocrine and reproductive systems.  
Effective: Summer 2011  
Prerequisite:

PHARM 581 (PSIO 581) **Maintaining Homeostasis A: Heart and Vasculature** (1) Physiology of the cardiovascular system.  
Effective: Fall 2007  
Prerequisite:

PHARM 583 (PSIO 583) **Maintaining Homeostasis C: Kidney** (1) Renal physiology and pharmacology.  
Effective: Fall 2007  
Prerequisite:

PHARM 584 (ANAT 584) **Human Anatomy and Development A: Gross Human Anatomy** (1) Explore gross human anatomy providing orientation to organs and the overall relationship of organs and structures within the human body.  
Effective: Fall 2007

PHARM 585 (ANAT 585) **Human Anatomy and Development B: Human Development** (1) Explores human embryology and organogenesis beginning at the third week of gestation through parturition.  
Effective: Fall 2007

PHARM 586 (ANAT 586) **Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine** (1) Exploration of stem cell biology and the role of stem cells in regenerative medicine.  
Effective: Fall 2007

PHARM 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

PHARM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

PHARM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

PHARM 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

PHARM 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

PHARM 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

PHARM 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Philosophy (PHIL)

PHIL 401 (AM ST 421) **American Philosophy** (3) Survey of key figures and movements in American thought including the Transcendentalists, the Pragmatists, and contemporary developments.

Effective: Fall 2007

Prerequisite:

PHIL 402 **European Philosophy** (3 per semester, maximum of 6) Survey of key figures and movements of Europe, including phenomenology, existentialism, structuralism and post-structuralism, and critical theory.

Effective: Fall 2007

Prerequisite:

PHIL 403 **Environmental Ethics** (3) Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

Effective: Fall 2007

Prerequisite:

PHIL 405 **Philosophy of Law** (3) Examines philosophical views of the nature of law, legal ethics, law and society through questions regarding definition, interpretation, and institutions.

Effective: Fall 2007

Prerequisite:

PHIL 406 **Business Ethics** (3) Examines the moral justification of business practices and economic systems through critical analyses of case studies and applied ethical theories.

Effective: Summer 1998

Prerequisite:

PHIL 407 (S T S 407) **Technology and Human Values** (3) Interrelationships of twentieth-century technological change and human values. Emphasis on the social and ethical aspects of technological progress.

Effective: Spring 1999

Prerequisite:

PHIL 408W **Social and Political Philosophy** (3) Historical and philosophical foundations of political organization, authority, and justice, and contemporary issues of rights, community, and culture.

Effective: Fall 1998

Prerequisite:

PHIL 409 **Aesthetics** (3) Studies concepts of beauty, truth, value, representation, production and reproduction, and reality through philosophical theory and works of art.

Effective: Fall 2007

Prerequisite:

PHIL 410 **Philosophy of Science** (3) Historical and contemporary foundational and methodological issues such as causality, relativity and epistemological relativism, teleology, and the nature of reality.

Effective: Fall 1998

Prerequisite:

PHIL 413 **Philosophy of Literature** (3) Discusses truth, belief, illusion, imagination and creativity through philosophical literature, as well as problems of philosophical writing.

Effective: Fall 1998

Prerequisite:

PHIL 416 **Philosophy of Social Science** (3) Examines the philosophical nature and foundations of methodology, structures and objects, value-neutrality and objectivity in the social sciences.

Effective: Summer 2013

Prerequisite:

PHIL 418 **Ethics** (3) Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

Effective: Fall 2007

Prerequisite:

PHIL 418W **Ethics** (3) Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

Effective: Summer 1998

Prerequisite:

PHIL 424 **Philosophy of Religion** (3) Examines the relation between faith and reason, the nature of religious experience, the problem of evil, the existence of God.

Effective: Fall 2007

Prerequisite:

PHIL 425W **Epistemology** (3) The nature of cognition and perception, the conditions of experience, and the justification and truth of belief.

Effective: Summer 1998

Prerequisite:

PHIL 426W **Metaphysics** (3) Examines the nature of reality, the existence of freedom, and the nature of matter, mind, and

values.

Effective: Summer 1998

Prerequisite:

**PHIL 427 Philosophy of Mind (3)** Investigates problems of mind from the standpoint of traditional metaphysical views, modern scientific psychology, neuroscience, and artificial intelligence.

Effective: Spring 1999

Prerequisite:

**PHIL 432 (S T S 432) Medical and Health Care Ethics (3)** Examines ethical, political, and social issues in the research, implementation, and practice of medicine, medical technologies, and healthcare.

Effective: Fall 1998

Prerequisite:

**PHIL 433 (S T S 433) Ethics in Science and Engineering (3)** Ethical issues arising in the practice of science and engineering and their philosophical analysis.

Effective: Fall 1995

**PHIL 435 (S T S 435) The Interrelation of Science, Philosophy, and Religion (3)** The historical and transformative interactions between science and Western philosophical and religious views of nature, humanity, and God.

Effective: Spring 1996

**PHIL 437 (IL) World Philosophies and Cultures (3)** Philosophical traditions, problems, and authors in African, Asian, Middle- Eastern, Native American, or other non-Western cultures and intellectual traditions.

Effective: Fall 2007

Prerequisite:

**PHIL 438 (WMNST 438) Feminist Philosophy (3)** Examines the central currents of feminist philosophy, selected problems and concepts regarding difference, gender and sex, identity, and political culture.

Effective: Fall 2007

Prerequisite:

**PHIL 439 (IL) Asian Philosophies and Issues (3)** Exploration of the traditions, problems, and authors of one or more of the philosophical systems of Buddhism, Hinduism, Taoism, and Confucianism.

Effective: Fall 2007

Prerequisite:

**PHIL 441 Capstone Course in Philosophy (3)** This course is intended as the Capstone Course for Philosophy majors and is to be taken during their senior year or during the last semester of their junior year.

Effective: Spring 2011

Prerequisite:

**PHIL 453 Topics in Ancient Philosophy (3 per semester, maximum of 6)** Examines the philosophy of central figures in ancient philosophy from the pre-Socratics to the post-Aristotelians and Neoplatonists.

Effective: Fall 1998

Prerequisite:

**PHIL 455 Topics in Modern Philosophy (3 per semester, maximum of 6)** Descartes to Kant, including mind and reality, space and time, God and nature, morality and autonomy.

Effective: Summer 1998

Prerequisite:

**PHIL 456 Topics in Nineteenth Century Philosophy (3 per semester, maximum of 6)** Hegel to Nietzsche, including nature and spirit, history and human nature, ideology and morality.

Effective: Summer 1998

Prerequisite:

**PHIL 457 Topics in Twentieth Century Philosophy (3 per semester, maximum of 6)** Topics in the philosophy of figures such as Husserl, James, Russell, Wittgenstein, Heidegger, Merleau-Ponty, and Dewey.

Effective: Fall 2007

Prerequisite:

**PHIL 458 Topics in Contemporary Philosophy (3 per semester, maximum of 6)** Topics in the philosophy of contemporary figures such as Foucault, Habermas, Rorty, Derrida, Rawls, Davidson, and MacIntyre.

Effective: Summer 1998

Prerequisite:

**PHIL 460 (US;IL) (AF AM 460) African American Philosophy (3)** Major works by African American Philosophers, on topics of race, freedom, citizenship, nationhood, law and society.

Effective: Spring 2013

Prerequisite:

**PHIL 461 Plato (3 per semester, maximum of 6)** Examines the metaphysics, epistemology, politics, aesthetics, and moral theory of this central figure in the history of philosophy.

Effective: Spring 1999

Prerequisite:

**PHIL 473 German Idealism (3 per semester, maximum of 6)** Critically examines the philosophy of central German idealists, including Kant, Fichte, Schelling, and Hegel, and its impact on later philosophy.

Effective: Summer 1998

Prerequisite:

**PHIL 474 Kant** (3 per semester, maximum of 6) Critical examination of the metaphysics, epistemology, aesthetics, legal and moral philosophy, and influence of Immanuel Kant.

Effective: Fall 1998

Prerequisite:

**PHIL 476 Hegel** (3 per semester, maximum of 6) Critical examination of the metaphysics, moral theory, epistemology, and philosophy of history of this central figure of 19th-century philosophy.

Effective: Fall 1998

Prerequisite:

**PHIL 479 Critical Theory** (3 per semester, maximum of 6) Examines the ontology, political and social thought of the Frankfurt School from Horkheimer and Adorno to Marcuse and Habermas.

Effective: Summer 1998

Prerequisite:

**PHIL 485 Heidegger** (3 per semester, maximum of 6) Studies Heidegger's metaphysical thought from his early to later works regarding being, history, subjectivity, aesthetics, language, and his influence.

Effective: Fall 1998

Prerequisite:

**PHIL 486 Wittgenstein** (3 per semester, maximum of 6) Examines Wittgenstein's early and late work, including logical atomism, meaning, language games, forms of life, and the private-language argument.

Effective: Fall 1998

Prerequisite:

**PHIL 487 Analytic Philosophy** (3 per semester, maximum of 6) Analytic philosophy's founding by Frege, Russell, Moore, Wittgenstein; and its contemporary development by Quine, Kripke, Dummett, and Davidson.

Effective: Fall 1998

Prerequisite:

**PHIL 490 Dewey** (3 per semester, maximum of 6) Critically examines the metaphysics, epistemology, ethics, logic, aesthetics, education theory, and social and political philosophy of this major American pragmatist.

Effective: Summer 1998

Prerequisite:

**PHIL 491 Merleau-Ponty** (3 per semester, maximum of 6) Merleau-Ponty's phenomenological anti-dualism through his studies on the body and the flesh, aesthetics, political philosophy, and late ontology.

Effective: Summer 1998

Prerequisite:

**PHIL 493 Phenomenology and Hermeneutics** (3 per semester, maximum of 6) Studies major figures and issues in phenomenology and hermeneutics, focussing on the work of Husserl, Gadamer, Heidegger, Merleau-Ponty, and Levinas.

Effective: Summer 1998

Prerequisite:

**PHIL 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**PHIL 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**PHIL 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**PHIL 496A Advanced Topics in Contemporary Philosophy** (1-6) Study controversial topics in contemporary philosophy.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PHIL 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**PHIL 498 Special topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2001

**PHIL 499 (IL) Foreign Study--Philosophy** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**PHIL 501 American Philosophy Seminar** (3 per semester/maximum of 6) Critically examines central figures in American philosophy including Emerson, Thoreau, Pierce, James, Royce, Dewey, Santayana, Mead, Quine, Davidson, and Rorty.  
Effective: Spring 2000

**PHIL 502 European Philosophy Seminar** (3 per semester/maximum of 6) Critically examines central European philosophers including Husserl, Heidegger, Sartre, Merleau-Ponty, Gadamer, Levinas, Foucault, and Derrida; course content varies with instructor.  
Effective: Summer 2000

**PHIL 503 Ethics Seminar** (3 per semester/maximum of 6) Critical investigation of philosophical problems in ethics, and viability of historical and contemporary ethical positions; course content varies with instructor.  
Effective: Summer 2000

**PHIL 508 Social and Political Philosophy Seminar** (3 per semester, maximum of 6) Critical examination of social and political philosophies, their historical context and relation to philosophic method; course content varies with instructor.  
Effective: Summer 2000

**PHIL 512 Seminar in Logic** (3) This course covers topics in first-order symbolic logic with identity and advanced special topics in metatheory.  
Effective: Summer 2009

**PHIL 516 Aesthetic Seminar** (3 per semester, maximum of 6) Critical examination of problems in philosophy of art including beauty, taste, value, politics, culture, interpretation; course content varies with instructor.  
Effective: Summer 2000

**PHIL 525 Epistemology Seminar** (3 per semester/maximum of 6) Studies problems, figures, and movements in epistemology from the ancient philosophers to contemporary thinkers; course content varies with instructor.  
Effective: Spring 2000

**PHIL 538 (WMNST 538) Feminist Philosophy Seminar** (3) Critically examines feminist approaches to ethics, epistemology, philosophy of science, metaphysics, social/political philosophy, and the history of philosophy.  
Effective: Summer 2005

**PHIL 539 Critical Philosophy of Race** (3 per semester/maximum of 6) The study of philosophical issues raised by racism and by the concept of race and other related concepts.  
Effective: Summer 2012

**PHIL 553 Ancient Philosophy Seminar** (3 per semester/maximum of 6) Analyzes specific concerns and texts of ancient philosophy including those of Plato and Aristotle; course content varies with instructor.  
Effective: Summer 2000

**PHIL 554 Medieval Philosophy Seminar** (3 per semester/maximum of 6) Critical examination of medieval texts and philosophers, including Augustine, Anselm, Aquinas, Duns Scotus, and Ockham; course content varies with instructor.  
Effective: Summer 2000

**PHIL 555 Modern Philosophy Seminar** (3 per semester/maximum of 6) Examines rationalism, empiricism, and other philosophical movements from Bacon and Descartes to Kant and Mill; course content varies with instructor.  
Effective: Summer 2000

**PHIL 556 19th-Century Philosophy Seminar** (3 per semester, maximum of 6) Examination of philosophy from Hegel to Nietzsche on history, dialectic, ideology, existence, science, and art; course content varies with instructor.  
Effective: Summer 2000

**PHIL 557 20th Century Philosophy Seminar** (3 per semester/maximum of 6) Central problems in works of twentieth-century philosophers including Russell, Dewey, Wittgenstein, Heidegger, Foucault, Levinas; course content varies with instructor.  
Effective: Spring 2000

**PHIL 558 Contemporary Philosophy Seminar** (3 per semester, maximum of 6) Critically investigates diverse recent figures and problems of continental, pragmatic, and analytic philosophy; course content varies with instructor.  
Effective: Summer 2000

**PHIL 561 Major Figures in Ancient Philosophy** (3 per semester/maximum of 12) Close study of a major figure in ancient philosophy (6th BCE to 4th CE) through one central or several important texts.  
Effective: Fall 2011

**PHIL 562 Major Figures in Modern Philosophy** (3 per semester/maximum of 12) Close study of a major figure in modern philosophy through one central or several important texts.  
Effective: Fall 2011

**PHIL 563 Major Figures in Nineteenth-Century Philosophy** (3 per semester/maximum of 12) Close study of a major figure in nineteenth-century philosophy through one central text or several important texts.  
Effective: Summer 2012

**PHIL 564 Major Figures in Twentieth-Century Philosophy** (3 per semester/maximum of 12) Close study of a major figure in twentieth-century philosophy by means of one central text or several important texts.  
Effective: Summer 2012

**PHIL 571 (BIOET 501) Perspectives and Methods in Bioethics** (3) This course explores a variety of theories and methods in bioethics and applies them to a selection of current topics.  
Effective: Spring 2012

**PHIL 572 (BIOET 502) Perspectives in Macro-Bioethics** (3) This course explores systemic and structural issues in bioethics, and the theories and methodologies required to address them.  
Effective: Spring 2012

**PHIL 573 (BIOET 573) Ethics and the Responsible Conduct of Biomedical Research** (3) Provides an understanding of ethical issues arising in the responsible conduct of biomedical research and frameworks for critically analyzing them.  
Effective: Spring 2012

**PHIL 580 Phenomenology** (3 per semester/maximum of 6) A critical study of one or more thinkers, ideas, or movements in modern phenomenology.  
Effective: Fall 1983

**PHIL 589 Philosophical Translation Seminar** (2) Studies philosophical works in their original (non-English) languages; course content varies with instructor.  
Effective: Spring 2001  
Prerequisite:

**PHIL 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987

**PHIL 594 Research Technique** (1) A course utilizing research sources and techniques relevant to philosophical studies. Taken in the first semester of graduate study.  
Effective: Spring 1987

**PHIL 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**PHIL 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**PHIL 600 Thesis Research** (1-15) No description.  
Effective: Fall 1983

**PHIL 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 1983

**PHIL 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Students will teach introductory logic course--i.e., Phil 1--and other introductory level courses as required by staffing.  
Effective: Fall 1983

**PHIL 603 Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Spring 2000

**PHIL 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983



PHIL 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

PHIL 803 (HLS 803) **Homeland Security: Social and Ethical Issues** (3) This course will examine the social, political, legal, and ethical issues that arise in the context of homeland security.  
Effective: Summer 2010

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## **Phys Med&Rehabilitat (PMR)**

PMR 730 **Physical Medicine and Rehabilitation Elective (3rd and 4th year)** (5) This elective is for 3rd and 4th year medical students interested in gaining experience in the field of Adult and Pediatric Physical Medicine and Rehabilitation, improving diagnostic skills related to the complications of disability, and improving neurologic and musculoskeletal examination skills.

Effective: Summer 2011

Prerequisite:

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## Physics (PHYS)

**PHYS 400 Intermediate Electricity and Magnetism I** (3-4) Electrostatics and magnetostatics in vacuum; electrical and magnetic properties of matter; electrodynamics, Maxwell's equations, conservation laws, electromagnetic waves and radiation.

Effective: Fall 2012

Prerequisite: Concurrent: MATH 230 OR MATH 231 ; PHYS 204

**PHYS 402 Electronics for Scientists** (4) Circuit and network theory; active devices; amplifiers; introduction to digital electronics; noise theory.

Effective: Spring 2007

Prerequisite:

**PHYS 406 Subatomic Physics** (3) Introductory treatment of elementary particles, fundamental strong and electroweak interactions, nuclear structure, accelerators, particle detection, nuclear astrophysics.

Effective: Spring 1995

Prerequisite:

**PHYS 410 Introduction to Quantum Mechanics I** (3-4) Basic postulates; Schrodinger wave equation; stationary states; variational method; scattering in one dimension; orbital angular momentum; hydrogen atom; numerical methods.

Effective: Spring 2007

Prerequisite:

**PHYS 411 Introduction to Quantum Mechanics II** (3) General theory of angular momentum; approximation methods; scattering theory; radiation theory; applications to atomic, molecular, condensed matter, nuclear and particle physics.

Effective: Spring 1994

Prerequisite:

**PHYS 412 Solid State Physics I** (3) Crystal symmetry, x-ray structure analysis, lattice vibrations, thermal properties, free electron transport theory, elementary one-electron quantum theory of solids.

Effective: Fall 1986

Prerequisite: Concurrent: PHYS 410

**PHYS 413 Solid State Physics II** (3) Quantum theory of electronic and optical properties of solids, semiconductors, dielectrics, magnetic properties, crystal imperfections, low- temperature effects, and superconductivity.

Effective: Fall 1986

Prerequisite:

**PHYS 414 Solid State Physics** (3) Crystal structure; reciprocal lattice; X-ray diffraction; lattice vibrations; thermal properties; free electron gas model; energy bands; semiconductors; magnetism.

Effective: Spring 2007

Prerequisite:

**PHYS 419 (MATH 419) Theoretical Mechanics** (3) Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions.

Effective: Spring 2007

Prerequisite:

**PHYS 420 Thermal Physics** (3) Basic postulates of statistical mechanics and thermodynamics, microscopic quantum states and macroscopic parameters; partition functions; Maxwell- Boltzmann and quantum statistics.

Effective: Spring 2007

Prerequisite:

**PHYS 421W Research Methods in Physics** (3) Methodology focusing on the theory of measurement and experiment design.

Effective: Spring 2007

Prerequisite:

**PHYS 443 Intermediate Acoustics** (3) Vibration and simple vibrating systems, sound wave propagation, acoustic instruments, recent developments.

Effective: Fall 1999

Prerequisite:

**PHYS 444 Topics in Contemporary Physics** (2) Modern research topics and career opportunities in physics; employment, graduate education, and tailoring the physics curriculum to meet career goals.

Effective: Spring 2007

Prerequisite:

**PHYS 446 The Year in Physics: A Seminar on the Latest Research** (1) Discussion recent research in physics.

Effective: Spring 2007

Prerequisite:

**PHYS 457 Experimental Physics** (1-3) Selected experiments in various fields of physics.

Effective: Spring 2007

Prerequisite:

**PHYS 457W Experimental Physics** (3) Selected experiments in various fields in physics.

Effective: Spring 2007

Prerequisite:

**PHYS 458 Intermediate Optics (4)** Geometrical and physical optics: theory of lens systems, aberrations, apertures, interference, diffraction, polarization.

Effective: Spring 2007

Prerequisite:

**PHYS 461 (MATH 461) Theoretical Mechanics (3)** Continuation of Math.(Phys.) 419. Theoretical treatment of dynamics of a rigid body, theory of elasticity, aggregates of particles, wave motion, mechanics of fluids.

Effective: Fall 1986

Prerequisite:

**PHYS 462 Applications of Physics in Medicine (3)** Applications of physics in human physiology and in instrumentation for medical diagnosis and treatment.

Effective: Summer 2002

Prerequisite:

**PHYS 472 Elements of Nuclear Physics and its Applications to Medical Imaging and Treatments (3)** Introduction to the theory of nuclei, interactions with fast particles, and applications to medical imaging and radiation oncology.

Effective: Spring 2012

Prerequisite:

**PHYS 479 (MATH 479) Special and General Relativity (3)** Mathematical description, physical concepts, and experimental tests of special and general relativity.

Effective: Spring 2007

Prerequisite:

**PHYS 494 Physics Research Project (1-12)** Investigation of an original research problem, including a literature search.

Preparation of a formal thesis is optional.

Effective: Spring 2007

**PHYS 494H Physics Research Project (1-12)** Investigation of an original research problem, including a literature search.

Preparation of a formal thesis is optional.

Effective: Fall 2007

**PHYS 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2007

Prerequisite:

**PHYS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**PHYS 496H Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2012

**PHYS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**PHYS 497A (BIOL 497A) Networks in Life Science (3)** Introduction of network analysis and modeling techniques applied to molecular and cellular-level interaction networks.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**PHYS 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**PHYS 499A (IL) Low-Dimensional Electronic Materials (1)** This course will provide an introduction to physics of low-dimensional electronic materials, combining intensive learning in a classroom with a supervised project of independent research. This course is taught by Penn State faculty at the Shanghai Jiao Tong University in Shanghai, China, and is offered to undergraduate students majoring in physics, chemistry, mathematics, and related fields who have finished at least two (preferred) but not more than three academic years of study. SJTU is a premier university in China with a long history and strong tradition in academics and research. The course, to be offered with the Zhiyuan College (honors college) and the Department of Physics at SJTU, will provide students the opportunity to work together in an international setting.

Effective: Summer 2013 Ending: Summer 2013

**PHYS 510 General Relativity I (3)** Foundations of general relativity, elements of differential geometry, Einstein's equation, Newtonian limit, gravity waves, Friedmann cosmologies and Schwarzschild solution.

Effective: Spring 1996

Prerequisite:

**PHYS 511 Topics in General Relativity** (3) Selected topics from: Cauchy problem, Hamiltonian formulation, positive energy theorems, asymptotics, gravitational radiation, singularity theorems, black-holes, cosmology, observational tests.  
Effective: Spring 1996  
Prerequisite:

**PHYS 512 Quantum Theory of Solids I** (3) Electrons in periodic potentials; single electron approximations; lattice dynamics; electrical, optical, and magnetic properties of solids; transport theory.  
Effective: Spring 1996  
Prerequisite: Concurrent: PHYS 517

**PHYS 513 Quantum Theory of Solids II** (3) Electron-phonon interaction, BCS theory; Landau Fermi-liquid theory; disorder and localized states; spin-wave theory; many-body theory.  
Effective: Spring 1996  
Prerequisite:

**PHYS 514 Physics of Surfaces, Interfaces, and Thin Films** (3) This course focuses on interfacial and surface phenomena; structural, electronic, vibrational and thermodynamic properties; physisorption and chemisorption; phase transitions and ultrathin film nucleation; and growth phenomena.  
Effective: Summer 1995  
Prerequisite:

**PHYS 517 Statistical Mechanics** (3) Thermodynamics, classical and quantum statistics; Bose and Fermi gases; Boltzmann transport equation; phase transitions, critical phenomena; Ising model.  
Effective: Spring 1996  
Prerequisite:

**PHYS 518 Critical Phenomena and Field Theory** (3) Critical phenomena using field theoretical and renormalization group techniques; solvable statistical models and conformal field theory; fluctuations and random processes.  
Effective: Spring 2011  
Prerequisite:

**PHYS 524 Physics of Semiconductors and Devices** (3) Electronic structure, optical and transport properties of crystalline and amorphous semiconductors, quantum wells, superlattices; quantum devices; quantum Hall effect.  
Effective: Spring 1996  
Prerequisite:

**PHYS 525 Methods of Theoretical Physics I** (3) Complex variables, Hilbert spaces, linear operators, calculus of variations, Fourier analysis, Green's functions, distributions, differential equations, and special functions.  
Effective: Spring 1996

**PHYS 526 Methods of Theoretical Physics II** (3) Finite and Lie groups, representations and application to condensed matter and particle physics; selected topics from differential geometry.  
Effective: Spring 1996  
Prerequisite:

**PHYS 527 (ASTRO 527) Computational Physics and Astrophysics** (3) Introduction to numerical methods for modeling physical phenomena in condensed matter, atomic and high energy physics, gravitation, cosmology and astrophysics.  
Effective: Fall 2008

**PHYS 530 Theoretical Mechanics** (3) Newtonian mechanics, noninertial coordinate system, Lagrangian mechanics, small oscillations, Hamiltonian formulation, canonical transformations, Hamilton-Jacobi theory, dynamical systems.  
Effective: Spring 1996  
Prerequisite:

**PHYS 533 Theoretical Acoustics** (3) Wave propagation in complex systems and materials: viscoelastic fluids, superfluids, elastic solids, periodic and random media, nonlinear media.  
Effective: Spring 1996

**PHYS 541 Elementary Particle Phenomenology** (3) Baryons and mesons; leptons and quarks; electromagnetic and weak interactions and their unification; quantum chromodynamics; experimental techniques.  
Effective: Spring 1996  
Prerequisite:

**PHYS 542 Standard Model of Elementary Particles Physics** (3) Weinberg-Salam model of electroweak interactions, spontaneous symmetry breaking, quantum chromodynamics; selected topics from grand unified theories and superstring theory.  
Effective: Summer 1995  
Prerequisite:

**PHYS 545 (ASTRO 545) Cosmology** (3) Modern cosmology of the early universe, including inflation, the cosmic microwave background, nucleosynthesis, dark matter and energy.  
Effective: Spring 2009

**PHYS 555 (MATSE 555) Polymer Physics I** (3) Introduction to the fundamental concepts needed to understand the physics applicable to polymer melts, solutions and gels.  
Effective: Spring 2006

**PHYS 557 Electrodynamics (3)** Special relativity, electromagnetism fields, Maxwell's equations, conservation laws, electrostatics and magnetostatics.

Effective: Spring 2011

Prerequisite:

**PHYS 559 Graduate Laboratory (2)** Study and applications of techniques and instrumentation used in modern physics laboratories.

Effective: Spring 1996

**PHYS 561 Quantum Mechanics I (3)** Postulates of quantum mechanics, Hilbert space methods, one dimensional potentials, spin systems, Harmonic oscillator, angular momentum, Hydrogen atom.

Effective: Spring 1996

Prerequisite:

**PHYS 562 Quantum Mechanics II (3)** Addition of angular momenta, perturbation theory, variational principle, scattering theory, density matrices, identical particles, interpretations of quantum mechanics, Dirac theory.

Effective: Spring 1996

Prerequisite:

**PHYS 563 Quantum Field Theory I (3)** Canonical and functional integral quantization of relativistic and non-relativistic field theories; Feynman diagrams; spontaneous symmetry breaking; renormalization group.

Effective: Spring 1996

Prerequisite:

**PHYS 564 Quantum Field Theory II (3)** Abelian and non-Abelian gauge theories; renormalization group and operator product expansions; BRST quantization; scattering theory, other related topics.

Effective: Spring 1996

Prerequisite:

**PHYS 565 Interface of General Relativity and Quantum Physics (3)** Limitations of perturbative methods, conceptual problems; selected topics from black hole thermodynamics, canonical quantum gravity, loop space methods and string-theory.

Effective: Summer 1995

Prerequisite:

**PHYS 571 Modern Atomic Physics (3)** Light-atom interactions, atomic structure, laser cooling and trapping, interferometry, and Bose-Einstein condensation.

Effective: Spring 2011

Prerequisite:

**PHYS 572 Laser Physics and Quantum Optics (3)** Theory of modern lasers, non-linear and quantum optics, photon statistics, laser spectroscopies, pulsed lasers.

Effective: Spring 2011

Prerequisite:

**PHYS 580 Elements of Network Science and Its Applications (3)** Introduction to elements of network theory used to describe and model complex networks; applications in social, biological, and technological networks.

Effective: Spring 2011

Prerequisite:

**PHYS 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 1997

**PHYS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**PHYS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

**PHYS 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

**PHYS 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 1983

**PHYS 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 1983

**PHYS 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Fall 1983

PHYS 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2007

PHYS 897A **Hands-On Particle Astrophysics** (2) This workshop features hands-on explorations of high-energy phenomena, highlighting ongoing experiments in Antarctica, the Argentine Pampas, and the upper reaches of the Earth's atmosphere. Strategies for classroom implementation will be highlighted.

Effective: Summer 2013 Ending: Summer 2013

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## Physiology (PHSIO)

PHSIO 508 (NUTR 508) **Critical Readings in Molecular Nutrition** (1.5 per semester/maximum of 6) Understanding of approaches, methods and current concepts in molecular biology and nutrition through critical readings of current primary literature.

Effective: Summer 2013

Concurrent: NUTR 445 or NUTR 446

PHSIO 510 **Physiological Adaptations to Stress** (3) Students will learn how to address problems in physiological adaptations to stress through parallel molecular, cellular, and systemic approaches.

Effective: Spring 1998

Prerequisite:

PHSIO 567 (KINES 567) **Advanced Exercise Physiology** (3) Physiological changes during exercise with emphasis on the effects of physical conditioning and training.

Effective: Fall 1987

Prerequisite:

PHSIO 571 (BIOL 571) **Animal Physiology** (3) Mammalian cardiovascular, respiratory, renal, and gastrointestinal systems.

Effective: Summer 1985

Prerequisite:

PHSIO 572 (BIOL 572) **Animal Physiology** (3) Mammalian nervous, endocrine, metabolic, and reproductive systems.

Effective: Summer 1985

Prerequisite:

PHSIO 577 (KINES 577) **Cardiovascular Physiology** (3) In-depth study of the heart and circulatory system with emphasis on the effects of exercise on cardiovascular function.

Effective: Fall 1997

Prerequisite:

PHSIO 578 (KINES 578) **Physiology and Mechanical Behavior of Skeletal Tissues** (3) In-depth examination of the structure, composition, and material behavior of the basic skeletal tissues, including bone, cartilage, tendon, and ligament.

Effective: Spring 1999

Prerequisite:

PHSIO 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

Effective: Spring 1987

PHSIO 595 (EXSCI 595) **Internship in Exercise Physiology and Cardiac Rehabilitation** (1-15) Clinical and related research aspects of exercise physiology and exercise prescription with respect to cardiac and cardiovascular rehabilitation.

Effective: Spring 1988

Prerequisite:

PHSIO 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

PHSIO 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

PHSIO 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

PHSIO 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 1983

PHSIO 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

PHSIO 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1983

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## Physiology-Hy (PSIO)

PSIO 501 **Scientific Analysis and Presentation** (1) Journal club format used to develop critical analytical and presentation skills for understanding and clearly presenting current scientific data.  
Effective: Summer 1998

PSIO 503 **Cellular Physiology** (1) PSIO 503 is a physiology course that focuses on cellular aspects of physiology.  
Effective: Summer 2000

PSIO 504 **Cellular and Integrative Physiology** (3) PSIO 504 is a physiology course that integrates cellular and organ-based physiology concepts.  
Effective: Summer 2000

PSIO 505 **Cellular and Integrative Physiology II** (3) This is a physiology course that integrates cellular and organ-based physiology concepts.  
Effective: Spring 2002  
Prerequisite:

PSIO 522 **Physiological Adaptations to Stress** (3) Students will learn how to address problems in physiological adaptations to stress through parallel molecular, cellular, and systemic approaches.  
Effective: Spring 2012

PSIO 581 (PHARM 581) **Maintaining Homeostasis A: Heart and Vasculature** (1) Physiology of the cardiovascular system.  
Effective: Fall 2007  
Prerequisite:

PSIO 583 (PHARM 583) **Maintaining Homeostasis C: Kidney** (1) Renal physiology and pharmacology.  
Effective: Fall 2007  
Prerequisite:

PSIO 584 **Practical Bioinformatics A: Analysis of Biological Databases** (1) Understanding and using protein, nucleotide, structure and human disease databases.  
Effective: Fall 2007  
Prerequisite:

PSIO 585 **Practical Bioinformatics B: Protein and Structural Biology** (1) Understanding and using protein structure databases; advanced topics include basic biological switches, protein:protein interactions and molecular modeling.  
Effective: Spring 2008  
Prerequisite:

PSIO 586 **Practical Bioinformatics C: Gene and Protein Expression** (1) Understanding modern techniques to address gene and protein expression; using database searching or data collection to obtain such information.  
Effective: Fall 2007  
Prerequisite:

PSIO 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.  
Effective: Spring 1987

PSIO 596 **Individual Studies** (1-9) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

PSIO 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

PSIO 600 **Thesis Research** (1-15) No description.  
Effective: Summer 1983

PSIO 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 1983

PSIO 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1983

PSIO 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1983

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## Plant Biology (PLBIO)

PLBIO 512 **Plant Resource Acquisition and Utilization** (4) Advanced study of plant resource acquisition and utilization considering molecular, physiological, and whole plant perspectives through lectures and problem solving.  
Effective: Fall 2006

PLBIO 513 **Integrative Plant Communication and Growth** (4) Advanced study of plant communication, growth, and development considering molecular, physiological, and whole plant perspectives through lectures and problem solving.  
Effective: Fall 2006

PLBIO 514 (HORT 514) **Modern Techniques and Concepts in Plant Ecophysiology** (2) An intensive introduction to concepts of plant ecophysiology and modern techniques used in this field.  
Effective: Fall 2006  
Prerequisite:

PLBIO 515 **Modern Techniques and Concepts in Plant Cell Biology** (2) An intensive introduction to concepts of plant cell biology and modern techniques used in this field.  
Effective: Spring 2012  
Prerequisite:

PLBIO 516 **Modern Techniques and Concepts in Plant Molecular Biology** (2) An intensive introduction to contemporary molecular biology methods as applied to the study of plants.  
Effective: Spring 2012  
Prerequisite:

PLBIO 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Fall 2006

PLBIO 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2006

PLBIO 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Fall 2006

PLBIO 600 **Thesis Research** (1-15) No description.  
Effective: Fall 2006

PLBIO 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Fall 2006

PLBIO 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 2006

PLBIO 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 2006

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## Plant Pathology (PPATH)

PPATH 405 **Microbe-Plant Interactions: Plant Disease and Biological Control** (3) Survey of microbe-plant interactions causing plant disease, mechanisms of pathogenesis, disease control, and microbial and molecular biological control strategies.

Effective: Spring 1999 Ending: Fall 2013

Prerequisite:

PPATH 412 **Turfgrass Disease Management** (3) Introduction to biology of turfgrass pathogens and management of cool- and warm-season turfgrass disease.

Effective: Spring 2008 Ending: Fall 2013

Prerequisite:

PPATH 416 **Plant Virology: Molecules to Populations** (3) A exploration of the molecular biology and population dynamics of the virus-plant interaction.

Effective: Fall 2005 Ending: Fall 2013

Prerequisite:

PPATH 417 **Phytopathology** (3) Lecture and lab coverage of how bacteria cause plant diseases.

Effective: Fall 2009 Ending: Fall 2013

Prerequisite:

PPATH 419 **Plant Nematology** (2) The biology of plant pathogenic nematodes, the diseases they cause, and their control.

Effective: Fall 2009 Ending: Fall 2013

Prerequisite:

PPATH 425 (BIOL 425) **Biology of Fungi** (4) A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to humans.

Effective: Spring 2002 Ending: Fall 2013

Prerequisite:

PPATH 427 **Mycotoxins: Effects of Fungal Toxins on Human and Animal Health** (3) Description and history of mycotoxicoses. Mycotoxin formation, occurrence, control, economic and social impacts, and regulatory issues.

Effective: Summer 2007 Ending: Fall 2013

Prerequisite:

PPATH 430 (E R M 430) **Air Pollution Impacts to Terrestrial Ecosystems** (3) An overview of direct and indirect effects of air pollution on terrestrial plants and ecosystems.

Effective: Summer 2004 Ending: Spring 2014

Prerequisite:

PPATH 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983 Ending: Fall 2013

PPATH 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983 Ending: Fall 2013

PPATH 497A **Ecology of Viruses (Virus Ecology)** (3) In this course students will learn about the interplay of viruses, hosts and the environment. All known life forms are hosts to viruses; viruses are the most abundant life entity on our planet, and the most understudied and unknown. Although most of virology has been devoted to the study of those that cause disease, viruses also can be beneficial to their hosts, and a majority of viruses probably do not cause disease. Viruses play an important role in the ecology of the planet, including carbon cycles, host adaptation to extreme environments, host health or disease, and host evolution. We will use specific examples to understand basic principles of virus ecology and we will explore viruses of plants, animals, fungi and other microbial eukaryotes, bacteria and archaea. Students also will learn to critically read the scientific literature, and will present a paper to the class.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

PPATH 502 **Plant Disease Diagnosis** (3) Field and laboratory techniques used in diagnosing plant diseases caused by various types of pathogens with emphasis on fungi.

Effective: Summer 2013

Prerequisite:

PPATH 505 **Fundamentals of Phytopathology** (2) An in-depth tutorial of the fundamental theories and concepts of plant pathology.

Effective: Summer 2013 Ending: Fall 2013

Prerequisite:

PPATH 505 **Fundamentals of Phytopathology** (2) An in-depth tutorial of the fundamental theories and concepts of plant pathology.

Effective: Spring 2014 Future: Spring 2014

**PPATH 522 Professional Development & Ethics in Plant Pathology** (1) Graduate students will develop key professional skills and ethics through a combination of lectures, discussions, and assignments.  
Effective: Summer 2013

**PPATH 533 Molecular Genetics of Plant-Pathogen Interactions** (3) In depth discussion/review of the primary literature on the mechanisms of plant-pathogen interactions at the molecular and cellular levels.  
Effective: Summer 2013 Ending: Fall 2013  
Prerequisite:

**PPATH 533 Molecular Genetics of Plant-Pathogen Interactions** (3) In depth discussion/review of the primary literature on the mechanisms of plant-pathogen interactions at the molecular and cellular levels.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**PPATH 540 Plant Disease Control** (3) Principles of plant disease control, including theoretical considerations involved in control by chemical and nonchemical means.  
Effective: Summer 2013

**PPATH 542 Epidemiology of Plant Diseases** (3) Disease development in populations of plants, with emphasis on the impact of environment and control practices on rate of development.  
Effective: Summer 2013  
Prerequisite:

**PPATH 543 Pathogen Variation and Host Resistance** (3) Mechanisms and implications of genetic variation in plant pathogens related to breeding for disease resistance in plants by genetic means.  
Effective: Summer 2013  
Prerequisite:

**PPATH 544 Fungal Genetics** (4) Fungal breeding systems, mating types, asexual restrictions and recombination, tetrad analysis, gene conversion and extra genetic elements.  
Effective: Summer 2013  
Prerequisite:

**PPATH 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2013

**PPATH 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

**PPATH 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2013

**PPATH 600 Thesis Research** (1-15) No description.  
Effective: Summer 2013

**PPATH 601 Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2013

**PPATH 602 Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised preparation and presentation of materials in lectures and laboratories, preparation and supervision of exams and student consultation and evaluation.  
Effective: Summer 2013

**PPATH 610 Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2013

**PPATH 611 Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 2013

**PPATH 802 (AGBIO 802) Plant Protection: Responding to Introductions of Threatening Pests and Pathogens** (3) This course provides knowledge of plant biosecurity, plant disease, regulations, and technologies using case study examples.  
Effective: Summer 2013  
Prerequisite:

**PPATH 853 (TURF 853) Interpreting Turfgrass Science Literature** (3) Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results.  
Effective: Summer 2013

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## Political Science (PL SC)

PL SC 403 **The Legislative Process** (3) Analysis of the policy process within the legislative system; the effects of environmental factors on policy alternatives and legislative decision making.

Effective: Spring 2001

Prerequisite:

PL SC 405 **The American Presidency** (3) An examination of the selection methods for, and powers of, the American presidency, as well as other chief executives.

Effective: Fall 1983

Prerequisite:

PL SC 410 **Strategy and Politics** (3) This course examines political behavior using social choice theory and game theory.

Effective: Spring 2013

Prerequisite:

PL SC 411W **Principles of International Cooperation** (3) An exploration of the forces that make conflict, or cooperation, more likely in international relations.

Effective: Summer 2006

Prerequisite:

PL SC 412 **International Political Economy** (3) The transnational politics of trade, investment, aid, raw materials, and the environment; nation-states, multinational corporations, and the U.N.

Effective: Spring 2011

Prerequisite:

PL SC 413 **The Rise and Fall of the Soviet Union** (3) Background, organization, and operation of the Communist Party and the government of the Soviet Union.

Effective: Spring 2001

Prerequisite:

PL SC 414 **Dictators and Their Demise** (3) Dictators and Their Demise examines the political economy of authoritarian rule.

Effective: Summer 2011

Prerequisite:

PL SC 415 **International Organization: Political and Security Functions** (3) Theory and evolution of international organization; political and security functions of the United Nations and regional organizations.

Effective: Spring 2003

Prerequisite:

PL SC 417 **American Local Government and Administration** (3) Organization, powers, functions, and problems of American cities and metropolitan areas; modern trends and developments.

Effective: Winter 1978

Prerequisite:

PL SC 418 **International Relations Theory** (3) A survey of traditional and contemporary conceptual frameworks and theoretical approaches for the analysis of international relations.

Effective: Winter 1978

Prerequisite:

PL SC 418W **International Relations Theory** (3) A survey of traditional and contemporary conceptual frameworks and theoretical approaches for the analysis of international relations.

Effective: Spring 1999

Prerequisite:

PL SC 419 **The Bureaucratic State** (3) Overview of structural, technological, decision-making, behavioral, and political subsystems of bureaucracy; emphasis on bureaucratic dynamics within larger environmental, interorganizational contexts.

Effective: Fall 2007

Prerequisite:

PL SC 420 **State Making** (3) Students learn about how national states arise, expand the territory and population they control, and persist or fail.

Effective: Summer 2013

Prerequisite:

PL SC 422 **Comparative Urban Politics** (3) Relationships between structure and evolution of city systems and patterns of political behavior.

Effective: Spring 2001

Prerequisite:

PL SC 423 **Post-Soviet Politics** (3) Aspects of political transition and institutions of the fifteen Soviet successor republics; emphasis on Russia and republican confederation.

Effective: Fall 2007

Prerequisite:

PL SC 424 **Topics in Comparative Government and Institutions** (3) Topics in the comparative analysis of representative contemporary Western and non-Western governmental institutions.

Effective: Fall 2007

Prerequisite:

**PL SC 425 Government and Politics of the American States (3)** Comparative analysis of political processes; executive, legislative, and judicial decision making and behavior; examination of systems functioning; selected public policies.

Effective: Winter 1978

Prerequisite:

**PL SC 426 Political Parties and Interest Groups (3)** Interest group basis of American politics, analysis of party and group behavior in electoral politics and the policy process.

Effective: Fall 1983

Prerequisite:

**PL SC 427 Political Opinion (3)** Nature and development of mass attitudes and opinions; political socialization; voting behavior; relation between opinions and public policy.

Effective: Spring 2001

Prerequisite:

**PL SC 428 (US;IL) (WMNST 428) Gender and Politics (3)** Gender in politics in the United States and around the world; major areas of women and politics research.

Effective: Fall 2007

Prerequisite:

**PL SC 429 Analysis of Electoral Politics (3)** The new politics, its technology, and the strategic perspectives that underlie it.

Effective: Spring 2007

Prerequisite:

**PL SC 430 Selected Works in the History of Political Theory (3)** Detailed examination and analysis of a selected major work, thinker, or tradition in the history of political theory.

Effective: Spring 1998

Prerequisite:

**PL SC 430W Selected Works in the History of Political Theory (3)** Detailed examination and analysis of a selected major work, thinker, or tradition in the history of political theory.

Effective: Spring 2008

Prerequisite:

**PL SC 431 Ancient, Medieval, and Renaissance Political Theories (3)** Political theories of Plato and Aristotle; selected Greek, Roman, medieval, and Renaissance theorists through Machiavelli.

Effective: Spring 2003

Prerequisite:

**PL SC 432 Modern and Contemporary Political Theories (3)** Political theories of the seventeenth through the twentieth centuries, including Hobbes, Locke, Rousseau, Marx, Mill, Mosca, Weber, and selected theorists.

Effective: Spring 2003

Prerequisite:

**PL SC 433 Political Foundations of the Early American Republic (3)** The course introduces students to the major political and philosophical movements that influenced the founders of the early American republic.

Effective: Summer 2008

Prerequisite:

**PL SC 434 (IL) (AFR 434) War and Development in Africa (3)** This course will examine the relationship between war and development in sub-Saharan Africa in the post colonial era.

Effective: Fall 2012

Prerequisite:

**PL SC 435 Foundations of American Political Theory (3)** Political theories of colonial, revolutionary, and constitutional periods presented through works of selected thinkers and analysis of particular political problems.

Effective: Spring 2001

Prerequisite:

**PL SC 435W Foundations of American Political Theory (3)** Political theories of the revolutionary and constitutional periods presented through works of selected political thinkers and political issues.

Effective: Spring 2001

Prerequisite:

**PL SC 436 Civil Wars (3)** This course examines factors influencing the onset, duration, severity, termination, recurrence, and consequences of civil wars around the world.

Effective: Spring 2012

Prerequisite:

**PL SC 437 War in World Politics (3)** Causes, resolution, and consequences of crises and wars; testing theories of conflict using both case and statistical studies.

Effective: Summer 1997

Prerequisite:

**PL SC 438 National Security Policies (3)** Impact of national security on U.S. government and foreign policy; roles and interaction of President, Congress, government agencies, interest groups.

Effective: Spring 2001



Prerequisite:

PL SC 439 (CRIMJ 439) **The Politics of Terrorism** (3) Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

Effective: Spring 2008

Prerequisite:

PL SC 440 (US;IL) (AFR 440, I B 440) **Globalization and Its Implications** (3) This course explores the socioeconomic implications of globalization.

Effective: Spring 2013

Prerequisite:

PL SC 441 **Transnational Corporations and Other Organizations in International Relations** (3) Analysis of the effects of transnational actor behavior on international relations.

Effective: Fall 2007

Prerequisite:

PL SC 442 **American Foreign Policy** (3) Principles of American foreign policy; processes of policy formulation; roles of the President, Congress, the State Department, and other government agencies.

Effective: Spring 2001

Prerequisite:

PL SC 443 (IL) (AFR 443) **Ethnic Conflict in Africa** (3) This course explores the various causes and impacts of ethnic conflicts in the African context.

Effective: Spring 2013

Prerequisite:

PL SC 444 **Government and the Economy** (3) Interactions of governmental and economic activity in American life. Survey of governmental (national, state, local) promotional, regulatory, and ownership policies.

Effective: Winter 1978

Prerequisite:

PL SC 445Y (US) (AF AM 445Y, LER 445Y) **Politics of Affirmative Action** (3) Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S.

Effective: Fall 2012

Prerequisite:

PL SC 450H **Genocide and Tyranny** (3) This course focuses on the conceptualization and socio-political determinants of genocide and tyrannical regimes, with an emphasis on the Holocaust.

Effective: Spring 2013

Prerequisite:

PL SC 452 **Government and Politics of Central Europe** (3) Politics and society in the Communist Era, the revolutions of 1989, and problems of adjustment to democracy and market.

Effective: Fall 2007

Prerequisite:

PL SC 453 (IL) **Political Processes in Underdeveloped Systems** (3) Comparative analysis of the political, social, and economic problems characteristic of underdeveloped systems.

Effective: Fall 2007

Prerequisite:

PL SC 454 (IL) (AFR 454) **Government and Politics of Africa** (3) Contemporary African politics, institutions, and ideologies; patterns of change, social forces, and nation building in selected African states.

Effective: Fall 2012

Prerequisite:

PL SC 455 **Governments and Politics of Western Europe** (3) Comparative analysis of political and governmental structures of major West European nations; main functions and processes of such structures.

Effective: Spring 2001

Prerequisite:

PL SC 456 **Politics and Institutions of Latin-American Nations** (3) Social forces and processes, governmental institutions, foreign policies of major states of Latin America.

Effective: Spring 2001

Prerequisite:

PL SC 457 **International Politics of Latin America** (3-6) Relationships among the nations of Latin America and the social forces which determine and shape their direction.

Effective: Spring 2001

Prerequisite:

PL SC 458 **Government and Politics of East Asia** (3-6) Examination of political institutions, democratic and communist revolution, political leadership, political processes of major states of East Asia.

Effective: Summer 1996

Prerequisite:

PL SC 459 (IL) (AFR 459) **Culture and World Politics** (3) Role of culture in world politics.

Effective: Spring 2013

PL SC 460 (S T S 460) **Science, Technology, and Public Policy** (3) The all-pervasive importance of science and technology policy in modern societies and mechanisms and processes by which it is made.

Effective: Spring 1995

Prerequisite:

PL SC 461 (IL) **Politics of the European Union** (3) This course introduces students to the history, institutions and politics of the European Union.

Effective: Spring 2011

Prerequisite:

PL SC 462 **Marxist and Socialist Political Theory** (3) Analysis of major problems and key works in the Marxist and Socialist tradition; dialectical materialism, alienation, class warfare, etc.

Effective: Spring 2001

Prerequisite:

PL SC 464 (IL) (AFR 464) **Globalization, Extractive Industries, and Conflict in Africa** (3) Socioeconomic and environmental impacts of extractive industries in Africa.

Effective: Fall 2012

Prerequisite:

PL SC 467 **International Relations of the Middle East** (3) The international relations of the Middle East, stressing national security policies of regional and outside actors, and major contemporary conflicts.

Effective: Spring 1985

Prerequisite:

PL SC 470W **Legal Brief Writing** (3) Writing of legal briefs as practiced in American courts.

Effective: Spring 1998

Prerequisite:

PL SC 471 **American Constitutional Law** (3) The origins of judicial review, landmark decisions of the Supreme Court, and their impact on the American form of government.

Effective: Fall 2007

Prerequisite:

PL SC 472 **The American Legal Process** (3) Analysis of the roles, procedures, and policies characterizing the American legal system.

Effective: Spring 2001

Prerequisite:

PL SC 473 **American Judicial Behavior** (3) Analyzes behavior of judges and other participants in the legal process; examines how and why courts function as policymaking bodies.

Effective: Fall 2007

Prerequisite:

PL SC 474 **Civil Liberties and Due Process** (3) Fundamental problems relating to civil liberties and due process.

Effective: Fall 2007

Prerequisite:

PL SC 480W **Congress and the Presidency** (3) Basic characteristics and processes of the national legislature and executive; roles and interaction of these institutions in the policy process.

Effective: Fall 2007

Prerequisite:

PL SC 481 **Global Political Economy** (3) This course examines states, markets, power, production, and the relations between the various transnational agents who act in these areas. Students may not receive credit for PL SC 481 and PL SC 412.

Effective: Spring 2007

Prerequisite:

PL SC 482 **American State and Urban Politics** (3) Explores basic characteristics and processes of American state and urban politics; nature of intergovernmental relations involving these governmental levels.

Effective: Fall 2007

Prerequisite:

PL SC 484W **The Foreign Policy of Soviet Successor States** (3) Relations between Russia and The Newly Independent States (NIS); Russia's relations with selected foreign states and political Institutions; regional impact of the NIS in Baltic, Asian, and Central Asian areas.

Effective: Fall 2007

Prerequisite:

PL SC 486 (IL) (HIST 489, ASIA 489) **International Culture in East Asia** (3) Study of the role of culture in East Asian regional and East-West international relations.

Effective: Summer 2013

Prerequisite:

PL SC 487 **International Law and Organizations** (3) Major topics and issues of international law with special attention to institutional arrangements (international organizations) through which that law operates.

Effective: Fall 2007

Prerequisite:

PL SC 488 **Comparative Public Policy** (3) Comparative methodology and public policy implementation in postindustrial

societies; selected case studies of policy output.

Effective: Fall 2007

Prerequisite:

PL SC 489 **Public Administration** (3) A survey of the major approaches to the management of most governmental agencies.

Effective: Fall 2007

Prerequisite:

PL SC 490 **Policy Making and Evaluation** (3) Advanced analysis of public policy, emphasizing policy evaluation and the factors that determine policy success and failure.

Effective: Fall 2007

Prerequisite:

PL SC 491 **Peace and Conflict Studies Seminar** (3) Advanced study of major contemporary issues of peace and conflict; includes anthropological, technological, psychological, and economic perspectives.

Effective: Spring 2013

Prerequisite:

PL SC 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

PL SC 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

PL SC 495 **Political Science Internship** (1-6) Combining experience in government offices, related agencies, or law firms, with appropriate readings and a research paper/report.

Effective: Fall 2007

Prerequisite:

PL SC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

PL SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

PL SC 497A **Politics of the American South** (3) Course about government and policies of the American South during the 20th and 21st centuries.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

PL SC 497A **Post-Communist Transitions** (3) This course explores their different reform (or non-reform) paths, asking what conditions have helped to promote or retard political and economical change.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

PL SC 497B **US Foreign Policy and the Civil Rights Movement** (3) This course examines the relationship between US foreign policy and the modern civil rights movement.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

PL SC 497B **Democratization in Asia** (3) This seminar addresses the literature on democracy and democratization and then applies it in Asia. Since 1974, over thirty countries around the world started a transition toward democracy. As a result of these dramatic events, comparative scholars have studied these, and earlier transition cases, to understand why some countries become democratic while others do not, and why some new democracies who signs of consolidating while others collapse. This seminar then, addresses the recent work in the field of democratization. First, we will review works that define and measure key concepts, such as authoritarianism, democracy, and democratic consolidation. Then, we will consider a range of factors to explain the installation, consolidation, or failure of democracy in specific Asian countries, The goals of this seminar are three-fold.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

PL SC 497C **War and State Making** (3) This course looks at how states come into existence and how war influences their development.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

PL SC 497C **The Politics of Human Rights** (3) This course examines the politics of human rights and repression, focusing on the causes and consequences of human rights violations. The core questions considered include: Are human rights universal? Why do governments choose to repress individuals within their jurisdiction? Have level of repression changed over time? What strategies have international institutions, non-state actors, and individuals used to uncover and reduce the use of repressive actions? Students will learn to identify and critically evaluate human rights issues as they arise in

different time periods and regions of the world. Course material will draw from the diverse research methodologies that have been applied to the study of human rights.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 497D Intro to South Asian Politics (3)** This course will present an overview of the politics of modern South Asia focusing on Afghanistan, India and Pakistan. Also explore South Asian politics by studying the impact of the British colonial experience, rise of nationalism and emergence of independent nation states in South Asia.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 497D Political Psychology (3)** This course will present a genuinely interdisciplinary approach to the study of political psychology. We will draw on work in social, developmental and clinical psychology, as well the cognitive neurosciences, biological anthropology, genetics, evolution and behavioral economics to examine existing problems relevant to the field. Specifically, this class will investigate how political elites and the mass publics think and act, including the reasoning processes that come into play when human beings try to make sense of their political world. We will address political world. We will address political identity, cooperation, risk and conflict. We will look at leaders and leadership, motivation, and intergroup behavior.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 497E (COMM 497E) Role of the Media in the Israeli-Palestinian Conflict (3)** This course examines the role of framing and selective reporting in broadcast, digital, and print media in affecting perceptions of the Israeli-Palestinian Conflict.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 497E Political Representation (3)** Purpose of course is to acquaint students with significant concepts and ideas regarding political representation. Questions pertaining to the representation of citizens' interests and to the responsiveness of government to citizen preferences are central to our understanding of American politics. Indeed, assessments of the nature and quality of democratic governance hinge, at least to some extent, on the degree to which government officials are responsive to citizen concerns and attentive to their interests. Throughout the course we will be attentive to how normative considerations shape expectations about representation in practice.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 497F The Politics of Human Rights (3)** This course examines politics of human rights and repression. Focuses on the causes and consequences of human rights violations. Asking core questions and learn to identify and critically evaluate human rights issues as they arise in different time periods and regions of the world.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 497F Business-Government Relations (3)** In this class, we will study what drives the structure and behavior of business relations with governments in various kinds of political systems. We will trace the nature of business-government interactions throughout the political process from election campaigns to policy formulation, and throughout the policy process from design to implementation. We will use cases from developed and developing countries and analyze three policy cases using the tools we develop.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 497G Introduction to Chinese Politics (3)** This class aims to provide an overview of the politics of modern China. We will begin our study of Chinese Politics from the last years of the Ming dynasty and the rise of modern Chinese nationalism, the evolution of the Chinese Communist Party and, the emergence of the People's Republic of China. We will then explore in detail the main political event, the political dynamics driving them and the challenges the PRC has faced in subsequent decades. We will focus on three central themes - the state of economic development, political reforms over the years and, China's changing role within global politics.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 497H Analysis of US National Elections (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 497I Politics and the Media (3)** This course is designed to introduce students to the interactive dynamics of the news media and the political system. We focus primarily on the news media as it is the dominant medium for political communication. We also examine the relationship between the historical development of mass media and its impact on democratic communication.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 499 (IL) Foreign Study--Government (1-12)** Study, in selected foreign countries, of political institutions.

Effective: Summer 2005

Prerequisite:

**PL SC 501 Methods of Political Analysis (3)** Survey of important methods and approaches to the study of politics; introduction to research design.

Effective: Fall 1995

PL SC 502 **Statistical Methods for Political Research** (3) Basic concepts of statistics and their use in political research; data analysis, casual inference, regression analysis, computer applications.  
Effective: Spring 1995

PL SC 503 **Multivariate Analysis for Political Research** (3) Analysis of selected issues in quantitative political analysis; introduction to advanced multivariate analysis techniques.  
Effective: Spring 2003  
Prerequisite:

PL SC 511 **Professional Norms in Political Science** (1.5) An introduction to professional norms, the fundamentals of good research, and the basic skills necessary for good teaching.  
Effective: Spring 2007

PL SC 513 **Writing and Professional Development in Political Science** (1.5) Professional development focusing on publishing research, writing dissertations, and professional issues of advanced graduate students.  
Effective: Fall 2007  
Prerequisite:

PL SC 518 (SOC 518) **Survey Methods I: Survey Design** (3) Research design of social, behavioral and health surveys.  
Effective: Fall 2007

PL SC 519 (SOC 519) **Survey Methods II: Analysis of Survey Data** (3) Intermediate course on the statistical analysis of survey data: topics include weighting, complex surveys, missing data, and contextual analysis.  
Effective: Spring 2008  
Prerequisite:

PL SC 534 (AFR 534) **Political Economy of Energy and Extractive Industries in Africa (Oil and Mining)** (3) Students will examine how the expansion of petroleum and mining industries has impacted Africa's political economics and external relations.  
Effective: Spring 2013

PL SC 540 **American Government and Politics** (3) Survey of basic literature in major fields of U.S. government: public opinion, parties, voting, interest groups, presidency, congress, judiciary.  
Effective: Fall 1995

PL SC 541 **American Political Institutions** (3-9) Research on a selected topic in United States political institutions such as the presidency, the courts, congress, bureaucracy, state governments.  
Effective: Spring 1995

PL SC 542 **American Political Behavior** (3 per semester/maximum of 9) Research on a selected topic in United States political behavior such as public opinion, voting, parties, socialization, judicial behavior.  
Effective: Spring 1995

PL SC 550 **Comparative Politics: Theory and Methodology** (3) Survey of basic literature and major research efforts in comparative political analysis.  
Effective: Fall 1995

PL SC 551 **Comparative Political Institutions** (3 per semester/maximum of 9) Comparative study of the institutional structures of different political systems: the state, party systems, administrative structures.  
Effective: Spring 1995

PL SC 552 **Comparative Political Behavior** (3 per semester, maximum of 9) Research on aspects of comparative political behavior, such as political culture, political change and development, interest groups, public opinion.  
Effective: Spring 2003

PL SC 553 **Studies in Regional Politics** (3 per semester/maximum of 9) Research on political systems in selected regions of the world, such as Europe, Latin America, East and South Asia.  
Effective: Spring 1995

PL SC 554 **The Politics of Development** (3) The course explores the origins of modernity, its proliferation globally, and problems associated with initiating and sustaining development.  
Effective: Summer 2005

PL SC 555 **Comparative Regimes** (3 per semester/maximum of 9) This course provides an overview of comparative analyses of regimes as they relate to the field of political science.  
Effective: Summer 2013

PL SC 556 **Civil Conflict** (3) This class addresses civil conflict, in terms of general theory regarding cooperation and

conflict and also cross-regional cases of civil conflict.  
Effective: Spring 2013

PL SC 560 **International Relations: Theory and Methodology** (3) Survey of major traditional and contemporary theory-building efforts and contemporary research techniques and orientations in international relations.  
Effective: Summer 1995

PL SC 561 **American Foreign Policy** (3 per semester/maximum of 9) Research on the institutions, dynamics, and major themes of United States foreign policy.  
Effective: Spring 2003

PL SC 563 **International Political Economy** (3 per semester, maximum of 9) Research on international political economy with a focus on theory building; analysis of political causes and consequences of economic behavior.  
Effective: Spring 2003

PL SC 564 **International Organization** (3 per semester/maximum of 6) Research on international governmental and non-governmental organizations in the international system, emphasizing the United Nations and collective security.  
Effective: Spring 1995  
Prerequisite:

PL SC 565 **International Conflict** (3) Research into the causes and consequences of international crises and wars, using various methodologies for theory assessment.  
Effective: Spring 1996  
Prerequisite:

PL SC 566 **Conflict Management, Termination, and Bargaining** (3) Research on termination and resolution of international conflicts, focusing on theory building and empirical assessment of theories of conflict resolution.  
Effective: Fall 2008  
Prerequisite:

PL SC 580 **Modern Democratic Political Theory** (3) Survey of major themes and problems in modern theories of democratic politics.  
Effective: Spring 2003

PL SC 581 **History of Political Theory** (3 per semester/maximum of 9) Research on selected political theorists or historical traditions of political thought.  
Effective: Spring 2003

PL SC 583 **Modern Political and Social Theory** (3 per semester/maximum of 9) Research on major developments and issues in modern political and social theory, such as critical theory, modernism, and postmodernism.  
Effective: Spring 2003

PL SC 586 **Theory of Bureaucratic and Administrative Politics** (3 per semester/maximum of 6) The role of the executive in government and politics; theories of administrative organization, organization behavior, and decision-making processes.  
Effective: Spring 1998

PL SC 594 **Research in Political Science** (1-6) Supervised student activities on research projects identified on an individual or small group basis.  
Effective: Summer 1988

PL SC 595 **Internship in Political Science** (1-9) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 1987  
Prerequisite:

PL SC 595A (SOC 595A) **Survey Research Practicum** (1-6 per semester/maximum of 6) Practicum in Survey Research data collection or management.  
Effective: Summer 2011  
Prerequisite:

PL SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.  
Effective: Spring 1987

PL SC 596A **Independent Study in American Politics** (1-18) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 596A Independent Study in American Politics (1-18)** Projects and non-thesis research in American Politics, supervised on an individual basis by a faculty expert in the American Politics field. This will give a specific title to the students transcript, given more details than just Individual Studies.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 596B Independent Study in Comparative Politics (1-18)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 596B Independent Study in Comparative Politics (1-18)** Projects and non-thesis research in Comparative Politics, supervised on an individual basis by a faculty expert in the Comparative Politics field. This will give a specific title to the students transcript, given more details than just Individual Studies.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 596C Independent Study in International Relations (1-18)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 596C Independent Study in International Relations (1-18)** Projects and non-thesis research in International Relations, supervised on an individual basis by a faculty expert in the International Relations field. This will give a specific title to the students transcript, given more details than just Individual Studies.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 596D Independent Study in Political Methodology (1-18)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 596D Independent Study in Political Methodology (1-18)** Projects and non-thesis research in Political Methodology, supervised on an individual basis by a faculty expert in the Political Methodology field. This will give a specific title to the students transcript, given more details than just Individual Studies.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**PL SC 597A Introduction to Duration Models (3)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 597A Africa and World Politics (3)** While often marginalized in mainstream analyses of world politics, Africa was once at the centerpiece of seminal issues at the core of academic study in the nascent field of world politics in the US, such as imperialism, anarchy, balance of power, war, national self-determination, racism, international organization, and democratization. This graduate seminar examines sub-Saharan African's international relations--primarily in the post-colonial era, through an examination of the domestic and foreign policies of African states and the interaction of African states and non-state actors with non-African entities especially the superpowers, the former colonial powers, IGOs, NGOs, and IFIs.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**PL SC 597B Globalization and Development (3)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 597C Mathematics for Political Science (1.5)** This course provides a foundation in the basic mathematical principles needed to complete required coursework in statistical methods in the political science Ph.D. curriculum, and to undertake quantitative research and formal analysis in political science. Students will gain exposure to the mathematical language used in social science research and analysis, and develop the skills necessary to critically read and evaluate articles in political science and make informed choices about analytical approaches for their own research. Topics to be covered include basic principles of mathematics (including principles of arithmetic; mathematical notation and terminology; functions and equations; logarithms and exponents; Greek alphabet; and analytical geometry); calculus and linear algebra (including vectors and matrices; matrix operations; matrix structure).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 597D Multivariate Analysis for Political Research II (3)** This course introduces a range of statistical models widely

used in empirical political science that generalize from linear-normal regression. It is the third foundational course in statistical methods in the political science Ph.D. curriculum; students are expected to have completed the prior courses or their equivalents. The primary focus of the course is on models where the traditional assumptions or ordinary least-squares regression are violated because the dependent variable is non-continuous. Emphasis is given to maximum likelihood estimation of models of various kinds of limited-dependent and qualitative response variables including binary, multinomial, and ordered logit and probit, as well as Poisson and other models for event counts. Additional topics include models for survival (time-to event) data; panel and time series analysis; item response underlying those methods for causal inference using observational data.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 597E Big Data and The Law (3)** This graduate-level course examines the social, political, and legal implications of "big data." Topics will include questions of agency and consent regarding personal information, privacy and confidentiality, and ethical issues raised by ubiquitous, real-time digital information. We will also discuss legal and judicial responses to big data, including its implications for standards of proof and liability, rules of evidence, criminal procedure, and intellectual property. Finally, we'll consider the impact of advances in data and analytics on the operation of law enforcement, the judicial system, and the legal services industry.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PL SC 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1995

**PL SC 599 (IL) Foreign Studies (1-12 per semester/maximum of 24)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Effective: Summer 2005

**PL SC 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

**PL SC 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Fall 1983

**PL SC 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** No description.

Effective: Spring 1995

**PL SC 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Spring 2000

**PL SC 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 1983

**PL SC 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Fall 1983

**PL SC 836 Root Causes of Terrorism (3)** Investigates the role economic, political and social factors play in determining patterns of international and domestic terrorism and terrorist activity.

Effective: Spring 2013

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## Portuguese (PORT)

PORT 405 **Advanced Composition and Conversation** (3) Intended to strengthen the advanced student's ability to speak, read, and write in modern Brazilian Portuguese.

Effective: Summer 1981

Prerequisite:

PORT 476 **Brazilian Literature, The Modern Era (1880 to the Present)** (3) A survey of the major texts of Brazilian literature from romanticism to the present.

Effective: Summer 1991

Prerequisite:

PORT 480 **The Brazilian Novel** (3) A survey of the Brazilian novel from its origins to the present.

Effective: Spring 1993

Prerequisite:

PORT 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

PORT 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

PORT 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

PORT 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

PORT 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

PORT 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

PORT 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1988

PORT 600 **Thesis Research** (1-15) No description.

Effective: Fall 1983

PORT 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Fall 1983

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## **Poultry Science (PTYSC)**

NOTE: Also see courses listed under ANIMAL SCIENCE, DAIRY and ANIMAL SCIENCE, and FOOD SCIENCE.

**PTYSC 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**PTYSC 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**PTYSC 600 Thesis Research (1-15)** No description.

Effective: Fall 1983

**PTYSC 610 Thesis Research Off Campus (1-15)** No description.

Effective: Fall 1983

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## Primary Care Medicine (PCMED)

PCMED 700 **Primary Care Preceptorship** (1) Participation in primary care settings of family medicine, general internal medicine, and general pediatrics.

Effective: Spring 1994

Prerequisite: Concurrent: MED 701 MED 702

PCMED 731 **Primary Care Clerkship** (5) This course provides an opportunity for students to learn the principles of primary health care in rural, small town, and/or medically underserved communities.

Effective: Summer 1996

Prerequisite:

PCMED 741 **Primary Care Elective - Medical Director-Practice Management Fishburn Family Medicine** (5) This module was developed for those students interested in gaining experience working with a medical director in primary care to learn about managing a practice and with family physicians, nurse practitioners and physician assistants in primary care.

Effective: Summer 2009

Prerequisite:

PCMED 742 **Primary Care Longitudinal Advanced Elective** (5) Longitudinal outpatient experience caring for patients over time (once/week over six months) emphasizing continuity of care.

Effective: Summer 2011

Prerequisite:

PCMED 743 **Primary Care in PA** (5) Four-week clinical experience with selected primary care physicians in PA.

Effective: Summer 2003

Prerequisite:

PCMED 744 **Primary Care, Continental U.S. Sites** (5) Four-week Primary Care related experience in an outpatient clinic within the continental U.S. that meets the student's individual needs.

Effective: Summer 2003

Prerequisite:

PCMED 745 **Primary Care, Indian Health Service** (5) Four-week clinical experience with primary care physicians located at Indian Health Service sites.

Effective: Summer 2003

Prerequisite:

PCMED 746 **Primary Care, International** (5) Four-week clinical experience with primary care physicians located at International sites.

Effective: Summer 2003

Prerequisite:

PCMED 747 **Primary Care Elective - Leadership in Community Module** (5) This module was developed for those who have both the interest and potential to become leaders in the health care of hi-risk children and their families, and to meet the challenges and opportunities of community-oriented primary care.

Effective: Summer 2009

Prerequisite:

PCMED 748 **Primary Care Elective - Penn State Orthopaedics and Sports Medicine** (5) This module was developed for those students interested in gaining experience working in the areas of primary care sports medicine.

Effective: Summer 2009

Prerequisite:

PCMED 749 **Primary Care Sports Medicine, Hershey (4th year)** (5) This course provides exposure to concepts utilized in the evaluation and initial treatment of common sports medicine conditions.

Effective: Fall 2009

Prerequisite:

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## **Profession Of Medici (POM)**

POM 711 **Profession of Medicine** (1-2) A prologue to the student's medical school experience and an introduction to the medical profession.

Effective: Summer 2013

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## Psychiatry-Hy (PSCHT)

PSCHT 700 **Psychiatry Clinical Clerkship** (5) Clinical experience in the management of patients with psychiatric disorders.

Effective: Winter 1978

Prerequisite:

PSCHT 771 **Adult Psychiatry Inpatient Acting Internship** (5) Students are assigned selected adult inpatients and receive close individual supervision in diagnosis and treatment, including psychotherapy and drug therapy.

Effective: Spring 2009

Prerequisite:

PSCHT 773 **Child Psychiatry Inpatient Acting Internship** (5) Students are involved, under faculty supervision, in diagnostic evaluation and treatment planning and implementation of selected child and adolescent outpatients.

Effective: Spring 2009

Prerequisite:

PSCHT 774 **Child Psychiatry Outpatient Elective** (5-15) Students are involved, under faculty supervision, in diagnostic evaluation and treatment planning and implementation of selected child and adolescent inpatients.

Effective: Fall 2003

Prerequisite:

PSCHT 775 **Consultation/Liaison Psychiatry Elective** (5-15) Students evaluate medical/surgical patients where psychiatric consultation is requested and receive supervision in diagnosis and short-term psychiatric treatment.

Effective: Summer 1985

Prerequisite:

PSCHT 783 **Research in Physiology and Pathology of Sleep** (5-15) Participation in experimental and clinical studies of normal and disordered sleep and the evaluation, diagnosis and treatment of sleep disorders.

Effective: Winter 1978

Prerequisite:

PSCHT 796 **Psychiatry Individual Studies** (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2009

Prerequisite:

PSCHT 796A **Psychiatry Individual Studies for 3rd Year Students** (2.5) Psychiatry Individual Studies for 3rd Year Students.

Effective: Spring 2010

Prerequisite:

PSCHT 797 **Psychiatry Special Topics** (5) Psychiatry Special Topics.

Effective: Spring 2010

Prerequisite:

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## Psychology (PSY)

**PSY 501 Seminar in General Psychology** (1) Orientation course for first-year graduate students in Psychology.

Effective: Spring 1999

Prerequisite:

**PSY 502 (BB H 502) Health: Biobehavioral Perspectives** (3) Introduction to the role of psychology in maintaining health and in treating nonpsychiatric disorders.

Effective: Summer 1992

**PSY 507 Analysis of Psychological Data I** (3) Overview of analysis techniques for psychological data.

Effective: Summer 2000

Prerequisite:

**PSY 508 Analysis of Psychological Data II** (3) Overview of advanced analytic techniques for psychological data.

Effective: Summer 2004

Prerequisite:

**PSY 511 Seminar in Contemporary Psychology** (1-3 per semester/maximum of 12) Critical review of readings on a topic of current interest, either in content or methodology, within psychology.

Effective: Fall 2006

Prerequisite:

**PSY 517 Advanced Social Psychology** (3) Problems of theory and of research methods with emphasis on persisting issues relevant to contemporary developments in social psychology.

Effective: Spring 2007

Prerequisite:

**PSY 520 (LING 520) Seminar in Psycholinguistics** (3 per semester/maximum of 9) Considerations of theoretical and research issues relevant to psychological aspects of language sounds, syntax and semantics, and other cognitive support.

Effective: Spring 2004

**PSY 521 Cognitive Studies** (3) Survey of theories, methods, and issues in cognitive science.

Effective: Spring 2007

Prerequisite:

**PSY 522 Personnel Selection and Appraisal** (3) Evaluation of models for personnel selection, placement, and performance appraisal in business and industry.

Effective: Spring 2007

Prerequisite:

**PSY 523 Social-Organization Psychology in Industry** (3) Analysis of the role of social and organizational variables as they affect employee performance and employee attitudes.

Effective: Spring 2007

Prerequisite:

**PSY 524 Proseminar in Cognitive Psychology** (3) An historical introduction to theories and critical findings in the field of cognitive psychology.

Effective: Summer 1997

Prerequisite:

**PSY 525 COG PSY SEM** (3 per semester/maximum of 12) An advanced seminar in a topical or research area in the field of cognitive psychology.

Effective: Spring 1998

Prerequisite:

**PSY 526 (HD FS 526) Measurement in Human Development** (3) Principles and methods for assessment of human developmental processes across the life span.

Effective: Spring 2007

Prerequisite:

**PSY 528 (HD FS 528) Observational Methodologies for Development** (3) Design and application of observational methods in developmental research.

Effective: Spring 1994

Prerequisite:

**PSY 529 (HD FS 529) Seminar in Child Development** (1-6) Readings and reports on recent findings in child development.

Effective: Spring 1999

Prerequisite:

**PSY 534 Practicum in Industrial/Organizational Psychology** (1-3) Supervised application of psychological principles in industrial and governmental settings.

Effective: Spring 2007

Prerequisite:

**PSY 536 (HD FS 536) Research Methods in Developmental Processes** (3) Methodological issues in research on varying

stages of development across the individual life-span.

Effective: Summer 1990

Prerequisite:

**PSY 538 Psychology of Personnel Development** (3) Industrial training in relation to psychological learning theory and experimental findings.

Effective: Spring 2007

Prerequisite:

**PSY 540 Seminar in Clinical Problems** (1-9) Contemporary psychological theory, research, and methodology in relation to clinical psychology.

Effective: Winter 1978

Prerequisite:

**PSY 541 Personality Theory** (3-4) Contemporary theories of personality; relevant research.

Effective: Spring 2007

Prerequisite:

**PSY 542 Psychopathology** (3-4) Theories of pathological behavior with reference to clinical and experimental data.

Effective: Spring 2007

Prerequisite:

**PSY 543 Research Design in Clinical Psychology** (3) Experimental and quasi-experimental designs, methodological problems, and techniques of experimental control in clinical psychology research.

Effective: Winter 1978

Prerequisite:

**PSY 547 Fundamentals of Social Development** (3) An introduction to theories, current issues, and critical psychological research findings relating to social and emotional development.

Effective: Summer 2005

**PSY 549 (HD FS 549) Developmental Theory** (3) Conceptual frameworks and major contributions to the study of individual development across the life-span.

Effective: Summer 1990

Prerequisite:

**PSY 554 Clinical Assessment** (3) Development of psychological measures; evaluation of reliability and validity. Predictive utility of tests in clinical settings emphasized.

Effective: Summer 1990

Prerequisite:

**PSY 555 Theory and Practicum in Clinical Assessment** (3-9) Theoretical issues and research in clinical assessment with special reference to administration and interpretation of testing procedures and clinical interviewing.

Effective: Winter 1978

Prerequisite:

**PSY 556 Neuropsychological Assessment** (4) Survey of human neuroanatomy, neuropathology, behavioral correlates of cerebral dysfunction, and the assessment of neurological disorders.

Effective: Spring 2007

Prerequisite:

**PSY 557 Introduction to Psychopharmacology and Survey of Biological Therapies** (3) An introduction to the principles of psychopharmacology and to the medications used to treat psychopathologies.

Effective: Summer 1998

Prerequisite:

**PSY 558 (PHP 558, HLS 558) Disaster Psychology** (3) Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.

Effective: Spring 2011

Prerequisite:

**PSY 560 Practicum in Clinical Methods** (1-6) Supervised practice in the Psychology Clinic, including assessment, therapy, report writing, and staff participation.

Effective: Fall 1987

Prerequisite:

**PSY 561 Clinical Practicum with Children** (1-6) Diagnosis and counseling of child-parent problems of learning and adjustment.

Effective: Spring 2007

Prerequisite:

**PSY 563 Behavior Modification I** (3) Conceptual foundations of principles, assessment methods, and research strategies.

Effective: Winter 1978

**PSY 564 Behavior Modification II** (3) Survey and empirical evaluation of treatment strategies.

Effective: Winter 1978

Prerequisite:

**PSY 565 Seminar in Community Psychology** (3) Application of social psychological research methods and principles to

prevention and alleviation of behavior disorders in family and community settings.  
Effective: Winter 1978

**PSY 566 Cultural Psychology** (3) Experimental and descriptive research on culture and behavior in both Western and non-Western settings.  
Effective: Spring 2007  
Prerequisite:

**PSY 569 Advanced Theory and Practicum in Counseling and Psychotherapy** (3-9) Theoretical issues, research, and practicum experience in psychotherapy.  
Effective: Winter 1978

**PSY 571 Seminar in Social Psychology** (3-12 per semester/maximum of 12) Historical development of theory and methods; determinants and principles of complex social or interactional behavior; contemporary problems and research.  
Effective: Spring 2006

**PSY 572 Psychology of Gender** (3) Theory and research on the psychology of gender, emphasizing gender in social interaction, and in individual identity.  
Effective: Spring 2012  
Prerequisite:

**PSY 575 Clinical Child Psychopathology** (3) Overview of developmental clinical child psychopathology; emphasis on social- emotional development, with review of abnormal development and social- emotional maladjustment.  
Effective: Summer 1988  
Prerequisite:

**PSY 576 Clinical Child Interventions** (3) Clinical-child therapeutic techniques from a developmental-clinical perspective with emphasis on theoretical basis and empirical evaluation of various techniques.  
Effective: Summer 1988  
Prerequisite:

**PSY 577 Clinical Child Assessment** (3) Overview of major methods used in clinical assessment of infants, pre-school children, and grade-school children with emphasis on social-emotional functioning.  
Effective: Summer 1988  
Prerequisite:

**PSY 583 Designing Research in Social Psychology** (3) Designs and procedures useful in social psychology and cognate disciplines; quasiexperimental designs and analysis, field experimentation, validity of inferences.  
Effective: Fall 1983  
Prerequisite:

**PSY 584 (SOC 584) Attitude Formation and Change** (3) Theory and method in research on attitude formation and change with emphasis on critical analysis.  
Effective: Spring 2007  
Prerequisite:

**PSY 585 Interaction Processes Within and Between Groups** (3) Interactions in personal, group, and intergroup relations; theory and observational methods.  
Effective: Spring 2012  
Prerequisite:

**PSY 589 Social Cognition and Social Perception** (3) Overview of how social behavior and social perception (e.g., impression formation, attitudes, the self, stereotyping) are influenced by cognitive processes.  
Effective: Summer 1997

**PSY 590 Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1998

**PSY 591 Seminar on Teaching Psychology** (1-3) Objectives and content of psychology; organization and presentation of material; teaching aids and techniques.  
Effective: Winter 1978

**PSY 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

**PSY 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**PSY 597A TIES Fellowship Seminar** (1-2) Graduate seminar focuses on topics related to publishing scientific studies in the interdisciplinary educational sciences as a key component to the TIES Program. For the Fall 2013 semester the course



will offer two 1 credit topics, students may choose to participate in one credit (attend one topic) or two credits (attend both topics) as needed.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PSY 597B Multilevel Theory, Measurement and Analysis (3)** This class is designed to provide doctoral students with an introductory treatment of multilevel theory building and testing. Issues to be discussed include: multilevel theory building, composition and compilation models, aggregation, aggregation bias, the role of within-group agreement in multilevel modeling, cross-level inference, cross-level interactions, and hierarchical linear modeling. If time permits, we will discuss other special topics based on class interest (e.g., HLM & dyadic data, HLM & missing data, HLM and ordinal data, multilevel mediation). Students will be evaluated on class participation, presentations, and a final research paper.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PSY 597C The Art and Science of Psychology: A Professional Development Seminar (3)** This is a professional development seminar for graduate students interested in academic careers in the social sciences. This course will provide instruction in basic and applied research methods, logic and reasoning, strategies for data analysis, and professional ethics. This is a writing intensive course with a strong emphasis on how to produce, conduct, and present research. Students enrolled in this course will develop a novel hypothesis, plan research to evaluate their ideas, write for publication, and evaluate the original research of others. This course is intended for Ph.D. students in the social sciences and is intended to facilitate students' productivity while providing students with experience submitting for publication, reviewing for journals, writing original ideas, and presenting research orally.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PSY 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**PSY 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1983

**PSY 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Supervised training in lecture content and presentation, examination construction, and individual instruction.  
Effective: Fall 1983

**PSY 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

**PSY 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1983

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## Psychology-CI (PSYC)

**PSYC 500 Ethics and Professional Practice in Psychology and Counseling** (3) This course will familiarize students with the standards of ethical conduct related to research and practice in psychology and counseling.

Effective: Fall 2005

Prerequisite:

**PSYC 501 Cultural Competency in Psychology** (3) This course will familiarize students with the need for sensitivity to individual and group differences associated with culture and ethnicity.

Effective: Spring 2001

Prerequisite:

**PSYC 502 Applied Social Psychology** (3) An examination of social psychological applications to areas such as health, law, interpersonal relations, environment, politics, and other social issues.

Effective: Spring 1998

**PSYC 510 Human Development and Growth** (3) The course covers human development across the life span.

Effective: Spring 2005

Prerequisite:

**PSYC 514 Preventive Psychology** (3) This course focuses on the theoretical, conceptual, programmatic, and empirical issues currently in preventive psychology.

Effective: Fall 1999

Prerequisite:

**PSYC 515 Clinical Health Psychology** (3) This course examines wellness maintenance, early detection, and the impact of health care on individuals and the community.

Effective: Spring 1997

Prerequisite:

**PSYC 516 Child Health Psychology** (3) This course will familiarize students with health issues in the context of child development and family systems.

Effective: Spring 2001

Prerequisite:

**PSYC 517 Psychopathology** (3) A broad spectrum view of psychopathology including biological, social, cognitive, psychological, and neuropsychological approaches, is emphasized, with an applied focus.

Effective: Fall 2001

Prerequisite:

**PSYC 518 Interviewing and Counseling** (3) This course covers basic clinical interviewing and counseling techniques from both the didactic and experiential perspectives.

Effective: Spring 2005

Prerequisite:

**PSYC 519 Theories and Models of Psychotherapy** (3) An advanced level of psychotherapies and applications in diverse settings.

Effective: Summer 2005

Prerequisite:

**PSYC 520 Research Methods** (4) The course will review experimental, quasi-experimental designs, program evaluation, between subject designs, and within subject or intra-subject designs.

Effective: Fall 1999

Prerequisite:

**PSYC 521 Statistics** (4) The nature, computation, computer analysis, interpretation, and APA-style write-up will be discussed for a number of statistical tests.

Effective: Spring 2000

Prerequisite:

**PSYC 524 Biological Basis of Behavior** (3) This course focuses on biological determinants of behavior, including evolution, hormones, sensory systems, internal states, reproduction, emotions, learning, and memory.

Effective: Spring 2001

Prerequisite:

**PSYC 525 Forensic Psychology** (3) This course will explore social, cognitive, civil and criminal issues related to forensic psychology.

Effective: Spring 2001

Prerequisite:

**PSYC 526 Behavioral Systems in Criminal Justice** (3) The impact of crime on the offender, the victim, and society will be studied from the psychological perspective.

Effective: Spring 2001

Prerequisite:

**PSYC 530 Research Paper** (3) Supervised research in psychology for degree candidates.

Effective: Spring 2001

Prerequisite:

PSYC 535 **Behavioral Management** (3) Analysis of determinants of behavior and behavioral ecology. Emphasis on data collection and data evaluation techniques.  
Effective: Fall 1997

PSYC 540 **Group Interventions** (3) This course covers applications of psychotherapeutic techniques to a group setting.  
Effective: Fall 2005  
Prerequisite:

PSYC 571 **Tests and Measurements** (3) Administration, analysis, and interpretation of psychological evaluation methods will be reviewed.  
Effective: Spring 2005  
Prerequisite:

PSYC 572 **Neuropsychological Assessment** (3) This course will review the biological bases of behavior, emphasizing brain-behavioral relationships and assessment of these relationships.  
Effective: Fall 2001  
Prerequisite:

PSYC 592 **Current Topics in Applied Psychology** (3 per semester/maximum of 99) Advanced topics in applied psychology will be taught through readings, research, and practice.  
Effective: Spring 1999  
Prerequisite:

PSYC 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual or small group basis.  
Effective: Summer 2003

PSYC 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 1995

PSYC 595A **Clinical Practicum** (1-18) Provides practicum experience component for interviewing and counseling course.  
Effective: Fall 2005  
Prerequisite:

PSYC 595B **Clinical Internship** (1-18) Supervised clinical experience in a community setting. This course is repeatable.  
Effective: Spring 2005  
Prerequisite:

PSYC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1996

PSYC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1995

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## Public Administration (P ADM)

P ADM 401 **Introduction to Homeland Security** (3) This course provides foundational knowledge about homeland security, including policy, organization, and legal issues in the American context.  
Effective: Summer 2008

P ADM 404 **Homeland Security and Defense in Practice** (3) This course analyzes, evaluates, and critiques homeland security plans in practice.  
Effective: Summer 2008  
Prerequisite:

P ADM 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1993

P ADM 500 **Public Organization and Management** (3) Development of basic concepts and issues in public administration; administrative theory and public policy processes.  
Effective: Spring 2003

P ADM 502 **Governmental Fiscal Decision Making** (3) Nature, function, and technique of governmental budgeting viewed as mechanism for allocating resources among alternative public uses.  
Effective: Fall 2012

P ADM 503 (H ADM 503) **Research Methods** (1-3) Examination of research methodologies relevant to administration, planning, and public policy.  
Effective: Fall 2012  
Prerequisite:

P ADM 505 **Human Resources in the Public and Nonprofit Sectors** (3) Concepts and approaches contributing to effective use of human resources in public and non-profit organizations; legal issues and requirements.  
Effective: Fall 2012

P ADM 506 (H ADM 506) **Management Information Systems for Public and Health Administration** (3) The design, implementation, and purpose of computerized management information systems in public and non-profit organizations.  
Effective: Spring 2003

P ADM 507 **Introduction to Public Policy Analysis** (3) Introduction to the analysis of public policy within its organizational and political contexts, including an emphasis on an economic perspective.  
Effective: Summer 2004 Ending: Summer 2013  
Prerequisite:

P ADM 507 **Introduction to Public Policy Analysis** (3) Introduction to the analysis of public policy within its organizational and political contexts, including an emphasis on an economic perspective.  
Effective: Fall 2013 Future: Fall 2013

P ADM 510 (H ADM 510) **Organizational Behavior** (3) Examination of concepts of human behavior in formal organizations, systems analysis, conceptual models, and decision processes.  
Effective: Spring 2003

P ADM 511 **Organizational Change and Development** (3) Theory of organizational change and development; case analysis of applications in actual situations.  
Effective: Spring 2003  
Prerequisite:

P ADM 512 **Issues in Human Resources** (3) A survey of major human resource issues such as job stress, burnout, and the many forms of discrimination in organizations.  
Effective: Spring 2003 Ending: Summer 2013  
Prerequisite:

P ADM 512 **Issues in Human Resources** (3) A survey of major human resource issues such as job stress, burnout, and the many forms of discrimination in organizations.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

P ADM 514 **Public Organization and Managerial Consultation** (3) This course will review the theories, approaches, methods, and expected outcomes of organization and management consultation.  
Effective: Spring 2003 Ending: Summer 2013  
Prerequisite:

P ADM 514 **Public Organization and Managerial Consultation** (3) This course will review the theories, approaches,

methods, and expected outcomes of organization and management consultation.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

P ADM 515 (MNGMT 515) **Labor Management Relations** (3) Labor relations issues; collective bargaining agreement, negotiations, and administration; legal framework of collective bargaining; labor relations in larger social context.

Effective: Fall 2011

Prerequisite:

P ADM 516 **Strategic Planning** (3) A survey of strategic planning purposes, approaches and methods, and expected outcomes in small and large organizations.

Effective: Summer 1999 Ending: Summer 2013

Prerequisite:

P ADM 516 **Strategic Planning** (3) A survey of strategic planning purposes, approaches and methods, and expected outcomes in small and large organizations.

Effective: Fall 2013 Future: Fall 2013

P ADM 517 **Nonprofit Organizations: History and Evolution** (3) A study of the history, development and current role of nonprofit organizations as a distinguishing feature of American society.

Effective: Spring 2003 Ending: Summer 2013

Prerequisite:

P ADM 517 **Nonprofit Organizations: History and Evolution** (3) A study of the history, development and current role of nonprofit organizations as a distinguishing feature of American society.

Effective: Fall 2013 Future: Fall 2013

P ADM 518 **Nonprofit Organizations: Management and Leadership** (3) A study of the theoretical and practical issues involved in management and leadership of nonprofit organizations.

Effective: Spring 2003 Ending: Summer 2013

Prerequisite:

P ADM 518 **Nonprofit Organizations: Management and Leadership** (3) A study of the theoretical and practical issues involved in management and leadership of nonprofit organizations.

Effective: Fall 2013 Future: Fall 2013

P ADM 519 **Nonprofit Organizations: Resource Development and Management** (3) Process by which nonprofit organizations assure that resources are obtained and used effectively and efficiently toward the achievement of objectives.

Effective: Summer 2003

P ADM 522 **Government Financial Management** (3) Theories and techniques of financial planning and control, with emphasis on their application in government and nonprofit agencies.

Effective: Spring 2003

Prerequisite:

P ADM 523 **Governmental and Nonprofit Accounting** (3) Accounting, reporting, and auditing principles and procedures for public sector agencies and nonprofit organizations.

Effective: Summer 1998

Prerequisite:

P ADM 524 **Administrative Law** (3) Statutory and judicial controls upon administrative discretion. Administration of rule making, rate setting, licensing, adjudication. Judicial review and citizen advocacy.

Effective: Spring 2003 Ending: Summer 2013

Prerequisite:

P ADM 524 **Administrative Law** (3) Statutory and judicial controls upon administrative discretion. Administration of rule making, rate setting, licensing, adjudication. Judicial review and citizen advocacy.

Effective: Fall 2013 Future: Fall 2013

P ADM 532 **Urban Government** (3) Administrative processes and policy problems associated with managing urban communities; political, intergovernmental, fiscal, structural, and analytical concepts in urban government.

Effective: Winter 1978

P ADM 533 **Local Planning Law and Administration** (3) Structure and function of local and regional government from perspective of local planning law and its administration.

Effective: Spring 2003 Ending: Summer 2013

Prerequisite:

P ADM 533 **Local Planning Law and Administration** (3) Structure and function of local and regional government from perspective of local planning law and its administration.

Effective: Fall 2013 Future: Fall 2013

P ADM 534 **Managing Economic Development** (3) Theoretical and operational aspects of economic development

emphasizing the role of local and regional government.  
Effective: Spring 2003 Ending: Summer 2013  
Prerequisite:

**P ADM 534 Managing Economic Development (3)** Theoretical and operational aspects of economic development emphasizing the role of local and regional government.  
Effective: Fall 2013 Future: Fall 2013

**P ADM 535 Policy Analysis and Planning (3)** The course will cover the theoretical issues in and basic methods of policy analysis and planning (prospective policy analysis).  
Effective: Summer 2004  
Prerequisite:

**P ADM 550 Policy and Program Evaluation (3)** The course will cover the theoretical issues in and basic methods of policy and program evaluation (retrospective policy analysis).  
Effective: Spring 2005  
Prerequisite:

**P ADM 556 State Government Administration (3)** Study of structures, systems, processes, problems, and issues affecting state government administration; case studies, field observations, and research.  
Effective: Spring 2003 Ending: Summer 2013  
Prerequisite:

**P ADM 556 State Government Administration (3)** Study of structures, systems, processes, problems, and issues affecting state government administration; case studies, field observations, and research.  
Effective: Fall 2013 Future: Fall 2013

**P ADM 557 Federalism and Intergovernmental Relations (3)** Study of the impact of a federal system of government on the administration of public functions. National-state-local dimensions.  
Effective: Spring 2003 Ending: Summer 2013  
Prerequisite:

**P ADM 557 Federalism and Intergovernmental Relations (3)** Study of the impact of a federal system of government on the administration of public functions. National-state-local dimensions.  
Effective: Fall 2013 Future: Fall 2013

**P ADM 558 Legislative Processes (3)** Legislatures in American government, emphasizing comparative state legislatures: constitutional patterns; organization, administration; interaction with bureaucracy, constituencies, and organized interests.  
Effective: Spring 2003 Ending: Summer 2013  
Prerequisite:

**P ADM 558 Legislative Processes (3)** Legislatures in American government, emphasizing comparative state legislatures: constitutional patterns; organization, administration; interaction with bureaucracy, constituencies, and organized interests.  
Effective: Fall 2013 Future: Fall 2013

**P ADM 570 Scope and Methods of Public Administration (3)** Examination of theoretical approaches to public administration and the role of theory in the field.  
Effective: Fall 2012  
Prerequisite:

**P ADM 571 Seminar in Organizational Theory (3)** Selected theories of organizations and their applications to the study of public organizations.  
Effective: Fall 2012  
Prerequisite:

**P ADM 573 Research and Theory in Public Policy and Governance (3)** An introduction to policy analysis, the stages of the policy process, and key theoretical issues. applications to real world problems.  
Effective: Spring 2005  
Prerequisite:

**P ADM 574 Research and Theory in Public Management (3)** Theoretical and empirical bases for selected functions of public managers.  
Effective: Spring 1988  
Prerequisite:

**P ADM 575 Advanced Research Design (3)** Experimental, quasi-experimental, survey, aggregate, and other research designs applied to organizational, managerial, and policy analysis research problems.  
Effective: Fall 2012  
Prerequisite:

**P ADM 576 Multivariate Statistical Methods (3)** Multivariate statistical methods, with special emphasis on their use in organizational, managerial, and policy analysis research settings.  
Effective: Spring 1988  
Prerequisite:

P ADM 579 **Public Leadership and Ethics** (3) Examination of theory and research in leadership and public ethics, and their application to the field of Public Management.

Effective: Fall 2012

Prerequisite:

P ADM 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

P ADM 591 **Readings in Public Administration** (3) Directed readings in selected areas of public administration.

Effective: Spring 1999

Prerequisite:

P ADM 594 **Research Topics** (1-18) Supervised student activities on research projects identified on an individual basis.

Effective: Fall 2012

Prerequisite:

P ADM 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Summer 1995 Ending: Summer 2013

P ADM 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

P ADM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

P ADM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

P ADM 597A **Homeland Security Law** (3) Foundation for understanding homeland security law, its Constitutional basis, judicial interpretations, and current field of statutes.

Effective: Summer 2013 Ending: Summer 2013

P ADM 597A **Homeland Security Law** (3) Foundation for understanding homeland security law, its Constitutional basis, judicial interpretations, and current field of statutes.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

P ADM 600 **Thesis Research** (1-15) No description.

Effective: Spring 1990

P ADM 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 2000

P ADM 801 (HLS 801) **Homeland Security Administration: Policies and Programs** (3) Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management approaches.

Effective: Summer 2010

P ADM 802 **Multifaceted Approaches to Homeland Security** (3) Examination of the roles of the public and private sectors and the military in preparing, mitigating, and responding to disasters.

Effective: Fall 2008

Prerequisite:

P ADM 803 **Strategic Planning and Organizational Imperatives in Homeland Defense and Security** (3) The Homeland Security framework depends on strategic planning and organization. This course examines the key issues associated with these.

Effective: Fall 2008

Prerequisite:

P ADM 897 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 2007

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## **Public Admn (PUB A)**

PUB A 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

PUB A 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## Public Health Preparedness (PHP)

PHP 410 (HLS 410) **Public Health Preparedness for Disaster and Terrorist Emergencies I** (3) Analyzes the history of terrorism and explores the preparation and response to specific terrorist threats, natural disasters, and conventional catastrophes.

Effective: Fall 2010

Prerequisite:

PHP 510 **Public Health Preparedness for Disaster and Terrorist Emergencies II** (3) A public health perspective on the preparation necessary to develop a coordinated response to a disaster or terrorist emergency.

Effective: Spring 2012

Prerequisite:

PHP 527 **Public Health Evaluation of Disasters and Bioterrorism** (3) Introduces students to the design of exposure assessment and health effect studies applicable to disasters and terrorism.

Effective: Spring 2012

Prerequisite:

PHP 530 (HLS 530) **Critical Infrastructure Protection of Health Care Delivery Systems** (3) Investigates the impact that terrorist incidents may have on healthcare facilities or their ability to deliver healthcare services.

Effective: Spring 2012

Prerequisite:

PHP 553 (CAS 553) **Disaster Communication** (3) This seminar provides students with a comprehensive understanding of the multifaceted nature of disaster communication across phases of a disaster.

Effective: Spring 2012

PHP 558 (PSY 558, HLS 558) **Disaster Psychology** (3) Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.

Effective: Spring 2012

Prerequisite:

PHP 594 (HLS 594) **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2012

Prerequisite:

PHP 596 **Individual Studies** (1-9 per semester/maximum of 9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

PHP 597 **Special Topics** (1-3 per semester/maximum of 9) Formal courses given on a topical or special interest subject which may be offered infrequently, several topics may be taught in one year or term.

Effective: Summer 2013

PHP 597A **After the Emergency Operation Plan: Exercises in Public Health Preparedness** (3) This course teaches students the fundamentals of emergency preparedness exercises, such as Orientation, Tabletop, Drill, Functional, and Full-scale exercises.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

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## Public Health Sciences (PHS)

**PHS 500 Research Ethics for Clinical Investigators** (1) This course is designed for graduate students preparing for a career that will include clinical investigations.  
Effective: Spring 2009

**PHS 501 Principles of Public Health** (3) This course is designed to provide students with a foundation in public health principles.  
Effective: Summer 2012

**PHS 504 Behavioral Health Intervention Strategies** (3) Evaluation of intervention strategies from a biobehavioral health context; theories of change processes in health.  
Effective: Spring 2011

**PHS 505 Public Health Program Planning and Evaluation** (3) Foundations in public health program planning and evaluation.  
Effective: Summer 2012  
Prerequisite:

**PHS 506 Behavioral Health Intervention Strategies II** (3) This course provides instruction on how to design theory-driven public health interventions.  
Effective: Summer 2012  
Prerequisite:

**PHS 510 Clinical Research Methods** (3) Introduction to the design, implementation, analysis, and interpretation of health research, including observational and controlled trials.  
Effective: Spring 2009

**PHS 511 Methods Used in Translational Research** (1) This course is designed to familiarize clinicians with state-of-the-art laboratory techniques as they apply to translational research studies.  
Effective: Spring 2009

**PHS 516 Statistical Genetics** (3) Basic theory and methods for statistical analysis, introduction to bioinformatics, principles and methods of statistical genetics, case-control association studies.  
Effective: Spring 2009

**PHS 518 Scientific Communication** (2) A survey of the formats in which medical science is presented, with exercises in the preparation of abstracts, manuscripts, and grant applications, including illustrations.  
Effective: Fall 2011

**PHS 519 Patient Oriented Research** (2) This course provides an overview of clinical research and an introduction to methods used to conduct clinical research.  
Effective: Fall 2011  
Prerequisite:

**PHS 520 Principles of Biostatistics** (3) Introduction to the application of techniques and interpretation of results that are commonly used to plan, analyze, and report clinical and health services research.  
Effective: Spring 2009

**PHS 521 Applied Biostatistics** (3) An intermediate course that provides more in-depth development of analytical topics covered in the Intro Biostats course, such as analysis of variance and regression techniques. Students will perform analyses, summarize, and interpret results.  
Effective: Spring 2009  
Prerequisite:

**PHS 522 Multivariate Biostatistics** (3) This course focuses on advanced topics in biostatistics involving multivariate responses in biomedical research.  
Effective: Spring 2009  
Prerequisite:

**PHS 523 Multivariate Analysis** (3) This course focuses on the theoretical and applied aspects of multivariate analyses that are relevant to biomedical research.  
Effective: Spring 2012  
Prerequisite:

**PHS 524 Longitudinal Data Analysis** (3) This course focuses on the theoretical and applied aspects of longitudinal data analyses that are relevant to biomedical research.  
Effective: Spring 2012  
Prerequisite:

**PHS 525 Biostatistics for Lab Scientists (3)** Basic theory and methods for statistical analysis, data presentation and experimental design, with a focus on biomedical applications.

Effective: Summer 2010

Prerequisite:

**PHS 526 Categorical Data Analysis (3)** This course focuses on statistical theory and methods for analyzing categorical data.

Effective: Spring 2012

Prerequisite:

**PHS 527 Survival Analysis (3)** This course focuses on the analysis of time-to-event data with a focus on biomedical research.

Effective: Spring 2012

Prerequisite:

**PHS 528 Bayesian Methods (3)** Approaches to Bayesian modeling and computation with application to medicine and biomedical research.

Effective: Spring 2012

Prerequisite:

**PHS 535 Quality of Care Measurement (3)** Emphasizes the concept and measurement issues involved in assessing and improving the quality of health care.

Effective: Spring 2012

Prerequisite:

**PHS 536 Health Survey Research Methods (3)** This course provides instruction on how to design health research survey questionnaires and how to conduct survey studies.

Effective: Spring 2009

Prerequisite:

**PHS 537 Health Policy and Law (3)** This course reviews processes related to health policy formulation, implementation, and advocacy.

Effective: Spring 2013

Prerequisite:

**PHS 540 Decision Analysis I (1)** This course provides an introduction to the methods and applications of decision analysis in clinical decision making.

Effective: Spring 2012

Prerequisite:

**PHS 541 Decision Analysis II (1)** This course provides an introduction to the methods and applications of decision analysis in clinical decision making.

Effective: Spring 2012

Prerequisite:

**PHS 542 Environmental Health Sciences (3 per semester/maximum of 3)** Overview of the impact that chemical, physical, and biologic agents in the environment have on human health.

Effective: Spring 2011

**PHS 550 Principles of Epidemiology (3)** Topics include measurements, surveillance, outbreak investigation, bias, and study design.

Effective: Spring 2009

Prerequisite:

**PHS 551 Advanced Epidemiological Methods (3)** Advanced methodological course providing in-depth discussions on applications of advanced methods to design, execution, data analysis, and epidemiological studies reporting.

Effective: Spring 2009

Prerequisite:

**PHS 552 Molecular Epidemiology of Chronic Disease (3)** This course provides instruction on molecular epidemiologic study design and methods in the study of chronic disease.

Effective: Spring 2009

Prerequisite:

**PHS 553 Infectious Disease Epidemiology (3)** Principles of infectious disease epidemiology and the use of epidemiologic methods to address infectious diseases of national and international importance.

Effective: Summer 2012

Prerequisite:

**PHS 570 Health Economics and Economic Evaluation (3)** An introductory course on applied economic evaluation, with emphasis on micro-economic theory, cost-effectiveness and economic modeling.

Effective: Spring 2009

Prerequisite:

**PHS 571 Health Services Organization and Delivery (3)** Examination of health systems, organization, financing, and evaluation; trends, problems, and issues.

Effective: Fall 2010

**PHS 580 Clinical Trials: Design and Analysis (3)** This course stresses the concepts of statistical design and analysis in

biomedical research, with special emphasis on the clinical trial.

Effective: Spring 2009

Prerequisite:

**PHS 581 Clinical Trials: Case Studies (1)** This course emphasizes case studies in clinical trials design, conduct, and analysis.

Effective: Spring 2009

**PHS 594 Research Topics (1-9)** A closely monitored, clinical or population based research project that is conducted during the second year of the PHS MS curriculum.

Effective: Spring 2009

**PHS 595 Public Health Practice Internship (1-6 per semester/maximum of 6)** This course provides Master of Public Health degree students with hands-on, "real-world" experience in the practice of public health.

Effective: Summer 2011

**PHS 596 Individual Studies (1-9)** Creative projects including non-thesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2009

**PHS 597 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be of topical or of special interest.

Effective: Spring 2009

**PHS 597B Statistical Computing Using SAS (1)** How to construct data queries using SAS statistical software.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PHS 597C Principles of Health Services Research (1)** This course is designed to introduce new graduate students to the Health Services Research methodology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**PHS 597D Advanced Biostatistical Methods in Clinical Trials (3)** A special topics course on advanced biostatistical methods in clinical trials.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**PHS 598 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2009

**PHS 598A Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2009

**PHS 600 Thesis Research (3-6)** Research training provided to enable the student to advance his or her knowledge about a selected topic in public health sciences.

Effective: Fall 2010

**PHS 801 Data Management (1)** Development and implementation of plans for managing clinical research data, collection and processing data, and ensuring data quality.

Effective: Summer 2010

**PHS 807 Public Health Education Methods (3)** Provides the knowledge and skills associated with the methods used to deliver successful public health education programs.

Effective: Spring 2013

Prerequisite:

**PHS 895A Master of Public Health Internship (3 per semester/maximum of 6)** Provides Master of Public Health (MPH) degree students with hands-on, real- world experience in the practice of public health.

Effective: Summer 2012

**PHS 897 Special Topics (1-9 per semester/maximum of 9)** Formal courses offered infrequently on a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2012

**PHS 897D Special Topics: Capstone Experience (3)** This course serves as a culminating experience option for students in the Master of Public Health in Public Health degree program.

Effective: Summer 2013 Ending: Summer 2013

PHS 897F **Practice of Public Health** (2) Examines key issues related to the practice of public health through discussion of case studies and students' practicum experiences.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

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## **Pulmonary Medicine-Hy (PLM)**

PLM 726 **Pulmonary Medicine** (3) Some of the areas studied will be: Symptoms and Signs of Respiratory Disease; Use of Common Diagnostic Tools to Evaluate Patients; Pathophysiology; COPD; Bronchial Asthma; Hypertension; Thromboembolism; Pediatric Pulmonary Disease; Infections; Diffuse Infiltrative Pulmonary Diseases; Acute and Chronic Respiratory Failure; Acute Respiratory Distress Syndrome; Lung Cancer: Pathology and Clinical Aspects; Environmental and Occupational Lung Disease.

Effective: Spring 2009

Prerequisite:

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## Quality and Manufacturing Management (QMM)

**QMM 491 Introduction to Business Concepts for Manufacturing** (3) Introduction to business, topics in marketing, accounting, and finance for nonbusiness students in manufacturing management.

Effective: Fall 2001  
Prerequisite:

**QMM 492 Introduction to Engineering Design Principles** (3) Engineering principles including different engineering fields, graphics, design, solid modeling and failure analysis.

Effective: Fall 2001  
Prerequisite:

**QMM 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2008

**QMM 552 Applied Statistical Process Control and Experimental Design** (3) Concepts and techniques of statistical process control and the design of experiments.

Effective: Fall 2008  
Prerequisite:

**QMM 561 Manufacturing Systems Planning and Control I** (3) Systems, components and configurations, flow of material and information in a manufacturing system.

Effective: Spring 1996  
Prerequisite:

**QMM 562 Manufacturing Systems Planning and Control II** (3) Flow of material and information in a manufacturing system; emphasis on systems integration.

Effective: Spring 1996  
Prerequisite:

**QMM 581 Manufacturing Processes of Materials** (3) Characteristics of materials with respect to their properties and associated choices of processing to create a range of products.

Effective: Spring 1996  
Prerequisite:

**QMM 582 Manufacturing and Supply Chain Strategy** (3) Strategic decision context of manufacturing and its supply chains with linkage to corporate and business strategy.

Effective: Fall 2001  
Prerequisite:

**QMM 593 Field Experience in Manufacturing** (1-2) Experiential learning through the firsthand study of manufacturing plants and by interacting with manufacturing leaders.

Effective: Spring 2001  
Prerequisite:

**QMM 596 Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1997

**QMM 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1997

**QMM 851 Quality Management** (3) Concepts of design, assessment, and improvement of quality systems; customer needs analysis, identification of opportunities for application of measurement techniques.

Effective: Fall 2008  
Prerequisite:

**QMM 871 Design Practice for Manufacturing I** (3) Contemporary concepts in design and design practice with emphasis on engineering, business, and human strategic issues.

Effective: Fall 2008  
Prerequisite:

**QMM 872 Design Practice for Manufacturing II** (3) Contemporary concepts in design and design practice with emphasis on logistics, risk, design and manufacturing readiness, and production.

Effective: Spring 2009  
Prerequisite:

**QMM 891 Communication and Leadership Skills for Manufacturing Managers** (1-3) Applied principles of managerial, visual, and written communication that support the needs of manufacturing leaders.

Effective: Fall 2008  
Prerequisite:

**QMM 897 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2007

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## **Quantitative Analys (QANLY)**

QANLY 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

QANLY 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 1986

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## Radiology (RAD)

**RAD 700 Pediatric Radiology (5)** Tutorial course emphasizing interpretation, clinical correlation, indications, and limitations of imaging studies used in the evaluation of infants and children.

Effective: Spring 2009

Prerequisite:

**RAD 771 General Radiology--Clinical Elective (5)** Clinical elective including experience in diagnostic radiology, film interpretation, nuclear medicine, and radiation therapy.

Effective: Spring 2009

Prerequisite:

**RAD 772 Radiology Advanced Elective (5)** Clinical experience in interpreting radiographs and imaging studies, , fluoroscopy, dictating and signing radiologic reports, and providing consultative services.

Effective: Summer 2011

Prerequisite:

**RAD 774 Radiation Oncology Elective (3rd or 4th year) (5)** This course provides exposure to the scope of clinical Radiation Oncology.

Effective: Fall 2010

Prerequisite:

**RAD 774A Radiation Oncology Elective (3rd year) (2.5)** This course provides 2 week exposure to the scope of clinical Radiation Oncology.

Effective: Fall 2010

Prerequisite:

**RAD 796 Radiology Individual Studies (5)** Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2009

**RAD 796A Radiology Individual Studies for 3rd year Medical Students (2.5)** Radiology Individual Studies for 3rd Year Medical Students.

Effective: Spring 2010

Prerequisite:

**RAD 797 Radiology Special Topics (5)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Spring 2009

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## Real Estate (R EST)

R EST 515 (I B 515) **Property Rights in a Global Economy** (2) Analysis of economic, financial, legal, and political factors affecting international real estate decision making.  
Effective: Summer 2011

R EST 560 **Real Estate Financial Analysis** (2) This course provides a modern framework for the valuation and analysis of real property using both theoretical and empirical approaches.  
Effective: Summer 2011  
Prerequisite:

R EST 570 **Institutional Real Estate Investment** (2) A survey of the latest developments of real estate as an institutional investment.  
Effective: Summer 2011  
Prerequisite:

R EST 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2011

R EST 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2011

R EST 599 (IL) **Foreign Study--Real Estate** (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  
Effective: Summer 2011  
Prerequisite:

R EST 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2011

R EST 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2011

R EST 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) No description.  
Effective: Summer 2011

R EST 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2011

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## Real Prop/Envrml Law (RP&EL)

**RP&EL 960 Environmental Law (3)** This course introduces some of the most important concepts, issues, and statutes in environmental law. After discussing the economic and ethical bases for environmental law. After discussing the economic and ethical bases for environmental law and briefly reviewing the relevant principles of constitutional and common law, students examine a representative selection of federal statutes, including the National Environmental Policy Act, the Endangered species Act, "Superfund," and the Clean Air Act.  
Effective: Summer 1999

**RP&EL 962 Environmental Litigation (2)** This course explores the various aspects of litigation, client counseling, and regulatory work that arise in the day to day practice of environmental law. Emphasis is on the practical aspects of the practice of law, with active class participation using problems designed to duplicate situations faced by environmental attorneys in their practices. Among other things, students will cross-examine scientific experts, prepare a plant manager for a deposition, and negotiate a civil penalty for environmental violations. Although environmental law is used a basis for the mock exercises, prior environmental classes are not a prerequisite, and the skills taught in this course will translate well to other types of litigation.  
Effective: Spring 2013

**RP&EL 964 Real Estate Negotiation and Drafting (3)** Students will learn to negotiate and draft multiple standard documents used in commercial real estate transactions.  
Effective: Spring 2011

**RP&EL 965 Oil and Gas Law (3)** This course will address the basic concepts in oil and gas law within the United States as well as the specific legal issues associated with the development of the Marcellus Shale formation. This specific topics to be covered include the ownership of oil and gas, oil and gas leasing, oil and gas conservation laws, oil and gas interests, and government regulation of development.  
Effective: Summer 2012

**RP&EL 973 Land Use Controls (3)** The public regulation of private property raises some of the more interesting and difficult questions in property law. On one side of the debate is the government, which seeks to regulate land use in ways that it believes promote the public interest. On the other side are private property owners who often object to restrictions placed on their ability to use their property as they deem best. In studying this tension between public goals and private rights, the course will explore the constitutional limitations placed on governments in the area of land use regulations as well as topics such as variances, special use permits, vested rights, subdivision controls, exactions, and impact fees, exclusionary zoning, the rebuilding of urban cores, and the managing of growth in suburban areas.  
Effective: Summer 2011

**RP&EL 980 Construction Law (2-3)** This course examines the peculiar legal problems encountered on construction projects. It covers contract, tort and statutory law as adapted specifically to the construction industry. It analyzes the perspectives of an owner, developer, architect/engineer, contractor, subcontractor and bonding company, both in the context of private and public construction projects, commercial and residential. the principal areas of inquiry are contract structure, public bidding, theories of liability, payment and security mechanisms, claims related to time, disruption and extra work, and claims arising from construction defects. This course is designed to enable you to become familiar with construction law and the construction industry so that, whether you work in the public sector of private practice, you will be able to offer practical legal advice to construction professionals.  
Effective: Summer 2011

**RP&EL 988 Natural Resources Law (3)** This course provides a basic overview of federal and state regulations and the common law affecting title to and exploitation of such resources as water, coal, oil, gas, and public lands. Common mineral leasing provisions are given particular emphasis.  
Effective: Summer 1999

**RP&EL 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Spring 2005

**RP&EL 997A Law and Policy of Shale Gas Development (2)** This course will address current legal and policy aspects of shale oil and gas development. Students will focus on the major policy issues that are shaping - and have shaped - the development of the law in the early years of the so-called "Shale Revolution." Among the topics expected to be covered: role of shale oil and gas in our national energy portfolio, determining the appropriate regulatory entity to oversee developmental activities; managing economic benefits at the individual community, and state level in the short and long term; environmental concerns; government role in developing new technologies and expanding markets for product; and international development.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**RP&EL 997B Water Law and Policy (3)** Water issues are a critical to human and ecosystem health throughout the world. Here in the United States, it has been identified as a critical resource for national security and as a key regional issue in

many parts of the nation. This course provides an overview of U.S.-focused legal and policy questions related to water. The course will cover generally the legal and policy challenges facing water resources today, including the allocation of water supplies under the riparian and prior appropriation doctrines; protection of water quality under the Clean Water Act, and the Chesapeake Bay; and special topics with a water law and policy connection such as a climate change, flooding and drought, drinking water and infrastructure, and energy.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

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## Recreation, Park and Tourism Management (RPTM)

RPTM 410 **Marketing of Recreation Services** (3) Theoretical/practical application of marketing/advertising strategies in the development/delivery of recreation services.

Effective: Spring 2005

Prerequisite:

RPTM 415 **Commercial Recreation Management** (3) Planning, developing, and managing profit-oriented recreation opportunities.

Effective: Spring 2005

Prerequisite:

RPTM 425 **Principles of Interpretive Materials** (3) Principles, practices, application of non-personal interpretive activities common to natural/cultural history, including exhibits, audio-visual and illustrative materials.

Effective: Spring 2005

Prerequisite:

RPTM 430 **Environmental Education Methods and Materials** (3) Methods and materials for developing, implementing, and evaluating environmental education programs within formal and non-formal educational settings.

Effective: Summer 2011

Prerequisite:

RPTM 433W **Program Evaluation and Research in Recreation Services** (3) Systematic, structured problem-solving process for decision making in recreation and parks. Research techniques/evaluation procedures; quantitative, qualitative methodologies; deductive, inductive reasoning.

Effective: Spring 2005

Prerequisite:

RPTM 435 **Recreation Facilities Planning and Management** (3) Planning and management of selected facilities with emphasis upon maintenance, activity, and support provisions.

Effective: Spring 2005

Prerequisite:

RPTM 440 **Adventure-based Programming and Administration** (3) Utilization of wilderness/backcountry environments and participant challenge; history, models, theories; survey of organizations; program design, administration; and issues.

Effective: Spring 2005

Prerequisite:

RPTM 460 **Political and Legal Aspects of Recreation Services** (3) Role of local, state, federal government in provision of recreation services. Legislative and judicial systems.

Effective: Spring 2005

Prerequisite:

RPTM 470 **Recreation and Park Management** (3) Management of recreation and park services in public/non-profit settings; planning, budgeting fiscal development, resources allocation, decision-making, computer applications.

Effective: Spring 2005

Prerequisite:

RPTM 480 **Senior Management Seminar** (1) Current management issues will be examined relative to professional management strategies, ethics, and leadership in leisure services.

Effective: Spring 2005

Prerequisite:

RPTM 494H **Senior Honors Thesis** (1-6 per semester/maximum of 6) Senior Honors Thesis

Effective: Summer 2011

RPTM 495A **Internship in Recreation Services** (12) Meet educational objectives through participation in organized practical experience; direct observation and professional supervision in full-time work experience.

Effective: Spring 2005

Prerequisite:

RPTM 495B **Internship in Golf Management** (1-4) Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

Effective: Spring 2005

Prerequisite:

RPTM 495C **Internship in Golf Management** (1-4) Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

Effective: Spring 2005

Prerequisite:

RPTM 495D **Internship in Golf Management** (1-4) Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

Effective: Spring 2005

Prerequisite:

RPTM 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an

individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2005

RPTM 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2005

RPTM 497A **Social and Environmental Sustainability: Applications in the Tourism Industry** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

RPTM 497A **Social and Environmental Sustainability: applications in the Tourism Industry** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 497C **RPTM 497C - Outdoor Consortium** (2) The purpose of the Outdoor Recreation Consortium is to provide students with hands-on exposure to outdoor recreation resources management in a major National Park that is facing complex challenges.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 497D **RPTM 497D - Peer Mentoring** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 497G **Golf Operations** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 497I **Canoeing Leadership** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

RPTM 497J **Peer Mentoring** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

RPTM 497K **Administration of Golf Operations III** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2006

RPTM 498D **Backpacking Leadership** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

RPTM 498F **Rock Climbing Leadership** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

RPTM 498G **Player Development/Tournament Golf** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

RPTM 498G **Player Development/Tournament Golf** (2 per semester/maximum of 16) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 498K **Advanced Golf Instruction and Business** (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 499 (IL) **Foreign Studies** (1-12 per semester/maximum of 12) Foreign Studies in RPTM.

Effective: Summer 2012

Prerequisite:

**RPTM 501 Leisure Studies Foundations (3)** This course provides general background knowledge about the literature and research methods central to the field of leisure studies.

Effective: Spring 2008

**RPTM 510 Tourism Behavior: An interdisciplinary Approach (3)** An exploration of the various approaches that have been taken in the social sciences to understand tourism behavior.

Effective: Spring 2008

Prerequisite:

**RPTM 525 Behavioral Patterns of the Outdoor Recreationist (3)** Patterns of time and space use; user characteristics; meaning of participation; facilitation of environment-use enhancement.

Effective: Spring 2008

**RPTM 527 Social Psychology of Leisure (3)** Application of the methods, constructs, and theory of social psychology to the study of leisure, outdoor recreation, and therapeutic recreation.

Effective: Spring 2008

Prerequisite:

**RPTM 530 Research Methods in Leisure Studies (3)** Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in the leisure studies field.

Effective: Spring 2008

**RPTM 533 Leisure Studies, Surveys, and Appraisals (3)** Advanced procedures related to leisure, recreation, and park research.

Effective: Spring 2008

Prerequisite:

**RPTM 540 Public and Private Recreation Lands and Waters (3)** Public and private roles and interactions, allocation of resources, use policies, open space concepts, private enterprise developments, legal controls.

Effective: Spring 2008

**RPTM 545 Philosophical and Social Bases of Leisure (3)** Philosophical and social bases of leisure; analysis of critical issues of leisure for philosophical and social implications.

Effective: Spring 2008

**RPTM 560 Administrative Problems of Leisure Service Organizations (3)** Special problems of recreation and park departments; legal powers and liability; departmental organization, financing, personnel policies, and staff development.

Effective: Spring 2008

**RPTM 570 Conceptual Bases for Therapeutic Recreation (3)** Issues in the application of concepts in therapeutic recreation from a multidisciplinary perspective; evaluation and research.

Effective: Spring 2008

Prerequisite:

**RPTM 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2008

**RPTM 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 2008

**RPTM 597A Foundations of Tourism (3)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**RPTM 597C Leisure and Culture (3)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**RPTM 597F Qualitative Research Methods (3)** Graduate students will be introduced to and have the opportunity to apply many techniques employed by qualitative social science researchers. Of particular emphasis will be fieldwork-based research methods, including participant observation and on-site interviewing. Students will participate in discussion of assigned reading material as well as shared experiences associated with the preparation of course materials. Assignments will involve both small projects conducted locally using various methods as well as a more elaborate proposal for research involving qualitative methods. The course will be of particular value to students preparing for future thesis or dissertation research utilizing qualitative methods. Though qualitative research is often associated with an interpretivist or humanistic research paradigm, participants espousing a scientific/positivist paradigm are also encouraged to enroll, as are students



from outside or RPTM.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

RPTM 600 **Thesis Research** (1-15) No description.

Effective: Spring 2008

RPTM 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Spring 2008

RPTM 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Effective: Spring 2010

RPTM 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Spring 2008

RPTM 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Spring 2008

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## Religious Studies (RL ST)

RL ST 400 **Theories of Religion** (3) Comparative and interdisciplinary study of two or more systematic theories of religion: anthropological, psychological, sociological, philosophical/theological.

Effective: Fall 1983

Prerequisite:

RL ST 405 (IL) (J ST 405) **Ancient Jewish Traditions and Modern Food Movements** (3) Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times.

Effective: Spring 2012

RL ST 407Y (IL) (HIST 409Y, J ST 409Y) **European Anti-Semitism from Antiquity to the Present** (3) Surveys the history of anti-Semitism in Europe from antiquity through the Middle Ages to the present.

Effective: Summer 2005

RL ST 408 (US;IL) **Hindu Studies** (3) Special topics in Hindu studies.

Effective: Summer 2005

Prerequisite:

RL ST 409 (US;IL) **Buddhist Studies** (3) Special topics in Buddhist studies.

Effective: Spring 2006

Prerequisite:

RL ST 410 (US;IL) (HIST 410, J ST 410) **Jews in the Medieval World** (3) Trends in medieval Jewish society under Islam and Western Christendom.

Effective: Spring 2006

RL ST 411 (US;IL) (J ST 411) **Jewish Studies** (3) Study of the life and thought of a particular period or movement in the history of Judaism.

Effective: Spring 2006

Prerequisite:

RL ST 412 (J ST 412) **American Judaism** (3) The development of Jewish religion and culture in America from the colonial era to the present.

Effective: Summer 1999

Prerequisite:

RL ST 420 **Major Christian Thinkers** (3) Systematic inquiry into the religious thought of one or more Christian thinkers, such as Paul, Augustine, Luther, Calvin, Kierkegaard, or Tillich.

Effective: Fall 1983

Prerequisite:

RL ST 422 (AM ST 422) **Religion and American Culture** (3 per semester/maximum of 6) Selected topics, problems, or historical movements in American religion. Relation between religion and American culture.

Effective: Summer 1996

RL ST 424H (HIST 424H, J ST 424H) **Monotheism and the Birth of the West** (3) The birth of monotheism and its relation to social organization, the idea of individuality, and science.

Effective: Fall 2012

Prerequisite:

RL ST 440Y (US;IL) **The Orthodox Christian Tradition** (3) History, culture, and beliefs of the Eastern Orthodox religious tradition with special reference to Russia.

Effective: Summer 2011

Prerequisite:

RL ST 461 (US;IL) (SOC 461) **Sociology of Religion** (3) Contemporary religion in the United States: beliefs, structure, and function of major denominations and religious cults.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

RL ST 461 (US;IL) (SOC 461) **Sociology of Religion** (3) Contemporary religion in the global perspectives: beliefs, structure, and function of major religious traditions, denominations, and cults.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

RL ST 471Y (IL) (HIST 471Y) **Classical Islamic Civilization, 600-1258** (3) Pre-Islamic Arabia; Muhammad; Arab conquest; Islamic beliefs and institutions; literary, artistic, and scientific achievements; relations with Europe; breakdown of unity.

Effective: Spring 2006

RL ST 478 (J ST 478) **Ethics After the Holocaust** (3) Explores the philosophical effects of the Holocaust for thinking about the primary question: Is ethics possible?

Effective: Summer 2012

Prerequisite:

RL ST 483 (IL) **Zen Buddhism** (3) The development and current state of Zen Buddhist thought and practice.

Effective: Spring 2006

Prerequisite:

RL ST 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

RL ST 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

RL ST 495 **Internship** (1-18) Supervised off-campus, non-group instruction, including field experience, practica, or internships.

Effective: Summer 2004

Prerequisite:

RL ST 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

RL ST 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

RL ST 499 (IL) **Foreign Study--Religious Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

RL ST 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

RL ST 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

RL ST 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

RL ST 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

Effective: Spring 2002

RL ST 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Fall 1983

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## Renal Medicine-Hy (REN)

REN 728 **Hematology** (3) Some of the areas studied will be: Renal Pathology and Congenital Disorders; Renal Physiology; Renal Function Testing; Glomerular Disease I and II; Urinary Tract Pathophysiology/Urinary Tract Infection; Urinalysis; Acid-Base; Pathology of the Prostate; Testicular/Penile Neoplasm; Salt and Water; Diuretics; Acute Renal Failure; Potassium; Calcium/Phosphorous; Chronic Renal Failure; and Inflammatory Disease of the Male Genital Tract.  
Effective: Fall 2001  
Prerequisite:

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## **Reproductive Medcn-Hy (REP)**

REP 730 **Reproductive Medicine** (4) Some of the areas studied will be: Menstrual Cycle; Sexually Transmitted Diseases; Hormonal Contraception; Non-hormonal Contraception; Amenorrhea and Galactorrhea; Pathology of Cervix, Vulva, and Vagina; Cytology; Ectopic Pregnancy; Normal Pregnancy; Cancer of the Cervix; Pathology of the Breast; Perinatal Pathology; Prenatal Genetics Screen; Pathology of the Ovary and Fallopian Tube; Menopause; High Risk Pregnancy; Trophoblastic Tumors; Carcinoma of the Breast; Pathology of the Uterus; and Ovarian Cancer.

Effective: Fall 2001

Prerequisite:

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## Rural Sociology (R SOC)

R SOC 417 (CED 417) **Power, Conflict, and Community Decision Making** (3) Impact of institutions on human interdependence and behavior, the structure of power, and community decision making and public policy.

Effective: Summer 2013

Prerequisite:

R SOC 420 (US;IL) (CED 420, WMNST 420) **Women in Developing Countries** (3) Analysis of women's work, experiences, and development policies and practices in Africa, Asia, and Latin America.

Effective: Summer 2013

R SOC 452 **Rural Organization** (3) Social organization and change in rural communities; use of sociological principles in analysis of rural problems and rural development.

Effective: Summer 2013

Prerequisite:

R SOC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

R SOC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

R SOC 499 (IL) **Foreign Study--Rural Sociology** (1-12) Study in selected countries of rural social institutions and current rural sociological problems.

Effective: Summer 2013

R SOC 502 **Use of Theory in Rural Sociology** (3) Examine and evaluate metasociology of alternative theoretical systems applicable to rural society, with emphasis on American society.

Effective: Summer 2013

Prerequisite:

R SOC 505 (CEDEV 505, AEE 505) **Leadership Development** (3) Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

Effective: Summer 2013

R SOC 508 **Sociology of Agriculture** (3) Sociological analysis of changes in the organization of agriculture and food systems in the United States and developing countries.

Effective: Summer 2013

R SOC 513 **Research Methods in Rural Social Sciences** (3) Scientific method in planning and conducting research.

Effective: Summer 2013

R SOC 516 (CEDEV 516) **Change in Rural Society** (3) Social change in rural society, emphasizing prediction and control of the change process. Even years.

Effective: Summer 2013

R SOC 517 (CEDEV 517) **International Rural Social Change** (3) Implications of planned change for international rural societies, considering basic structural constraints, known institutional linkages, and potential synergetic consequences.

Effective: Summer 2013

R SOC 522 **Data Analysis in Rural Sociology** (1) Analysis of research data in rural sociology using computer library programs.

Effective: Summer 2013

Prerequisite:

R SOC 525 **Fertility, Population Change, and Development** (3) Fertility and population growth in less-developed countries; theories of fertility change, agricultural development, and population policies.

Effective: Summer 1987

Prerequisite:

R SOC 530 **Sociology and Demography of Poverty in the United States** (3) An in-depth treatment of sociological and demographic dimensions of poverty in rural and urban areas of the United States.

Effective: Summer 2013

R SOC 552 **Theoretical Frameworks for Rural Community Research** (3) Application of community theories to the study of communities in rural areas.

Effective: Summer 2013

Prerequisite:

R SOC 555 **Human Dimensions of Natural Resources** (3) Identification of the interrelationships and influence of human behavior and natural resources.

Effective: Summer 2013

R SOC 573 **Methods of Survey Data Analysis** (3) Use of multivariate procedures in the analysis of survey data in the rural social sciences.

Effective: Summer 2013

Prerequisite:

R SOC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

R SOC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2013

R SOC 597C **Qualitative Methods** (3) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

R SOC 600 **Thesis Research** (1-15) No description.

Effective: Summer 2013

R SOC 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Summer 2013

R SOC 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Provides advanced standing graduate students from a research oriented curriculum the opportunity to receive experience/supervision in resident instruction in higher education.

Effective: Summer 2013

R SOC 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2013

R SOC 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Summer 2013

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## Russian (RUS)

RUS 400 (IL) **Senior Seminar in Russian Culture** (3) Senior seminar devoted to topics in Russian culture; conducted in Russian.

Effective: Spring 2006

Prerequisite:

RUS 401 **Advanced Russian A** (3) Advanced Russian grammar, conversation, and composition.

Effective: Summer 2012

Prerequisite:

RUS 402 **Advanced Russian B** (3) Advanced Russian grammar, conversation, and composition.

Effective: Summer 2012

Prerequisite:

RUS 403 **Advanced Russian Conversation and Composition** (3) A conversation and composition course that includes situational topics as well as complex academic discourse.

Effective: Summer 2013

Prerequisite: Concurrent: RUS 400 RUS 401 RUS 402 RUS 405 RUS 412

RUS 404 **Advanced Reading and Composition** (3) Advanced Russian Reading and Composition.

Effective: Summer 2012

Prerequisite:

RUS 405 (IL) **Seminar in Russian Literature** (3-6 per semester/maximum of 6) Readings in classical Russian literature; Topics vary.

Effective: Summer 2012

Prerequisite:

RUS 406 (IL) **Russian Film** (3) Conversation and Composition based on classical Russian films.

Effective: Summer 2012

Prerequisite:

RUS 412 (IL) **Russian Translation** (3 per semester/maximum of 6) Translation from Russian into English of complex texts from the humanities, social sciences, and technical fields.

Effective: Spring 2006

Prerequisite:

RUS 426 (IL) **Dostoevsky** (3) Study of representative works by Dostoevsky in the original Russian.

Effective: Spring 2006

Prerequisite:

RUS 427 (IL) **Tolstoy** (3) Study of representative works by Tolstoy in the original Russian.

Effective: Spring 2006

Prerequisite:

RUS 460 (IL) **Linguistic Analysis of Contemporary Russian** (3) Detailed study of the phonology, morphology, and syntax of Modern Standard Russian and the major dialects.

Effective: Spring 2006

Prerequisite:

RUS 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

RUS 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

RUS 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

RUS 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

RUS 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

RUS 501 **Readings in Russian Literature** (3-6) No description.

Effective: Spring 1987

Prerequisite:



RUS 525 **Pushkin** (3) Pushkin's significance in Russian literature; his relation to other European literatures; Eugene Onegin and selected shorter works.  
Effective: Winter 1978

RUS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 2001

RUS 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

RUS 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Teaching RUS 001, 002, or 003 under the supervision of a full-time faculty member.  
Effective: Fall 1983

RUS 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

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## School Psychology (S PSY)

S PSY 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2011

S PSY 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 2011

S PSY 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 2011

S PSY 500 **Professional Issues in School Psychology** (1-3) Orientation to the field through study of unique problems, current issues, ethical and legal matters, unique cases, and research projects.  
Effective: Summer 2011

S PSY 503 **Development Across the Life Span** (3) This is a graduate level survey course on the scientific discipline of human development across the life span.  
Effective: Summer 2011  
Prerequisite:

S PSY 510 **Supervision of Pupil Service Personnel** (1-10) Program supervision and professional leadership in university clinics and school systems.  
Effective: Summer 2011  
Prerequisite:

S PSY 517 **Social Aspects of Behavior in Education** (3) A critical and detailed examination of social behavior in canons of classic and contemporary theoretical and empirical work.  
Effective: Fall 2013 Future: Fall 2013

S PSY 530 **Psychoeducational Interventions** (3) Development of empirically validated psychoeducational interventions for academic and behavioral problems experienced in school by children and adolescents.  
Effective: Summer 2011

S PSY 535 **School-Based Psychological Interventions for Children and Youth** (3) Development of empirically supported psychological and psychoeducational interventions for behavioral and emotional concerns among school-aged children.  
Effective: Summer 2011  
Prerequisite:

S PSY 554 **Psychological and Educational Evaluation of Exceptional Children** (3) Administration and interpretation of individual tests other than the Stanford- Binet, WISC, WAIS.  
Effective: Summer 2011  
Prerequisite:

S PSY 556 **Psychological Assessment of Preschool and School-Aged Children** (2) Study of cognitive/affective tests; use of systems--analytic, multivariate statistical, actuarial methods of data combination in decision-making processes.  
Effective: Summer 2011  
Prerequisite:

S PSY 559 **The Individual Psychological Examination** (3) Demonstrations and practice in widely used ability and aptitude tests; psychological report writing.  
Effective: Spring 2012  
Prerequisite:

S PSY 561 **Consultation in Educational Settings** (3) Prepares students to consult with teachers, administrators, parents, and other professionals about academic, behavioral, social-emotional, and programmatic issues.  
Effective: Summer 2011  
Prerequisite:

S PSY 575 **Child and Adolescent Psychopathology** (3) This course will familiarize students with specific psychiatric disorders of childhood and adolescence encountered by mental health professionals in schools.  
Effective: Fall 2013 Future: Fall 2013

S PSY 595A **Practicum in School Psychology** (1-6) Clinical experience with children under supervision in a variety of settings requiring service, including practice in synthesizing data and observations.  
Effective: Summer 2011  
Prerequisite:

S PSY 595B **Internship in School Psychology** (1-10) Long-term placement in settings providing work for school

psychologists with children, parents, teachers, administrators, and service agencies, under supervision.

Effective: Summer 2011

Prerequisite:

S PSY 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

S PSY 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject that may be offered infrequently; several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes, A, B, etc.

Effective: Summer 2011

S PSY 597A **Professional Development of School Psychologists in Working with English Language Learners** (3) This course is designated to educate school psychology graduate students on accommodations and adaptations for diverse learners, per Pennsylvania's guidelines.

Effective: Summer 2013 Ending: Summer 2013

S PSY 600 **Thesis Research** (1-15) No description.

Effective: Summer 2011

S PSY 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Summer 2011

S PSY 610 **Thesis Research Off Campus** (1-15) No description.

Effective: Summer 2011

S PSY 611 **Ph.D. Dissertation Part-Time** (0) No description.

Effective: Summer 2011

S PSY 843 (CN ED 843) **Prevention Strategies and Programming** (3) Addresses prevention program development, implementation, and evaluation, along with theoretical and empirical underpinnings, ethical, and multicultural issues related to prevention.

Effective: Summer 2011

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## Science (SC)

SC 400 **Consequences of Science** (1) A series of lecture/discussions in which science faculty members show the social implications of their research specialty.  
Effective: Winter 1978

SC 401 **Basic Science and Disease** (1) Clinical aspects of various disease and how basic scientific information contributes towards understanding and treating disease.  
Effective: Summer 2008  
Prerequisite:

SC 402 **Science-Related Employment: Corporate Organization, Opportunities, and Expectations** (1-3 per semester/maximum of 3) Present undergraduate and graduate students with information and skills necessary for success in science-related job positions available in industry.  
Effective: Spring 2011  
Prerequisite:

SC 476 **Human Dimensions of Health Care** (3) Field experience in five or more medical settings; complementary exposure to the scientific literature; weekly discussions.  
Effective: Spring 2011  
Prerequisite:

SC 494 **Research Project Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 1994

SC 494H **Research Project Courses** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

SC 495 **Science Co-op Work Experience III** (1-3) A supervised work experience where the student is employed in a scientific position. To be offered for SA/UN grading.  
Effective: Spring 2007  
Prerequisite:

SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1996

SC 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 1997

SC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1996

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## Science Education (SCIED)

**SCIED 410 Using Technology to Enhance Science Teaching (3)** This course explores contemporary practice and research associated with applications of technology to enhance science learning and teaching.

Effective: Summer 2000

Prerequisite:

**SCIED 411 Teaching Secondary Science I (3)** Introduction to teaching secondary school science, including curriculum, learning theory, media, evaluation as they relate to student progress.

Effective: Spring 1994

Prerequisite:

**SCIED 412 Teaching Secondary Science II (3)** Implementation of science instruction using a variety of modern approaches.

Effective: Spring 2001

Prerequisite: Concurrent: C I 412W

**SCIED 455 Field Natural History for Teachers (3)** Ecologically oriented field study course to provide teachers with basic knowledge of natural science resources in school environments.

Effective: Winter 1978

Prerequisite:

**SCIED 457 Environmental Science Education (3)** Philosophy, techniques, and skills for teaching environmental science, including curriculum development, fieldwork, and the use of appropriate technologies.

Effective: Fall 2003

Prerequisite:

**SCIED 458 Teaching Science in the Elementary School (3)** Interpreting children's science experiences and guiding development of their scientific concepts; a briefing of science content material and its use.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite: Concurrent: C I 495A OR C I 495B ; MTHED 420 SS ED 430W

**SCIED 458 Teaching Science in the Elementary School (3)** Interpreting children's science experiences and guiding development of their scientific concepts; a briefing of science content material and its use.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: C I 495A OR C I 495B ; MTHED 420 SS ED 430W

**SCIED 470 Selected Studies in Science Education (1-6)** Intensive work on particular issues, trends, or developments in science education for elementary and secondary school teachers.

Effective: Winter 1978

Prerequisite:

**SCIED 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**SCIED 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**SCIED 497A Astrobiology for Educators (2)** This course will cover topics including: is life beyond Earth possible and the nature of Science. Students will investigate the habitability of Earth, what is life, life in our solar system, life beyond our solar system and the best practices for teaching these concepts to grades 4-12.

Effective: Summer 2013 Ending: Summer 2013

**SCIED 497F (ENGR 497F) Fundamentals of Science, Technology and Engineering (3)** A course focusing on physics content, engineering design principles, and elementary science education pedagogy.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SCIED 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**SCIED 551 History, Philosophy, & Sociology of Science and Science Teaching (3)** Examination of the implications of history, philosophy, and sociology of science for science teaching.

Effective: Summer 2006

Prerequisite:

**SCIED 552 Science Teaching and Learning (3)** Exploration of the theoretical and empirical foundations of the teaching and learning of science.

Effective: Summer 2009

SCIED 556 **The Supervision of Science Curriculum** (3) Supervision of elementary and secondary science teachers as they develop K-12 programs in the public schools.

Effective: Winter 1978

Prerequisite:

SCIED 558 **Research Problems in Science Teaching** (3) Problems and research dealing with curriculum, materials, evaluation, and supervision of science teaching and learning.

Effective: Fall 1983

Prerequisite:

SCIED 559 **Analysis of Instruction in Elementary Science Education** (3) Analysis of the history, issues, trends, and research in elementary science education.

Effective: Winter 1978

Prerequisite:

SCIED 590 **Colloquium** (1-3) continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 1992

SCIED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

SCIED 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

SCIED 597B **Learning Sciences** (3) Course acquaints graduate students with the theoretical frameworks, research methods, and current scholarly issues in the emerging domain of the Learning Sciences.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

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## Science, Technology, and Society (S T S)

S T S 407 (PHIL 407) **Technology and Human Values** (3) Interrelationships of twentieth-century technological change and human values. Emphasis on the social and ethical aspects of technological progress.

Effective: Spring 1999

Prerequisite:

S T S 408 (COMM 408) **Cultural Foundations of Communications** (3) Examination of oral, scribal, print, industrial and electronic cultures; analysis of impact of technology on communications and social structure.

Effective: Spring 2009

Prerequisite:

S T S 416 (US;IL) (AF AM 416, WMNST 416) **Race, Gender and Science** (3) The class will focus on race and gender as products of science, and how societal values shape scientific activity.

Effective: Spring 2013

Prerequisite:

S T S 420 (EM SC 420, SOC 420) **Energy and Modern Society** (3) Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

Effective: Spring 1991

S T S 427W (CED 427W, SOC 427W) **Society and Natural Resources** (3) Analysis of the relationship between societal development and enhancement and natural resources.

Effective: Summer 2008 Ending: Summer 2013

Prerequisite:

S T S 427W (CED 427W) **Society and Natural Resources** (3) Analysis of the relationship between societal development and enhancement and natural resources.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

S T S 428 (IL) (HIST 428) **The Darwinian Revolution** (3) The origins and implications of evolutionary theory.

Effective: Spring 2006

Prerequisite:

S T S 430 (IL) (NUTR 430) **Global Food Strategies: Problems and Prospects for Reducing World Hunger** (3) Technological, social, and political solutions to providing basic food needs; food resources, population, and the environment; current issues.

Effective: Summer 2005

S T S 432 (PHIL 432) **Medical and Health Care Ethics** (3) Examines ethical, political, and social issues in the research, implementation, and practice of medicine, medical technologies, and healthcare.

Effective: Fall 1998

Prerequisite:

S T S 433 (PHIL 433) **Ethics in Science and Engineering** (3) Ethical issues arising in the practice of science and engineering and their philosophical analysis.

Effective: Fall 1995

S T S 435 (PHIL 435) **The Interrelation of Science, Philosophy, and Religion** (3) The historical and transformative interactions between science and Western philosophical and religious views of nature, humanity, and God.

Effective: Spring 1996

S T S 457 (US;IL) (HIST 457, WMNST 457) **The History of Women in Science** (3) Critical analysis of the role women, gender, and minorities have played in the natural sciences.

Effective: Spring 2013

Prerequisite:

S T S 460 (PL SC 460) **Science, Technology, and Public Policy** (3) The all-pervasive importance of science and technology policy in modern societies and mechanisms and processes by which it is made.

Effective: Spring 1995

Prerequisite:

S T S 470 **Technology Assessment and Transfer** (3) Nature of technology assessment and technology transfer in product design and development process from federal and university labs, and internationally.

Effective: Summer 1996

S T S 500 **Integrating Science and Technology Into Society** (3) Interdisciplinary analysis of critical issues for science, technology, and society.

Effective: Spring 1991

Prerequisite:

S T S 589 **Ethics and Values in Science and Technology** (3) Study interrelationships of 20th century technological change

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and human values with emphasis on social and ethical aspects of technological progress.  
Effective: Summer 1994

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## **Scient Princ Medicin (SPM)**

SPM 711 **Scientific Principles of Medicine** (15) This course provides an introduction to the basic science principles that form a foundation for the study of clinical medicine.

Effective: Summer 2013

Prerequisite:

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## Seminar - Dickinson (SEM)

**SEM 900 Advanced Corporate Tax Seminar (2-3)** This seminar will cover two main topics: Taxation of Executive Compensation and Corporate Mergers & Acquisitions.  
Effective: Spring 2007

**SEM 901 Advanced Evidence Seminar (2)** An advanced investigation of topics in the law of evidence.  
Effective: Spring 2007  
Prerequisite:

**SEM 903 History of International Law: Seminar (2)** The general historical introduction and seminar presentations and projects are designed to accentuate problems and issues which enable students to better understand the foundations of the law of nations and encourage independent research skills.  
Effective: Summer 2007

**SEM 905 EU and International Trade Law Seminar (3)** This seminar seeks to examine selected aspects of the Commercial Law of the European Union. It provides an introduction to the distinct methodology of EU law and the European Court of Justice, examines the principles of the internal market, and focuses on aspects which are particularly important for US lawyers from a practical or theoretical perspective. It covers, among others, the following topics: Introduction to the fundamentals of the EU Legal Order; the internal market; free movement of goods, customs duties, discriminatory companies; financial services; aspects of competition law; anti-competitive agreements and monopolies; enforcement of competition law; selected comparisons with WTO and NAFTA.  
Effective: Summer 2011

**SEM 907 The Supreme Court in Comparative Perspective (3)** This course examines the contribution of the judiciary to political governance in comparative perspective. It focuses on the Supreme Court and the European Court of Justice, which is the highest court of the European Union. It also takes into account selectively judgements of other constitutional courts. It seeks to explore the function of judicial review in modern democracy through a study of judicial decisions in selected areas. It examines the relationship between the judiciary and the other organs of government and the role of courts in protecting the citizen. It focuses on the following areas: federalism, the protection of human rights, the principles of democracy, non-discrimination, equality, proportionality, legitimate expectations, and fair hearing; Locus standi, remedies for the protection of constitutional rights, and the liability of public bodies and state agencies.  
Effective: Fall 2011

**SEM 908 Comparative Law in Globalized World Seminar (3)** This seminar gives students experience in researching, drafting and orally presenting an in-depth comparative scholarly work product. Early in the seminar, in consultation with the professor, students identify and select a timely and important topic which will serve as the subject of their Seminar research paper. Each student's research and written drafts are subject to ongoing review and critique by the professor and student colleagues throughout the Semester. When completed, each research paper is presented orally to the Seminar at the end of the course. The comparative research and drafting exercises sensitize students to the civil law tradition and contemporary national and supranational legal system in Europe and around the world that have grown out of or have been substantially influenced by the civil law tradition. Students also develop client counseling skills.  
Effective: Spring 2013

**SEM 909 Conflict Resolution Theory Seminar (2)** This seminar is a capstone course for students interested in understanding the lifecycle and dynamics of conflict and conflict resolution, and the role played by dispute resolution systems in furnishing both resolution and an experience of justice. The course will examine relevant dispute system design principles and socio-psychological theories and research and apply them to the processes used to resolve civil disputes in the United States and other countries through general and specialized courts, administrative agencies, ADR providers, and other private organizations. Students will conduct original legal and (if possible) empirical research, using the principles theories and research studied in the seminar to critique or propose elements of dispute resolution processes and/or systems. Students who enroll should be familiar with dispute system law and procedure from prior coursework.  
Effective: Summer 2011  
Prerequisite:

**SEM 910 Cross-Border Legal Practice Seminar (2)** This seminar will focus on two different themes. It will explore what it means to be a lawyer in the United States in comparison with what it means to be a lawyer in other countries. Among other things, participants will discuss the lawyer's role in society and the type of conduct that is regulated. This course will also examine the cross-border practice regulation that has emerged in response to the increasingly common circumstance of lawyers who handle a matter in a country other than their own.  
Effective: Fall 2007  
Prerequisite:

**SEM 911 Education Law Seminar (2)** This course covers the basic premises of compulsory education; issues concerning exclusion of students; school control of student behavior and curriculum; teacher employment problems; and issues of funding, minority rights, and school liability.  
Effective: Spring 2007

**SEM 912 Elder Law Seminar (2)** This course presents students with opportunities for advanced research and writing in

elder law, allowing them to draw on their experiences in other classes, including the Elder Law Clinic and the Elder Law Workshop. Students are required to write a paper and to make a presentation in class.  
Effective: Spring 2007

**SEM 913 European Union Law Seminar (3)** This course examines basic principles of the Union legal system, such as free movement of goods, persons, services, and capital, the right of establishment, common commercial policy, and foreign policy. It also examines the organization and functions of the Union's institutions and contrasts the United States federal experience. The relationship between Union law and the legal systems of member states will be addressed along with the jurisdiction of the Court of Justice. The relevance of the Union experience to the evolution of other common markets in North and South America and Asia will also be addressed.  
Effective: Spring 2007

**SEM 914 Federal Regulatory and Legislative Practice Seminar (2)** A seminar devoted to exploring the details of federal regulatory and legislative practice in Washington, D.C.  
Effective: Spring 2007

**SEM 916 Class Actions Seminar (3)** This seminar explores the class action device, tracing its historical origins from the earliest forms of aggregate litigation through various amendments to Rule 23 and passage of the Class Action Fairness Act. Although other non-class aggregation techniques are discussed, they are addressed only for comparative purposes. The unique nature of representative litigation and the special issues that arise during the course of a class action are the subject of discussion and student presentations during seminar sessions. Considerable discussion is devoted to the roles of the various "players" in a class action: the qualifications of the class representative, the qualifications and interest of class counsel, and the fiduciary role of the district judge.  
Effective: Summer 2011 Ending: Summer 2013  
Prerequisite:

**SEM 916 Class Actions Seminar (2)** This seminar explores the class action device, tracing its historical origins from the earliest forms of aggregate litigation through various amendments to Rule 23 and passage of the Class Action Fairness Act. Although other non-class aggregation techniques are discussed, they are addressed only for comparative purposes. The unique nature of representative litigation and the special issues that arise during the course of a class action are the subject of discussion and student presentations during seminar sessions. Considerable discussion is devoted to the roles of the various "players" in a class action: the qualifications of the class representative, the qualifications and interest of class counsel, and the fiduciary role of the district judge.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**SEM 917 Gender and the Law Seminar (2)** The role of gender in the development of modern law is considered in a variety of contexts. Among the topics are discrimination in pay and conditions of employment, psychological and sociological criminal defenses, pornography, spousal abuse, reproductive rights, and issues of child custody, support, and property division.  
Effective: Spring 2007

**SEM 922 International Protection of Human Rights Seminar (3)** This seminar provides an introduction to international human rights law and procedures. It examines what are "human rights" and explores the law of treaty interpretation, how human rights law is incorporated into domestic legal systems, and the role of international governmental organizations, international and regional courts, and non-governmental organizations in protecting human rights. Students also learn how to research international law and how to write legal analysis based on international law.  
Effective: Spring 2007

**SEM 923 International Refugee Law Seminar (2)** This course is intended to provide an introduction to the basic framework of international refugee law. It begins by laying out the historical political and philosophical background to the development of the concept of "refugee" in the twentieth century. It examines this legal framework within the context of the broader human rights system. The cardinal provisions of the principal international instruments establishing this framework--in particular the 1951 UN Convention Relating to the Status of Refugees and the 1967 Protocol thereto - are examined against the domestic legal regime establishing the substantive, procedural and evidentiary requirements for making a claim for asylum under U.S. law.  
Effective: Fall 2008

**SEM 925 Jurisprudence Seminar (2)** This seminar investigates myriad theories about law. It is an aim of this offering to afford students a vehicle whereby they might test and place in perspective many of the theories of law gleaned from classroom work and personal experience.  
Effective: Spring 2007

**SEM 926 Law and Individuals with Disabilities Seminar (2)** Major issues and concepts in law and social policy regarding individuals with handicaps are introduced. Topics include: income maintenance programs, special education, federal and state anti-discrimination laws, accessibility, special health issues, institutionalization and deinstitutionalization.  
Effective: Spring 2007

**SEM 927 Law of Artistic Persons and Properties Seminar (2)** The objectives of this course include an examination of the interface between law and the arts with an eye to both theoretical and practical implications and a striving to identify creative and serviceable solutions to the problems that have frustrated the growth and harvest of the creative effort. The

investigation will be directed toward subject areas that reflect functional divisions within the arts; i.e., the visual arts, dance, music, the literary arts, and areas such as television and film. The course includes a mandatory field trip to New York City at the student's expense.

Effective: Spring 2007

**SEM 928 Law and Semiotics Seminar (3)** Legal semiotics is the study of law focusing signs and symbols as well as the construction of meaning in law in legal discourse. Law's communicative structures are essential in this context. Moreover, recent large-scale economic, political and social developments in the Western hemisphere have increased the need to expand our knowledge about law, and semiotic studies sustain that need.

Effective: Summer 2011

**SEM 929 Law and Aging Policy Seminar (3)** Examination of laws and public policies affecting older adults and families, including health and long-term care. This seminar will analyze demographic trends of aging world populations, including alternative public benefit and private retirement strategies affected by laws. Medicare, Medicaid, Social Security, protection of older adults, long-term care planning, and consumer protection laws will be introduced, with opportunities for students to select individual topics for in-depth research, writing and presentation in class. The seminar will also examine roles for specialists in elder law, whether in private practice or as public advocates.

Effective: Summer 2011

**SEM 930 Law, Science, and Policy Seminar (2)** This course will identify diverse areas in which advances in technology have posed challenges to society and law and will study select topics within those areas in order to ground the participants in the relevant legal, scientific, and ethical principles and jurisprudential and social theories. Subjects addressed include issues in biotechnology, such as cloning, transgenics, xenotransplantation, and pharmaceutical development; the ownership of biotechnological products; experimentation with humans and animals; human and animal rights concerns; environmental bioremediation; and non-lethal defense technologies.

Effective: Spring 2007

**SEM 931 Lawyering and Ethics for the Business Attorney Seminar (2)** This seminar provides students with an opportunity to analyze and discuss ethical and legal issues relating to representation of business entities. Issues covered include (1) who is the client for the lawyer who represents a business entity; (2) what special rules govern confidentiality and information sharing in the representation of a business entity; (3) how should a lawyer respond to evidence of client fraud or other illegal activities; (4) what are the potential liabilities for furnishing legal advice or providing legal opinions for business transactions that are later found to have been fraudulent or illegal; (5) when is a business entity required or permitted to reimburse employees for legal expenses relating to their employment activities; and (6) what special obligations and responsibilities are imposed on "in-house" attorneys who are full-time employees of a business entity.

Effective: Summer 2011

Prerequisite:

**SEM 933 Protection of Individual Rights Under State Constitutions Seminar (2)** With the perception that the federal judiciary is increasingly hostile to constitutional claims, individuals have turned to state constitutions as an independent source of rights in civil and criminal litigation. This course will explore the unique procedures and methods of state constitutional rights interpretation. In lieu of an examination, persons enrolled in the course will brief questions of state constitutional law in an arena where the United States Constitution fails to afford protection.

Effective: Summer 2011

**SEM 934 Race, Racism, and American Law Seminar (2)** The purpose of this seminar is to facilitate discussion and understanding of the role law has played in both the subordination and promotion of the rights of people of color in America. Subjects for discussion will include race and the American criminal justice system, hate speech and the First Amendment, affirmative action policies, and the quest for effective schools.

Effective: Summer 2011

**SEM 936 Law and Sexuality Seminar (2)** This seminar explores the different ways in which the law regulates and accounts for sexuality in general and sexual orientation in particular. Topics to be covered will include rights to privacy and their impact on the ability of the state to regulate sexual conduct; rights to equal protection by lesbians and gay men; the military's "don't ask, don't tell" policy; rights to free speech and associations of lesbians and gay men (and of those who do not want to associate with them); same-sex marriage and adoption by lesbians and gay men; employment discrimination; and legal issues involving transgendered individuals.

Effective: Summer 2011

**SEM 937 Forensic Genetics Seminar (2)** An examination of the history of and current issues in using genetic identification in the criminal law.

Effective: Summer 2010 Ending: Summer 2013

Prerequisite:

**SEM 937 Forensic Genetics Seminar (2)** An examination of the history of and current issues in using genetic identification in the criminal law.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**SEM 938 The Supreme Court Seminar (2)** The Supreme Court, including procedure and practice, principles of adjudication, and history, as well as the topics of the current term are studied. Students are required to present analyses of current cases as well as an analytical paper on approved topics of constitutional law.

Effective: Fall 2008

**SEM 939 Tax Policy Seminar (2)** This course examines the fundamental issues in tax policy, focusing on trends and on current legislative proposals. Specific subjects include the underpinnings of the various tax systems, the tax legislative process, the use of tax structure and incentives to implement social and economic objectives, the legal methodology of controlling tax abuse, and similar subjects.  
Effective: Spring 2007

**SEM 941 The United Nations and International Law Seminar (2)** The inexorable paces of globalization and interdependence have made the need for international cooperation more acute. The role of the United Nations in these processes has become both more relevant and controversial. Notwithstanding the critical voices that have questioned the relevance or usefulness of the world body from certain national perspectives and points of view, the United Nations, through its activities and programmes, continues to have a considerable impact on countries and societies around the world, in such areas as conflict prevention and resolution, control of population displacements, humanitarian action, and social and economic development. These considerations, among others, make a study of the United Nations and International law more important today than it has ever been.  
Effective: Summer 2011

**SEM 943 International Justice Seminar (2)** The seminar will address international trial investigative techniques, tribunal jurisdiction and procedure, and areas of international civil and criminal law that are most relevant to legal practice before international tribunals.  
Effective: Fall 2010

**SEM 945 Congressional Investigations Seminar (2)** This seminar will examine the laws and procedures governing congressional investigations through a series of historically based case studies and student analytical presentations on approved areas of congressional investigations law and procedure.  
Effective: Spring 2011  
Prerequisite:

**SEM 946 Policy Issues in Corporate Crime Seminar (2)** This seminar focuses on the theoretical and policy justifications underlying the prosecution of white collar crime.  
Effective: Spring 2011

**SEM 947 International Financial Law Seminar (3)** This seminar examines selected aspects of international financial, securities, and banking law. It will cover elements of financial law, including legal aspects of banking, securities, and money; the objectives of regulations and supervision; an overview of US regulation; and the public and private law of international monetary obligations. It examines aspects of international financial and securities regulation, including an examination of the financial crisis of 2008 and the regulatory reforms resulting from it; selected comparative aspects of regulation in the US and the EU through a detailed discussion of legislation and case law. The course also includes discussion on the economic and monetary union in the EU and the eurozone crisis and it will provide an overview of the law of the IMF and the international financial architecture.  
Effective: Fall 2012

**SEM 948 International Financial Law (3)** This seminar examines selected aspects of international financial, securities, and banking law. It covers broadly four areas: First, it provides elements of financial law. Secondly, it examines aspects of international financial and securities regulation. Thirdly, it discusses economic and monetary union in the EU and the eurozone crisis. Finally, it provides an overview of the law of the IMF and the international financial architecture.  
Effective: Summer 2013

**SEM 967 Labor Law Seminar (2)** This is an advanced seminar that assumes students will already have studied the National Labor Relations Act. It provides an opportunity for students to deepen their knowledge of labor law while also developing research, writing, analytical, and trial strategy skills.  
Effective: Fall 2009  
Prerequisite:

**SEM 968 International Uniform Enforcement of Human Rights Seminar (3)** A study of the structure, value, and progress of the international Human Rights Law Project.  
Effective: Spring 2011

**SEM 969 Electronic Evidence Seminar (3)** This seminar cover the case law, procedural rules, evidence rules, and rules of professional conduct implicated by the unique attributes of information created and/or stored electronically, as well as the filing and courtroom presentation of documents in electronic format. There are three components to the course. The first part concerns the discovery of ESI, and covers the nature, sources, and terminology of ESI; the different formats of ESI and the implications for preservation and production of ESI attributable to the different formats; the evolution of the rules and case law regarding discovery of ESI; and the obligations of counsel with respect of the preservation of ESI.  
Effective: Summer 2011

**SEM 970 Russian Law Seminar (2)** This 2-credit seminar is concerned with the development of the law, legal system, and legal institutions of what is popularly known as Russia but also correctly and officially known as the Russian Federation within the boundaries presently occupied and, historically, within the boundaries of the Russian Empire. By "law" we mean

formal legislation, customary rules, relevant international legal rules, legal doctrine, and anything else regarded by the Russian State or by Russian jurists as comprising part of the "law." For our purposes "legal institutions" encompasses all law enforcement agencies or any other agencies of the State or empowered by the state which are concerned with the law in any manner whatsoever, including educational institutions.

Effective: Spring 2012

**SEM 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 2010

**SEM 997A Death Penalty Seminar (2)** This seminar will explore the statutory and constitutional rules regarding implementation of the death penalty in the United States. The course will begin with a brief discussion of arguments by proponents and opponents of the death penalty. We will then address the development of Eighth and Fourteenth Amendment restrictions on the use of capital punishment, including categorical exemptions from the death penalty for the insane, the mentally retarded, juveniles, certain felony-murders, and those who do not commit homicide. Next, we will look at issues surrounding the execution itself, including competency to be executed and the use of lethal injection and other methods of execution.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SEM 997A Intellectual Property: Doctrine & Theory Seminar (3)** The seminar will address recent topics in intellectual property law (IP): patent, trade mark and trade secret law. The seminar will address, IP's jurisprudential and economic underpinnings; the rights of creative professional and artists' and makers's rights; the question of property rights in the digital age, competing accounts of patent law and the dispute over open access IP regimes; and finally the doctrinal question of subject matter patentability in the context of DNA and genetically enhanced agricultural products. The seminar will work through the recent and important literature in IP; theoretical questions will be addressed in the context of IP doctrine, including recent landmark IP cases.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

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## **Social Influenc Hlth (SIH)**

SIH 711 **Social Influences on Health** (3) This course introduces population based medicine and its influence on individuals and provides a framework for learning subsequent biomedical sciences.

Effective: Fall 2008

Prerequisite:

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## Social Studies Education (SS ED)

**SS ED 411 Teaching Secondary Social Studies I** (3) Methods for teaching social studies in secondary grades; nature of social studies, content and learning outcomes, instructional strategies and planning.

Effective: Fall 2011

Prerequisite:

**SS ED 412W Teaching Secondary Social Studies II** (3) Writing-intensive course focusing on study of the social studies teacher's role in planning instruction; strategies for teaching.

Effective: Summer 2010

Prerequisite: Concurrent: C I 412W

**SS ED 430W Teaching Social Studies in the Elementary Grades** (3) Principles underlying use of social studies in the elementary school; practical demonstration of desirable methods.

Effective: Spring 2007 Ending: Fall 2013

Prerequisite: Concurrent: C I 495A OR C I 495B ; MTHED 420 SCIED 458

**SS ED 430W Teaching Social Studies in the Elementary Grades** (3) Principles underlying use of social studies in the elementary school; practical demonstration of desirable methods.

Effective: Spring 2014 Future: Spring 2014

Prerequisite: Concurrent: C I 495A OR C I 495B ; MTHED 420 SCIED 458

**SS ED 470 Issues in Social Studies Education** (1-6) Concentration on particular issues, trends, and developments in the social studies.

Effective: Winter 1978

Prerequisite:

**SS ED 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**SS ED 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**SS ED 498 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1992

**SS ED 530 Instructional Practices in the Social Studies** (3) Social studies innovations in the classroom, new programs, new materials, new methods, and evaluation.

Effective: Winter 1978

Prerequisite:

**SS ED 532 Curriculum Models in Social Studies Education** (3) Study of past and proposed curricula in elementary and secondary social studies. Various means of judging curricula will be offered.

Effective: Spring 1985

Prerequisite:

**SS ED 533 Research in the Teaching of Social Studies** (3) Procedures and methods of research for the teaching of social studies, strategies of investigation, and review of research literature.

Effective: Fall 1983

Prerequisite:

**SS ED 590 Colloquium** (1-3) Graduate seminar for new doctoral students in social studies education.

Effective: Summer 1998

Prerequisite:

**SS ED 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**SS ED 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

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## **Social Thought (SOCTH)**

SOCTH 501 **Seminar in Social Thought** (3) Selected topics in the historical development of the tradition in social thought, and a discussion of contemporary issues and debates.  
Effective: Spring 1996

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## **Socio-Ecolog Medicin (SOEM)**

SOEM 711 **Socio-Ecological Medicine** (3) An introductory course encompassing topics such as public health, socio-ecological medicine, global health, health systems, medical anthropology, and culturally-sensitive medicine.  
Effective: Summer 2013

Prerequisite:

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## Sociology (SOC)

SOC 400W **Senior Research Seminar** (3) Major concepts and principles of sociology through reading, data analysis, and writing. Capstone course for senior Sociology majors.

Effective: Fall 2001  
Prerequisite:

SOC 403 **Advanced Social Psychology** (3) Analysis of the major theoretical approaches and research findings of contemporary social psychology.

Effective: Fall 1983  
Prerequisite:

SOC 404 **Social Influence and Small Groups** (3) The study of social influence, leadership and status, and social cohesion and commitment processes in small groups.

Effective: Spring 2007  
Prerequisite:

SOC 405 **Sociological Theory** (3) Overview of the development of sociological theory; current issues and controversies.

Effective: Spring 2001  
Prerequisite:

SOC 406 (CRIMJ 406, CRIM 406) **Sociology of Deviance** (3) Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group's normative expectations.

Effective: Spring 2008  
Prerequisite:

SOC 408 **Urban Ecology** (3) Spatial and temporal aspects of urban structure; urban growth, neighborhoods, racial and ethnic groups, mental illness; cross-cultural perspectives.

Effective: Fall 1983  
Prerequisite:

SOC 409 (US) (AF AM 409) **Racial and Ethnic Inequality in America** (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

Effective: Fall 2012  
Prerequisite:

SOC 409U (US) (AF AM 409U) **Racial and Ethnic Inequality in America** (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

SOC 411 (US) (HD FS 416) **Racial and Ethnic Diversity and the American Family** (3) This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States.

Effective: Spring 2005  
Prerequisite:

SOC 412 (CRIMJ 412, CRIM 412) **Crime, Social Control, and the Legal System** (3) Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

Effective: Spring 2008  
Prerequisite:

SOC 413 (CRIM 413, CRIMJ 413) **Advanced Criminological Theory** (3) This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories.

Effective: Spring 2008  
Prerequisite:

SOC 414 (CRIMJ 414, CRIM 414) **Criminal Careers and the Organization of Crime** (3) Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and life-styles; policy implications.

Effective: Spring 2008  
Prerequisite:

SOC 416 (US) (EDTHP 416) **Sociology of Education** (3) The theoretical, conceptual, and descriptive contributions of sociology to education.

Effective: Spring 2006  
Prerequisite:

SOC 419 (US) **Race and Public Policy** (3) Seminar format course in which sociological theory and research are applied to current race policy issues.

Effective: Spring 2006  
Prerequisite:

SOC 420 (EM SC 420, S T S 420) **Energy and Modern Society** (3) Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

Effective: Spring 2001  
Prerequisite:

SOC 422 **World Population Diversity** (3) Survey of world diversity in national population growth/composition; the impacts

of demographic change on the economic/social life of nations/people.

Effective: Spring 2001

Prerequisite:

**SOC 423 Social Demography (3)** Social demographic perspectives on fertility, mortality, morbidity, migration, population density, demographic transitions, social mobility, family, the aged, and minorities.

Effective: Spring 2001

Prerequisite:

**SOC 424 Social Change (3)** Critical review of classical and recent theories of social change, emphasizing the transformations occurring in the modern world.

Effective: Fall 1983

Prerequisite:

**SOC 425 Social Conflict (3)** An analysis of the variables affecting intergroup and international conflict and cooperation.

Effective: Fall 2007

Prerequisite:

**SOC 427W (CED 427W, S T S 427W) Society and Natural Resources (3)** Analysis of the relationships between societal development and enhancement and natural resources.

Effective: Summer 2008 Ending: Summer 2013

Prerequisite:

**SOC 428 Homelessness in America (3)** Survey of social science research on homelessness in the contemporary United States.

Effective: Spring 2001

Prerequisite:

**SOC 428H Homelessness in America (3)** Survey of social science research on homelessness in the contemporary United States.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**SOC 429 Social Stratification (3)** Structure and dynamics of class, caste, and status systems; class differentials and social mobility; current theoretical and methodological issues.

Effective: Winter 1978

Prerequisite:

**SOC 430 Family in Cross-Cultural Perspective (3)** Sociological analysis of family systems in various cultures and subcultures.

Effective: Spring 2001

Prerequisite:

**SOC 431 (HD FS 431) Family Disorganization: Stress Points in the Contemporary Family (3)** Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

Effective: Spring 1994

Prerequisite:

**SOC 432 Social Movements (3)** Why and how people mobilize to promote or retard social change. Factors predicting success or failure of social movements.

Effective: Fall 1983

Prerequisite:

**SOC 435 (HD FS 434) Perspectives on Aging (3)** An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

Effective: Fall 2007

Prerequisite:

**SOC 440 (HD FS 440) Family Policy (3)** An in-depth examination of family policy.

Effective: Spring 2007

Prerequisite:

**SOC 445 U.S. Immigration (3)** This class examines theories of U.S. immigration and immigrant adaptation, effects of immigration, and policy.

Effective: Spring 2012

Prerequisite:

**SOC 446 Political Sociology (3)** Sociological analysis of types of political organization and their relations with other elements of social life.

Effective: Winter 1978

Prerequisite:

**SOC 448 Environmental Sociology (3)** Examination of the relationship between the physical environment and society.

Effective: Fall 2007

Prerequisite:

**SOC 449 Environmental Movements (3)** Comparative exploration of environmental movements within the context of classical and new social movement theory.

Effective: Fall 2007

Prerequisite:

**SOC 450 Justice and the Environment (3)** Considers notions of justice in relation to environmental philosophy, environmental movements, and general environmental concerns.

Effective: Fall 2007

Prerequisite:

**SOC 454 (US) The City in Postindustrial Society (3)** Postindustrial social organization in the United States and Europe; consequences for metropolitan social stratification, community power, and environmental quality.

Effective: Spring 2006

Prerequisite:

**SOC 455 Work and Occupations (3)** Work and occupational life in modern society; work in the past, present, and future.

Effective: Fall 1983

Prerequisite:

**SOC 456 (WMNST 456) Gender, Occupations, and Professions (3)** The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

Effective: Spring 2013

Prerequisite:

**SOC 457 (US;IL) (ANTH 457, J ST 457) Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3)** Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.

Effective: Summer 2006

Prerequisite:

**SOC 461 (US;IL) (RL ST 461) Sociology of Religion (3)** Contemporary religion in the United States: beliefs, structure, and function of major denominations and religious cults.

Effective: Spring 2006 Ending: Summer 2013

Prerequisite:

**SOC 461 (US;IL) (RL ST 461) Sociology of Religion (3)** Contemporary religion in the global perspective: beliefs, structure, and function of major religious traditions, denominations, and cults.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**SOC 467 (CRIM 467, CRIMJ 467) Law and Society (3)** Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials.

Effective: Spring 2008

Prerequisite:

**SOC 468 Mood-Altering Substances in Society (3)** Perspectives of cultures throughout the world toward mood-altering substances are reviewed in light of public policy, benefits, and problems.

Effective: Fall 2007

**SOC 469 Techniques in Small Group Facilitation (1-4 per semester/maximum of 12)** This course is the training course for students working as facilitators with the Race Relations Project.

Effective: Summer 2010 Ending: Summer 2013

Prerequisite:

**SOC 469 Techniques in Small Group Facilitation (1-4 per semester/maximum of 12)** This course is the training course for students working as facilitators with the World in Conversation Project.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**SOC 470 Intermediate Social Statistics (4)** Descriptive and inferential statistics in social research: central tendency and variation, normal distribution, measures of association, confidence intervals, hypothesis testing.

Effective: Fall 2001

Prerequisite:

**SOC 471 Qualitative Research Methods in Sociology (3)** Theory, methods, and practice of qualitative data collection, including observation, participant observation, interviewing; supervised projects in natural settings.

Effective: Spring 2001

Prerequisite:

**SOC 481H Senior Honors Seminar in Sociology (1)** Supervised experience in planning and writing the honors thesis.

Effective: Spring 1999

Prerequisite:

**SOC 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**SOC 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**SOC 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2000

Prerequisite:

**SOC 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**SOC 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**SOC 497A Latin American Revolutions and Revolutionaries (3)** An exploration of the social, cultural, and political economic dimensions of revolutions in Mexico, Cuba, Chile, Venezuela, Nicaragua, and Argentina. Also considered as the left-wing tilt through electoral politics in Latin America over the last two decades.

Effective: Summer 2013 Ending: Summer 2013

**SOC 497A (CRIM 497A) Communities and Crime (3)** Students will critically assess theory and empirical research on the effects of neighborhood structure and social organization on crime.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 497B Medical Sociology: Health, Disease, and Society (3)** The emphasis in the course is on the social patterning of health and disease with a focus on variation by age, gender, race/ethnicity, disability status, socioeconomic status and neighborhood/community.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 497H Changing American Family (3)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 499 (IL) Foreign Study--Sociology (2-6)** Study, in selected foreign countries, of groups, institutions, and social problems.

Effective: Summer 2005

Prerequisite:

**SOC 500 Introduction to Graduate Study in Sociology (1)** Required of all incoming graduate students in sociology.

Effective: Fall 1983

**SOC 501 Proseminar in Sociology (3 per semester/maximum of 6)** An in-depth introduction to the major specialty areas of Sociology.

Effective: Summer 1998

Prerequisite:

**SOC 502 Theories of Society I (3)** Review and analysis of trends and controversies in sociological theory from late eighteenth-century beginnings through the nineteenth century.

Effective: Fall 1983

**SOC 503 Theories of Society II (3)** Review and analysis of trends and controversies in sociological theory in the twentieth century.

Effective: Fall 1983

**SOC 512 (CLJ 512) Criminological Theories (3)** Survey of theoretical and substantive issues in deviance and criminology, with emphasis on critical review of theories.

Effective: Fall 2005

**SOC 513 Sociological Research Methods (3)** Critical review of methodological issues; research designs; analysis and interpretation of findings.

Effective: Fall 1983

**SOC 515 (CLJ 515) Research Methods in Criminology and Deviance (3)** Review of methodological issues; design and conduct of research; analysis and interpretation of findings; ethical and policy issues.

Effective: Spring 1996

**SOC 518 (PL SC 518) Survey Methods I: Survey Design (3)** Research design for social, behavioral and health surveys.

Effective: Fall 2007

**SOC 519 (PL SC 519) Survey Methods II: Analysis of Survey Data (3)** Intermediate course on the statistical analysis of survey data: topics include weighting, complex surveys, missing data, and contextual analysis.

Effective: Spring 2008

Prerequisite:

SOC 521 **Family Demography** (3) Current family demographic research on nuptiality, divorce, household composition, female employment, migration, and fertility.  
Effective: Spring 1985

SOC 522 **Demography of the Life Course** (3) The theoretical bases, critical concepts, and methods of life course analysis in the study of demographic transitions.  
Effective: Spring 1994  
Prerequisite:

SOC 523 **Internal and International Migration** (3) Examination of theories, frameworks, and policies related to internal and international migration causes and consequences in developed and developing nations.  
Effective: Spring 1997  
Prerequisite:

SOC 524 **The Demography of Human Fertility** (3) Overview of major issues and methodological approaches in the demographic study of human fertility in developing and developed countries.  
Effective: Fall 2000

SOC 525 **Immigration, Assimilation, and Inequality** (3) Examine theories, research, and policies on the incorporation of immigrants and their descendants.  
Effective: Summer 2011

SOC 526 (H P A 526) **Health Disparities** (3) This course provides an overview of social factors that lead to demographic disparities in health.  
Effective: Summer 2012

SOC 527 (AFR 527) **Migration, Urbanization, and Policy in the Developing World** (3) This course examines the dynamics of migration and urbanization processes, as well as their policy implications, in non-industrialized regions of the world.  
Effective: Summer 2012

SOC 528 **Homelessness in America** (3) Survey of social science research on homelessness in the contemporary United States.  
Effective: Fall 2000

SOC 529 **Seminar in Race and Ethnicity** (3) Reviews the status of U.S. racial and ethnic minority groups; analyzes factors influencing inequality and inter-group relations.  
Effective: Summer 2012

SOC 530 **Sociology of Family** (3) An in-depth introduction to the sociological study of the family.  
Effective: Spring 2002

SOC 531 (HD FS 531) **Family Disorganization: Stress Points in the Contemporary Family** (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.  
Effective: Summer 1994

SOC 532 **Global Health and Mortality** (3) Major issues in international health from a demographic perspective; special attention to the Global South and to data quality.  
Effective: Summer 2013  
Prerequisite:

SOC 533 **Sociology of Religion Seminar** (3) A survey of the sociology of religion designed to help students conduct and critique social science research.  
Effective: Summer 2013

SOC 534 (EDTHP 534, SOC 534) **Childhood and Education in Sociological and International Comparative Perspective** (3) The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in the process.  
Effective: Spring 2013

SOC 535 **Sociology of Aging** (3) Current research and methodological issues in the sociological study of aging.  
Effective: Fall 1983

SOC 537 (HD FS 537) **Biosocial Perspectives on the Family** (3) The implications of knowledge from behavioral endocrinology, behavior genetics, and evolutionary psychology for understanding family relationships and child development.  
Effective: Summer 2002

SOC 538 (EDTHP 538) **Sociology of Education** (3) Provides students with an overview of dominant sociological theoretical perspectives on schools, schooling, and education in modern society.  
Effective: Summer 2007

SOC 544 **Current Issues in Complex Organizations** (3) Critical survey of recent developments in sociological study of organizations and the theory of bureaucracy, including reciprocal effects on environments.  
Effective: Spring 2011

SOC 546 **Seminar in Political Sociology** (3) Analysis of issues and problems in political sociology. Topical emphasis varies.  
Effective: Fall 1983  
Prerequisite:

SOC 551 **Social Stratification and Social Change** (3) Origin and development of stratification systems and inequality among and within societies; social mobility; change in stratification systems.  
Effective: Fall 1983

SOC 553 (CI ED 553, EDTHP 553, HI ED 553) **Education Mobility in Comparative Perspective** (3) Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, South America.  
Effective: Summer 2002

SOC 557 (EDTHP 557, HI ED 557) **Sociology of Higher Education** (3) Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis.  
Effective: Fall 2000  
Prerequisite:

SOC 560 **Urban Sociology** (3) Examination of the structure and dynamics of North American cities and of residents' experiences in such settings.  
Effective: Fall 2000

SOC 573 **Demographic Techniques** (3) Models and measures of vital processes (fertility, mortality, migration) and their effects on growth and age structure of human populations.  
Effective: Fall 2001  
Prerequisite:

SOC 574 **Statistical Methods for Social Research** (3) Basic concepts of statistics; linear regression; computer software; analysis of social surveys; causal inferences from nonexperimental data.  
Effective: Fall 1983  
Prerequisite:

SOC 575 **Statistical Models for Nonexperimental Research** (3) Causal models for quantitative and qualitative data; path analysis and structural equations; logistic regression; duration models.  
Effective: Spring 1989  
Prerequisite:

SOC 576 **Applied Mathematical Demography** (3) Survey of mathematical models used in the study of population: models of growth, survivorship, fertility, migration, stability, kinship, projection.  
Effective: Fall 1986  
Prerequisite:

SOC 577 **Techniques of Event History Modeling** (3) Survival analysis theory and methods for discrete dependent variables.  
Effective: Summer 1998  
Prerequisite:

SOC 578 **Multilevel Regression Models** (3) Covers multilevel regression models for the analysis of nested or hierarchical data, including both contextual and longitudinal applications.  
Effective: Summer 2006  
Prerequisite:

SOC 579 (ANTH 579) **Spatial Demography** (3) This graduate course will expose students to spatial analysis tools and analytical methods applied to demographic research.  
Effective: Spring 2008  
Prerequisite:

SOC 584 (PSY 584) **Attitude Formation and Change** (3) Theory and method in research on attitude formation and change with emphasis on critical analysis.  
Effective: Spring 2007  
Prerequisite:

SOC 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1987



**SOC 591 (CLJ 591) Teaching Sociology/Crime, Law, and Justice (1)** Preparation for teaching sociology and/or crime, law, and justice at the college level.  
Effective: Fall 2000

**SOC 592 Writing for Publication in the Social Sciences (3)** Systematic, collective review of unpublished student manuscripts with an eye toward revision for publication.  
Effective: Spring 2007  
Prerequisite:

**SOC 595A (PL SC 595A) Survey Research Practicum (1-6 per semester/maximum of 6)** Practicum in Survey Research data collection or management.  
Effective: Summer 2011  
Prerequisite:

**SOC 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1987

**SOC 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 1987

**SOC 597A Demography of Aging (3)** This course focuses on the demographic aspects of health and aging and integrates social and biological approaches to population aging.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 597B Social Movements (3)** Overview of International research on social movements dynamics. Particular attention to Mobilization, Framing and Political Opportunity processes.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 597C Causal Analysis (3)** The concept of causality in the social sciences. Models for estimating causal effects in social research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 597D Social Networks (3)** Social network research methods and perspectives that focus on sets of actors and the patterns of social ties among them.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 597E (CLJ 597E) Sentencing and Corrections (3)** The course takes a sociological and criminological view of sentencing and corrections, through classic and contemporary theory and empirical research.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 597F Advanced SEM Methods (3)** This is an advanced course on measurement and modeling in the social sciences using modern structural equation models and methods.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOC 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**SOC 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1983

**SOC 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Students will teach introductory level courses as required by staffing and students' needs.  
Effective: Fall 1983

**SOC 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Summer 2005

**SOC 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

**SOC 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1983



## Software Engineering (SWENG)

**SWENG 400 Introduction to Software Engineering Studio** (3) Provides an introduction to the principles of software engineering and includes complementary instruction in one programming language.

Effective: Summer 1999

Prerequisite:

**SWENG 411 Software Engineering** (3) Software engineering principles including life cycle, dependability, process modeling, project management, requires specification, design analysis, implementation, testing, and maintenance.

Effective: Spring 2008

Prerequisite: Concurrent: SWENG 311

**SWENG 421 Software Architecture** (3) The analysis and design of software systems using canonical design patterns.

Effective: Summer 2008

Prerequisite:

**SWENG 431 Software Verification, Validation, and Testing** (3) Introduction to methods of software verification, validation, and testing; mathematical foundations of testing, reliability models; statistical testing.

Effective: Spring 2008

Prerequisite:

**SWENG 452W Embedded Real Time Systems** (3) The design and implementation of real time systems.

Effective: Summer 2008

Prerequisite:

**SWENG 465 Web Services** (3) This course introduces the students to a contemporary computing paradigm called "service-oriented computing."

Effective: Spring 2011

Prerequisite:

**SWENG 480 Software Engineering Design** (3) Concepts of engineering ethics, economy, and project management, senior capstone project selection, and technical communication skills.

Effective: Spring 2009

Prerequisite:

**SWENG 481 Software Engineering Project** (3) Capstone group design projects in software engineering.

Effective: Spring 2008

Prerequisite:

**SWENG 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2010

**SWENG 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Spring 2008

Prerequisite:

**SWENG 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2010

**SWENG 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 1999

**SWENG 497A Special Topics: Software Integration** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2013 Ending: Summer 2013

**SWENG 497B Special Topics: Software Documentation** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2013 Ending: Summer 2013

**SWENG 497C Special Topics: Domain Specific Languages** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Summer 2013 Ending: Summer 2013

**SWENG 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2010

**SWENG 500 Software Engineering Studio (3)** The 500-level studio provides an opportunity for students to undertake a substantial software project.  
Effective: Summer 1999

**SWENG 505 Software Project Management (3)** Analysis and construction of project plans for the development of complex software products; how to manage change and cost control.  
Effective: Fall 2003

**SWENG 510 Secure Software Engineering (3)** This course provides a foundation in software engineering techniques for developing secure software systems.  
Effective: Spring 2013

**SWENG 537 Software System Design (3)** Best practices in the requirements, analysis, and design of large software systems including the Unified Modeling language and the Unified Process.  
Effective: Spring 2008  
Prerequisite:

**SWENG 541 Advanced Database Design Concepts (3)** Practical benefits of a Database Management System; three-stage process to create and implement a relational database to meet defined requirements.  
Effective: Summer 2002  
Prerequisite:

**SWENG 545 Data Mining (3)** Practical benefits of data mining will be presented; data warehousing, data cubes, and underlying algorithms used by data mining software.  
Effective: Summer 2002  
Prerequisite:

**SWENG 552 Bioinformatics (3)** Introduction to information processing problems in computational biology and a unified treatment of machine learning methods for solving these problems.  
Effective: Summer 2002  
Prerequisite:

**SWENG 560 Web Based Systems (3)** Autonomous intelligent software agent mechanisms, Java's database connectivity, and the emerging architectures for the development of Web based information systems.  
Effective: Spring 2001  
Prerequisite:

**SWENG 568 Enterprise Integration (3)** Advances in design, development, and deployment of control and management software for enterprise and production information systems.  
Effective: Fall 2003

**SWENG 569 Service Oriented Architecture (3)** The principles of service oriented architecture; modeling, design and implementation of services; mapping business processes to services.  
Effective: Spring 2009

**SWENG 580 Advanced Software Engineering (3)** Description of tools and techniques in the software development lifecycle; Mitigation and managing time-to-market and quality of large software systems.  
Effective: Spring 2001  
Prerequisite:

**SWENG 581 Software Testing (3)** This course provides a rigorous formal framework and practical information on this the testing of software throughout its life cycle.  
Effective: Summer 2005  
Prerequisite:

**SWENG 582 Real-Time Software Design and Analysis (3)** A holistic, systems-based approach to design and analysis of real-time systems; design and implementation of a small real-time system.  
Effective: Summer 2002  
Prerequisite:

**SWENG 584 Genetic Algorithms (3)** Application of genetic algorithms to problems in engineering and science including combinatorial optimization, multi-criteria optimization, biology, chemistry, and neural networks.  
Effective: Summer 2002  
Prerequisite:

**SWENG 585 Pattern Oriented Design (3)** This class examines well-known heuristics, principles and patterns in the design and construction of reusable frameworks, packages and components.  
Effective: Spring 2006  
Prerequisite:

**SWENG 586 Requirements Engineering (3)** Theory and applications of requirements elicitation, analysis, modeling, validation, testing, and writing for hardware and software systems.  
Effective: Summer 2008

**SWENG 587 Software Systems Architecture (3)** Software systems architecture; architectural design principles/patterns;

documentation/evaluation of software architectures; reuse of architectural assets through frameworks/software product lines.

Effective: Summer 2008

**SWENG 588 Program Understanding (3)** Techniques for the analysis and visualization of large software systems to assess the quality of the design and architecture.

Effective: Spring 2009

**SWENG 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Summer 1999

**SWENG 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1999

**SWENG 594A Masters Research Paper (3)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2013 Ending: Summer 2013

**SWENG 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1999

**SWENG 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 1999

**SWENG 826 Applied Human-Computer Interaction (3)** Evaluate and design interactive products that support how people work and communicate from both a theoretical and practical perspective.

Effective: Fall 2010

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## Soil Science (SOILS)

**SOILS 401 Soil Composition and Physical Properties** (3) Advanced study of mineralogical and physical properties of soils which affect soil-plant-water relationships.

Effective: Summer 2013

Prerequisite:

**SOILS 402 Soil Nutrient Behavior and Management** (3) Chemical and biological behavior of soil nutrients; management for plant availability and fate in the environment. Laboratory emphasizes soil testing and soil-plant relationships.

Effective: Summer 2013

Prerequisite:

**SOILS 403 Soil Morphology Practicum** (2 per semester/maximum of 4) Students develop field skills to describe soil morphology, classify soils, and make land use interpretations.

Effective: Summer 2013

Prerequisite:

**SOILS 404 Urban Soils** (3) This course introduces the student to natural and human-influenced soils.

Effective: Summer 2013

Prerequisite:

**SOILS 405 (GEOSC 405) Hydropedology** (3) Soil and water interactions across scales, integrated studies of landscape-soil-water relationships, fundamental processes of water flow and chemical transport.

Effective: Summer 2013

Prerequisite:

**SOILS 412W Soil Ecology** (3) Introduction to soil organisms; includes interactions between organisms, their processes, and metabolism with a major focus on microorganisms.

Effective: Summer 2013

Prerequisite:

**SOILS 416 Soil Genesis, Classification, and Mapping** (4) Lecture and laboratory course on the genesis of soils, their classification, mapping, and interpretation for land use.

Effective: Summer 2013

Prerequisite:

**SOILS 418 (AGECO 418, AN SC 418) Nutrient Management in Agricultural Systems** (3) Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices.

Effective: Summer 2013

**SOILS 419 (GEOSC 418) Soil Environmental Chemistry** (3) Introduction to chemical constituents and processes occurring in soils. Topics include mineral weathering, soil solution chemistry and adsorption of solutes.

Effective: Summer 2013

Prerequisite:

**SOILS 420 Remediation of Contaminated Soils** (3) Basic principles and technical aspects of remediation of contaminated soils.

Effective: Summer 2013

Prerequisite:

**SOILS 422 Natural Resources Conservation and Community Sustainability** (3) Conservation, land-use, and community (soil, water, air, plants, animals, and humans) impacting quality of life and sense of place.

Effective: Summer 2013

Prerequisite:

**SOILS 450 Environmental Geographic Information Systems** (3) Use of geographic information systems (GIS) and digital spatial databases to characterize landscapes for environmental assessment and management.

Effective: Summer 2013

Prerequisite:

**SOILS 489 Supervised Experience in College Teaching** (1-3) Participate with instructors in teaching an undergraduate soil science course; assist with teaching and evaluation and with development of instructional materials.

Effective: Summer 2013

Prerequisite:

**SOILS 490 (AGRO 490) Colloquium** (1) Continuing written and oral presentations developed by students in consultation with the course instructor.

Effective: Summer 2013

Prerequisite:

**SOILS 494 Senior Thesis** (1-6) Supervised data collection and analysis on a topic of interest to the student culminating in a formal thesis.

Effective: Summer 2013

Prerequisite:

**SOILS 494H Senior Thesis** (1-6) Supervised data collection and analysis on a topic of interest to the student culminating in a formal thesis.

Effective: Summer 2013

Prerequisite:

**SOILS 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 2013

Prerequisite:

**SOILS 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

**SOILS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

**SOILS 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2013

**SOILS 502 Soils Properties and Functions (3)** Introduction to soil science for graduate students including fundamentals of and applications to plant production and environmental sustainability.

Effective: Summer 2013

**SOILS 507 Soil Physics (3-4)** Soil physical properties emphasizing water, heat, gas, and ion movement in unsaturated soils. Laboratory included with 4 credits.

Effective: Summer 2013

Prerequisite:

**SOILS 510 Geographic Information System Applications (3)** Soil data bases, image processing, and geographic information systems will be used to model and understand land and water resources.

Effective: Summer 2013

Prerequisite:

**SOILS 512 Environmental Soil Microbiology (3)** Biology and ecology of microorganisms in terrestrial environments; microbiological and molecular analysis methods; microbial processes in carbon and nitrogen cycling.

Effective: Summer 2013

Prerequisite:

**SOILS 513 Soil Environmental Chemistry (3)** Chemical constituents and processes occurring in soils. Discussion of soil components, reactions at the solid-solution interface, and soil chemical processes.

Effective: Summer 2013

Prerequisite:

**SOILS 516 Soil Genesis (1 per semester, maximum of 4)** Field trip to study the genesis, classification, and geomorphology of the major soils of the northeastern United States.

Effective: Summer 2013

Prerequisite:

**SOILS 519 Nature of Soil Minerals (3)** Constituent minerals of soils: modern methods for identification; relations to soil formation and agricultural practices.

Effective: Summer 2013

**SOILS 571 Ecosystem Nutrient Cycles (3)** Ecological theory and applications related to water, carbon, nitrogen, phosphorus, and cation cycling in managed and unmanaged terrestrial ecosystems.

Effective: Summer 2013

**SOILS 590 (AGRO 590) Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 1993 Ending: Fall 2013

**SOILS 590 Colloquium (1-3 per semester/maximum of 3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 2014 Future: Spring 2014

**SOILS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

**SOILS 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2013

**SOILS 597D Ecosystem Analytical Techniques (3)** Advanced quantitative laboratory experimentation course that is designed to give students a deeper understanding of modern analytical instruments and the background theory and principles underlying ecosystem chemical measurements. Upon completion of the course, the students will be well versed in, and able to apply appropriate techniques used to measure the chemical condition of ecosystems such as atmospheric, soil and geologic, aquatic, plant, animal, and insect chemical constituents. Instrumental methods of analysis will include: spectroscopic, chromatographic, spectrometric, electrochemical, and thermal methods for ecosystem measurements. Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOILS 597E Ecosystem Lab Quality Control (3)** This course gives an overview of the necessary actions to be taken to make sure that ecosystem analytical data of known quality objectives are obtained. The data quality objectives covered in the course include accuracy, bias, trueness, recovery, precision, sensitivity, instrument and method detection limits, decision limits, calibration lower range limits, homogeneity of variance and linearity tests, selectivity specificity, measureability, reliability, validity, timeliness and control charts. Implementing a quality control program is one of the requirements to be in compliance with the U.S. Environmental Protection Agency's Good Laboratory Practice Standards (GLPS). Effective: Summer 2013 Ending: Summer 2013

**SOILS 597E Ecosystem Lab Quality Control (3)** This course gives an overview of the necessary actions to be taken to make sure that ecosystem analytical data of known quality objectives are obtained. The data quality objectives covered in the course include accuracy, bias, trueness, recovery, precision, sensitivity, instrument and method detection limits, decision limits, calibration lower range limits, homogeneity of variance and linearity tests, selectivity specificity, measureability, reliability, validity, timeliness and control charts. Implementing a quality control program is one of the requirements to be in compliance with the U.S. Environmental Protection Agency's Good Laboratory Practice Standards (GLPS). Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SOILS 600 THESIS RESEARCH (1-15) NO DESCRIPTION.**  
Effective: Summer 2013

**SOILS 601 PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.**  
Effective: Summer 2013

**SOILS 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) GRADUATE STUDENT INVOLVEMENT IN PREPARATION, PRESENTATION, AND EVALUATION OF COURSE MATERIALS FOR UNDERGRADUATE FORMAL COURSES.**  
Effective: Summer 2013

**SOILS 610 Thesis Research Off-Campus (1-15) No description.**  
Effective: Summer 2013

**SOILS 611 PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.**  
Effective: Summer 2013

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## Spanish (SPAN)

**SPAN 410 Advanced Oral Expression and Communication (3)** Emphasis on achieving practical command of spoken Spanish and the comprehension of native speech. Use of journalistic materials.

Effective: Fall 1995

Prerequisite:

**SPAN 412 Translation (3)** Techniques of oral and written translation from Spanish to English and vice versa, particularly for business, literature, and social work.

Effective: Spring 2008

Prerequisite:

**SPAN 413 Interpretation (3)** Introduction to the art of interpretation, with particular attention to the professions for which it is most commonly required.

Effective: Summer 2012

Prerequisite:

**SPAN 414 Spanish Phonology (3)** Spanish phonetics and phonemics; systematic means of correcting pronunciation defects; other audio-lingual applications.

Effective: Spring 2013

Prerequisite:

**SPAN 415 Spanish Morphology and Syntax (3)** The Spanish grammatical system; analysis of morphemic units and their organization into syntactic structures.

Effective: Spring 2013

Prerequisite:

**SPAN 418 The Evolution of Spanish (3)** The emergence and development of the sounds and forms of Spanish.

Effective: Spring 2013

Prerequisite:

**SPAN 420 Spanish for Business and International Trade (3)** Introduction to the Spanish of international business and to the social and cultural norms of negotiation in Spanish-speaking countries.

Effective: Spring 2008

Prerequisite:

**SPAN 439 Don Quijote (3)** Thorough study of the masterpiece, including its sources, genesis, language, style, success, and influence.

Effective: Spring 2013

Prerequisite:

**SPAN 440 Teaching of Romance Languages (3)** Theories of second language acquisition. Current classroom practices in the teaching of Romance languages.

Effective: Spring 2001

Prerequisite:

**SPAN 472 The Contemporary Spanish American Novel (3)** The regionalist and social novel since 1910, together with the social background.

Effective: Spring 2013

Prerequisite:

**SPAN 474 Many Mexicos (3)** Overview of Mexican literature, culture and history from pre-colonial period to present.

Effective: Summer 2013

Prerequisite:

**SPAN 476 Masterpieces of Spanish American Literature (3)** Reading, analysis, and discussion of selected major works representative of Spanish American prose and poetry.

Effective: Spring 2013

Prerequisite:

**SPAN 490 Masterpieces of Spanish Prose (3)** Reading, analysis, and discussion of selected masterpieces of Spanish novels, short stories, etc.

Effective: Spring 2013

Prerequisite:

**SPAN 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994

**SPAN 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2007

**SPAN 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

SPAN 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

SPAN 497A **Data Processing and Analysis for Language Scientists Using the R Statistical Package** (3) This course will provide an introduction to the R-project for statistical computing. The goal of the course is to familiarize students with R so that data can be transformed and analyzed efficiently and with minimal human error. It is geared towards students with little or no prior knowledge of programming.  
Effective: Summer 2013 Ending: Summer 2013

SPAN 497A **Painting and Theater in Early Modern Spain** (3) Examine a number of plays and paintings to see how one influenced the other, how painters were seen and represented, and how the popular stage used painting and painters as principle characters to comment on art, society, politics, and social concerns.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

SPAN 497B **The Romance Languages** (3) This course situates Spanish in the broader context of the Romance languages through the study of the origin and development of these languages and through systematic comparison of their linguistic features (especially at the phonological, morphological, and syntactic levels).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

SPAN 497C **Mexico Noir** (3) This class traces the development of a particular genre of crime fiction and film known as el genero negro or noir in Mexico and along the U.S/Mexican border.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

SPAN 497D **Grammar Mistakes** (3) The goal of this course is to help students build their awareness of how Spanish grammar works and identify where and how they tend to make mistakes, which in turn can improve their Spanish.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

SPAN 499 (IL) **Foreign Study--Spanish** (1-12) Contemporary Spanish life and civilization. Emphasis on post-Civil War period: literature, arts, and sociopolitical problems.  
Effective: Summer 2005  
Prerequisite:

SPAN 502 **Theory and Techniques of Teaching Spanish** (1-3) Audio-lingual orientation.  
Effective: Winter 1978

SPAN 507 **Hispano-Romance Linguistics** (3 per semester/maximum of 9) History, development, and linguistic description of Old Spanish and related Romance languages of the Iberian Peninsula.  
Effective: Fall 1983

SPAN 508 **Generative Syntax** (3) This course offers foundations of generative syntax. It addresses the advantage of a scientific model to explain human knowledge of language that also makes predictions about its representation in the mind.  
Effective: Summer 2013

SPAN 509 **Functional Syntax** (3) This course covers foundations of functional syntax. It addresses the advantages of a scientific approach to explain human knowledge of language that makes predictions about its representation in the mind.  
Effective: Summer 2013

SPAN 510 **Spanish Descriptive Linguistics: Phonology** (3) No description.  
Effective: Winter 1978

SPAN 511 **Spanish Transformational-Generative Linguistics** (3) No description.  
Effective: Winter 1978

SPAN 513 **Acquisition of Spanish as a Second Language** (3) Analysis of research on the acquisition of syntax, phonology, lexicon, discourse.  
Effective: Spring 2002  
Prerequisite:

SPAN 514 **Hispanic Dialectology** (3 per semester/maximum of 6) Early fragmentation among the peninsular dialects; their status today, Judeo- Spanish; descriptive analysis of modern Spanish American dialects.  
Effective: Fall 1983

SPAN 516 **Medieval Spanish Literature** (3 per semester/maximum of 9) Topics vary: juglaria and clerecia, emergence of lyric and brief narrative; history and didacticism; origins of novel; balladry; fifteenth-century innovations.

Effective: Fall 1983

**SPAN 528 Seventeenth-Century Spanish Literature** (3 per semester/maximum of 9) Prose and poetry of major authors: works and trends of the late Golden Age and Baroque period.

Effective: Fall 1983

**SPAN 537 Golden Age Theatre** (3 per semester/maximum of 6) Major works of Lope de Vega, Tirso de Molina, Calderon, and others.

Effective: Fall 1983

**SPAN 553 Writings of the "Generation of 1898"** (3 per semester/maximum of 6) Novels, plays, short stories, essays, poetry of Valle-Inclan, Azorin, Benavente, Unamuno, Machado, Maeztu, and Baroja in the context of generation concept.

Effective: Fall 1983

**SPAN 560 The Contemporary Novel in Spain** (3 per semester, maximum of 9) The novel since 1941: Cela, Laforet, Zunzunegui, Suarez Carreno, Matute, and others.

Effective: Spring 2001

**SPAN 566 Contemporary Spanish Poetry** (3) Various currents in Spanish poetry from the generation of 1927: Lorca, Aleixandre, Salinas, Guillen, Alonso, Alberti, Hernandez, Otero, and others.

Effective: Fall 1983

**SPAN 568 Early Spanish American Literature** (3 per semester/maximum of 9) Content varies; selected topics from colonial period, romanticism, and the nineteenth century before modernism.

Effective: Fall 1983

**SPAN 574 The Spanish American Novel** (3 per semester/maximum of 9) Content varies; selected works from the late nineteenth century through the contemporary period.

Effective: Fall 1983

**SPAN 587 Stylistic and Literary Criticism** (3) Major theories of literary criticism applied to Hispanic literature.

Effective: Winter 1978

**SPAN 588 Seminar in Hispanic Literature** (3-12) Common and individual research in special problems in Spanish or Spanish American literature.

Effective: Summer 1988

**SPAN 589 (GER 589, CMLIT 589, FR 589) Technology in Foreign Language Education: An Overview** (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)

Effective: Spring 2004

**SPAN 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**SPAN 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 1988

**SPAN 597A Gender and Nation in Spanish American Literature** (3) This course will explore the literary work of Spanish American women since the seventeenth century until the present in relationship to a sense of belonging, or not, to a particular region, or to a colonial or postcolonial community, or a nation.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SPAN 597B Mystics, Ascetics and Visionaries: Religious Writings in Imperial Spain** (3) This course will focus on religious writers of Imperial Spain in the sixteenth and seventeenth centuries, including Saint John of the Cross, Fray Luis de Leon, Luisa de Carvajal y Mendoza, and Saint Theresa of Avila.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SPAN 600 Thesis Research** (1-15) No description.

Effective: Fall 1983

**SPAN 601 Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 1983

SPAN 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.  
Effective: Summer 1999

SPAN 603 **Foreign Academic Experience** (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.  
Effective: Spring 2001

SPAN 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

SPAN 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Fall 1983

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## Special Education (SPLED)

**SPLED 400 Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management (4)** Legal issues, learner characteristics, collaboration skills, assessment, and behavior management related to educating students with disability in inclusive settings.

Effective: Summer 2011

Prerequisite:

**SPLED 401 Motivating Exceptional Learners (4)** Group and individual techniques to promote student task engagement and prosocial behavior.

Effective: Summer 2011

Prerequisite:

**SPLED 402 Human Rights: Historical and Current Issues in Special Education (3)** Litigation, legislation, regulation, and advocacy issues impacting on educational and related services for individuals with academic and/or physical disabilities.

Effective: Summer 2011

Prerequisite:

**SPLED 403A Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing (3)** Evidence-based methods for design, delivery, and adaption of instruction for elementary students with disabilities in reading, mathematics, and writing.

Effective: Summer 2011

Prerequisite:

**SPLED 403B Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings (3)** Evidence-based methods for designing, delivering, and adapting instruction for students with disabilities in inclusive secondary education settings.

Effective: Summer 2011

Prerequisite:

**SPLED 404 Working with Families and Professionals in Special Education (3)** Strategies for productive interactions between special educators and others such as colleagues, employers, parents, service providers, professionals, and students.

Effective: Summer 2011

Prerequisite:

**SPLED 408 (EDPSY 408) Meeting Instructional Needs of English Language Learners with Special Needs (3)** The course content and activities focus on instruction and assessment for English Language Learners with special needs.

Effective: Summer 2011

Prerequisite:

**SPLED 409A Fundamental Literacy Skills for Students with Special Needs (3)** Effective reading curriculum and teaching methods to teach students with special needs.

Effective: Summer 2011

Prerequisite: Concurrent: SPLED 495G

**SPLED 409B Writing and Content Literacy for Students with Special Needs (3)** Effective curriculum and materials for teaching writing and content literacy to students with special needs.

Effective: Summer 2011

Prerequisite: Concurrent: SPLED 495G

**SPLED 409C Mathematics Instruction for Students with Special Needs (3)** Research-based practices for teaching mathematics skills to students with special needs.

Effective: Summer 2011

Prerequisite: Concurrent: SPLED 495G

**SPLED 411 Intervention for Students with Severe Disabilities (3)** Assessment, teaching strategies, curricula, materials, and assistive techniques for use with individuals having severe disabilities (mental and physical).

Effective: Summer 2011

Prerequisite: Concurrent: a grade of C or better in SPLED 495E

**SPLED 412 Instruction for Students with Mild Disabilities (4)** Appropriate teaching strategies, curriculum sequences, and materials selection and evaluation for children with mild special needs.

Effective: Summer 2011

Prerequisite: Concurrent: a grade of C or better required in SPLED 454

**SPLED 415 Early Special Education (3-4)** Includes early identification methods, assessment, curricula, parent involvement, and program evaluation for exceptional preschoolers in mainstreamed or segregated settings.

Effective: Summer 2011

Prerequisite:

**SPLED 418 Technologies for Persons with Disabilities (2)** Sensory aids, communication systems, computer systems, expert systems, simulations, and other technologies for students who are academically or physically challenged.

Effective: Summer 2011

Prerequisite:

**SPLED 419 Assistive Technology for General Education Teachers (2-3)** Strategies to support use of assistive

technologies by students with disabilities in general education classrooms.

Effective: Summer 2012

Prerequisite:

**SPLED 425 Foundations of Special Education, Etiologies, Law, and Implications for Practice (4)** An introduction to exceptional individuals being served in special education programs across the life span.

Effective: Fall 2011

Prerequisite:

**SPLED 430 Foundational Skills for Working with Students with Special Education Needs in General Education Classrooms (1)** Introduction to working with students with special education needs in the general education classroom, including history and legal foundation.

Effective: Summer 2011

Prerequisite:

**SPLED 431 Evidenced-Based Methods for Monitoring Student Progress and Making Instructional Decisions (2)**

Evidence-based methods for assessing student progress and making data-based instructional decisions.

Effective: Summer 2011

Prerequisite:

**SPLED 432 Evidence-Based Practices for Inclusive Behavior Management (2)** Managing and motivating learners with special needs in general education settings based upon principles of Applied Behavior Analysis.

Effective: Summer 2011

Prerequisite:

**SPLED 433 Effective and Explicit Instruction for Students with Learning Difficulties (2)** Evidence-based methods for designing, delivering, and adapting academic instruction for students with mild, moderate, and severe learning difficulties.

Effective: Summer 2011

Prerequisite:

**SPLED 434A Evidence-Based Practices for Inclusive Elementary Classrooms (2)** Evidence-based methods to effectively serve special needs students in elementary general education settings, including reading, writing, and mathematics instruction.

Effective: Summer 2011

Prerequisite:

**SPLED 434B Evidenced-Based Practices for Inclusive Secondary Classrooms (2)** Evidence-based methods to effectively serve special needs students in secondary general education settings.

Effective: Summer 2011

Prerequisite:

**SPLED 444 Inclusive Education and Assessment (6)** Knowledge and skills needed to educate students with special needs in urban schools.

Effective: Summer 2011

Prerequisite: Concurrent: URBED 395W

**SPLED 454 Assessment for Instruction (4)** Orientation to evaluation of special students with emphasis on the creation, use, and interpretation of teacher-made assessment procedures.

Effective: Summer 2011

Prerequisite: Concurrent: a grade of C or better in SPLED 412

**SPLED 460A Fundamentals of Reading Instruction in Special Education (3)** Topics include the interactive nature of reading, recent findings of the National Reading Panel, explicit instruction principles and reading assessments.

Effective: Summer 2011

**SPLED 460B Teaching and Assessing Reading Skills of Students with Special Needs (3)** Topics include methods for assessing and teaching reading skills including fluency, word level decoding and comprehension.

Effective: Summer 2011

Prerequisite:

**SPLED 460C Specialized Reading Applications in Special Education (3)** Topics include methods for assessing and teaching reading skills in vocational competence, functional reading, reading for students with sensory impairment.

Effective: Summer 2011

Prerequisite:

**SPLED 461 Introduction to Autism Spectrum Disorders: Issues and Concerns (3)** Overview of issues, characteristics, and evidenced-based assessment strategies, and approaches for individuals with autism/PDD.

Effective: Spring 2013

Prerequisite:

**SPLED 462 Autism and Applied Behavior Analysis (3)** This course addresses principles of applied behavior analysis and empiricism related to instruction and special issues affecting individuals with autism.

Effective: Spring 2013

Prerequisite:

**SPLED 463 Communication and Social Competence (3)** Overview of deficits and strategies in speech, language, and communication across the Autism Spectrum Disorder.

Effective: Summer 2011

Prerequisite:

**SPLED 464 Assessment and Curriculum (3)** Overview of screening, diagnosis, and identification of skills in developmental domains and curricula for individuals with autism.

Effective: Summer 2011

Prerequisite:

**SPLED 465 Asperger Syndrome (1)** Characteristics, assessment, intervention, and curricula for individuals with Asperger syndrome. Emphasis will be given to social skill development.

Effective: Summer 2011

**SPLED 495E Experience with Exceptional Children (3)** Supervised activities with exceptional children in a variety of possible settings, e.g., schools, institutions, day care centers, vocational settings.

Effective: Summer 2011

Prerequisite: Concurrent: a grade of C or better in SPLED 411 SPLED 412

**SPLED 495F Practicum in Special Education (15)** Teaching experience with mildly/moderately disabled children in age appropriate settings, e.g., infant/preschools, schools, vocational/job sites.

Effective: Summer 2011

Prerequisite:

**SPLED 495G Experience with an Integrated Inclusion Classroom (4)** Supervised teaching in integrated general classrooms with activities in assessment, diagnosis, and direct intervention with students in need or with disabilities.

Effective: Summer 2011

Prerequisite: Concurrent: a grade of C or better required in SPLED 409

**SPLED 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

**SPLED 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

**SPLED 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2011

**SPLED 500 Seminar in Special Education (1-9)** Continuing series of professional seminars designed to provide a forum for discussion of current and classical research concerning exceptional children.

Effective: Summer 2011

Prerequisite:

**SPLED 501 Administration and Supervision of Educational Programs for Exceptional Children (2-3)** Problems connected with the instituting and organizing of classes for atypical children; the legal phases, finances, teaching personnel, pupil personnel, housing, equipment, courses of study, curriculum, etc.

Effective: Summer 2011

Prerequisite:

**SPLED 502 Educating Individuals with Autism Spectrum Disorders (3)** This seminar addresses evidence-based strategies related to individuals with ASD including characteristics, assessment, treatment approaches, and life-span programming.

Effective: Summer 2011

**SPLED 503A Applied Behavior Analysis for Special Education: Basic Principles I (4)** Topics include a history of applied behavior analysis; underlying assumptions; dimensions and characteristics of ABA; ethics; basic terminology and principles.

Effective: Summer 2011

**SPLED 503B Applied Behavior Analysis for Special Education: Basic Principles II (4)** Topics include functional assessment of behavior, ethics, methods to increase and decrease behavior, and generalization.

Effective: Summer 2011

Prerequisite:

**SPLED 503C Applied Behavior Analysis for Special Education: Extended Applications I (4)** Topics include assessment and intervention for challenging behavior, systems support, classroom applications of ABA, and review of ABA Certification Exam.

Effective: Summer 2011

Prerequisite:

**SPLED 503D Applied Behavior Analysis for Special Education: Extended Applications II (3)** In this course students learn additional techniques to promote meaningful behavior change using principles of behavior.

Effective: Fall 2012

Prerequisite:

**SPLED 505 Single-Case Research (3)** Overview of research methods associated with collecting and evaluating repeated

measures on single cases.  
Effective: Summer 2011

**SPLED 510 Problems in the Education of the Mentally Retarded (2-4)** Study of existing curriculums, instructional practices, educational programs; experimentation in curriculum building and materials construction.  
Effective: Summer 2011  
Prerequisite:

**SPLED 511 Ethical Considerations for Special Education Populations (3)** Discussion of ethical and legal standards in special education.  
Effective: Summer 2012

**SPLED 515 Infants and Toddlers with Special Needs (3)** Comparison of typical and atypical development of infants and toddlers; applicable instructional strategies in education.  
Effective: Summer 2011  
Prerequisite:

**SPLED 516 Assessment in Early Educational Intervention (2-3)** Describes and illustrates models, methods, and materials for assessing infants and preschoolers with developmental delays and disabilities.  
Effective: Summer 2011  
Prerequisite:

**SPLED 530 Problems in the Education of the Learning Disabled (2-4)** Review of the research and theoretical implications in the educational and behavioral management of learning disabled children.  
Effective: Summer 2011  
Prerequisite:

**SPLED 540 Orientation to PhD Study in Special Education (3)** Information and skills needed for successful completion of Ph.D. study in Special Education for those targeting academic careers.  
Effective: Summer 2011  
Prerequisite:

**SPLED 550 Professional Seminar in Special Education (2)** Professional competencies and ethical issues related to obtaining and retaining positions in higher education.  
Effective: Summer 2011  
Prerequisite:

**SPLED 570 Problems in the Education of the Emotionally Disturbed (2-4)** Current issues, methods, and problems associated with the education of the emotionally/behaviorally disturbed.  
Effective: Summer 2011  
Concurrent: SPLED 305 SPLED 401

**SPLED 573 Introduction to Research in Special Education (3)** A seminar to review and design research in special education.  
Effective: Summer 2011  
Prerequisite:

**SPLED 575 Grant-Proposal Development in Special Education (3)** Designed to facilitate development of grants and proposal writing techniques for submission and funding by student researchers.  
Effective: Summer 2011  
Prerequisite:

**SPLED 594 Reserach Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 2011

**SPLED 595 Internship (1-12)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.  
Effective: Summer 2011

**SPLED 595A Practicum (1-6)** Supervised clinical experience on campus in University-managed diagnostic and remedial settings.  
Effective: Summer 2011  
Prerequisite:

**SPLED 595B Field Experiences in Off-Campus Laboratories (1-10)** Supervised off-campus field experiences in selected laboratory settings with exceptional children.  
Effective: Summer 2011  
Prerequisite:

**SPLED 595C Internship in Special Education Supervision (1-6)** Internship in day/residential school setting under supervision of field supervisor and University faculty.  
Effective: Summer 2011  
Prerequisite:

**SPLED 595D Internship in Special Education (2-10)** Internship to take place in schools or educational situations where



student is not regularly employed, under supervision of graduate faculty.

Effective: Summer 2011

Prerequisite:

**SPLED 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2011

**SPLED 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Summer 2011

**SPLED 597A Long Evidence-based Practices for Helping Adolescents with Learning Problems Succeed in Secondary General Education Classrooms (3)** Course provides information about teaching content enhancement routines and strategies for middle and senior students.

Effective: Summer 2013 Ending: Summer 2013

**SPLED 600 Thesis Research (1-15)** No description.

Effective: Summer 2011

**SPLED 601 Ph.D. Dissertation Full-Time (0)** No description.

Effective: Summer 2011

**SPLED 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Experience in structuring and teaching a college course supervised by a graduate faculty member.

Effective: Summer 2011

**SPLED 610 Thesis Research Off Campus (1-15)** No description.

Effective: Summer 2011

**SPLED 611 Ph.D. Dissertation Part-Time (0)** No description.

Effective: Summer 2011

**SPLED 867 Practicum in Applied Behavior Analysis (2-4 per semester/maximum of 10)** Supervised experience in applied settings implementing behavior management techniques.

Effective: Fall 2012

Concurrent: SPLED 503A SPLED 503B SPLED 503C SPLED 503D

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## **Special Grad Pmgr (SPEC)**

**SPEC 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1993

**SPEC 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**SPEC 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1983

**SPEC 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

**SPEC 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1983

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## Statistics (STAT)

STAT 401 **Experimental Methods** (3) Random variables; probability density functions; estimation; statistical tests, t-tests; correlation; simple linear regression; one-way analysis of variance; randomized blocks.

Effective: Spring 1988

Prerequisite:

STAT 402 **Statistical Analysis II** (3) Two-sample problems, single and multifactor ANOVA, simple and multiple regression, categorical data.

Effective: Fall 2007

Prerequisite:

STAT 414 (MATH 414) **Introduction to Probability Theory** (3) Probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Students may take only one course from STAT(MATH) 414 and 418.

Effective: Fall 2001

Prerequisite:

STAT 415 (MATH 415) **Introduction to Mathematical Statistics** (3) A theoretical treatment of statistical inference, including sufficiency, estimation, testing, regression, analysis of variance, and chi-square tests.

Effective: Fall 1989

Prerequisite:

STAT 416 (MATH 416) **Stochastic Modeling** (3) Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.

Effective: Spring 1984

Prerequisite:

STAT 418 (MATH 418) **Introduction to Probability and Stochastic Processes for Engineering** (3) Introduction to probability axioms, combinatorics, random variables, limit laws, and stochastic processes. Students may take only one course from MATH(STAT) 414 and 418 for credit.

Effective: Fall 2011

Prerequisite:

STAT 440 **Computational Statistics** (3) Topics related to computing in statistics, including numerical linear algebra, optimization, simulation, numerical integration, and bootstrapping.

Effective: Spring 2006

Prerequisite:

STAT 460 **Intermediate Applied Statistics** (3) Review of hypothesis testing, goodness-of-fit tests, regression, correlation analysis, completely randomized designs, randomized complete block designs, latin squares.

Effective: Fall 2006

Prerequisite:

STAT 461 **Analysis of Variance** (3) Analysis of variance for single and multifactor designs; response surface methodology.

Effective: Fall 2007

Prerequisite:

STAT 462 **Applied Regression Analysis** (3) Introduction to linear and multiple regression; correlation; choice of models, stepwise regression, nonlinear regression.

Effective: Fall 2006

Prerequisite:

STAT 463 **Applied Time Series Analysis** (3) Identification of models for empirical data collected over time; use of models in forecasting.

Effective: Spring 2006

Prerequisite:

STAT 464 **Applied Nonparametric Statistics** (3) Tests based on nominal and ordinal data for both related and independent samples. Chi-square tests, correlation.

Effective: Fall 2006

Prerequisite:

STAT 466 **Survey Sampling** (3) Introduction to design and analysis of sample surveys, including questionnaire design, data collection, sampling methods, and ratio and regression estimation.

Effective: Spring 2006

Prerequisite:

STAT 470W **Problem Solving and Communication in Applied Statistics** (3) Provide problem solving and communication skills through development of writing ability, interaction with peers and the SCC, and oral presentations.

Effective: Spring 2000

Prerequisite:

STAT 480 **Introduction to SAS** (1) Introduction to SAS with emphasis on reading, manipulating and summarizing data.

Effective: Spring 2008

Prerequisite:

**STAT 481 Intermediate SAS for Data Management** (1) Intermediate SAS for data management.

Effective: Summer 2007

Prerequisite:

**STAT 482 Advanced Topics in SAS** (1) Advanced statistical procedures in SAS, including ANOVA, GLM, CORR, REG, MANOVA, FACTOR, DISCRIM, LOGISTIC, MIXED, GRAPH, EXPORT, and SQL. Credit can not be received for both STAT 482 and STAT 480/481/483.

Effective: Summer 2009

Prerequisite:

**STAT 483 Statistical Analysis System Programming** (3) Introduction, intermediate, and advanced topics in SAS. Credit can not be received for both STAT 483 and STAT 480/481/482.

Effective: Summer 2009

Prerequisite:

**STAT 494 Research Project** (1-12) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2007

Prerequisite:

**STAT 494H Research Project** (1-12) Supervised student activities on research projects identified on an individual or small group basis.

Effective: Fall 2007

Prerequisite:

**STAT 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships.

Effective: Fall 2007

Prerequisite:

**STAT 496 Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 1983

**STAT 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Fall 1983

**STAT 497C Topics in Stat Computing with R** (1) Topics: I) Basic background on R II) Manipulating data I III) Finding help IV) Simple univariate data V) importing data VI) Documenting your work VI) Manipulating data II VII) Repetitive tasks - loops and the apply() family (IX) Bivisual data X) Basic analyses (as much as possible we'll work with real data.)

Effective: Summer 2013 Ending: Summer 2013

**STAT 497C Topics in Stat Computing with R** (1) Topics: I) Basic background on R II) Manipulating data I III) Finding help IV) Simple univariate data V) importing data VI) Documenting your work VI) Manipulating data II VII) Repetitive tasks - loops and the apply() family (IX) Bivisual data X) Basic analyses (as much as possible we'll work with real data.)

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**STAT 499 (IL) Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2005

**STAT 500 Applied Statistics** (3) Descriptive statistics, hypothesis testing, power, estimation, confidence intervals, regression, one- and 2-way ANOVA, Chi-square tests, diagnostics.

Effective: Spring 1999

Prerequisite:

**STAT 501 Regression Methods** (3) Analysis of research data through simple and multiple regression and correlation; polynomial models; indicator variables; step-wise, piece-wise, and logistic regression.

Effective: Fall 2006

Prerequisite:

**STAT 502 Analysis of Variance and Design of Experiments** (3) Analysis of variance and design concepts; factorial, nested, and unbalanced data; ANCOVA; blocked, Latin square, split-plot, repeated measures designs.

Effective: Fall 1995

Prerequisite:

**STAT 503 Design of Experiments** (3) Design principles; optimality; confounding in split-plot, repeated measures, fractional factorial, response surface, and balanced/partially balanced incomplete block designs.

Effective: Fall 1983

Prerequisite:

**STAT 504 Analysis of Discrete Data** (3) Models for frequency arrays; goodness-of-fit tests; two-, three-, and higher-way tables; latent and logistic models.

Effective: Fall 1983

Prerequisite:

**STAT 505 Applied Multivariate Statistical Analysis** (3) Analysis of multivariate data; T2-tests; particle correlation; discrimination; MANOVA; cluster analysis; regression; growth curves; factor analysis; principal components; canonical correlations.

Effective: Spring 2003

Prerequisite:

**STAT 506 Sampling Theory and Methods** (3) Theory and application of sampling from finite populations.

Effective: Fall 1983

Prerequisite:

**STAT 507 Epidemiologic Research Methods** (3) Research and quantitative methods for analysis of epidemiologic observational studies. Non-randomized, intervention studies for human health, and disease treatment.

Effective: Spring 2005

Prerequisite:

**STAT 509 Design and Analysis of Clinical Trials** (3) An introduction to the design and statistical analysis of randomized and observational studies in biomedical research.

Effective: Fall 2004

Prerequisite:

**STAT 510 Applied Time Series Analysis** (3) Identification of models for empirical data collected over time. Use of models in forecasting.

Effective: Fall 1983

Prerequisite:

**STAT 511 Regression Analysis and Modeling** (3) Multiple regression methodology using matrix notation; linear, polynomial, and nonlinear models; indicator variables; AOV models; piece-wise regression, autocorrelation; residual analyses.

Effective: Fall 2006

Prerequisite:

**STAT 512 Design and Analysis of Experiments** (3) AOV, unbalanced, nested factors; CRD, RCBD, Latin squares, split-plot, and repeated measures; incomplete block, fractional factorial, response surface designs; confounding.

Effective: Spring 1984

Prerequisite:

**STAT 513 Theory of Statistics I** (3) Probability models, random variables, expectation, generating functions, distribution theory, limit theorems, parametric families, exponential families, sampling distributions.

Effective: Summer 1986

Prerequisite:

**STAT 514 Theory of Statistics II** (3) Sufficiency, completeness, likelihood, estimation, testing, decision theory, Bayesian inference, sequential procedures, multivariate distributions and inference, nonparametric inference.

Effective: Summer 1986

Prerequisite:

**STAT 515 Stochastic Processes and Monte Carlo Methods** (3) Conditional probability and expectation, Markov chains, Poisson processes, Continuous-time Markov chains, Monte Carlo methods, Markov chain Monte Carlo.

Effective: Spring 2013

Prerequisite:

**STAT 517 (MATH 517) Probability Theory** (3) Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

Effective: Summer 2000

Prerequisite:

**STAT 518 (MATH 518) Probability Theory** (3) Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

Effective: Fall 1983

Prerequisite:

**STAT 519 (MATH 519) Topics in Stochastic Processes** (3) Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.

Effective: Fall 1984

Prerequisite:

**STAT 524 Ecometrics** (3) Stochastic models and statistical methods in ecological problems; population dynamics, spatial patterns in populations of one, two, or more species.

Effective: Winter 1978

Prerequisite:

**STAT 525 Survival Analysis I** (3) Location estimation, 2- and K- sample problems, matched pairs, tests for association and covariance analysis when the data are censored.

Effective: Summer 1992

Prerequisite:

**STAT 540 Statistical Computing** (3) Computational foundations of statistics; algorithms for linear and nonlinear models, discrete algorithms in statistics, graphics, missing data, Monte Carlo techniques.

Effective: Fall 1983

Prerequisite:

**STAT 544 Categorical Data Analysis I (3)** Two-way tables; generalized linear models; logistic and conditional logistic models; loglinear models; fitting strategies; model selection; residual analysis.

Effective: Summer 1992

Prerequisite:

**STAT 548 Statistical Distribution Theory (3)** Analytical study of nonnormal models and methods in reliability theory, survival analysis, records evaluation, scale/scale-free analysis, and directional statistics.

Effective: Spring 1984

Prerequisite:

**STAT 551 Linear Models I (3)** A coordinate-free treatment of the theory of univariate linear models, including multiple regression and analysis of variance models.

Effective: Spring 1987

Prerequisite:

**STAT 552 Linear Models II (3)** Treatment of other normal models, including generalized linear, repeated measures, random effects, mixed, correlation, and some multivariate models.

Effective: Spring 1987

Prerequisite:

**STAT 553 Asymptotic Tools (3)** A rigorous but non-measure-theoretic introduction to statistical large-sample theory for Ph.D. students.

Effective: Summer 2004

Prerequisite:

**STAT 557 (IST 557) Data Mining I (3)** This course introduces data mining and statistical/machine learning, and their applications in information retrieval, database management, and image analysis.

Effective: Summer 2009

Prerequisite:

**STAT 558 (IST 558) Data Mining II (3)** Advanced data mining techniques: temporal pattern mining, network mining, boosting, discriminative models, generative models, data warehouse, and choosing mining algorithms.

Effective: Summer 2010

Prerequisite:

**STAT 561 Statistical Inference I (3)** Classical optimal hypothesis test and confidence regions, Bayesian inference, Bayesian computation, large sample relationship between Bayesian and classical procedures.

Effective: Spring 2003

Prerequisite: Concurrent: STAT 517

**STAT 562 Statistical Inference II (3)** Basic limit theorems; asymptotically efficient estimators and tests; local asymptotic analysis; estimating equations and generalized linear models.

Effective: Spring 2003

Prerequisite:

**STAT 565 Multivariate Analysis (3)** Theoretical treatment of methods for analyzing multivariate data, including Hotelling's  $T^2$ , MANOVA, discrimination, principal components, and canonical analysis.

Effective: Spring 1987

Prerequisite:

**STAT 580 Statistical Consulting Practicum I (2)** General principles of statistical consulting and statistical consulting experience. Preparation of reports, presentations, and communication aspects of consulting are discussed.

Effective: Spring 2005

Prerequisite:

**STAT 581 Statistical Consulting Practicum II (1 per semester/maximum of 2)** Statistical consulting experience including client meetings, development of recommendation reports, and discussion of consulting solutions.

Effective: Summer 2004

Prerequisite:

**STAT 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**STAT 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**STAT 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Spring 1987

**STAT 597A Stochastic Differential Equations (1)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Effective: Summer 2013 Ending: Summer 2013

**STAT 597A Mixture Models (3)** Mixture models.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**STAT 600 Thesis Research (1-15)** No description.  
Effective: Fall 1983

**STAT 601 Ph.D. Dissertation Full-Time (0)** No description.  
Effective: Fall 1983

**STAT 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Fall 1983

**STAT 611 Ph.D. Dissertation Part-Time (0)** No description.  
Effective: Fall 1983

**STAT 897 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Spring 2008

**STAT 897A Introduction to Applied Statistics (3)** Description statistics, hypothesis testing, power estimation, confidence intervals, regression, one- and two-way ANOVA, chi-square tests, diagnostics.term.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**STAT 897D Applied Data Mining and Statistical Learning (3)** Data Mining tools are exploring data with regression, PCA, discriminant analysis, cluster analysis, classification and regression trees (CART).  
Effective: Summer 2013 Ending: Summer 2013

**STAT 897D Applied Data Mining and Statistical Learning (3)** Data Mining tools are exploring data with regression, PCA, discriminate analysis, cluster analysis, classification and regression trees (CART).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

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## **Structrl Basis-Med Pr (SBMP)**

SBMP 715 **Structural Basis of Medical Practice** (13) This integrated course will provide gross structure, organization, and function of human body with labs devoted to dissection of human body; clinical and radiological correlation.  
Effective: Summer 1997

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## **Study Abroad (ABLAW)**

ABLAW 900 **Study Abroad** (1-17) Law student attending international study abroad program.  
Effective: Summer 2008

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## Study Abroad (STABO)

STABO 999 (IL) **Study Abroad** (1-12) See summer program brochure for description.  
Effective: Summer 2005

STABO 999A (IL) **Consumer Arbitration - McGill PRG** (1) Examines the U.S. Canadian, and European law on the use of arbitration in the context of consumer disputes. Recent High Court cases from the implicated jurisdictions are considered.  
Effective: Summer 2013 Ending: Summer 2013

STABO 999B (IL) **UNCITRAL Model Law on ICA - McGill PRG** (1) Addresses the basic principles of the international governance of arbitration, arbitral awards, and arbitral proceedings through the uniform law established by the UN Commission on International Trade Law (UNCITRAL).  
Effective: Summer 2013 Ending: Summer 2013

STABO 999C (IL) **NAFTA Arbitration - McGill PRG** (1) A transborder arbitration system, like ICSID, that applies to the mixed (commercial and political) disputes of international trade in the North American context. The considerations focus primarily upon NAFTA Chapter 11 arbitral proceedings.  
Effective: Summer 2013 Ending: Summer 2013

STABO 999D (IL) **ICC Arbitration - McGill PRG** (1) Examines the structure and practices of a major provider of arbitration services. The International Chamber of Commerce, headquartered in Paris, France, administers more than 600 arbitrators yearly. It plays a significant role in transborder arbitral practice.  
Effective: Summer 2013 Ending: Summer 2013

STABO 999E (IL) **U.S. Law of Arbitration - McGill PRG** (1) Addresses the basic issues and rules of arbitration law (including international commercial arbitration [ICA]) as articulated in U.S. law and the rulings of the U.S. Supreme Court.  
Effective: Summer 2013 Ending: Summer 2013

STABO 999F (IL) **ICSID Arbitration - McGill PRG** (1) A study of the World Bank arbitration process. The latter is designed to address the issue of sovereignty in the context of transborder commercial and investment disputes. ICSID was established in 1965 under the Washington Convention. It has become a key arbitration system with the proliferation of Bilateral Investment Treaties (BITs). BITs give foreign investors the right to make claims against a host State.  
Effective: Summer 2013 Ending: Summer 2013

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## Study Abroad (STABR)

STABR 997 **Special Topics** (1-12) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2010

STABR 999 (IL) **Study Abroad** (1-12) See summer program brochure for description.  
Effective: Summer 2005

STABR 999A (IL) **Separation of Powers - Florence PRG** (1) This course will examine the federal doctrine of Separation of Powers, as applied in opinions of the United States Supreme Court. Subjects, covered will include appointment and removal of federal officers, unconstitutional delegation of legislative powers, the legislative veto, standing to sue, and proper attributes of the judicial power. The assigned readings will include brief excerpts from *The Federalist* and from Tocqueville's *Democracy in America*. Throughout the course, comparisons will be made to the treatment of similar issues in foreign countries, particularly the countries of the European Union.  
Effective: Summer 2013 Ending: Summer 2013

STABR 999B (IL) **Comparative Law in a Globalized World - Transnational Perspectives - Florence PRG** (2.5) This course addresses selected topics that are important for U.S. lawyers in transnational practice. It introduces students to the civil law tradition and contemporary national and supranational legal systems in Europe and around the world that have grown out of or have been substantially influenced by the civil law tradition.  
Effective: Summer 2013 Ending: Summer 2013

STABR 999C (IL) **International and Comparative Family Law - Florence PRG** (2.5) This course will present an overview of the family law systems in the United States and European countries with emphasis on Italy. The course will also focus on transnational family law problems involving recognition of foreign decrees, transnational custody battles, international adoptions etc. The course will combine theoretical and practical approaches. No prior knowledge of family law is required, and the course is not intended to be a substitute for an in depth U.S. family law course.  
Effective: Summer 2013 Ending: Summer 2013

STABR 999D (IL) **International Arbitration - Florence PRG** (2.5) Because international arbitration has become a common method for resolving transnational business disputes, an understanding of arbitration enhances a lawyer's ability to work in international contexts. This course will facilitate understanding this important area of law.  
Effective: Summer 2013 Ending: Summer 2013

STABR 999E (IL) **Transnational Litigation and Civil Procedure - Florence PRG** (2.5) This course explores the problems that most frequently arise in litigation involving foreign parties or business transactions. It initially focuses on judicial jurisdiction and related questions of forum non conveniens, validity and enforceability of forum selection clauses, anti-suit injunctions and international lis pendens. It then concentrates on the intricacies of serving process in transnational cases, and provisional remedies (injunctions, attachment and equivalent remedies) in litigation involving foreign parties or activities. The discovery process in transnational disputes and recognition and enforcement of foreign judgments are also addressed.  
Effective: Summer 2013 Ending: Summer 2013

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## **Summer Practicum (SP)**

SP 714 **Summer Practicum** (1) The Penn State College of Medicine's summer practicum gives students the opportunity to gain direct experience in the care of patients in conducting biomedical research. The course is offered during the summer session between the first and second year of medical school.

Effective: Summer 2011

Prerequisite:

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## Supply Chain Mgmt (SCM)

SCM 400 **Transport Planning** (3) Advanced study of transport systems in supply chain networks.

Effective: Spring 2007

Prerequisite:

SCM 404 **Demand Fulfillment** (3) Analysis of demand fulfillment and the role of distribution operations management in the supply chain.

Effective: Spring 2011

Prerequisite:

SCM 405 **Manufacturing and Services Strategies** (3) Investigates manufacturing and services strategies in supply chain networks.

Effective: Spring 2011

Prerequisite:

SCM 406 **Strategic Procurement** (3) Analysis of strategic procurement in the supply chain.

Effective: Summer 2011

Prerequisite:

SCM 416 **Warehousing and Terminal Management** (3) Administration of warehouse and terminal functions in logistics systems, with analysis of customer service, forecasting, inventory, investment, design, and operation. Not available to baccalaureate business students in Smeal.

Effective: Spring 2007

Prerequisite:

SCM 421 **Supply Chain Analytics** (3) Models and Methodologies for supply chain analysis.

Effective: Spring 2011

Prerequisite:

SCM 435 **International Logistics** (3) Design and operation of global supply chain networks. Not available to baccalaureate business students in Smeal.

Effective: Spring 2007

Prerequisite:

SCM 445 **Operations Planning and Control** (3) Aggregate production planning procedures, disaggregation methods in hierarchical production planning, master production scheduling, material requirements planning, lot-sizing, and capacity planning. Not available to baccalaureate business students in Smeal.

Effective: Fall 2012

Prerequisite:

SCM 450W **Strategic Design and Management of Supply Chains** (3) Strategic design and management of supply chains.

Effective: Fall 2011

Prerequisite:

SCM 455 **Logistics Systems Analysis and Design** (3) Customer service, inventory management, transportation, warehousing, purchasing, international logistics, site location planning and analysis, and total cost analysis.

Effective: Spring 2007

Prerequisite:

SCM 456 **Supply Chain Risk Analysis** (3) Business processes are modeled as a network of queues using discrete-event simulation and analyzed model outcomes using statistical methods.

Effective: Spring 2007

Prerequisite:

SCM 460 **Purchasing and Materials Management** (3) Purchasing policies, procedures, order specifications and agreements, supplier selection, and the role of purchasing in production planning and inventory management. Not available to baccalaureate business students in Smeal.

Effective: Spring 2007

Prerequisite:

SCM 465 **Electronic Business Management** (3) A problem-based exploration of the various electronic business tools and technologies required to efficiently manage a supply chain. Not available to baccalaureate business students in Smeal.

Effective: Spring 2007

Prerequisite:

SCM 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2007

SCM 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2008

SCM 496 **Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Spring 2007

SCM 496A **Electronic Business Management** (3) A problem-based exploration of the various electronic business tools and technologies required to efficiently manage a supply chain.

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

SCM 496B **Supply Chain Management** (1-6) Supply chain management concepts, principles, and methodologies.

Effective: Summer 2013 Ending: Summer 2013

SCM 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2007

SCM 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Spring 2007

SCM 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2007

SCM 530 **Supply Chain Analysis** (3) Methods and tools to support supply chain decision making with emphasis on forecasting, inventory analysis, and demand planning.

Effective: Summer 2007

Prerequisite:

SCM 540 **Transportation in Supply Chains** (2) Strategies and processes for design and implementation of transportation service links in supply chain networks.

Effective: Summer 2002

Prerequisite:

SCM 546 **Strategic Procurement** (2) Development of procurement and supply management strategies to support synchronized supply chains.

Effective: Summer 2002

Prerequisite:

SCM 556 **Manufacturing Strategy** (2) Development of service-sensitive manufacturing strategies to support synchronized supply chains.

Effective: Summer 2002

Prerequisite:

SCM 566 **Demand Fulfillment** (2) Demand fulfillment strategies, operations, and methods in supply chain networks.

Effective: Summer 2002

Prerequisite:

SCM 570 **Supply Chain Modeling** (2) Explore current modeling methods and software for design, analysis, execution and integration of supply chains.

Effective: Summer 2002

Prerequisite:

SCM 576 **Logistics and Supply Chain Leadership** (2) Current issues and best practices for selected supply chain leadership topics.

Effective: Summer 2002

Prerequisite:

SCM 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2007

SCM 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2004

SCM 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 2002

SCM 597A **Special Topics** (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Summer 2013 Ending: Summer 2013

SCM 597B **Six Sigma Blackbelt for MBA Students** (2) A focused overview highlighting principles of six sigma

methodology including implementation of proven principles and techniques for business performance.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SCM 800 Supply Chain Management (4)** Introduction to the strategic framework, issues, and methods for integrating supply and demand management within and across companies.  
Effective: Summer 2007

**SCM 810 Transportation and Distribution (4)** Role of transportation and distribution operations in matching supply with demand; principles of transport industry analysis and competitive positioning.  
Effective: Summer 2007  
Prerequisite:

**SCM 815 Product Realization: Development, Manufacturing, and the Supply Chain (4)** Integration of product development, production, and supply chain processes required to launch products from design concept to steady state manufacturing.  
Effective: Fall 2012

**SCM 820 Strategic Procurement (4)** Strategic planning for the source/buy process, including developing and managing supplier relationships, global issues, and e-procurement.  
Effective: Summer 2007  
Prerequisite:

**SCM 830 Supply Chain Analysis (2)** Methods and tools to support supply chain decision making with emphasis on forecasting, inventory analysis, and demand planning.  
Effective: Summer 2007  
Prerequisite:

**SCM 840 Supply Chain Project Management (4)** The fundamentals and tools of managing supply chain projects, with special emphasis given to related information technology projects.  
Effective: Summer 2007  
Prerequisite:

**SCM 850 Supply Chain Design and Strategy (4)** Design and management of supply chain networks, emphasizing the alignment of supply chain networks with corporate competitive strategy.  
Effective: Summer 2007  
Prerequisite:

**SCM 860 Supply Chain Transformation and Innovation (4)** Strategic supply chain transformation and innovation with emphasis on (re)configuration of key capabilities to achieve competitive advantages.  
Effective: Summer 2007  
Prerequisite:

**SCM 894 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Summer 2007

**SCM 896 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2007

**SCM 897 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2007

**SCM 898 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2007

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## Supply Chain and Information Systems (SC&IS)

SC&IS 505 **Management Information Systems Research** (1-3) Research problems and issues in supply chain and information systems.  
Effective: Spring 2006

SC&IS 510 **Introduction to Supply Chain and Information Systems** (3) Introduction to the strategic framework, issues, and methods for integrating supply and demand management within and across companies.  
Effective: Spring 2006

SC&IS 516 (I E 516) **Applied Stochastic Processes** (3) Study of stochastic processes and their applications to engineering and supply chain and information systems.  
Effective: Spring 2006  
Prerequisite:

SC&IS 519 (I E 519) **Dynamic Programming** (3) Theory and application of dynamic programming; Markov decision processes with emphasis on applications in engineering systems, supply chain and information systems.  
Effective: Spring 2006  
Prerequisite:

SC&IS 520 **Principles of SC&IS I** (3) Initial course on principles of supply chain and information systems with special emphasis on potential research topics.  
Effective: Spring 2006  
Prerequisite:

SC&IS 525 **Supply Chain Optimization** (3) Introduction to theory and practice of optimization methods and models for analyzing and improving the performance of supply chain environments.  
Effective: Spring 2006  
Prerequisite:

SC&IS 530 **Principles of SC&IS II** (3) Sequel on principles of supply chain and information systems with special emphasis on potential research topics.  
Effective: Spring 2006  
Prerequisite:

SC&IS 535 **Statistical Research Methods for Supply Chain and Information Systems** (3) Current statistical research methods for modeling and analysis of supply chain and information systems.  
Effective: Spring 2006  
Prerequisite:

SC&IS 540 **Transportation and Distribution Management** (3) Transportation and distribution systems in supply chains. Emphasis on role of system cost, price, service elements in total order management.  
Effective: Spring 2006

SC&IS 545 **Supply Chain Systems Simulation** (3) Application of computer simulation to analysis and design of supply chain and information systems design; simulation experiments in SC&IS research.  
Effective: Spring 2006  
Prerequisite:

SC&IS 546 **Procurement and Supply Management** (3) Analysis, planning, and management of domestic and international procurement and supply activities.  
Effective: Spring 2006

SC&IS 560 **Seminar in Transport Economics and Policy** (3 per semester/maximum of 6) Comparative analysis of theoretical and empirical studies in transport cost, demand, pricing, and policy problems.  
Effective: Spring 2006

SC&IS 565 **Supply Chain Strategy** (3) Strategies, issues and best practices in technology adoption, change management, financial/capability assessments, critical aspects of relationship management in supply-chain networks.  
Effective: Spring 2006  
Prerequisite:

SC&IS 570 (I E 570) **Operations Research in Supply Chains** (3) Use of operations research models and methods for solving problems in supply chain systems.  
Effective: Summer 2006 Ending: Fall 2013  
Prerequisite:

SC&IS 570 (I E 570) **Supply Chain Engineering** (3) Use of operations research models and methods for solving problems in supply chain systems.  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

SC&IS 590 **Colloquium** (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or



outside speakers.  
Effective: Summer 2004

SC&IS 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 2005

SC&IS 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Spring 2005

SC&IS 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.  
Effective: Summer 2004

SC&IS 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 2004

SC&IS 597P **Supply Chain Practicum** (2) Course designed to expose students to supply chain research in the context of industry.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

SC&IS 597P **Supply Chain Practicum** (2) Course designed to expose students to supply chain research in the context of industry.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

SC&IS 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Spring 2005

SC&IS 599 (IL) **Foreign Studies** (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

SC&IS 600 **Thesis Research** (1-15) No description.  
Effective: Spring 2004

SC&IS 601 **Thesis Preparation** No description.  
Effective: Spring 2004

SC&IS 610 **Thesis Research** (1-15) No description.  
Effective: Spring 2004

SC&IS 611 **Thesis Preparation** No description.  
Effective: Spring 2004

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## Surgery-Hy (SURG)

**SURG 700 Surgical Core Clerkship** (15) Fundamental surgical course for medical students designed to provide basic surgical information and clinical exposure.

Effective: Winter 1978

Prerequisite:

**SURG 710 General Surgery Acting Internship** (5) Four week General Surgery Acting Internship.

Effective: Spring 2009

Prerequisite:

**SURG 711 Cardiothoracic Surgery Acting Internship** (5) Acting Internship in Adult Cardiothoracic Surgery.

Effective: Spring 2009

Prerequisite:

**SURG 712 Surgical Endocrinology Elective** (5) An in-depth experience involving the medical and surgical management of endocrinological disorders.

Effective: Summer 2012

Prerequisite:

**SURG 713 Vascular Surgery Acting Internship** (5) An opportunity for in-depth experience in vascular surgery.

Effective: Spring 2009

Prerequisite:

**SURG 714 Transplant Surgery Acting Internship** (5) An in-depth experience in the preoperative evaluation, intra-operative procedures, and postoperative management of kidney, liver, and pancreas transplant patients.

Effective: Spring 2009

Prerequisite:

**SURG 720 Plastic Surgery Acting Internship** (5) Preceptorship with an active plastic surgical service at The Milton S. Hershey Medical Center or an affiliated hospital.

Effective: Spring 2009

Prerequisite:

**SURG 722 Hand Surgery Acting Internship** (5) Surgical Acting Internship experience in Hand Surgery.

Effective: Spring 2009

Prerequisite:

**SURG 740 Urology Acting Internship** (5) In-depth experience in evaluation and management of urologic problems.

Effective: Spring 2009

Prerequisite:

**SURG 741 Intensive Respiratory Care -- Anesthesia** (5) Students are taught to assess and manage acute respiratory insufficiency.

Effective: Spring 2009

Prerequisite:

**SURG 745 (PED 745) Pediatric Cardiothoracic Surgery Elective** (5) This fourth-year elective provides an introduction to the operative repair and peri-operative management of simple and complex congenital heart disease.

Effective: Summer 2009

Prerequisite:

**SURG 770 Otolaryngology Acting Internship** (5) A clinical experience devoted to disorders of the ears, nose, throat, and head and neck.

Effective: Fall 2008

Prerequisite:

**SURG 771 Otolaryngology - Head and Neck Surgery Elective for Third Year Medical Students** (2.5) This course provides exposure to basic concepts for diagnosis and management of ear, nose and throat problems in children and adults.

Effective: Summer 2009

Prerequisite:

**SURG 780 Pediatric Surgery Acting Internship** (5) Exposure to the surgical crises of the pediatric patient and their treatment.

Effective: Fall 2008

Prerequisite:

**SURG 796 Surgery Individual Studies** (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 2009

Prerequisite:

**SURG 796A Surgery Individual Studies for 3rd Year Medical Students** (2.5) Surgery Individual Studies for 3rd Year Medical Students.

Effective: Spring 2010

Prerequisite:

**SURG 797 Surgery Special Topics** (5) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 2009

Prerequisite:

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## Systems Engineering (SYSEN)

**SYSEN 497 Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1999

**SYSEN 497A Wireless Positioning** (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SYSEN 505 Technical Project Management** (3) Analysis and construction of project plans for the development of complex engineering products taken from a variety of problem domains.  
Effective: Fall 2003

**SYSEN 507 Systems Thinking** (3) The theory and practice of systems thinking. General systems theory; system dynamics, emergent properties, structure, feedback and leverage.  
Effective: Spring 2009

**SYSEN 509 Biostatistics** (3) Multivariate Statistical methodology arising in the health care and biological sciences.  
Effective: Summer 2005  
Prerequisite:

**SYSEN 510 Engineering Analysis I** (3) The course includes applications of advanced engineering mathematics; the study of systems are described by ordinary/partial differential equations and methods of solutions.  
Effective: Spring 2001  
Prerequisite:

**SYSEN 520 Systems Engineering** (3) Fundamentals of Systems Engineering with focus on System methodology, design, and management; includes life cycle analysis, human factors, maintainability, serviceability/reliability.  
Effective: Spring 2012  
Prerequisite:

**SYSEN 522 Systems Verification Validation & Testing** (3) The theory and practice of verification, validation and testing of engineering systems.  
Effective: Summer 2013

**SYSEN 530 Systems Optimization** (3) Theory/practice of linear programming will be developed including determination of optimum mix of products, levels of staffing, blending, network analysis, multi-period planning.  
Effective: Spring 2001  
Prerequisite:

**SYSEN 531 Probability Models and Simulation** (3) Provides background in modeling problems containing random components that must be accounted for in a reasonable solution.  
Effective: Summer 2007

**SYSEN 533 Deterministic Models and Simulation** (3) Provides a background in simulation and the modeling of problems that contain differential equations as part of the system.  
Effective: Summer 2007

**SYSEN 536 Decision and Risk Analysis in Engineering** (3) Analysis of engineering decisions under uncertainty; problem identification, formulation, judgment, resolution; mitigation, risk analysis, quantification and management.  
Effective: Summer 2008

**SYSEN 540 Intelligent System Applications** (3) Mathematical foundations of intelligent control and systems; linear quadratic self-tuning regulation and model reference adaptive control.  
Effective: Summer 2002  
Prerequisite:

**SYSEN 550 Creativity and Problem Solving I** (3) Foundations of individual problem solving, including creativity, cognitive style and level, problem solving processes and techniques, the paradox of structure.  
Effective: Spring 2006

**SYSEN 552 Creativity and Problem Solving II** (3) Theory and practical applications of group problem solving, including cognitive gap, coping behavior, agents of change, and managing cognitive diversity.  
Effective: Summer 2005  
Prerequisite:

**SYSEN 554 Problem Solving Leadership** (3) Models, processes, and techniques for solving complex problems, managing problem solving diversity, and facilitating change through problem solving in socio-technical systems.

Effective: Summer 2007

Prerequisite:

**SYSEN 555 Invention and Creative Design (3)** This course focuses on the creative design process which leads to the development of new products, processes, and systems (i.e. invention).

Effective: Spring 2001

**SYSEN 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1999

**SYSEN 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 1999

**SYSEN 594A Advanced Systems Engineering Studio (3)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 2013 Ending: Summer 2013

**SYSEN 594A Masters Research Paper (3)** Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**SYSEN 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1999

**SYSEN 596A Modeling Relationships of Engineering Design Behavior, Problem Solving, and Data of Engineers (3)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013 Ending: Summer 2013

**SYSEN 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1999

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## Taxation (TAX)

**TAX 949 Basic Federal Income Taxation (3)** This course examines the basic substantive provisions of the federal income tax law. Included are the following general topics: gross income, exclusions, deductions, depreciation, basis, tax accounting, and other provisions affecting situations encountered by attorneys in general practice.  
Effective: Fall 2009

**TAX 950 Advanced Federal Income Taxation (3)** This course is designed to continue the examination of the basic substantive provisions for the federal income tax law begun in Basic Federal Income Taxation, including the following general topics: income splitting and assignment, realization and recognition of gain and loss, capital transactions, the investment credit, and other taxable entities.  
Effective: Summer 2011  
Prerequisite:

**TAX 951 Comparative International Tax Law (3)** This course treats the unique problems of Home country taxation of the foreign income and operations of resident persons and enterprises and Host country taxation of foreign persons and enterprises. Topics include the treatment of cross-border business and investment; sales, financing and e-commerce; the source of income; worldwide and territorial taxation; methods for the elimination of double taxation including foreign tax credits, exemption, and treaties; controlled foreign corporations; tax avoidance; and value added taxes. While stressing the law of the United States and the European Union, this course broadly examines the tax law of both developed and emerging economies to gain a better understanding of the impact of taxation internationally.  
Effective: Summer 2013

**TAX 960 Employee Benefits Law (2-3)** This course introduces students to the law governing employer-provided benefit programs. It will begin with a look at the early development of welfare and pension plans offered through the workplace. The course will examine closely the landmark Employee Retirement Income Security Act of 1974 ("ERISA) and its subsequent amendments. Among topics to be covered will be defined benefit and defined contribution pension programs. This will include a survey of rules relating to pension taxation, vesting, funding, alienability, guaranty, and fiduciary duties. With respect to health insurance, the course will look at issues affecting both employee and retiree health programs, including collectively bargained ones. The course will also discuss the subjects of age discrimination in employee benefit programs as well as ERISA preemption.  
Effective: Summer 2011

**TAX 980 Partnership Taxation (2)** This course examines the income tax consequences of the formation, operation, and liquidation of a partnership, the classification of an entity as a partnership, distributions by a partnership, and sales of partnership interests.  
Effective: Fall 2007  
Prerequisite:

**TAX 988 State and Local Taxation (2)** Beginning with historical and constitutional aspects, students will analyze in detail recent developments in state and local taxation and their impact on client representation. Attention will be concentrated on corporate, sales and use and other business taxes, death duties, and property taxes and exemptions.  
Effective: Fall 1998

**TAX 991 Corporate Tax (3)** This course focuses primarily on income tax problems unique to corporations and the income tax problems arising from the shareholder-corporate relationship.  
Effective: Fall 2009  
Prerequisite:

**TAX 992 International Tax (2)** This course addresses U.S. taxation of the foreign income and operations of U.S. persons and enterprises.  
Effective: Fall 2010  
Prerequisite:

**TAX 994 Tax Aspects of Mergers and Acquisitions (2)** This course approaches corporate tax issues through the prism of the Federal income tax treatment of taxable and tax free mergers and acquisitions (M&A).  
Effective: Summer 2008  
Prerequisite:

**TAX 997 Special Topics (1-9)** Special topics in Tax Law field.  
Effective: Spring 2008

**TAX 997A Taxation of Executive Compensation and Benefits (2)** This class will focus on the tax and ERISA aspects associated with executive compensation and nonqualified deferred compensation, including a variety of executive perquisites, equity programs and fringe benefits. The course will address the applicable income tax reporting and withholding rules for employer-provided meals, lodging, transportation and other miscellaneous section 132 fringe benefits. In this course students will also learn about the tax doctrines of constructive receipt and economic benefit, as well as the requirements found in section 409A and section 83. Also covered will be the special tax rules for employees of tax exempt entities under section 457(b) and section 457(f).  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

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## Theatre (THEA)

THEA 400 **Advanced Theatre Projects** (1-6 per semester) Individual and group-directed study of in-depth projects involving reading, discussion, performance, and critical analysis by faculty.

Effective: Spring 1991

Prerequisite:

THEA 401Y (IL) **Theatre History I: Ancient to 1700** (3) Survey of drama and theatre from primitive rites through the Renaissance.

Effective: Spring 2008

Prerequisite:

THEA 402 **Theatre History II: From 1700 to Present** (3) Survey of European drama and theatre from the eighteenth century through the modern period.

Effective: Spring 2012

Prerequisite:

THEA 405 (US) **Theatre History: American Theatre** (3) Survey of American drama and theatre from the colonial period to the present.

Effective: Spring 2008

Prerequisite:

THEA 407 (US) (WMNST 407) **Women and Theatre** (3) A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background.

Effective: Spring 2008

Prerequisite:

THEA 408 (US) **History of American Musical Theatre** (3) A survey of the history of American musical theatre presented in a social, cultural, and aesthetic prospective.

Effective: Spring 2008

Prerequisite:

THEA 410 **Play Analysis** (3) Advanced skills in textual analysis of plays and screenplays.

Effective: Spring 2008

Prerequisite:

THEA 412 (US;IL) (AF AM 412) **African American Theatre** (3) Exploration of the development of African American theatre from its roots in Africa through the diaspora, to the present time.

Effective: Spring 2013

Prerequisite:

THEA 420 **Scene Study I** (3 per semester/maximum of 9) Advanced monologue and scene study techniques. Principal focus on realism.

Effective: Spring 2013

Prerequisite:

THEA 423 **Musical Theatre Performance III** (2) Studio training in the unique performance skills, repertoire and business of professional musical theatre.

Effective: Spring 2006

Prerequisite:

THEA 424 **Musical Theatre Performance IV** (2) Studio training in the unique performance skills, repertoire and business of professional musical theatre.

Effective: Spring 2006

Prerequisite:

THEA 425A **B.F.A. Acting Studio II** (2) Scene Study

Effective: Summer 2005

Prerequisite: Concurrent: THEA 425C

THEA 425C **B.F.A. Voice/Speech Studio II** (2) Advanced voice and speech training for BFA Musical Theatre students.

Effective: Summer 2005

Prerequisite: Concurrent: THEA 425A

THEA 426 **Children's Theatre** (3) Theories and practice of theatre for children.

Effective: Spring 2001

Prerequisite:

THEA 427A **B.F.A. Acting Studio III** (2) Continuation of THEA 425A

Effective: Summer 2005

Prerequisite: Concurrent: THEA 427C

THEA 427C **B.F.A. Voice/Speech Studio III** (2) Stage Dialect Studies

Effective: Summer 2005

Prerequisite: Concurrent: THEA 427A

THEA 429 **Theatre Performance Practicum** (1-3 per semester) Supervised experience in rehearsal and performance of significant roles.



Effective: Fall 1983  
Prerequisite:

**THEA 434 Introduction to Directing** (3) Introduction to principles and procedures of play direction.  
Effective: Summer 2012  
Prerequisite:

**THEA 436 Directorial Processes** (3) Preparing a play for production including the scoring of the script, developing ground plan, casting, and staging projects in American realism.  
Effective: Spring 1991  
Prerequisite:

**THEA 437 Artistic Staff for Production** (1-6) To provide students with experience in choreography, dramaturgy, combat, staging, voice/speech, musical direction, assisting in direction, for major productions.  
Effective: Summer 1989  
Prerequisite:

**THEA 440 Principles of Playwriting** (3 per semester/maximum of 6) Structure, dramatic effect, characterization, and dialogue; the writing, reading, and criticism of original one-act plays.  
Effective: Spring 2013  
Prerequisite:

**THEA 447 Make-Up Design for Production** (1-6) Materials, research, preparation, design, execution of make-up for major University Theatre productions.  
Effective: Summer 1989  
Prerequisite:

**THEA 450 Advanced Topics in Scene Design** (3 per semester/maximum of 6) Design emphasis on a variety of production techniques, genre, and styles.  
Effective: Spring 2006  
Prerequisite:

**THEA 451 Drafting, Drawing, and Painting for the Theatre** (1) Drafting, freehand drawing including perspective methods and property development, rendering techniques, and painters' elevations.  
Effective: Summer 1993  
Prerequisite:

**THEA 453 Advanced Scene Painting** (1 per semester, maximum of 12) Practicum study in painting techniques currently in professional use. Exploration of tools, available paints, and texturing materials.  
Effective: Spring 1991  
Prerequisite:

**THEA 454 Period Research for the Theatre** (3) History of decor, styles, and movements in art and architecture.  
Effective: Summer 1993  
Prerequisite:

**THEA 456 Scenic Projects for Production** (1 per semester, maximum of 6) Special projects for production; painting, properties, design assistance.  
Effective: Summer 1993  
Prerequisite:

**THEA 457 Scene Design for Production** (1 per semester/maximum of 6) Design and execution of production projects.  
Effective: Fall 1983  
Prerequisite:

**THEA 458 Digital Imaging for the Theatre** (1) Introduction to imaging software and its application in theatrical design and production.  
Effective: Summer 2005  
Prerequisite:

**THEA 459 Theatre Portfolio & Business Practices** (2) Life as a professional theatre designer. Contracts, taxes, record-keeping, resumes, portfolios, interviewing, job hunting, and legal considerations.  
Effective: Spring 2006  
Prerequisite:

**THEA 460 Advanced Topics in Costume Design** (3 per semester/maximum of 6) Developing and executing a design concept in a variety of the performing arts.  
Effective: Spring 2006  
Prerequisite:

**THEA 461 Advanced Topics in Costume Construction and Technology** (3 per semester/maximum of 6) A specialized course in advanced costume construction techniques and theatrical costume technologies.  
Effective: Spring 2006  
Prerequisite:

**THEA 464 History of Fashion** (3) Survey of dress from Egyptian period to contemporary fashion.  
Effective: Spring 2008  
Prerequisite:

**THEA 465 History of Fashion II** (3) Survey of dress from 1800 to contemporary fashion.  
Effective: Summer 2004

Prerequisite:

**THEA 466 Costume Construction for Production** (1 per semester/maximum of 6) Execution of production projects in construction and shop management.

Effective: Fall 1983

Prerequisite:

**THEA 467 Costume Design for Production** (1 per semester/maximum of 6) Design and execution of production design projects.

Effective: Fall 1983

Prerequisite:

**THEA 470 Advanced Topics in Lighting Design** (3 per semester/maximum of 6) Advanced Topics in Lighting Design will rotate through opera, dance, non-traditional spaces, architecture, advanced technology, and color theory.

Effective: Spring 2006

Prerequisite:

**THEA 471 Stagelighting Design II** (3) Advanced training through lectures and laboratory experience with color, shape, and form as it relates to the specifics of illumination.

Effective: Summer 1993

Prerequisite:

**THEA 472 Lighting Technology** (3) An introduction to the basics of electricity, dimmer protocols, lightboard programming, lighting paperwork, and master electrician & assistant lighting design practices.

Effective: Summer 2005

Prerequisite:

**THEA 477 Lighting Design for Production** (1 per semester/maximum of 6) Design and execution of design projects.

Effective: Fall 1983

Prerequisite:

**THEA 480 Advanced Topics in Technical Direction for the Theatre** (3 per semester/maximum of 6) Advanced study of the methods, materials, equipment, facilities, concepts and processes associated with Technical Direction for the Theatre.

Effective: Summer 2005

Prerequisite:

**THEA 480B Technical Production IV** (3) Discussion of problems of the technical director: personnel management, time management, scheduling, budgeting, purchasing, and the technical drawing of production.

Effective: Spring 1995

Prerequisite:

**THEA 481 Stage and Production Management** (3) Production planning, scheduling, assignment of personnel, rehearsal procedures, and budgeting.

Effective: Fall 1983

Prerequisite:

**THEA 482 Technical Production - Rigging** (3) In-depth exploration of current rigging techniques used in entertainment.

Effective: Fall 2013 Future: Fall 2013

**THEA 484 Sound Recording Techniques** (3) Multi-track audio recording and post production techniques.

Effective: Spring 2011

Prerequisite:

**THEA 485 Sound for Theatre Production** (3 per semester/maximum of 6) Aesthetics of live and recorded sound; recording and editing techniques for the stage.

Effective: Fall 2012

Prerequisite:

**THEA 486 Stage Management for Production** (1-9) Stage manager for University Theatre production.

Effective: Summer 1996

Prerequisite:

**THEA 487 Technical Projects for Production** (1 per semester/maximum of 6) Execution of practical production projects.

Effective: Fall 1983

Prerequisite:

**THEA 489 Theatre Production Practicum** (1 per semester) Supervised experience in production techniques. For theatre majors only.

Effective: Summer 2012

Prerequisite:

**THEA 494H Research Projects - Honors** (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Spring 2012

**THEA 495 Internship Practicum** (1-6 per semester/maximum of 12) Professional field experience in theatre performance, production, and management assignments.

Effective: Fall 1983

Prerequisite:

THEA 496 **Independent Studies** (1-18) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

THEA 496H **Independent Studies - Honors** (1-18) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 2012

THEA 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Fall 1983

THEA 497A **Properties and Scenic Crafts** (3) Advanced work for design and technical students.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

THEA 497A **Acting/Camera** (3) This course will introduce the student to the basics of acting in TV and film productions for single-camera techniques.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

THEA 497B **Advanced Acting Studio for Musical Theatre** (3) Acting Studio for advanced Musical Theatre students.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

THEA 497C **Acting for the Camera** (3) Camera acting workshop for advanced actors.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

THEA 497D **Professional Preparation** (3) Professional preparation for the theatre business.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

THEA 497E **Dramatic Literature for BAs** (3) This course is being offered to give students caught in the BA transition the opportunity to fulfill a requirement for dramatic literature.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

THEA 497J **Comedy Writing Workshop** (3) A writing workshop in the comedy genre.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

THEA 497K **Writer's Room** (3) Workshop for students writing the script for the School of Theatre/College of Communications sitcom.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

THEA 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Summer 1994

THEA 499 (IL) **Foreign Studies--Theatre Arts** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005  
Prerequisite:

THEA 500 **Theatre Research: Sources and Procedure** (3) Source materials and techniques as applied to theatre research; the form and content of theses and monographs.  
Effective: Winter 1978

THEA 502 **Creative Collaboration** (3) Theory and process of creative collaboration between the theatre artistic and production staffs.  
Effective: Summer 1993  
Prerequisite:

THEA 505 **Masterpieces in Production I** (3) Dramatic structure, theatrical validity, production viability of great plays from Greek to eighteenth-century. Drama as blueprint for production.  
Effective: Summer 1990

THEA 506 **Masterpieces in Production II** (3) Dramatic structure, theatrical validity, production viability of masterworks of theatre. Drama as the blueprint for production. Offered in London, England.  
Effective: Fall 2004  
Prerequisite:

THEA 507 **Masterpieces in Production III** (3) Dramatic structure, theatrical validity, production viability of major

American plays from Tyler to the present. Drama as blueprint for production.  
Effective: Spring 1990

THEA 508 **Experiential Analysis of Italian Design Styles** (3) Applications of Historical and Cultural Perspectives in Dramatic Production. Offered in Italy.  
Effective: Fall 2009

THEA 509 **Experiential Analysis of Eastern European Styles** (3) Applications of Historical and Cultural Perspectives in Dramatic Production. Offered in Prague and Budapest.  
Effective: Fall 2009

THEA 510 **Experiential Analysis of Period Style** (3) Applications of Visual/Spatial History in Dramatic Production. Offered in London, England.  
Effective: Spring 2004

THEA 524 **Acting V** (2) Advanced scene study and class projects; development of individual student repertoires.  
Effective: Spring 1996  
Prerequisite:

THEA 526 **Acting for the Camera** (2) Development of techniques and skills necessary for media performance: commercials, soap operas, television drama, etc.  
Effective: Spring 1996  
Prerequisite:

THEA 529 **Performance Monograph** (1-2 per semester, maximum of 4) The development and presentation of M.F.A. monographs in acting, design/ production, or directing.  
Effective: Spring 1996  
Prerequisite:

THEA 530 (THEA 222) **Rehearsal Methods for the Director** (3) Theory and practice in approaches, procedures, and techniques in mounting a play.  
Effective: Fall 1985  
Prerequisite:

THEA 531 **Directorial Styles and Approaches** (2) Seminar in advanced theory and directorial practice. Designed for the advanced student of directing.  
Effective: Fall 1999  
Prerequisite:

THEA 532 **Directing Seminar** (2) Career orientation: resume preparation, interviewing, unions, survey of directorial opportunities, and review of major contemporary directors and practices.  
Effective: Fall 1999  
Prerequisite:

THEA 537 **Artistic Staff for Performance in Production** (1 per semester/maximum of 6) Practical experience in choreography, dramaturgy, combat, special staging, voice/speech work, musical direction, or assisting in stage direction for university theatre productions.  
Effective: Spring 1990  
Prerequisite:

THEA 539 **Projects in Directing** (1-2) Approved directing projects for the M.F.A. directing student.  
Effective: Spring 1990  
Prerequisite:

THEA 543 **Projects in Playwriting** (1-9) Preparation of the script for revision during and following production of the student's original play.  
Effective: Fall 1983  
Prerequisite:

THEA 550 **Scenic Design III** (3 per semester/maximum of 9) Advanced design, concentration on conceptualization, visual communication skills, portfolio production.  
Effective: Fall 1983  
Prerequisite:

THEA 551 **Scenic Design IV** (1-6) Advanced projects in scenic design.  
Effective: Fall 1983  
Prerequisite:

THEA 552 **Scene Design III** (3) Design and project execution of plays and industrial installations.  
Effective: Summer 1994  
Prerequisite:

THEA 553 **Scene Design IV** (3) Design of plays for proper theatre and mass media.  
Effective: Summer 1994  
Prerequisite:

THEA 559 **Portfolio Presentation** (1 per semester, maximum of 2) Current practice in portfolio development and

presentation to client and employer.

Effective: Spring 1994

Prerequisite:

**THEA 560 Costume Design III** (3 per semester/maximum of 9) Advanced costume design with emphasis on total production concept.

Effective: Fall 1983

Prerequisite:

**THEA 562 Costume Design: Rendering Techniques** (3) Exploration and development of various rendering techniques with application to costume design.

Effective: Spring 1994

Prerequisite:

**THEA 568A Costume Design for Related Performance Arts** (3) Exploration and development of costume design with application to the other arts (opera/dance/film).

Effective: Spring 1994

Prerequisite:

**THEA 568B Costume Design: Production Concepts** (3) Exploration and development of costume design for specific production concepts.

Effective: Spring 1994

Prerequisite:

**THEA 569 Costume Construction: Crafts** (3) Exploration and development of various crafts techniques with application to costume construction (i.e. masks, jewelry, armor, millinery, footwear, wigs).

Effective: Spring 2010

**THEA 570 Stage Lighting Design III** (3) Advanced techniques in the art of theatrical lighting design.

Effective: Fall 1983

Prerequisite:

**THEA 571 Stage Lighting Design IV** (3) Course addresses individual problems in the stage lighting design process concentrating on the development of skills necessary for professional examination.

Effective: Spring 1994

Prerequisite:

**THEA 580A Technical Production VII** (3) Mechanical design for the theater; calculation for and specification of, DC motors and controls, sprockets, chain drives, gearboxes, gearing, shafts for the movement of scenery.

Effective: Summer 2011

**THEA 580B Technical production VIII** (3) Planning of the theater shop; emphasis on space design, renovation, upgrade, planning, outfitting, and safety; selection of tools and tool support systems.

Effective: Spring 1994

Prerequisite:

**THEA 585 Theatre Planning** (3) Processes and problems in planning and designing theatres: performance, audience, and technical requirements.

Effective: Winter 1978

**THEA 589 Design/Production Monograph** (1-4) The development and presentation of M.F.A. monographs in design/production.

Effective: Summer 1995

**THEA 590 Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Spring 1987

**THEA 595 Internship** (1-3) Professional field experience in theatre performance, production, and management assignments.

Effective: Spring 1987

Prerequisite:

**THEA 596 Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1987

**THEA 597 Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1987

**THEA 597A Internship Journal Report** (3) Individual time with instructor to complete and review internship journal.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

THEA 597C **Singing** (1) Vocal singing technique and familiarization of vocal music.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

THEA 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

THEA 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Teaching of theatre and film classes under senior faculty supervision.  
Effective: Fall 1983

THEA 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Fall 1983

THEA 811 **International Studio Intensive** (1-9) The course enhances the ability of the actor to meet the voice and speech demands for the performance of Shakespeare.  
Effective: Fall 2007

THEA 811A **International Production Studio Intensive** (1 per semester/maximum of 9) Intensive studio application of processes and procedures within specific theatre disciplines as influenced by the work of international professionals.  
Effective: Summer 2009  
Prerequisite:

THEA 820A **Acting I** (4) Exercises, monologue, and scene study. Principal focus on realism.  
Effective: Spring 2009  
Prerequisite:

THEA 820B **Movement for Actors I** (2) Techniques and skills in physical expression, awareness, control, and stage movement.  
Effective: Fall 2007  
Prerequisite:

THEA 820C **Voice and Speech I** (2) Vocal techniques for the actor: articulation, voice control, support, and projection.  
Effective: Fall 2007  
Prerequisite:

THEA 821A **Acting II** (3) A continuation of THEA 520A.  
Effective: Fall 2007  
Prerequisite:

THEA 821B **Movement for Actors II** (2) A continuation of THEA 520B.  
Effective: Fall 2007  
Prerequisite:

THEA 821C **Voice and Speech II** (2) A continuation of THEA 520C.  
Effective: Fall 2007  
Prerequisite:

THEA 822A **Acting III** (3) This course will focus on the research and development of skills necessary to perform the plays of Shakespeare and his contemporaries.  
Effective: Fall 2007  
Prerequisite:

THEA 822B **Movement for Actors III** (2) Advanced techniques and skills in physical expression.  
Effective: Fall 2007  
Prerequisite:

THEA 822C **Voice and Speech III** (2) Advanced voice and speech training for the actor: articulation, resonance, and vocal technique related to verse and heightened language drama.  
Effective: Fall 2007  
Prerequisite:

THEA 823A **Acting IV** (3) Students prepare audition material for their New York Showcase for theatrical agents.  
Effective: Fall 2007  
Prerequisite:

THEA 823B **Movement for Actors IV** (2) Fundamentals of unarmed and armed stage combat with emphasis on enactment of safe and effective stage fights.  
Effective: Fall 2007  
Prerequisite:

THEA 823C **Voice and Speech IV** (2) A study of stage dialects.  
Effective: Fall 2007  
Prerequisite:

THEA 824 **Acting for the Camera** (6) This course introduces the actor to the skills necessary for successful performance in television, film, video and commercial venues.

Effective: Summer 2009

Prerequisite:

**THEA 825A Acting Professionally/NYC Showcase** (3) Development of audition repertoire; study of business topics; development, rehearsal and performance of NYC showcase.

Effective: Spring 2009

Prerequisite:

**THEA 825C Professional Repertory Performance** (3) Rehearsal and performance of theatre productions at Penn State featuring third year MFA actors and professional guest artists.

Effective: Summer 2007

Prerequisite:

**THEA 830 Interdisciplinary Theatrical Design Studio** (3-6 per semester/maximum of 36) Advanced analysis, graphic, and presentation techniques for evolving and communicating design for the stage.

Effective: Fall 2009

**THEA 857 Scenic Design for Production** (1 per semester/maximum of 6) Design and execution of production design projects.

Effective: Summer 2010

**THEA 861 Costume Design and Construction** (1-6 per semester/maximum of 18) Advanced special projects for the graduate designer and costumer.

Effective: Spring 2010

Prerequisite:

**THEA 863 Costume Construction: Draping** (3) Exploration and development of various draping techniques with application to costume construction.

Effective: Spring 2010

**THEA 865 Costume Construction: Period Reconstruction** (3) Exploration and development of reproduction techniques relating to period clothing, and their application to costume construction.

Effective: Spring 2010

**THEA 866 Costume Construction for Production** (1 per semester/maximum of 6) Execution of production in construction and shop management.

Effective: Summer 2010

**THEA 867 Costume Design for Production** (1 per semester/maximum of 6) Design and execution of production design projects.

Effective: Summer 2010

**THEA 877 Lighting Design for Production** (1 per semester/maximum of 6) Design and execution of production design projects.

Effective: Spring 2010

**THEA 887 Technical Projects for Production** (1 per semester/maximum of 6) Execution of assigned technical projects for theatre production.

Effective: Summer 2010

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## Training and Development (TRDEV)

TRDEV 418 **Instructional Methods in Training and Development** (3) Emphasis on teaching techniques and learning principles used by trainers and supervisors in business, health care, and government.  
Effective: Spring 1986

TRDEV 421 **Presentation Skills for New Trainers** (3) The effective use of platform skills for training, including the use of voice, audio-visual aids, group facilitation, and personal presence.  
Effective: Summer 1993  
Prerequisite:

TRDEV 431 **Basic Technology Skills in Training** (3) Introduces basic training technology skills: electronic communications, word processing, spreadsheets, databases; provides skills to create and maintain electronic presentations and programs.  
Effective: Spring 1999  
Prerequisite:

TRDEV 432 **Video Production in Training** (3) Introduces learners to the equipment, design, and production of video instruction for the workplace.  
Effective: Spring 2002  
Prerequisite:

TRDEV 460 **Foundations in Training and Development** (3) Roles in training and development, relationships between training and development and other organizational structures, and the principles of training design.  
Effective: Spring 1986

TRDEV 465 **Performance Analysis** (3) This course involves the systematic analysis of employee performance in organizations to identify performance problems, diagnose causes, and specify solutions.  
Effective: Spring 2005  
Prerequisite:

TRDEV 470 **Human Resource Development Tools and Techniques** (3) Examination of contemporary strategies, tools, and techniques for designing human resource functions to promote employee learning and performance within organizations.  
Effective: Spring 2005  
Prerequisite:

TRDEV 475 **Career and Succession Management** (3) This course involves the study of a systematic approach for integrating career planning and succession planning programs in organizations.  
Effective: Spring 2005  
Prerequisite:

TRDEV 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Effective: Spring 1986

TRDEV 505 **Project Management in Training and Development** (3) Introduces skills for managing complex training and development projects, such as developing timelines, creating budgets, and allocating resources.  
Effective: Spring 2006  
Prerequisite:

TRDEV 507 **Program Evaluation** (3) Evaluation of educational and other human services programs; preparation and presentation of the evaluation proposal.  
Effective: Summer 2002  
Prerequisite:

TRDEV 518 **Systematic Instructional Design in Training** (3) Study of theory and practice of systematic instructional design. Application of instructional design principles to training problems in local organizations.  
Effective: Summer 2002  
Prerequisite:

TRDEV 520 **Learning Styles and Learning Theory in Training** (3) Adult learning theory and its application to training and development.  
Effective: Spring 2001  
Prerequisite:

TRDEV 531 **Technology in Training** (3) Applications of various new instructional technologies to training problems.  
Effective: Summer 2002  
Prerequisite:

TRDEV 532 **Web-Based Training** (3) Introduction to the design and development of websites for computer-based instruction in the workplace.  
Effective: Fall 2001  
Prerequisite:



TRDEV 533 **Distance Learning for Trainers** (3) This course will explore a variety of instructional technologies which have direct applications in training adult learners at a distance.

Effective: Summer 2002

Prerequisite:

TRDEV 565 **Implementing Training and Development Programs** (3) The critical analysis of theories, strategies, and techniques for planning and implementing TRDEV programs to enhance employee learning and performance.

Effective: Spring 2006

Prerequisite:

TRDEV 583 **Issues in Training** (3) An issue seminar addressing topics such as an unprepared work force, diversity, recession, and issues generated by the class.

Effective: Summer 2002

Prerequisite:

TRDEV 587 **Master's Paper** (1-6) The development of an original master's project (paper, production, or practicum) supervised and judged by an appropriate faculty committee.

Effective: Spring 1986

TRDEV 588 **Research Designs Applied in Training** (3) Planning experimental, observation, survey and qualitative research designs for training setting needs such as needs assessments and evaluations.

Effective: Spring 1995

Prerequisite:

TRDEV 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Fall 2001

Prerequisite:

TRDEV 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Spring 1988

TRDEV 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Spring 1987

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## **Trans Clinical Medic (TCM)**

TCM 706 **Transition to Clinical Medicine** (2) Introductory course that teaches the basic skills and knowledge a student needs to enter the clinical training years.

Effective: Summer 2007

Prerequisite:

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## Traveling Schl Prog (C I C)

C I C 597 **Special Topics** (1-15) Formal courses taken on a special interest subject which will be offered on a C I C institution by C I C traveling scholars; several different topics may be taken each semester.

Effective: Spring 1993

Prerequisite:

C I C 598 **Special Topics** (1-15) Formal courses taken on a special interest subject which will be offered on a C I C institution by C I C traveling scholars; several different topics may be taken each semester.

Effective: Spring 1993

Prerequisite:

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## **Trial Team (TRTEM)**

TRTEM 995A **AAJ Trial Team** (2) See Handbook for description.  
Effective: Spring 2009

TRTEM 995B **BLSA Trial Moot Court Team** (2) See Handbook for description.  
Effective: Spring 2005

TRTEM 995C **Gourley Trial Competition Team** (2) See Handbook for description.  
Effective: Fall 1998

TRTEM 995D **National Trial Moot Court Team** (2) See Handbook for description.  
Effective: Fall 1998

TRTEM 995E **Miscellaneous Trial Moot Court Teams** (2) See Handbook for description.  
Effective: Fall 1998

TRTEM 997 **BLSA Mock Trial Team** (2) BLSA Mock Trial Team.  
Effective: Spring 2011

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## Turfgrass (TURF)

**TURF 425 Turfgrass Cultural Systems** (3) A study of turfgrass maintenance practices and how their interrelationships can be utilized to develop meangement systems.

Effective: Summer 2013

Prerequisite:

**TURF 434 Turfgrass Edaphology** (3) Characterization of soil physical properties for the establishment and maintenance of sports turf; includes root-zone construction.

Effective: Summer 2013

Prerequisite:

**TURF 435 Turfgrass Nutrition** (4) Study of turfgrass nutrition and growth; emphasizing constructed and mineral soil fertility, nutrient uptake and function, and fertilizer use efficiency.

Effective: Summer 2013

Prerequisite:

**TURF 436W Case Studies in Turfgrass Management** (3) Case study and discussion considering integrated management of selected turfgrass sites; emphasis on problem analysis, principle application, and decision making.

Effective: Summer 2013 Ending: Fall 2013

Prerequisite:

**TURF 436W Case Studies in Turfgrass Management** (3) Case study and discussion considering integrated management of selected turfgrass sites; emphasis on problem analysis, principle application, and decision making.

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**TURF 489 Supervised Experience in College Teaching** (1-3) Participate with instructors in teaching and undergraduate turfgrass course. Assist with teaching an evaluation and with development of instructional materials.

Effective: Summer 2013

Prerequisite:

**TURF 490 Colloquium** (1) Oral presentations developed by students in consultation with the course instructor.

Effective: Summer 2013

Prerequisite:

**TURF 495 Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Effective: Summer 2013

Prerequisite:

**TURF 496 Independent Studies** (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Effective: Summer 2013

**TURF 850 Turfgrass Physiology** (3) Lectures, reading assignments, and problems designed to develop student competency in plant physiology as it relates to turfgrass management strategies.

Effective: Summer 2013

**TURF 852 Turfgrass Health Management** (3) Lectures and exercises designed to develop student competency in solving turfgrass pest problems, as well as disease resistance in turfgrass.

Effective: Summer 2013

**TURF 853 (PPATH 853) Interpreting Turfgrass Science Literature** (3) Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results.

Effective: Summer 2013

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## **Underser Med&Dom Hlt (UMDH)**

UMDH 700 **Underserved Medicine and Domestic Health** (5) Students will apply critical thinking and clinical reasoning to improve patient outcomes within the framework of underserved medicine.

Effective: Summer 2013

Prerequisite:

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## Urban & Reg Plan-CI (UR PL)

UR PL 595 **Planning Internship** (1-6) Internship with a planning agency, under supervision of a graduate faculty member.  
Effective: Spring 1987  
Prerequisite:

UR PL 596 **Individual Studies** (1-9) Creative projects, including nonthesis reseach, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Fall 1983

UR PL 600 **Thesis Research** (1-15) No description.  
Effective: Fall 1983

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## **Veterinary Science (V SC)**

V SC 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Summer 1995

V SC 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Spring 1992

V SC 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Spring 1992

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## Veterinary and Biomedical Sciences (VB SC)

VB SC 402W (ENT 402W) **Biology of Animal Parasites** (3) An introduction to animal parasitology. Emphasis placed on host/parasite interactions, parasites of zoonotic importance, control programs and taxonomy.

Effective: Spring 2010

Prerequisite:

VB SC 405 **Laboratory Animal Science** (3) Principles involved in maintaining laboratory animals. Emphasis is on management, preventive medicine, and surgical considerations used in laboratory animal colonies.

Effective: Spring 2009

Prerequisite:

VB SC 407 **Dairy Herd Health Programs** (2) A discussion of health programs for dairy herds to assist in the control of infectious and metabolic diseases of dairy animals.

Effective: Fall 2007

Prerequisite:

VB SC 409 **Wildlife Diseases** (3) An introduction to wildlife diseases emphasizing their impact on wildlife, domestic animals and humans in today's world.

Effective: Spring 2013

Prerequisite:

VB SC 418 **Bacterial Pathogenesis** (2) Study of molecular interactions between bacterial pathogens and their hosts.

Effective: Fall 2007

Prerequisite:

VB SC 420 **General Animal Pathology** (3) Nature and mechanisms of the disease process including degenerations, growth disturbances, inflammation, host-parasite relationships and neoplasia.

Effective: Fall 2007

Prerequisite:

VB SC 421 (BIOL 421) **Comparative Anatomy of Vertebrates** (4) The comparative anatomy of representative vertebrate animals, discussed from a descriptive and an evolutionary viewpoint.

Effective: Spring 2008

Prerequisite:

VB SC 423W **Pathology of Nutritional and Metabolic Diseases** (3) Overview of nutritional and metabolic diseases of animals integrating concepts from biochemical and physiologic aberrations to clinical applications.

Effective: Spring 2008

Prerequisite:

VB SC 425 (AN SC 425) **Principles of Avian Diseases** (3) Principles of pathogenesis and control of diseases in poultry and other avian populations. Case material used where appropriate.

Effective: Spring 2009

Prerequisite:

VB SC 430 **Principles of Toxicology** (3) Introduction to the biomedical aspects of toxicology with emphasis on the mechanisms and fate of chemical interaction with biological systems.

Effective: Fall 2007

Prerequisite:

VB SC 431 (E R M 431) **Environmental Toxicology** (3) Effects of pollutants on animal health at the chemical, physical, and cellular level.

Effective: Spring 2011

Prerequisite:

VB SC 432 (B M B 432, MICRB 432) **Advanced Immunology: Signaling in the Immune System** (3) The study of signaling pathways that regulate the immune response.

Effective: Fall 2007

Prerequisite:

VB SC 433 (B M B 433) **Molecular and Cellular Toxicology** (3) In-depth coverage of processes by which drugs/chemicals interact with biological systems and the experimental approaches used to study these interactions.

Effective: Fall 2007

Prerequisite:

VB SC 435 (B M B 435, MICRB 435) **Viral Pathogenesis** (2) A study of the molecular, immunological, and pathological aspects of viral diseases as well as laboratory methods of diagnosis.

Effective: Fall 2007

Prerequisite:

VB SC 444 **Epidemiology of Infectious Diseases** (3) An introduction to epidemiology of infectious diseases with emphasis on understanding epidemiologic concepts for identifying, preventing and controlling infectious diseases.

Effective: Fall 2007

Prerequisite:

VB SC 445 **Molecular Epidemiology of Infectious Diseases** (3) A discussion and practicum of the molecular laboratory techniques used to study molecular epidemiology of infectious diseases.

Effective: Fall 2007

Prerequisite:

VB SC 448W **Current Topics in Immunology** (3) Study of current approaches and questions driving research in immunology and infectious diseases.

Effective: Fall 2007

Prerequisite:

VB SC 451 **Immunotoxicology of Drugs and Chemicals** (3) An in depth discussion of the effect of xenobiotics and drugs on host immune mechanisms.

Effective: Fall 2012

Prerequisite:

VB SC 494H **Honors Thesis** (1-6 per semester/maximum of 6) Independent study directed by a faculty supervisor that culminates in the production of a Veterinary and Biomedical Sciences honors thesis.

Effective: Summer 2013

Prerequisite:

VB SC 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2007

VB SC 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Effective: Fall 2007

VB SC 511 (BMMB 511, IBIOS 511) **Molecular Immunology** (2) The study of molecular and biochemical events that influence immune responses and define current questions in immunology.

Effective: Spring 2008

Prerequisite:

VB SC 514 (NUTR 514) **Prostaglandins and Leukotrienes** (3) Biochemical, physiological, and nutritional aspects of arachidonic acid and related essential fatty acid metabolism. Structure-activity relationships of prostaglandins, prostacyclins, thromboxanes, and leukotrienes.

Effective: Fall 2012

Prerequisite:

VB SC 515 (BMMB 515) **Macrophage Biology** (2) The role of macrophages at the interface between innate and adaptive immunity.

Effective: Spring 2008

Prerequisite:

VB SC 518 (BMMB 518) **T Cell Recognition and Development** (2) An in-depth analysis of the mechanisms of T cell recognition, activation and development, and the acquired immune response.

Effective: Spring 2008

Prerequisite:

VB SC 520 **Pathobiology** (3) The course deals with the mechanism of disease. Topics are: homeostasis, vascular injury, inflammation, neoplasia, genetic disorders, and biochemical toxicology.

Effective: Fall 2009

Prerequisite:

VB SC 530 (IBIOS 530) **Regulation of Gene Expression by Xenobiotics** (3) The mechanisms by which foreign chemicals alter gene expression and the techniques used to examine this effect are examined.

Effective: Spring 2008

Prerequisite:

VB SC 532 (IBIOS 532) **Developmental and Reproductive Toxicology** (3) Effects of environmental chemicals, nutrients and drugs on embryo/fetal development and maternal/paternal toxicity.

Effective: Spring 2008

Prerequisite:

VB SC 534 **Current Topics in Cancer Research** (3) A discussion of current cancer research literature with the focus on primary research literature.

Effective: Summer 2011

Prerequisite:

VB SC 590 **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Effective: Fall 2007

VB SC 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Fall 2007

VB SC 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Effective: Fall 2008

VB SC 600 **Thesis Research** (1-15) No description.

Effective: Fall 2007

VB SC 601 **Ph.D. Dissertation Full-Time** (0) No description.

Effective: Fall 2007

VB SC 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Experience in preparing and conducting lectures/laboratories and assembling materials for laboratories.

Effective: Fall 2007

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## Wildlife and Fisheries Science (W F S)

W F S 406 **Ornithology Laboratory** (1) Laboratory and field identification of Pennsylvania birds, avian ecology and behavior, field survey techniques.

Effective: Summer 2013

Prerequisite:

W F S 407 **Ornithology** (3) Introduction to the biology, ecology, adaptations, and conservation of birds.

Effective: Summer 2013

Prerequisite:

W F S 408 **Mammalogy** (3) Identification, systematics, characteristics, adaptations, ecology, behavior, natural history and conservation, and socio-economic aspects of mammals.

Effective: Summer 2013

Prerequisite:

W F S 409 **Mammalogy Laboratory** (1) Laboratory and field identification of mammals, ecology and behavior of mammals, field survey techniques.

Effective: Summer 2013

Prerequisite:

W F S 410 **General Fishery Science** (3) Introduction to the study, management, and uses of fish populations; methods of investigation, culture, and harvest of fishes.

Effective: Summer 2013

Prerequisite:

W F S 422 **Ecology of Fishes** (3) Role of fishes in aquatic communities and general ecosystems. Environmental factors influencing fish as individuals, populations, and communities.

Effective: Summer 2013

Prerequisite:

W F S 430 (FOR 430) **Conservation Biology** (3) The application of biological principles to issues in the conservation of biodiversity.

Effective: Summer 2013

Prerequisite:

W F S 435 (E R M 435) **Limnology** (3) Biogeochemistry and natural history of freshwater ecosystems.

Effective: Summer 2013

Prerequisite:

W F S 436 (E R M 436) **Limnological Methods** (3) Application of current methodologies to evaluate the biological, chemical, and physical characteristics of aquatic ecosystems.

Effective: Summer 2013

Prerequisite:

W F S 440 **Natural Resources Public Relations** (3) The course prepares students to integrate public relations concepts with principles of natural resources management at the community level.

Effective: Summer 2013

Prerequisite:

W F S 446 **Wildlife and Fisheries Population Dynamics** (3) Concepts and estimation of mammalian, avian, and fish populations; processes of mortality, natality, growth, and regulation.

Effective: Summer 2013

Prerequisite:

W F S 447W **Wildlife Management** (3) Management of renewable wildlife resources by applying ecological concepts, habitat evaluation, and decision-making; writing and editing reports are emphasized.

Effective: Summer 2013

Prerequisite:

W F S 450 (E R M 450) **Wetland Conservation** (3) Wetland types, classification, functions and values; hydrology, soils, and plants; introduction to wetland identification and delineation; wetland regulations.

Effective: Summer 2013

Prerequisite:

W F S 452 **Ichthyology** (2) Study of the structure, taxonomy, systematics, and natural history of freshwater and marine fishes.

Effective: Summer 2013

Prerequisite:

W F S 453 **Ichthyology Laboratory** (2) Identification of fishes, major fish families, use of keys.

Effective: Summer 2013

Prerequisite:

W F S 454 **Field Ichthyology** (2) Introduction to collection and field identification of the fishes of Pennsylvania.

Effective: Summer 2013

Prerequisite:

W F S 460 **Wildlife Behavior** (3) Scholarly discussion and critique of history, concepts, and application of wildlife behavioral concepts to conservation issues.

Effective: Summer 2013

Prerequisite:

W F S 462 **Amphibians and Reptiles** (3) Critique of global evolution and conservation of amphibians and reptiles, focusing on Northeastern U.S. natural history and ecology.

Effective: Summer 2013

Prerequisite:

W F S 463W **Fishery Management** (3) Management of sport and commercial fisheries, including biological, political, social, and economic factors; regulations and other management techniques.

Effective: Summer 2013

Prerequisite:

W F S 495 **Wildlife/Fisheries Internship** (1-6) Supervised field experience related to the student's major.

Effective: Summer 2013

Prerequisite:

W F S 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

W F S 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

W F S 497A **Animal Welfare** (3) Understanding animal welfare and promoting animal well-being in farmed, wild and captive animals, and implications for policy, legislation and conservation.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

W F S 497A **Ornithology Lab Practicum** (1) This one-credit lab practicum must be scheduled concurrently with W F S 406, Ornithology Lab.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

W F S 497B **Mammalogy Lab Practicum** (1) This one-credit lab practicum must be scheduled concurrently with W F S 409, Mammalogy Lab.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

W F S 499 (IL) **Foreign Studies** (1-12 per semester/maximum of 12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2013

W F S 499A (IL) **Namibia Study Tour** (1) During the 14-day tour, which takes place June 6-22, students will learn about (a) the vast skies of the Southern Hemisphere, (b) the Namib Desert and Skeleton Coast, (c) the Benguela Current and other upwelling ecosystems, (d) continental drift and landscape ecology, (e) the lore of the Bushmen, and (f) the contrasts of government and private management of wildlife resources. These examples will in turn be related through a series of lectures to the presumed origin of the Cosmos, history of the Earth, origins of mankind, and genetic bottlenecks. The study tour price is 4,000 USD/student and includes all in-country travel, lodging and meals, entry fees, and vehicle and driver. Prices exclude airfare to and from Namibia, accidental, live, health and personal property insurance (required), personal purchases, and alcoholic drinks. Lodging will be two persons per room, unless single rooms are requested at additional cost. A 50% non-refundable deposit is required.

Effective: Summer 2013 Ending: Summer 2013

W F S 500 **Professionalism in Natural Resources** (3) Scholarly discussion and critique of skills important to professionalism of students in natural resources, wood products, and related science-based disciplines.

Effective: Summer 2013

Prerequisite:

W F S 525 **Communications in Natural Resources** (3) Communications of research results through manuscripts for peer reviewed journals, presentations at professional meetings, and articles for the general public.

Effective: Summer 2013

Prerequisite:

W F S 530 **Conservation Ecology** (3) Discussion of the application of ecological principles to conservation and management of biological diversity, landscapes, and ecosystems.

Effective: Spring 2005

Prerequisite:

W F S 536 **Freshwater Field Ecology** (3) Organisms and physical/chemical factors that affect them in the aquatic environment; basic water chemistry; identification of aquatic organisms.

Effective: Summer 2013

Prerequisite:

W F S 542 **Systematics** (3) Principles and methods of classification, phylogeny, and speciation; taxonomic techniques; analysis of species; causal interpretation of animal diversity.  
Effective: Summer 2013

W F S 551 **Wildlife Biometrics and Population Analysis** (3) Application of biometrics and mathematics to concepts and problems in wildlife ecology with emphasis on population analysis.  
Effective: Summer 2013  
Prerequisite:

W F S 552 **Systematics and Evolution of Fishes** (3) Detailed study of the systematics, evolution, identification, and natural history of fishes.  
Effective: Summer 2013  
Prerequisite:

W F S 560 **Population Estimation and Modeling** (4) Application of statistical models to estimating population parameters to test ecological theories.  
Effective: Summer 2013  
Prerequisite:

W F S 590 (FOR 590) **Colloquium** (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Summer 2013

W F S 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Spring 1989

W F S 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.  
Effective: Summer 2013

W F S 597A **Applied Spatial Ecology** (3) Compilation and analysis of spatial data for making sound resource management and conservation decisions.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

W F S 597B **Design of Ecological Field Studies** (2) Application of the scientific method and general principles of designing ecological field studies through discussion and critique of the primary literature.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

W F S 597B **Quantitative Methods in Ecology** (3) Course will provide practical experience to develop skills and an understanding of quantitative methods for the analysis interpretation, and presentation of ecological data.  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

W F S 600 **Thesis Research** (1-15) No description.  
Effective: Summer 2013

W F S 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 2013

W F S 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in wildlife courses.  
Effective: Summer 2013

W F S 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 2013

W F S 611 **Ph.D. Dissertation Part-Time** (0) No Description.  
Effective: Summer 2013

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## Women's Studies (WMNST)

WMNST 400 (US;IL) **Debates in Contemporary Feminism** (3) Consideration of feminist theories of women's experience in transforming understanding, reconceptualizing old problems, raising new ones, and expanding traditional disciplines.  
Effective: Spring 2013  
Prerequisite:

WMNST 401 **Doing Feminism: Theory and Practice** (3) Advanced analysis of feminist theory and the nature of its integration (sometimes uneasily) within feminist movements and practices.  
Effective: Spring 2013  
Prerequisite:

WMNST 407 (US) (THEA 407) **Women and Theatre** (3) A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background.  
Effective: Summer 2005  
Prerequisite:

WMNST 412 (EDTHP 412) **Education and the Status of Women** (3) An examination of the relationship of education to the status of women in American society.  
Effective: Spring 2005

WMNST 416 (US;IL) (AF AM 416, S T S 416) **Race, Gender and Science** (3) The class will focus on race and gender as products of science, and how societal values shape scientific activity.  
Effective: Spring 2013  
Prerequisite:

WMNST 420 (US;IL) (R SOC 420, CED 420) **Women in Developing Countries** (3) Analysis of women's work, experiences, and development policies and practices in Africa, Asia, and Latin America.  
Effective: Fall 2009

WMNST 421 (IL) (HIST 421) **The History of European Women** (3) European women's lives from the Middle Ages to the present.  
Effective: Spring 2013  
Prerequisite:

WMNST 423 (US) (CRIM 423, CRIMJ 423) **Sexual and Domestic Violence** (3) Legal, sociological, and psychological perspectives of sexual and domestic violence.  
Effective: Spring 2008  
Prerequisite:

WMNST 424 (US) (KINES 424) **Women and Sport** (3) An interdisciplinary approach to contemporary issues related to women and sport from historical, physiological, psychological, and sociological perspectives.  
Effective: Spring 2013  
Prerequisite:

WMNST 426Y (US;IL) (GEOG 426Y) **Gender and Geography** (3) Description and explanation of the links between gender relations and spatial structures; gender and work, social services, and neighborhood activism.  
Effective: Summer 2011 Ending: Summer 2013  
Prerequisite:

WMNST 426Y (US;IL) (GEOG 426Y) **Gender Geographies** (3) Description and explanation of the links between gender relations and spatial structures; gender and work, social services, and neighborhood activism.  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

WMNST 428 (US;IL) (PL SC 428) **Gender and Politics** (3) Gender in politics in the United States and around the world; major areas of women and politics research.  
Effective: Fall 2007  
Prerequisite:

WMNST 430 (US) (AM ST 430) **Women in American Society** (3) A historical study of women's roles and experiences in the United States.  
Effective: Spring 2008  
Prerequisite:

WMNST 438 (PHIL 438) **Feminist Philosophy** (3) Examines the central currents of feminist philosophy, selected problems and concepts regarding difference, gender and sex, identity, and political culture.  
Effective: Fall 2007  
Prerequisite:

WMNST 452 (US) (NURS 452, BB H 452) **Women's Health Issues** (3) Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.  
Effective: Spring 2007 Ending: Summer 2013  
Prerequisite:

WMNST 452 (US) (NURS 452, BB H 452) **Women's Health Issues** (3) Exploration of major health issues concerning women

today, with an emphasis on social, cultural, and medical influences.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

WMNST 453 (US) (CRIM 453, CRIMJ 453) **Women and the Criminal Justice System** (3) This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system.

Effective: Spring 2013

Prerequisite:

WMNST 455 (US) (CAS 455) **Gender Roles in Communication** (3) Explores the literature on gender research in the discipline of human communication.

Effective: Summer 2005

Prerequisite:

WMNST 456 (SOC 456) **Gender, Occupations, and Professions** (3) The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

Effective: Spring 2013

Prerequisite:

WMNST 457 (US;IL) (S T S 457, HIST 457) **The History of Women in Science** (3) Critical analysis of the roles women, gender, and minorities have played in the natural sciences.

Effective: Spring 2013

Prerequisite:

WMNST 458 (BB H 458) **Critical Issues in Reproduction** (3) Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

Effective: Spring 2007 Ending: Summer 2013

Prerequisite:

WMNST 458 (GS) (BB H 458) **Critical Issues in Reproduction** (3) Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

WMNST 462 (US) (ENGL 462) **Reading Black, Reading Feminist** (3) Female identity and its construction in textual representations of gender, class, color, and cultural difference in English-language literatures.

Effective: Summer 2005

Prerequisite:

WMNST 464 (US) (BE SC 464) **Feminine/Masculine** (3) Study of sex role learning; investigating feminine/masculine labeling; implications for contemporary society.

Effective: Spring 2008

Prerequisite:

WMNST 466 (US;IL) (HIST 466) **Lesbian and Gay History** (3) Critical exploration of the history of sexuality, focusing especially on the emergence of modern lesbian and gay identities.

Effective: Spring 2013

Prerequisite:

WMNST 471 (US) (PSYCH 479) **The Psychology of Gender** (3) Theories and research on gender differences and gender roles. Emphasis on women's and men's current positions in society.

Effective: Spring 2007

Prerequisite:

WMNST 472 (LER 472) **Work-Life Practices and Policies** (3) Explore the causes and consequences of conflicts between work, family, and other life commitments, and how these may be resolved.

Effective: Spring 2008

Prerequisite:

WMNST 489 (ENGL 489) **British Women Writers** (3) A study of selected British women writers.

Effective: Spring 2008

Prerequisite:

WMNST 490 (US;IL) (ENGL 490) **Women Writers and Their Worlds** (3) American and British literature written from the perspective of women.

Effective: Summer 2005

Prerequisite:

WMNST 491 (AM ST 476, ENGL 492) **American Women Writers** (3) A study of selected American women writers.

Effective: Spring 2008

Prerequisite:

WMNST 492W **Current Feminist Issues** (3) Critical analysis of major contemporary feminist research and writing in the arts, humanities, social and natural sciences.

Effective: Spring 2002

Prerequisite:

WMNST 494 **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

Effective: Summer 1994



WMNST 494H **Research Project** (1-12) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Fall 2007

WMNST 495 **Internship** (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  
Effective: Spring 1998  
Prerequisite:

WMNST 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside scope of formal courses.  
Effective: Fall 1983

WMNST 496A **Intro to Queer Study** (1-6) Discuss the primary texts of queer theory.  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

WMNST 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 1984

WMNST 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.  
Effective: Summer 2005

WMNST 501 **Feminist Perspectives on Research and Teaching Across the Disciplines** (3) Feminist approaches to methodological issues in research and teaching in the social sciences, humanities, and natural sciences.  
Effective: Spring 2002

WMNST 502 **Global Perspectives on Feminism** (3) Exploration of feminist issues in a global perspective, including debates in history, ethics, and political feminism.  
Effective: Fall 2001

WMNST 507 **Feminist Theory** (3) Development of feminist theory and its relationship to history in terms of critique of family, sexuality, and gender stratification.  
Effective: Spring 2002

WMNST 516 (HIST 516) **US Women's and Gender History** (3) A critical analysis of gender and theories of gender in selected American historical contexts.  
Effective: Fall 2012

WMNST 520 **Gender and Nationalism** (3) Impact of Western nationalism and colonialism on the organization of gender roles from the 18th century to the present.  
Effective: Fall 2001

WMNST 536 **Gender and Science** (3) Studies the foundations of feminist science studies as applied to biocultural practices of gender, biology, and reproductive technologies.  
Effective: Fall 2013 Future: Fall 2013

WMNST 537 (AFR 537) **Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship** (3) A course about discourses of sexuality and gender in studies of Islam in Africa, with South Africa as a case study.  
Effective: Spring 2013

WMNST 538 (PHIL 538) **Feminist Philosophy Seminar** (3) Critically examines feminist approaches to ethics, epistemology, philosophy of science, metaphysics, social/political philosophy, and the history of philosophy.  
Effective: Summer 2005

WMNST 541 (ADTED 541) **Women and Minorities in Adult Education** (3) Seminar on women and minority adults as learners and leaders in various contexts of adult education.  
Effective: Spring 1998  
Prerequisite:

WMNST 594 **Research Topics** (1-15) Supervised student activities on research projects identified on an individual or small-group basis.  
Effective: Spring 1998

WMNST 595 **Internship** (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Effective: Spring 1998

WMNST 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 1987

WMNST 597 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

Effective: Spring 1992

WMNST 597A (A ED 597A, IST 597A) **Gender, Art & STEM** (3) This course introduces FemTechNet, a global network of feminist scientists and artists collaborating across areas of health, climate change, information-technology.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

WMNST 597A **Gender and Environment** (3) This course focuses on gender and the environment from a global perspective.

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

WMNST 597B (ENGL 597B) **Gen(d)ering the Climate Change Crisis: Feminist Narratives of Environment, Ecology, and Epistemology** (3) This is a course about the facts and the fictions of climate change, and about feminist critique.

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

WMNST 602 **Supervised Experience in College Teaching** (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Effective: Fall 1996

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## Wood Products (W P)

W P 400 **Properties of Wood** (2) Chemical Structure and Mechanical Properties of Wood Composites.

Effective: Summer 2003 Ending: Fall 2013

Prerequisite:

W P 411 **Wood-Environmental Relationships** (4) Material composition and structure; basic and derived physical properties; moisture movement in wood; methods and techniques of drying wood.

Effective: Spring 2001 Ending: Fall 2013

Prerequisite:

W P 412 **Wood in Structures** (3) Behavior and design of solid, laminated, and plywood wood beams, trusses, columns, and foundations. Wood construction details.

Effective: Summer 2013

Prerequisite:

W P 413 **The Chemistry of Wood** (3) Chemical composition, reactions, and properties in relation to products and the uses of wood.

Effective: Summer 1997 Ending: Fall 2013

Prerequisite:

W P 416 **Wood Industries Management Development** (3) Managerial concepts and issues important to forest products organizations will help prepare students to assume management-level positions.

Effective: Summer 2013

Prerequisite:

W P 417 **Wood Products Manufacturing Systems and Processes** (4) Description of systems and processes used in the manufacture of wood products.

Effective: Summer 2013

Prerequisite:

W P 418 **Chemical Processing of Wood** (4) Principles and practices of basic operations in converting wood and wood waste into useful chemicals and modified cellulose products.

Effective: Summer 2013

Prerequisite:

W P 423 **Deterioration and Protection of Wood Products** (2) Timber and wood deterioration from fungi, insects, fire; treatment of wood products for protection.

Effective: Fall 1996 Ending: Fall 2013

Prerequisite:

W P 437W **Wood Industries Marketing Management** (4) Examination of major international wood products market segments in terms of products, distribution, industry structure, and strategic management issues.

Effective: Summer 1997 Ending: Fall 2013

Prerequisite:

W P 438 **Business Concepts for Wood Manufacturing** (4) The course will cover manufacturing strategies and related financial measures in a wood production environment.

Effective: Summer 2013

Prerequisite:

W P 460 **Wood Products Industrial Environmental Control** (3) Wood products industrial environmental control technologies and strategies for pollution abatement.

Effective: Summer 2013

Prerequisite:

W P 490 **Wood Products Colloquium** (1) Presentations and discussions of solutions to problems within the forest products industry.

Effective: Spring 1993 Ending: Fall 2013

Prerequisite:

W P 495 **Wood Products Internship** (1-6) Supervised field experience related to the student's major.

Effective: Summer 2013

Prerequisite:

W P 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Effective: Summer 2013

W P 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Effective: Summer 2013

W P 499 (IL) **Foreign Studies** (1-12) Courses offered in foreign countries by individual or group instruction.

Effective: Summer 2013

**W P 511 Physical Properties of Wood and Fibers (3)** Theories of moisture, diffusion, permeability, and heat transport; ultrastructure and thermal properties of wood and fibers.  
Effective: Summer 2013  
Prerequisite:

**W P 513 Wood Chemistry (3)** Treatment of the chemical components of wood, their distribution and reactions.  
Effective: Summer 2013 Ending: Fall 2013  
Prerequisite:

**W P 513 Wood Chemistry (3)** Treatment of the chemical components of wood, their distribution and reactions.  
Effective: Spring 2014 Future: Spring 2014

**W P 515 Wood Composite Processing Parameters (3)** Wood composite manufacture in theory and practice including various synthesis parameters in relation to physical and mechanical properties.  
Effective: Summer 2013  
Prerequisite:

**W P 530 Case Studies in Forest Products (3)** Manufacturing, marketing, and management issue analysis from a global perspective in the forest products industries.  
Effective: Summer 2013

**W P 531 Mechanical Behavior of Wood (3)** Time-dependent properties, theory of failure, rheologic properties, and theory of the mechanical behavior of wood and structural composites.  
Effective: Summer 2013

**W P 532 Theory of Adhesion (3)** Theory of adhesion as it pertains to bonding of wood, paper-based laminates, fibers, and bonding of wood to dissimilar materials.  
Effective: Summer 2013

**W P 537 International Wood Products Marketing and Trade (3)** Strategic analysis, environmental scanning, international trade policy implications, determinants of competitive strategy for firms, industries, and nations.  
Effective: Summer 2013  
Prerequisite:

**W P 560 Wood Products Industrial Environmental Control (3)** Legislation, impacts, and management of air, water, and solid waste pollution in the wood products industry.  
Effective: Summer 2013  
Prerequisite:

**W P 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
Effective: Spring 1993

**W P 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 2013

**W P 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  
Effective: Summer 2013

**W P 600 Thesis Research (1-15)** No description.  
Effective: Summer 2013

**W P 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Provides an opportunity for supervised and graded teaching experience in forest products courses.  
Effective: Summer 2013

**W P 610 Thesis Research Off Campus (1-15)** No description.  
Effective: Summer 2013

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## Workforce Education and Development (WF ED)

WF ED 402 **Supervision of Vocational Education** (3) For administrators, supervisors, and teachers responsible for improvement of instruction through supervision or for students preparing for supervisory work.  
Effective: Fall 2001

WF ED 405 **Project Management for Professionals** (3) Covers the essential concepts and skills needed to make effective contributions on projects, on time and within budget.  
Effective: Summer 2011  
Prerequisite:

WF ED 410 **Leadership Competencies for Professionals** (3) Designed to teach contemporary professional leadership competencies for workforce professionals who do not currently have supervisory responsibilities.  
Effective: Summer 2011  
Prerequisite:

WF ED 413 **Vocational Education for Special-Needs Learners** (3) Introduction to program modifications, supplementary services, and resources required for special-needs learners in vocational and practical arts education programs.  
Effective: Fall 2001

WF ED 424 (CN ED 424) **Facilitating Career Development** (3) This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work.  
Effective: Summer 2012  
Prerequisite:

WF ED 441 **Conceptual and Legal Bases for Cooperative Vocational Education** (2) History, conceptual and legal bases for a cooperative vocational education program.  
Effective: Summer 1996  
Prerequisite:

WF ED 442 **Operating Cooperative Vocational Education Programs** (2) Student and training station selection, training plan and related subject development, records and reporting systems, school-industry coordination.  
Effective: Summer 1996  
Prerequisite:

WF ED 445 **Vocational Guidance** (3) Problems and possibilities of vocational guidance; the field of guidance and guidance literature; methods of field work; school guidance techniques.  
Effective: Summer 1996  
Prerequisite:

WF ED 450 (US;IL) **Cultural Diversity in the Workplace** (3) Provides opportunities for students to explore different cultures and mores that are changing the dynamics of the workplace.  
Effective: Fall 2006

WF ED 451 **Lean-Sigma for Professionals** (3) The course focuses on essential lean and six sigma concepts to improve processes in any industry.  
Effective: Summer 2013  
Prerequisite:

WF ED 471 **Training in Industry and Business** (3) Appraisal of training functions and development of competencies in work analysis, design, development, delivery, and evaluation of training.  
Effective: Spring 2001  
Prerequisite:

WF ED 495 **Internship** (1-6) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.  
Effective: Summer 1996  
Prerequisite:

WF ED 495A **Cooperative Education Practicum** (2) Validation of competencies learned in prerequisite courses during interaction with professional staff while functioning under the supervision of a certified cooperative coordinator.  
Effective: Summer 1996  
Prerequisite:

WF ED 495C **Student Teaching** (10) Supervised observation and practice teaching in approved vocational industrial schools/health occupations education settings.  
Effective: Spring 1997  
Prerequisite:

WF ED 495D **Instructional Internship in Industrial Training** (5) Supervised internship in industrial training. Interns will be expected to perform instructional duties in industrial environments.  
Effective: Summer 1996  
Prerequisite:

WF ED 496 **Independent Studies** (1-18) Creative projects, including research and design, which are supervised on an

individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1996

WF ED 497 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 1996

WF ED 498 **Special Topics** (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Effective: Summer 1996

WF ED 498A **Occupational Safety and Health for Workplace Professionals** (3) This five-day, 3-credit course can help you acquire the knowledge and skills you need to support a workplace free of occupational safety and health hazards. The curriculum meets requirements for OSHA-30 General Industry Safety and CPR and AED Training, as well as the safety elements of the approved program evaluation (PA 339 review) facilitated by the Pennsylvania Department of Education. Topics to be covered include: OSHA standards and inspections; worker rights and employer responsibilities; management of safety and health; hazard communication; industrial hygiene and blood-borne pathogens; ergonomics.  
Effective: Summer 2013 Ending: Summer 2013

WF ED 508 **Workforce Education Management** (3) Introduction to theories and concepts of managing workforce education programs in the public and private sector.  
Effective: Summer 1996

WF ED 518 **Curriculum and Instructional Leadership for Workforce Education** (3) Study of topics related to curriculum and instructional leadership in workforce education in the public and private sectors.  
Effective: Summer 1996  
Prerequisite:

WF ED 528 **Fiscal and Facilities Management for Vocational Administrators** (3) Sources of revenue, budget preparation, purchasing, and the management of physical facilities in vocational education.  
Effective: Summer 1996  
Prerequisite:

WF ED 538 **Administering Personnel Services in Vocational Education** (3) Planning and implementing staff development activities, student guidance services, admissions, student organizations, and placement.  
Effective: Summer 1996  
Prerequisite:

WF ED 540 **Data Analysis in Workforce Education and Development** (3) Provides opportunities to acquire and practice skills in descriptive and inferential statistics.  
Effective: Spring 1996

WF ED 542 **Social and Economic Foundations of Workforce Education and Development** (3) Review of labor force, demographic and economic concepts, measures, and models.  
Effective: Summer 1996

WF ED 543 **Evaluation of Investments in Workforce Education and Development** (3) Use of labor supply models to evaluate investments in workforce education and development.  
Effective: Spring 2011

WF ED 544 **Analysis of Policies for Workforce Education and Development** (3) Explores models and methods for analyzing policies for workforce education.  
Effective: Summer 1996  
Prerequisite:

WF ED 545 **Economic and Demographic Modeling of Policies for Workforce Education and Development** (3) Use of economic and demographic models to plan and evaluate workforce education and development.  
Effective: Summer 1996  
Prerequisite:

WF ED 546 **Work Based Education** (3) Discussion of legislation and educational requirements for education based at the worksite including cooperative education, youth apprenticeship, and apprenticeship programs.  
Effective: Summer 1996  
Prerequisite:

WF ED 550 **Research in Workforce Education** (3) Research techniques in workforce education.  
Effective: Summer 1996

WF ED 560 **Historical and Philosophical Foundations of Workforce Education** (3) An investigation of historical, philosophical, and professional foundations of workforce education.  
Effective: Summer 1996

WF ED 572 **Organization Development For Industrial Trainers** (3) An introduction to major concepts, skills and techniques required by industrial trainers to support and facilitate organization change.  
Effective: Summer 1996  
Prerequisite:

WF ED 573 **Needs Assessment for Industrial Trainers** (3) Acquire skills to identify training and development needs, distinguish problems with management versus training solutions, develop and evaluate training solutions.  
Effective: Fall 2001

WF ED 574 **Strategic Planning For Education For Work** (3) Study of human capital as a component of education, industrial and business training strategic planning at economy, and organizational levels.  
Effective: Summer 1996  
Prerequisite:

WF ED 575 **Current Policy and Practices in Industrial Training** (3) Analysis of training and development practices and their articulation with business practices.  
Effective: Summer 1996  
Prerequisite:

WF ED 578 **Process Consultation in Organization Development** (3) This course provides a foundation in process consultation. Process refers to how groups interact and how people get along.  
Effective: Summer 2013

WF ED 582 **Assessing Data: Organizational Diagnosis** (3) This course familiarizes students with approaches to assessing and feeding back data in organization development (OD) and consulting services.  
Effective: Summer 2013

WF ED 585 **Appraising Organization Change and Development and Consulting** (3) This course familiarizes students with approaches to evaluating organization development (OD) and consulting services.  
Effective: Summer 2013

WF ED 588 **Platform Skills for Human Resource Development Professionals** (3) Platform skills focuses on theory and practice related to delivering well-crafted and effective training presentations.  
Effective: Spring 2013

WF ED 590 **Industrial Training Professional Seminars** (1) Study of special topics relating to problems, practices, methodologies and special competency needs in industrial training.  
Effective: Fall 2001

WF ED 595A **Field Based Project in Industrial Training** (2-5) Students identify a training and/or organization development problem in industry and/or business and carry out contract problem analysis and resolutions.  
Effective: Fall 2001

WF ED 595B **Workforce Education Administrative Internship** (2-15) Supervised study with an administrator or researcher at a cooperating school, state governmental agency, or research institution.  
Effective: Summer 1996

WF ED 595C **Internship in Cooperative Vocational Education** (1-10) Validation of teaching and co-op coordinator competencies learned in prerequisite courses during interaction with professional staff while functioning under the supervision of a certified cooperative coordinator.  
Effective: Fall 1997  
Prerequisite:

WF ED 596 **Individual Studies** (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Effective: Summer 1996

WF ED 597 **Special Topics** (1-9) Formal courses given on a topic or special interest subject which may be offered infrequently.  
Effective: Summer 1996

WF ED 597A **Working Close Apart** (3) The purpose of this course is to provide experience with testing and implementing web-based applications that promote collaboration and communication at work. In modern, globally-networked workplaces, collaboration and communication can occur over distances and asynchronously.  
Effective: Summer 2013 Ending: Summer 2013

WF ED 597A **Scholarly Inquiry** (3) The purpose of this course are to help WF ED doctoral students: (a) initiate their programs of studies for doctoral degrees; (b) develop a working knowledge of the structure and processes for earning doctoral degrees at Penn State.

WF ED 597B **Diffusion of Innovations** (3) The course focuses on research and practice about getting new ideas adopted. It is designed for graduate students from any discipline who are interested in managing change. The problem of moving innovations into practice is common. Some of the diverse interest areas that might find value in this course include: health prevention and care, all forms of technology transfer, advertising and marketing, educational and behavioral change, lifelong learning, outreach and extension services, workforce and management development, and community development (just to name a few).  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

WF ED 598 **Special Topics** (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.  
Effective: Fall 2001

WF ED 600 **Thesis Research** (1-15) No description.  
Effective: Summer 1996

WF ED 601 **Ph.D. Dissertation Full-Time** (0) No description.  
Effective: Summer 1996

WF ED 602 **Supervised Experience in College Teaching** (1-3 per semester/maximum of 6) An opportunity for graduate students to teach a college level course under the supervision of an experience professor.  
Effective: Summer 1996

WF ED 610 **Thesis Research Off Campus** (1-15) No description.  
Effective: Summer 1996

WF ED 611 **Ph.D. Dissertation Part-Time** (0) No description.  
Effective: Summer 1996

WF ED 880 **Facilitating Groups and Teams** (3) This course provides students with necessary skills to facilitate small groups and teams.  
Effective: Summer 2013

WF ED 881 **Marketing Organization Development** (3) This course familiarizes students with the unique issues in marketing organization development (OD) and OD consulting services.  
Effective: Summer 2013

WF ED 883 **Organization Change and Development Interventions** (3) This course focuses on organization change and development interventions, where an intervention means a change effort.  
Effective: Summer 2013

WF ED 884 **Appreciative Inquiry** (3) This course provides a foundation in the theories, principles and techniques of Appreciative Inquiry (AI).  
Effective: Summer 2013

WF ED 886 **Laboratory in Organization Change and Development** (3) Students will work in teams to carry out an OD intervention in a field setting.  
Effective: Summer 2013

Last Import from UCM: July 13, 2013 3:00 AM





## Long Course Descriptions

### Accounting (ACCTG)

**ACCTG 403** Auditing (3) Financial compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses.

#### **ACCTG 403 Auditing (3)**

Financial statement, regulatory and contract compliance, internal and operational audits, professional standards and ethical conduct; statistical and judgmental sampling; the audit-impact of information technology; audit risk and internal control structure evaluation; application of procedures in transaction cycles; audit reporting; professional issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 403W** Auditing (3) Financial, compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses.

#### **ACCTG 403W Auditing (3)**

Financial statement, regulatory and contract compliance, internal and operational audits, professional standards and ethical conduct; statistical and judgmental sampling; the audit-impact of information technology; audit risk and internal control structure evaluation; application of procedures in transaction cycles; audit reporting; professional issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 404** Managerial Accounting: Economic Perspective (3) Accounting techniques as planning, control, and motivating devices in business and other organizations; accounting data for decision making and performance evaluation.

#### **ACCTG 404 Managerial Accounting (3)**

This course emphasizes the use of accounting information for internal purposes as opposed to the external disclosure focus of the financial accounting course. The cost covers the vocabulary and mechanics of cost accounting and the design of management accounting systems for planning and controlling operations, and for motivating personnel. The course integrates accounting with ideas from data analysis, decision analysis, finance, microeconomics, and operations management. The themes stressed throughout the course will be the notion that information is costly; the circumstances that necessitate cost allocation, the idea that different costs and different allocation schemes apply for different purposes; and fundamentals of incentive and compensation plans. Among the topics covered are cost behavior, cost-volume analysis, relevant costs, and the use of cost information for decision making. The course will rely on lectures and discussion of case studies.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 405** Principles of Taxation I (3) Elements of tax policy and tax-planning concepts for personal and business decision making; with emphasis on taxation of individuals.

#### **ACCTG 405 Principles of Taxation (3)**

Introduction to Taxation, is the first course that undergraduate accounting majors take that is devoted entirely to

taxation. Although the course is intended for accounting majors, the content is relevant to finance majors seeking elective courses. The objective of the course is to provide students with a basic understanding of the concepts, terminology, and decision-making skills specific to the discipline of taxation that are germane to the professional development of those preparing for a career in accounting. Although the course surveys the many forms of taxation that are found in industrialized societies, and the comparisons thereof, the main focus is on the federal income taxation of individuals. However, coverage is provided regarding the manner in which the taxation of individuals relates to corporate and partnership entities. ACCTG 405 is related to other accounting courses through its coverage of income concepts, and micro-economic principles. The former compares differences in the measurement of financial accounting income with the manner in which income is determined according to the tax laws. The latter emphasizes business decision-making principles that are important in the managerial portion of the accounting program. The course covers topics that illustrate fundamental tax strategies and how such enable taxpayers to achieve business and personal economic objectives. The assessment process in ACCTG 405 incorporates examinations, homework assignments, and individual and group projects. The exams are combinations of objective questions and open-ended problems. Exams are often given in the evening. Course learning aids include a text book, on-line tax research services, spreadsheet software, and a packet of handouts prepared by instructors to keep the classes updated on the many changes in the tax laws that occur each year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 406 Principles of Taxation II (3)** Impact of federal tax structure on business decisions, research methodology, tax planning; ethical considerations of tax practice.

### **Principles of Taxation II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 410 Federal Taxation II (3)** An examination of the rules and forms used to compute the federal tax liability of corporations and partners.

### **Federal Taxation II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 411 Accounting Practicum: VITA (3)** Introduces students to practical aspects of tax preparation through the IRS' VITA program and completion of a tax research project.

### **Accounting Practicum: VITA (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 422 Accounting Systems (3)** Understanding flow and documentation of accounting information and internal controls in the context of accounting cycles.

### **ACCTG 422 Accounting Systems (3)**

This course primarily investigates accounting transactions cycles-processes and procedures by which an organization's financial information is recorded, processed, reported, and disposed of. The processes covered in this course range from manual to fully automated and Web-enabled systems. The documentation and analysis of the accounting cycles for the revenue, expenditure, conversion, and managerial reporting areas are explored via flowcharts and narrative descriptions. The concepts of files, transaction updates, editing, and reporting in the automated accounting systems are explored. The course also covers internal controls in the manual and automated systems. Additional topics may include fraud examination, applicable laws and regulations, and computerized auditing.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 426** Financial Statement Analysis (3) The exploration of conventional and advanced methods of analyzing financial statements, including the assessment of earnings quality.

### **ACCTG 426 Financial Statement Analysis (3)**

The objective of this course is to explore conventional and advanced analytical methods of analyzing financial statements. Expanding on the material covered in the principles of accounting and principles of finance courses and using actual financial statements, students:

- review and apply the traditional methods for analyzing financial statements, such as ratio analysis, trend analysis, and common-size analysis,
- apply advanced tools for analyzing financial statements, such as financial distress prediction models and earning manipulation prediction models, and
- evaluate accounting policies and disclosures and their impact on the financial statements through the assessment of earnings quality.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 431** Advanced Auditing (3) Examination of legal liability, EDP, statistical sampling, SEC reporting, internal control, and financial reporting in specialized industries.

### **Advanced Auditing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 432** Accounting Information Systems (3) Systems analysis tools and techniques; internal control concepts; development of computer control procedures.

### **ACCTG 432 Accounting Information Systems (3)**

Accounting data are utilized as information in making decisions and as a control mechanism. The focus of this course, however, will be upon the actual production of accounting data.

The purpose of the course is to learn how accountants collect relevant data and transform them into reports appropriate for managers and external readers. Procedural details will focus first on the traditional accounting cycle and the journal entries for business transactions and events. Then we shall examine in detail the principle accounting cycles: sales cycle, cash receipts cycle, purchases cycle, cash disbursements cycle, payroll cycle, facilities cycle, general ledger cycle, production cycle.

For each cycle, you should be able to explain the relation of the accounting process to the business enterprise, the basic journal entries, the basic internal control features, and the document flow.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 440** Advanced Management Accounting (3) Management accounting topics such as decision models, quantitative techniques, variance analysis, and their use in accounting.

**ACCTG 440 Advanced Management Accounting (3)**

An in-depth examination of accounting techniques used within modern organizations. The course is designed for students interested in pursuing careers in corporate accounting or financial management.

The portfolio of managerial accounting procedures, including cost measurement and allocation, budgeting practices, transfer pricing, and variance analyses appropriate to an organization's unique circumstances are derived. The student will learn to apply psychological and sociological theories of behavior to practical problems of control and to apply quantitative methods and models to managerial decision-making. Other topics covered by the course may include, financial management of working capital, long-term assets and liabilities; techniques for managing inventory; and strategic cost management including inter-organizational cost management.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 440 Advanced Management Accounting (3)** Management accounting topics such as decision models, quantitative techniques, variance analysis, and their use in accounting.

**ACCTG 440 Advanced Management Accounting (3)**

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The portfolio of managerial accounting procedures, including cost measurement and allocation, budgeting practices, transfer pricing, and variance analyses appropriate to an organization's unique circumstances are derived. The student will learn to apply psychological and sociological theories of behavior to practical problems of control and to apply quantitative methods and models to managerial decision-making. Other topics covered by the course may include, financial management of working capital, long-term assets and liabilities; techniques for managing inventory; and strategic cost management including inter-organizational cost management.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 450 Advanced Accounting (3)** Accounting theory and practice for business combinations, branches, international operations, partnerships, consolidated financial statements, corporate liquidations, nonprofit organizations, estates, and trusts.

**Advanced Accounting (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 461 (IL) International Accounting (3)** Study of international accounting issues with emphasis on need, use, and interpretation of financial accounting required in global business environment.

**International Accounting (3)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 462 Governmental and Not-for-Profit Accounting (3)** Provides an understanding of governmental and

not-for-profit accounting theory, procedures, and financial statements.

### **Governmental and Not-for-Profit Accounting (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 463 Accounting Theory (3)** An analysis of the development of accounting theory and its current and future impact on accounting.

### **Accounting Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 471 Intermediate Financial Accounting I (3)** Theory and practice issues in income concepts and value measurement; GAAP; revenues, costs, assets, liabilities, and equities.

### **ACCTG 471 Intermediate Accounting I (3)**

This course provides students with an understanding of generally accepted accounting principles and procedures so that they properly account for and present information in financial statements prepared for external users. The student should acquire a complete understanding of the accounting issues relating to cash, receivables, inventory, plant assets, natural resources, and intangibles. The student should be able to evaluate alternative accounting methods and choose the methods which will best convey the financial information related to the above areas. The student should be able to apply appropriate generally accepted accounting principles and procedures to account for transactions related to the above asset areas. The student should be able to demonstrate an understanding of the transaction analysis, recording, classification, summarization, and reporting procedures in the accounting cycle, and an understanding of the information contained in the financial statements. Finally, student should be able to demonstrate written communication skills required of accountants.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 472 Intermediate Financial Accounting II (3)** Off-balance-sheet financing; special issues in cost capitalization, liabilities, and equities; matching; funds flow statements; statement analysis; inflation accounting.

### **Intermediate Financial Accounting II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 473 Advanced Financial Accounting (3)** Reporting for multi-corporate enterprises, business combinations, quasi-reorganizations, and selected contemporary reporting problems.

### **ACCTG 473 Advanced Financial Accounting (3)**

This course explores four major topics: accounting for business combinations, introduction to derivatives and special purpose entities, accounting for foreign currency transactions and consolidating foreign subsidiaries, and ethics and policy issues for the profession.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 481 Financial Statement Analysis: Accounting Based Evaluation and Decision Making (3)** An accounting based evaluation and decision making approach to analyzing financial statements by studying business and firm valuation.

### **ACCTG 481 Financial Statement Analysis (3)**

The proposed course in financial statement analysis is structured to improve the student's ability to extract and interpret information from actual financial statements and to expose the student to how financial statement information is integrated into equity valuation and credit analysis. The course would not only rely upon textbook-based and lecture-based learning, but also emphasize case-based learning.

The course will consist of two main sections. The first will deal with accounting and business analysis. This part will explore the types of financial information data typically available for publicly traded companies and introduce a model of the economic drivers of company performance. It would incorporate some technical accounting as well as some standards business economics/strategy concepts. Students will be forced to recast financial statements that they believe do not reflect the underlying economic state of the company. Financial reporting issues relating to revenue and expense recognition, leases and consolidations will be discussed.

The other section of the course will deal with firm valuation. Students would be exposed to some standard approaches to equity valuation and the analysis activities underlying these approaches. Aspects of valuation that would be covered in this section of the course are financial ratio analysis, forecasting, pro-forma statements, cost of capital and valuation methods.

The course will rely on lectures and extensive use of case studies.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 483 Forensic Accounting (3)** Study of investigative accounting, consulting and litigation support activities undertaken in forensic accounting engagements.

### **ACCTG 483 Forensic Accounting (3)**

ACCTG 483 is the exploration of the broad discipline known as "forensic accounting," which includes a variety of investigative accounting, valuation, damage assessment and litigation support services. Forensic accounting is an evolving discipline which is distinguished from assurance services in that it does not involve reporting on the fairness of financial statements. It generally involves the investigation and analysis of financial data for some specific purpose – obtaining an in-depth understanding of information that enables the forensic accountant to prove, disprove or at least confidently speculate about allegations related to the information and to report those findings objectively.

Forensic accountants are involved in presenting analyses that might be valuable for such things as settling legal disputes, calculating economic damages, valuing intellectual property, determining the extent of damage or loss due to fraud, or tracing elusive assets or revenue sources. A forensic accountant might also participate in pro-active engagements such as the development of systems and procedures to prevent fraud.

The first part of the course deals with the technical and ethical framework of forensic accounting and focuses on the understanding of forensic and investigative accounting including investigation methodology, the nature of fraud, fraud risk factors, financial statement fraud, litigation support and dispute resolution services and development of the skills needed in those professional activities. These skills include the ability to integrate knowledge of accounting, finance, economics, business law and other business disciplines in gathering, analyzing and evaluating evidence and drawing conclusions. The second part of the course focuses on forensic accounting investigation and analysis of financial information in connection with litigation, dispute resolution, estimation of economic damages, or other specific objectives, and the preparation of comprehensive, objective reports of findings and conclusions.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 489 Seminar in Accounting (3)** New trends and concepts in accounting; applications and impact on problem solving and decision making.

### **Seminar in Accounting (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 494H** Research Project (1-3 per semester/maximum of 6) Supervised student activities on research projects identified on an individual or small-group basis.

**ACCTG 494H Research Project (1-6)**

ACCTG 494H, Senior Honors Thesis in Accounting - Investigation of an original problem area associated with accounting, including literature review. A thesis topic must be approved and a thesis supervisor must be identified before the course may be scheduled. Students sign up for three credits in each of their last two semesters for a total of six credits.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 496A** Advanced Accounting (1-6) Accounting theory and practice for business acquisitions, consolidations, foreign currency, international operations and governmental accounting.

**Advanced Accounting (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 496A** Advanced Accounting (1-6) Accounting theory and practice for business acquisitions, consolidations, foreign currency, international operations and governmental accounting.

**Advanced Accounting (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 497A** Hot Tax Topics (3) The course will highlight principles and concepts in US international tax, trusts, and estates, and estate planning.

**Hot Tax Topics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 497B** Financial Reporting in Special Industries (3) Covers definitions, measurements and disclosures for revenues, expenses, assets, and liabilities not traditionally covered by financial accounting courses.

**Financial Reporting in Special Industries (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 497H** Sustainability (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Sustainability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest. .

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 501** Research Methods in Accounting (3) An introduction to the methods and techniques of contemporary research in accounting.

**Research Methods in Accounting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 504** Seminar in Managerial Accounting (3-6) Accounting and the managerial processes of planning, control, and decision making.

**Seminar in Managerial Accounting (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 507** Seminar in Financial Accounting (3) Theoretical basis of financial accounting.

**Seminar in Financial Accounting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 511** Financial and Managerial Accounting (3) Fundamental financial and managerial accounting concepts and issues from the viewpoint of the report user.

**Financial and Managerial Accounting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 512** Financial Accounting Theory and Reporting Problems (3) Measurement and reporting of financial information for external purposes, with particular attention to current problems in asset and income measurement.

**Financial Accounting Theory and Reporting Problems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 524** Managerial Accounting (3) Concepts and techniques of accounting for planning, control, and motivation.

**Managerial Accounting (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 550** Taxation and Management Decisions (2) Framework for understanding the effects of taxes on business decisions and for devising effective tax planning strategies.

**Taxation and Management Decisions (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 560** Accounting and Business Analysis (2) Develop ability to assess the relation between accounting data in financial statements and the economic fundamentals represented.

**Accounting and Business Analysis (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 596A** Managerial Accounting (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Managerial Accounting (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597A** Empirical Accounting Seminar (4) Seminar for 2nd year Accounting doctoral students.

**Empirical Accounting Seminar (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597A** Empirical Accounting Seminar (4) Seminar for 2nd year Accounting doctoral students.

**Empirical Accounting Seminar (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597B** Financial Reporting in Special Industries (3) Covers definitions, measurements and disclosures for revenues, expenses, assets, and liabilities, within industries not traditionally covered by financial accounting courses.

**Financial Reporting in Special Industries (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597D** Research Methods (1) Continuation course for ACCTG 501.

**Research Methods (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597E** Research Seminar in Analytical Modeling (4) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Research Seminar in Analytical Modeling (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597K** Advanced Empirical Accounting Seminar (4) Seminar for 3rd year Accounting doctoral students.

**Advanced Empirical Accounting Seminar (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 597K** Advanced Empirical Accounting Seminar (4) Seminar for 3rd year Accounting doctoral students.

**Advanced Empirical Accounting Seminar (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 599** (IL) Foreign Study--Accounting (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Study--Accounting (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) The student assists in teaching one of the following courses: Acctg. 16, 101, 104, 201, 202, 206, or 400.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 803** Forensic Accounting and Litigation Support (3) Study of investigative accounting, consulting and litigation support activities undertaken in forensic accounting engagements.

**Forensic Accounting and Litigation Support (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 806** Taxes and Business Planning (3) Effects of tax regimes on decision-making, tax planning and market outcomes. Also, ethics, tax research, and policy.

**Taxes and Business Planning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 873** Advanced Topics in Financial Reporting (3) Financial disclosure and reporting for complex business enterprises and activities; current issues in financial reporting.

**Advanced Topics in Financial Reporting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCTG 881** Financial Statement Analysis (3) Analysis of financial reports to identify business strategy, assess performance and economic standing, and value claims.

**Financial Statement Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Accounting - Behrend (ACNTG)

**ACNTG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### Individual Studies (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACNTG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Accounting-CI (ACCT)

**ACCT 501** Financial Statement Analysis (3) Study of financial reporting, financial statement analysis, capital markets, asset pricing and impact of ethical, legal, regulatory and environmental concerns.

### Financial Statement Analysis (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 504** Auditing Theory and Practice (3) Auditing theory pertaining to the regulatory environment, risk assessment, internal controls, materiality, computerization, analytical procedures, sampling, fraud, ethics, and professional responsibilities.

### ACCT 504 Auditing Theory and Practice (3)

This course provides in-depth coverage of the theory and practice of auditing. Topics may include the regulatory environment, risk assessment and planning, internal controls, materiality, computerized auditing, analytical procedures and sampling, accounting fraud, ethics and professional responsibilities. Students are expected to apply professional judgment in practical applications of course concepts, building on technical knowledge acquired in undergraduate accounting coursework.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 510** Business Tax Planning Theory and Practice (3) Tax theory pertaining to corporations, partnerships and conduit entities, estates, trusts, ethics, and professional tax responsibilities.

### ACCT 510 Business Tax Planning Theory and Practice (3)

This course provides in-depth coverage of the theory and practice of tax planning for corporations, partnerships and other related pass-through entities. Topics will include tax research, corporate formation and capital structure, corporate non-liquidating distributions, corporate acquisitions and reorganizations, consolidated tax returns, partnership formation and operation, special partnership issues, S corporations, taxation of gifts, estates and trusts, and professional responsibilities and ethics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 540** Accounting for Managerial Decisions (2) Application of accounting to monitoring and improving the internal operation of an organization.

### **ACCT 540 Managerial Accounting (3)**

Accounting is the language of economic activity. Managers in all organizations - business, government, and not-for-profit - use accounting information to make decisions. As such, managerial accounting is an important competency area for MBA graduates.

Managerial Accounting addresses resource-related questions from a cost perspective. Relevant issues include resources consumed and the related cost of producing goods and providing services, and the effectiveness and efficiency of resource usage.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 545** Strategic Cost Management (3) Current managerial accounting topics such as activity-based costing, theory of constraints, performance measures and their use in organizations.

### **Strategic Cost Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 561** Financial Statement Analysis II (3) The exploration of conventional and advanced methods of analyzing financial statements, including earnings quality and financial distress assessment.

### **ACCT 561 Financial Statement Analysis II (3)**

The objective of this course is to explore conventional and advanced analytical methods of analyzing financial statements. Expanding on the material covered in a financial accounting or financial statement analysis course and using actual financial statements, students:

- review and apply the traditional methods for analyzing financial statements, such as ratio analysis, trend analysis, and common-size analysis
- apply advanced tools for analyzing financial statements, such as financial distress prediction models and earning manipulation prediction models
- evaluate accounting policies and disclosures and their impact on the financial statements through the assessment of earnings quality

Evaluation methods include case studies of actual companies and a comprehensive project to analyze the financial statements of a publicly-traded company. This course typically will be offered once a year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**ACCT 571 Strategic Tax Planning (3)** Study of strategic aspects of tax for planning business operations, growth, expansion, capital transactions, and transfer of wealth.

### **ACCT 571 Strategic Tax Planning (3)**

The objective of this course is to provide a framework for understanding the strategic impacts of tax-related decisions for new and existing businesses. Emphasis is placed on the managerial implications of tax planning and decisions with respect to operations, growth and expansion, capital transactions and the transfer of wealth. Six topics will be covered. These areas are as follows:

- (1) Strategic Tax Planning - Review of net present value and impact of taxation on maximization of wealth.
- (2) Tax Strategies for New Businesses - Exploration of choice of organizational form and compensation arrangements.
- (3) Business Operating Strategies - Study of the impact on the routine conduct of business of tax and accounting issues such as obtaining tax incentives, use of conduit entities and distributing cash and property.
- (4) Strategies for Business Growth and Expansion - Consideration of the tax consequences of operating with multiple entities in multiple jurisdictions.
- (5) Business Capital Transactions - Examination of the tax consequences of corporate reorganizations, mergers, acquisitions, divisions and liquidations.
- (6) Personal Wealth Planning - Explanation of the consequences of gift and estate taxes on the accumulation of family wealth.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 572 Financial Reporting I (3)** Accounting theory and practice for reporting consolidations, foreign currency transactions, and preparing financial statements for governmental and NGOs.

### **ACCT 572 Financial Reporting I (3)**

This course covers accounting theories and procedures as they pertain (a) to the preparation of financial statements for consolidated entities, (b) to the use of foreign currency and (c) to the financial reporting of activities of governmental and of not-for-profit entities. Contemporary reporting issues are reviewed and explored.

This course may utilize textbooks, lectures and/or cases. It is guided by financial reports. It explores the means of preparing certain financial statements and the ways of interpreting them. This course is recommended for students who did not take Advanced Accounting and/or Governmental Accounting at the undergraduate level.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 573 Financial Reporting II (3)** Topics involving consolidated financial statements, special purpose entities, derivative financial instruments, and use of the Financial Accounting Research System (FARS).

### **ACCT 573 Financial Reporting II (3)**

This course covers (a) advanced topics related to the preparation of consolidated financial statements, (b) accounting for derivative financial instruments, (c) accounting for off-balance sheet financing and special purpose entities, and (d) the use of the Financial Accounting Research System (FARS) to explore advanced financial reporting issues.

This course relies upon textbooks-based, lecture-based, and case-based learning. It is guided by financial reports. It explores the means of preparing certain financial statements and the ways of interpreting them. It is assumed that students taking this course have either completed ACCT 572 or have completed courses providing significant coverage of consolidations, foreign currency transactions, governmental accounting and not-for-profit accounting at either the undergraduate or graduate level.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 574** Accounting and Management Control Systems (3) Study of theories, practices and issues associated with accounting and management control as reflected in relevant literature.

**ACCT 574 Accounting and Management Control Systems (3)**

Objective setting, strategy formulation, and control are three key management processes. This course focuses exclusively on control. The attributes of good control systems and poor control systems are identified. Basic types of controls are studied and by studying cases the applications of controls are considered relative to various settings.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 596** Individual Studies (1-9) Creative projects, including research and design, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACCT 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Acoustics (ACS)**

**ACS 402** Introduction to Acoustics (3) Basic principles of acoustics and perception of sound; fundamentals of applications: electroacoustic transducers, noise measurement and control, architectural and building acoustics, underwater sound. Offered for science and engineering majors.

**Introduction to Acoustics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 501** Fundamentals of Acoustics I (2) Vibrational concepts of acoustics: natural frequency and modes, resonances of lumped parameter systems, strings, elastic rods, beams and membranes.

**Fundamentals of Acoustics I (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 502** Fundamentals of Acoustics II (2) Acoustical wave phenomena: propagation, transmission, reflection and energy; periodic and transient waves; plane, spherical, and standing waves.

**Fundamentals of Acoustics II (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 505** Experimental Techniques in Acoustics (2) Properties of acoustical and vibrational transducers, electronic and other instrumentation used in fundamental data measurement, acquisition and analysis.

**Experimental Techniques in Acoustics (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 511** Underwater Sound Propagation (3) Theoretical and empirical treatment of sound propagation in the ocean, including effects of the environment, characteristics of targets, and transducers.

**Underwater Sound Propagation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 513** Digital Signal Processing (3) Discrete linear systems, transforms, digital filter design and applications, discrete fourier transforms, spectrum analysis.

**Digital Signal Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 514** Electroacoustic Transducers (3) The theory, design, and calibration of passive, linear, reciprocal electroacoustic transducers for use in both air and water media.

**Electroacoustic Transducers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 515** Acoustics in Fluid Media (3) Wave propagation in stationary and moving fluids; acoustic radiation and scattering; standing waves in ducts and cavities.

**Acoustics in Fluid Media (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 516** Acoustical Data Measurement and Analysis (3) Presents the engineering applications of recent developments in correlation and spectral analysis to acoustical measurement problems.

**Acoustical Data Measurement and Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 519** Sound-Structure Interaction (3) Acoustic radiation from and effects of fluid-loading on vibrating infinite and finite plates and shells. Acoustic transmission through and reflection from elastic plates and shells, acoustic excitation of elastic plates and coupling between panels and acoustic spaces.

**Sound-Structure Interaction (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 521 (E MCH 521) Stress Waves in Solids (3)** Recent advances in Ultrasonic Nondestructive Evaluation: waves; reflection and refraction; horizontal shear; multi-layer structures; stress; viscoelastic media; testing principles.

### **Stress Waves in Solids (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 530 Flow-Induced Noise (3)** Introduction to the basic and applied aspects of flow-induced noise created by subsonic flows of various complexities.

### **ACS 530 Flow-Induced Noise (3)**

The objective of this course is to introduce the basic and applied aspects of flow noise created by subsonic flows of various complexities. Basic concepts of noise and pressure fluctuations induced by unsteady fluid flows are discussed, including theoretical as well as experimental approaches. For a given class of flow, mechanisms for the creation of unsteady wall pressures and forces, radiated sound, and fluid-structure interactions are detailed. Various prediction schemes are presented which range from purely theoretical to empirical. The intent is to keep the material practical while at the same time introducing the student to a wide variety of specific topics. Some of the topics to be presented include: basic fluid mechanics, fundamental flow noise theory, flow noise measurement issues including wave vector-frequency spectral estimates of unsteady pressures and forces, compact Green's functions, unsteady forces and noise created by bluff bodies in flow, vortex shedding noise, wall pressure fluctuations and acoustics associated with turbulent boundary layers, including separated layers and transition zones, unsteady forces and noise due to flow over lifting surfaces, edge acoustic scattering mechanisms, axial-flow fan noise, rotor/flow interactions, turbulence ingestion, centrifugal blower noise, and noise generated by flow in pipes. The prerequisite for this course is a solid understanding of the fundamentals of acoustics, as demonstrated by successful completions of ACS 501 and 502. Students with a minor in Acoustics from accredited universities may also have the proper background to take this course. Although basic fluid mechanics is covered in the course, any previous courses or experience in this area will be beneficial. Homework problems will be assigned weekly and graded. Some of the homework may involve reading technical papers and providing a written synopsis. The average of all homework grades will constitute one-third of the final course grade. Another third will come from the mid-term exam and the final third from the final exam.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 537 Noise Control Engineering I (3)** As the first of three courses, this course provides an orientation to the program and covers fundamentals of noise control.

ACS 537

### **ACS 537 Noise Control Engineering I (3)**

This course will introduce students to the application of acoustic and vibration fundamentals to the analysis and reduction of noise and vibration problems in industrial and residential settings. Topics will include: source-path-receiver model, human hearing and psychoacoustics, human response to noise and vibration, sound quality metrics and criteria for quantifying noise, acoustic standards related to noise and vibration control, instrumentation for measuring and analyzing noise and vibration, noise sources (distributed sources, impact sources, flow noise), absorption (materials, measurement, placement), control of sound in large and small rooms, partitions and barriers, mufflers, and vibration control techniques. Homework will combine

problem solving with analysis of case studies. Group projects may be used to encourage collaborative approaches to problem solving.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 573 (M E 573) Designing Quiet Structures (3)** Course integrates structural dynamics, acoustics and optimization into unified method for designing quiet structures virtually for early product development.

### **ACS (M E) 573 Designing Quiet Structures (3)**

During the past decade, several Mechanical & Nuclear Engineering faculty have been developing a broadly applicable methodology for the acoustic design of structures. The method integrates the disciplines of structural dynamics, acoustics and optimization into a unified approach that allows designers the possibility of including sound as a parameter in the early stages of product development. This course is designed as an introduction to this unique design method.

The format of the teaching style is a series of modular lectures each supplemented with an experiment (either numerical or physical) that students perform in teams. Because of the multidisciplinary nature of the course, the composition of the teams is balanced to ensure that at least one team member has a solid background in one of the three disciplines to be covered.

All of the experiments center on the problem of controlling the sound power spectrum of a structure via material tailoring, e.g., adding trim elements such as mass, stiffness, damping or dynamic absorbers. In particular, each team is asked to modify the acoustic signature of a selected structure to minimize its sound power radiation within a given frequency band. Optimization search routines identify the optimal location and size of the trim elements to give the best fit to the prescribed objective function.

Dedicated computer programs are available to students enrolled in this course.

Students are evaluated through individual and group homework assignments, in-class participation and activities, and a group project report and presentation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 596A** Propagation Uncertainty Analysis (4) Model assessment of uncertain acoustic propagation models including genetic algorithm methodologies.

**Propagation Uncertainty Analysis (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 597A** Fundamentals of Acoustics (3) Vibration concepts of acoustics; natural frequency and modes, resonances of lumped parameter systems, strings, elastic rods, beams and membranes.

**Fundamentals of Acoustics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 597B** Acoustics in Fluid Media (3) This course lays the fundamental groundwork for the propagation of acoustic waves in fluids. Topics include: basic equations of fluid dynamics, acoustic lumped elements, speed of sound, linear acoustic wave propagation, plane and spherical waves, radiation of sound from sources and arrays, sound intensity and power, reflection and transmission of sound at boundaries, absorption of sound, normal modes in rooms, propagation of sound in pipes and acoustic filters.

**Acoustics in Fluid Media (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 597C** Marine Bioacoustics (3) The role of acoustics in studying biology-related topics in the marine environment. Topics include underwater sound propagation, major groups of sound producing marine organisms, marine organism sound production and reception, marine noise and its effects on marine life, and the use of both passive and active sound for remote sensing of marine organisms. Integrated activities and problem-based assignments will provide an interactive learning experience.

**Marine Bioacoustics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 600 Thesis Research (1-15)** No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 601 Ph.D. Dissertation Full-Time (0)** No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 610 Thesis Research Off Campus (1-15)** No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ACS 611 Ph.D. Dissertation Part-Time (0)** No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Adult Education (ADTED)**

**ADTED 456 Introduction to Family Literacy (3)** Explores comprehensive family literacy models, focusing upon families, services, outcomes, and roles and responsibilities of individuals, organizations, and communities.

**ADTED 456 Introduction to Family Literacy (3)**



Introduction to Family Literacy is one of the five 3-credit courses in the 15-credit Certificate in Family Literacy developed by the Goodling Institute for Research in Family Literacy in the College of Education in partnership with the National Center for Family Literacy (Louisville, KY). It is offered both summer and fall semesters to about 20 students per class. The course is 15 weeks in length, entirely online, and cohort-based. Study materials are both web- and print-based. Students work in teams for most of their assignments although they are also expected to produce a portfolio of individual application activities. An Associate's Degree or 60 baccalaureate credits at an accredited institution are required to enter the course. Technological requirements, registration, and other support are provided.

This course provides opportunities for students to discover and analyze comprehensive family literacy within a model centered on how services evolved out of a need to break the cycle of intergenerational poverty and under-education.

Course objectives include to: (1) Identify the qualifying and distinguishing characteristics of families for whom comprehensive family literacy services are designed. (2) Describe ways in which comprehensive family literacy programs are designed to meet individual family needs. (3) Analyze the influence unique family and community characteristics have on family literacy programs and student learning. (4) Identify key characteristics and quality standards for Adult Education, Children's Education, Parent-Child Interactive Literacy, and Parenting Education. (5) Communicate an awareness of the characteristics of comprehensive family literacy as described in the federal definition. (6) Communicate an understanding of component integration and its importance. (7) Communicate an understanding of how to network with external agencies for program participant referral and services. (8) Describe key roles and responsibilities of family literacy staff. (9) Communicate an understanding of program tools for assessment, evaluation and reporting. (10) Analyze a family literacy site and develop plans intended to impact quality within that program that help family participants identify and meet their individual goals.

Based on criteria provided in rubrics, students are evaluated on weekly individual activities, collaborative team assignments, and various components of an individual final project. In addition to evaluation of these student assignments, each student is assessed on participation in team and whole-class discussion groups, and contributions to team effectiveness for completing assignments. Feedback is provided for each submitted assignment, using a rubric with instructor comments added.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 457 Adult Literacy (3)** Surveys adult basic and literacy education programs and best practices; applies recent research on adult and family literacy.

### **ADTED 457 Adult Literacy (3)**

Adult Literacy is one of the five 3-credit courses in the 15-credit Certificate in Family Literacy developed by the Goodling Institute for Research in Family Literacy in the College of Education in partnership with the National Center for Family Literacy (Louisville, KY). It is offered during the summer and fall semesters to about 20 students per class. The course is 15 weeks in length, entirely online, and cohort-based. Study materials are both web- and print-based. Students work in teams for most of their assignments although they are also expected to produce a portfolio of individual application activities. An Associate's Degree or 60 baccalaureate credits at an accredited institution are required to enter the course. Technological requirements, registration, and other support are provided.

The overarching course objectives are to equip students with the knowledge and skills to:

- a) develop meaningful instruction for adult literacy learners.
- b) Deliver basic skills instruction, using methods that enhance the learning of individual adult learners.
- c) Encourage and guide adult learners in developing skills that promote lifelong learning.

Students set their own learning goals within the parameters of the course objectives. This allows students to focus their learning in a direction that best addresses their own adult literacy interests. Student goals, in turn provide the basis for the course project, which is a learning portfolio. Students define the purpose of their portfolio and develop the criteria that will be used to evaluate their learning outcomes. The course portfolio provides students with a means to learn about integrating assessment into teaching/learning. It also puts into practice many aspects of adult learning theory. Portfolios include course assignments that involve student research and require student-developed lesson plans. In addition, students are required to create their own portfolio work to demonstrate their learning as it relates to their portfolio goals.

Students are also required to participate in group discussions and two team tasks. Group discussions are designed to enhance learning through the sharing of information and perspectives on a variety of adult literacy topics. Team tasks serve two purposes: (1) students are given a topic to research and present to the class and (2) students experience a powerful teaching method and are required to evaluate their group process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 458** Early Literacy Development and Parental Involvement (3) Focuses on young children's language and literacy development, including parental and staff support, grounded in scientifically based reading research.

**ADTED 458 Early Literacy Development and Parental Involvement (3)**

Early Literacy Development and Parental Involvement is one of the five 3-credit courses in the 15-credit Certificate in Family Literacy developed by the Goodling Institute for Research in Family Literacy in the College of Education in partnership with the National Center for Family Literacy (Louisville, KY). It is offered during the summer and fall semesters to about 20 students per class. The course is 15 weeks in length, entirely online, and cohort-based. Study materials are both web- and print-based. Students work in teams for most of their assignments although they are also expected to produce a portfolio of individual application activities. An Associate's Degree or 60 baccalaureate credits at an accredited institution are required to enter the course. Technological requirements, registration, and other support are provided.

This course focuses on young children's language and literacy development, including ways that parents and staff support this development, research related to children's learning, and ways in which family literacy supports early literacy development.

Course objectives include to: (1) Identify personal theories regarding children's reading, writing, and language and literacy development, reading and writing. (2) Know what research indicates regarding children's reading, writing, and language and literacy development. (3) Apply research to practice. (4) Know areas of language and literacy development and ways that adults support it. (5) Plan ways teachers can support language and literacy development, including within the realms of goal setting, the teaching/learning cycle, the learning environment, routines, and interactions. (6) Plan ways to inform and support parents. (7) Modify and adapt in order to serve students of all abilities. (8) Understand integration and demonstrate the integration of language and literacy learning across components. (9) Demonstrate ways language and literacy development informs interactive learning between parents and children and parenting education.

Based on criteria provided in rubrics, students are evaluated on weekly individual activities, collaborative team assignments, and various components of an individual final project. In addition to evaluation of these student assignments, each student is assessed on participation in team and whole-class discussion groups, and contributions to team effectiveness for completing assignments. Feedback is provided for each submitted assignment, using a rubric with instructor comments added.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 459** Interactive Literacy: Parents and Children (3) Focuses on literacy and language interactions between parents and their young children (including English language learners), implementing intentional/planned learning.

**ADTED 459 Interactive Literacy: Parents and Children (3)**

Interactive Literacy: Parents and Children is one of five 3-credit courses in the 15-credit Certificate in Family Literacy developed by the Goodling Institute for Research in Family Literacy in the College of Education in partnership with the National Center for Family Literacy (Louisville, KY). It is offered during the summer and fall semesters to about 20 students per class. The course is 15 weeks in length, entirely online, and cohort-based. Study materials are both web- and print-based. Students work in teams for most of their assignments although they are also expected to produce a portfolio of individual application activities. An Associate's Degree or 60 baccalaureate credits at an accredited institution are required to enter the course. Technological requirements, registration, and other support are provided. The courses focuses on the component of family literacy in which the low-literate parents engage in language and literacy development activities with their young children (birth to age 8). During interactive literacy the teachers both model and supervise the literacy interactions. Students learn to use planned and intentional activities that are developmentally appropriate for the children. They also learn how to teach the parent the necessary interaction skills as well as how to debrief the parents afterwards. They also learn how to assess the literacy interactions between parents and their children.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 460** Introduction to Adult Education (3) History, methods, agencies, program areas, and problems of adult education in the United States.

**Introduction to Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 470** (CI ED 470) Introduction to Distance Education (3) An introduction to the history, philosophy, organizations, learning theories, and instructional procedures used in American and foreign distance education.

### **Introduction to Distance Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 496** Independent Studies (1-18) Creative projects supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 497** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 501** Foundations of Medical Education (3) This course provides an overview of medical education, and considers how it operates as a specific form of adult education.

### **ADTED 501 Foundations of Medical Education (3)**

The primary focus of this course is to explore the foundations of medical education by providing an overview of medical education, and considering how medical education operates as a specific form of adult education. It is especially relevant to educators working with adult learners in medical education, nursing education, or health education. More specifically, the course will focus on how insights from adult learning theory can contribute to the theory and practice of medical education in designing curriculum and developing an appropriate pedagogy in both classroom and clinical teaching contexts. It will examine recent and future trends in US medical education in light of the context of: the guidelines of the American Association of Medical Colleges (AAMC); the current health care system; and comparative trends in medical education in other countries. The course will examine research in medical education, and help students focus on the connections of research and educational philosophy/theory with developing their own teaching practice in medical education in classroom settings (face to face and online), and in clinical teaching settings. Finally, it will briefly explore trends in medical education assessment, and issues in continuing medical education.

Objectives are:

1. To provide an overview of the foundations of Medical Education as Adult Education

2. To consider the development of medical education in light of its history and recent trends in health care in both a U.S. and international context
3. To analyze and discuss adult learning theory as related to medical education in both classroom and clinical settings
4. To examine some of the research in medical education assessment strategies used in evaluating medical education
5. To develop a philosophy of medical education that guides the development of curriculum and pedagogy in different medical education settings
6. To develop specific strategies for medical education teaching practice for both classroom and clinical contexts

In addition to ongoing participation, evaluation is predominantly based on the following:

1. A paper where students discuss their philosophy of medical education and what it suggests for curriculum development in light of course readings and class discussion
2. A collaborative book review and presentation of a recent book in medical education
3. A final paper or project exploring an issue in medical education in depth

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 502** Program and Instructional Design in Medical Education (3) This course focuses on program planning and instructional design in a medical setting with an emphasis on teaching with simulation.

#### **ADTED 502 Program and Instructional Design in Medical Education (3)**

Participants of this course will explore a variety of program and curriculum planning and instructional design approaches to teaching in a medical setting, with a particular emphasis on the use of simulation as an instructional design. Program planning is informed by models from the adult education literature and curriculum planning informed by the field of medical education which will provide a framework for preparing participants in the assessing, planning, developing and evaluating simulations as an instructional design. The course will provide participants with the both theoretical understanding and direct practical experience so they are able to effectively plan and develop effective simulations for teaching in a medical setting. In addition, this course is taught in six sessions (9-5pm) which is a suitable format for teaching the content and the work schedule of medical students/faculty who will be taking this course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 505** The Teaching of Adults (3) Examination of direct and indirect teaching; contracts, application of current technology, andragogy, motivation, evaluation; knowledge of research.

#### **The Teaching of Adults (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 506** Program Planning in Adult Education (3) Intensive study of theoretical foundations, policies, evaluation models, methods, and materials in program planning in adult education.

#### **Program Planning in Adult Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 507** Research and Evaluation in Adult Education (3) Guided discussion and reading in selected research and evaluation methods and trends as applied in adult education settings.

### **Research and Evaluation in Adult Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 508** (CI ED 508) Globalization and Lifelong Learning (3) Examination of globalization discourses and their relationships, implications and impacts on lifelong learning processes and contexts.

### **ADTED (CI ED) 508 Globalization and Lifelong Learning (3)**

The course is designed to help students to critically examine the nature and impacts of globalization on lifelong learning. The main goal is to enhance the students' ability to learn and work in a globalizing world and to challenge traditional perspectives about globalization and lifelong learning. As such, the course will adopt a critical perspective on globalization while helping the students to develop a reflective stance on the theory and practice of lifelong learning. A central focus of the course will be to develop a critical analysis that contributes to the building of a more active and socially responsible adult learner. Students will be evaluated using a number of assignments/projects. The major research paper, class presentation, two critiques of theories of lifelong learning, country profile of lifelong and a short reaction paper will count for 90% of the course grade. Class participation will be awarded 10%.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 509** (CI ED 509) Language, Literacy, Identity, and Culture in a Global Context (3) Examines the relationship between issues of language, identity and culture for adult learners in an increasingly global context.

### **ADTED (CI ED) 509 Language, Literacy, Identity, and Culture in a Global Context (3)**

This core required course provides graduate students in the ADTED Ph.D. program a critical overview of the literature, theories, and scholarship examining the complexities inherent in an increasingly diverse global and post-colonial sphere. Explorations of historical, theoretical, postcolonial perspectives will be the focus, as will the daily portrayals of diverse peoples by the media. Participants in the course will be expected to familiarize themselves with the readings portraying the complexities of ethnicity, indigeneity, race, gender, and social class. Evaluation will focus primarily on writing a scholarly paper, preparing video materials that illustrate the issues, writing their personal educational histories, and participating in class.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 510** Historical and Social Issues in Adult Education (3) Social and historical foundations of adult education in the United States and selected nations.

### **Historical and Social Issues in Adult Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 531** Course Design and Development in Distance Education (3) In depth study of the practices of designing

courses taught by print, broadcast, and telecommunications media to adult distance learners.

### **Course Design and Development in Distance Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 532** Research and Evaluation in Distance Education (3) Study of previous, current, and needed research strategies, and issues concerning evaluation in distance education.

### **Research and Evaluation in Distance Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 541** (WMNST 541) Women and Minorities in Adult Education (3) Seminar on women and minority adults as learners and leaders in the various contexts of adult education.

### **Women and Minorities in Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 542** Perspectives on Adult Learning Theory (3) Introduction to adult education learning theory, principles, and models of adult learning by adults alone, in groups, and in communities.

### **Perspectives on Adult Learning Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 549** (HI ED 549) Community Junior College and the Technical Institute (2-3) Distinctive contributions to meeting the need for postsecondary education; development, functions, curriculum and instruction, government, administration, and finance.

### **Community Junior College and the Technical Institute (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 550** Qualitative Research in Adult Education (3) Introduction to the theory, principles, and practice of qualitative research.

### **Qualitative Research in Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 551 Qualitative Data Analysis (3)** Students learn to analyze data qualitatively by engaging in, and continuously reflecting on the process.

### **ADTED 551 Qualitative Data Analysis (3)**

The course is designed for graduate students wishing to gain competencies in qualitative data analysis. It is especially suitable for students needing guidance in completing the data analysis phase of their masters' or doctoral research. The course takes a thoroughly hands-on, inductive approach. Students learn the skills and principles of qualitative data analysis by engaging in, and reflecting on, the process. Texts will be consulted, as needed, but only as resources to assist in the students' on-going work, not as blue prints to follow. Using their own data, the instructor will guide students in selecting and using appropriate strategies and techniques for qualitatively analyzing data. Students will work in teams. Each work team will make periodic progress reports - in the form of oral class presentations. It is expected that students will actively participate in class discussions and in their work teams. Each student will also submit a diskette that contains samples of the work he or she has generated while using qualitative data analysis computer programs. Each student will also submit a final paper that articulates what he or she learned about the qualitative data analysis process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 552 Participatory Action Research (3)** Examines origins, historical development, main characteristics, methodological assumptions and models, practice of participatory action research adult education and community development.

### **ADTED 552 Participatory Action Research (3)**

This course is designed to provide students with a critical overview of the theory and practice of participatory action research (PAR). The course begins with an examination of the meaning and nature of participatory action research. Related issues such as the major differences between PAR and the orthodox, traditional research paradigm will be discussed. This will be followed with a discussion of the historical roots of PAR and a critical examination of its epistemological assumptions and philosophical roots. The course will explore the various models of doing PAR with particular reference to the guidelines, phases, methods, and techniques. Finally, the course will critically examine a selected number of case studies from various regions. Students will be evaluated using a variety of assignments. The scholarly paper, a case study of PAR practice, annotated bibliography and three reaction papers will count for 90% of the course grade. Class participation will be awarded 10%.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 560 Teaching Reading to College Students and Adults (3)** Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

### **Teaching Reading to College Students and Adults (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 560 Teaching Reading to College Students and Adults (3)** Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

### **Teaching Reading to College Students and Adults (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 561 Family Literacy (3)** Examines the research related to the four components of family literacy, program effectiveness, and theoretical underpinnings.

**ADTED 561 Family Literacy (3)**

Open to graduate students who are interested in literacy, adult education, early childhood education, family studies, communication, and related fields, this 3-credit course provides a research-based study of family literacy. Family literacy comprises four components: Adult literacy instruction, early childhood education, parenting education, and parent - child interaction. Research about the four components and the program as implemented in the USA (primarily under the Goodling Even Start Act) and internationally will be studied in addition to the theoretical underpinnings of the concept of family literacy. Students will be required to conduct original or library research related to family literacy and present their findings both in class and in a written paper that could be publishable. Students may choose to do research related to the projects of the Goodling Institute for Research in Family Literacy in the College of Education; students' papers may have the opportunity to be disseminated through the Institute. The research project, presentation, and paper will be counted as 50% of the course grade. Class participation (including email discussion groups) will be awarded 20% of the course grade while the remaining 30% will be awarded to short reaction papers to the assigned readings.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 562 Politics, Language and Pedagogy: Applying Paulo Freire today (3)** Examines the work of Paulo Freire as it applies to community action projects.

**ADTED 562 Politics, Language, and Pedagogy: Applying Paulo Freire today (3)**

The life and work of Paulo Freire will be the focus of this advanced graduate seminar. Freire was one of the foremost Adult Literacy educators of our time. Graduate students participating in the course will read and reflect on his vision, his impact on scholarship, his impact on the daily-lived realities of diverse adult learners, and the implications for policy, praxis and community based action research. We will explore how elements related to his work such as conscientization, transformative action and pedagogy for liberation impact pedagogy and community action projects. The course will model the Freirian perspective by relying on critical dialogue, reflection, and the design of action projects. Readings will include Freire's books such as: Politics of Education, Letters to Cristina, Pedagogy of the heart, Pedagogy of the oppressed, Pedagogy of freedom, Teachers as cultural workers as well as Kaplan's Crazy for democracy. A media-rich presentation and paper are the major items to be evaluated along with class participation and other smaller assignments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 564 (CI ED 564) Social and Cultural Contexts of Learning and Work (3)** Examines the relationship between learning and work with special attention given to how certain forms of learning are legitimized.

**ADTED (CI ED) 564 Social and Cultural Contexts of Learning and Work (3)**

This course is designed to provide students with the knowledge and skills required to critically examine the concepts and meanings of learning and work and their relationship to community. The course focuses on formal, nonformal, informal, and incidental learning, with particular emphasis given to how different types of knowledge and different forms of learning are legitimized. The course will allow students to develop and understand the social context in which learning and work operate and how those concepts shape and impact the community. Students will write critiques of readings as well as a major literature review, participate in class discussion, and do a class presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 570 (CI ED 570) Comparative and International Adult Education (3)** Critical and comparative analysis of adult education theory and practice outside North America, including international agency involvement.

**Comparative and International Adult Education (3)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 572** (CI ED 572) Policy Studies in Lifelong Learning (3) Examine lifelong learning policies and the relationship between lifelong learning issues and problems, policy development, policy actors and institutional structures.

### **ADTED (CI ED) 572 Policy Studies in Lifelong Learning (3)**

The main purpose of the course is to help students develop a deeper understanding of the relationship between lifelong education issues, policymaking, and institutions and structures that support them. The course focuses on a critical examination of the policymaking structures and institutions in various regional contexts. The roles and impact of various policy actors are examined. Finally, the course will critically examine a selected number of case studies from various regions. Students will be evaluated using a variety of assignments. The term paper, a policy practice paper, annotated bibliography and two policy critiques will count for 90% of the course grade. Class participation will be awarded 10%.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 575** Administration of Adult Education (3) Organization of a program of adult education; legal status, finances, selection of teachers, learning personnel, housing; other administrative problems.

### **Administration of Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 580** Adult Education Research Seminar (1-3) A seminar dealing with specific research topics and methods in adult education. Open to advanced students in adult education.

### **Adult Education Research Seminar (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 588** Professional Seminar: Research and Adult Education (3) Review of research in adult education, current and past, with analysis of its directions, effects, methodology, quality, financing, and prospects.

### **Professional Seminar: Research and Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 595** Internship in Adult Education (3-9) Supervised student internship in adult education agency.

#### **Internship in Adult Education (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 596** Individual Studies (1-9) Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 597A** Doctoral Pro-Seminar in Adult Education (3) This course provides both an orientation to the field of adult education as an area of study and an initial seminar for doctoral students to understand the process of graduate study in this program.

#### **Doctoral Pro-Seminar in Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 597A** Doctoral Pro-Seminar in Adult Education (3) This course provides both an orientation to the field of adult education as an area of study and an initial seminar for doctoral students to understand the process of graduate study in this program.

#### **Doctoral Pro-Seminar in Adult Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 597B** The Modern Practice of Distance Education (3) Students will explore current practices and issues in DE including: the changing relationship between Adult Education and DE; the growth of DE and online education in particular including open educational resources, for-profit online education, and MOOCs (massive open online courses); the changing information technology landscape driving changes to DE; and the pedagogical organizational, instructional design and research challenges these changes create.

### **The Modern Practice of Distance Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 597C** (CI ED 597A) Multicultural Education Schools and the Workplace (3) Describes multicultural education as "an educational reform movement designed to increase educational equity for all students from diverse racial and ethnic groups, gender groups, exceptional students, and students from each social-class group."

### **Multicultural Education Schools and the Workplace (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 601** Ph.D. Dissertation Full-Time Ph.D. Dissertation research.

### **Ph.D. Dissertation Full-Time**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 601** Ph.D. Dissertation Full-Time Ph.D. Dissertation research.

**Ph.D. Dissertation Full-Time**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 602** College Teaching (1-3) Experience in teaching in the Adult Education Program.

**College Teaching (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 611** Ph.D. Dissertation Part-Time Ph.D. dissertation research

**Ph.D. Dissertation Part-Time**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ADTED 611** Ph.D. Dissertation Part-Time Ph.D. dissertation research

**Ph.D. Dissertation Part-Time**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Aerospace Engineering (AERSP)**

**AERSP 401A** Spacecraft Design--Preliminary (3) Conceptual and preliminary design of a spacecraft, its constituent subsystems, and related systems, to satisfy a given set of specifications.

### **AERSP 401A Spacecraft Design - Preliminary (3)**

AERSP 401A is the first of a two-semester sequence of senior capstone design courses. In this course, students will begin to learn the design process, complete a conceptual design, and to begin a preliminary design of a spacecraft, working in teams. This process is inherently multidisciplinary, requiring the use of engineering practices in such subjects as structures, dynamics, electrical and thermal systems, propulsion, controls, and information systems. In addition to the technical design content, this course seeks to enhance students' skills in verbal and written communications, ethical thinking, and the team approach to design, which is widely used in industry and government. Classes (115 minutes each,

twice weekly) include lecture and time for team meetings. Students are evaluated on the technical merit of the designs (presented in written and oral reports), as well as their ability to function on a team.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 401B** Spacecraft Design--Detailed (2) Detailed design of the constituent subsystems and related support systems for a spacecraft.

#### **AERSP 401B Spacecraft Design -- Detailed (2)**

AERSP 401B is the second of a two-semester sequence of senior capstone design courses. In this course, students work in teams, continuing the design process begun in AERSP 401A. This process is inherently multidisciplinary, requiring the use of engineering practices in such subjects as structures, dynamics, electrical and thermal systems, propulsion, controls, and information systems. In addition to the technical design content, this course seeks to enhance students' skills in verbal and written communications, and the team approach to design, which is widely used in industry and government. Classes (115 minutes each, twice weekly) include lecture and time for team meetings.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 402A** Aircraft Design--Preliminary (3) Conceptual and preliminary design of an aircraft, its constituent subsystems, and related systems, to satisfy a given set of specifications.

#### **AERSP 402A Aircraft Design -- Preliminary (3)**

AERSP 402A is the first of a two-semester sequence of senior capstone design courses. In this course, students will complete the preliminary design for an aircraft such that it satisfies the assigned specifications. Students completing this course will have the ability to design a system, component, or process to meet desired needs in aircraft systems; they will have the ability to function on multi-disciplinary teams; and they will have the ability to identify, formulate, and solve engineering problems. In addition, students will have the background to help determine what the ethical responsibilities are to themselves, to employers, and to society. Classes (115 minutes each, twice weekly) include lecture and time for team meetings.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 402B** Aircraft Design--Detailed (2) Detailed design of the constituent subsystems and related support systems for an aircraft.

#### **AERSP 402B Aircraft Design - Detailed (2)**

AERSP 402B is the second of a two-semester sequence of senior capstone design courses. In this course, students will complete the detailed design for an aircraft, and all of its constituent and related support systems, such that it satisfies the assigned specifications. Students completing this course will have the ability to design a system, component, or process to meet desired needs in aircraft systems; they will have the ability to function on multi-disciplinary teams; and they will have the ability to identify, formulate, and solve the associated engineering problems. Classes (115 minutes each, twice weekly) include lecture and time for team meetings.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 404H** Flight Vehicle Design and Fabrication II (3 per semester/maximum of 12) Project management, design, fabrication, aerodynamic and structural testing, and flight evaluation of an advanced composite flight vehicle.

**Flight Vehicle Design and Fabrication II (3 per semester/maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 405** Experimental Methods and Projects (3) Experimental methods involving a variety of aerospace engineering topics; teams of students focus on advanced measurement techniques and project engineering.

**AERSP 405 Experimental Methods and Projects (3)**

This is a senior-level elective laboratory course that builds on AERSP 305W "Aerospace Technology Laboratory." The first part of AERSP 405 addresses the engineering of typical data acquisition systems through a series of lectures and laboratory experiments. Data acquisition and processing are covered as they relate to a broad range of engineering experiments. Several sessions in the laboratory provide students with hands-on experience with data acquisition, followed by computer program exercises to complete the assignments. Initially the lectures are twice a week (75 minutes each). This activity comprises approximately 20 % of the total course.

The major portion of the course introduces students to "real-world" projects in engineering and laboratory research. Students work in teams to identify, formulate, plan and solve engineering problems associated with a design or system, the completion of an experiment, or an extensive computational simulation requiring a team of students. Teams of 2 to 4 students are assigned, following student input on preferences from a list of proposed projects. Students learn, through practice, the methodology of team project engineering. The teams each develop goals for the semester's project, performed following a careful work breakdown analysis with realistic time estimations and scheduling. Many of the projects involve the design and completion of an experiment. As part of the project, students will assemble, analyze and interpret relevant data, and prepare progress and final reports (written and oral). The reports should contain graphs that go with the text to provide the necessary data interpretation. The topics in the projects have application to a variety of research programs currently underway at Penn State. At the initiation of the project activity, lectures on principles of project planning including Gantt chart preparation, work breakdown structures and critical path considerations are presented. Common best practices for the preparation of project proposals, reports, presentations and general record keeping are discussed.

Overall meetings with the course instructor become bi-weekly once the projects are underway. Many of the projects also have knowledgeable graduate student or faculty consultants to assist with project planning and implementation. Project consultants conduct occasional individual review meetings with each team. Much of the project coordination work is undertaken within the regularly scheduled hours for the course. The class meetings include a combination of informal presentations by the students and, occasionally, the instructor on important technical issues. Considerable class time is spent discussing the goals and progress of individual tasks, and each student gives several brief oral presentations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 407** Aerodynamics of V/STOL Aircraft (3) Rotary wing aircraft; VTOL and STOL performance; propeller-wing combinations; jet flap; high lift devices.

**Aerodynamics of V/STOL Aircraft (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 410** Aerospace Propulsion (3) Analysis and performance characteristics of reciprocating engine, turbo-jet, turbo-prop, turbo-fan, ram-jets, and chemical rockets. Aerothermodynamics of inlets, combustors, and turbomachinery.

**Aerospace Propulsion (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 412** Turbulent Flow (3) Homogeneous turbulence; spectral transfer of energy, viscous dissipation; turbulent shear flow: mixing-length theory, eddy viscosity, scaling laws, energy budget.

### **Turbulent Flow (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 413** Stability and Control of Aircraft (3) Static and dynamic stability and control of aircraft; open and closed loop systems.

### **Stability and Control of Aircraft (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 420** Principles of Flight Testing (3) In-flight and analytical studies of airplane performance, stability, and control; reduction of data; instrumentation; flight test techniques.

### **Principles of Flight Testing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 423** Introduction to Numerical Methods in Fluid Dynamics (3) Finite difference methods applied to solving viscous/inviscid fluid dynamics problems, error control, numerical stability.

### **Introduction to Numerical Methods in Fluid Dynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 424** Advanced Computer Programming (3) Engineering and scientific programming topics: object oriented programming, parallel programming, and various modern languages (e.g. C++, Java, and Ada).

### **AERSP 424 Advanced Computer Programming (3)**

This course presents an advanced view of computer programming, mainly using Java, C++, and Ada95. The use of current operating systems (e.g. Linux and Unix) and compilers (e.g. gcc) will also be presented. Object Oriented Programming will also be discussed in detail. Object Oriented Programming is quite different than functional or procedural programming, and it is difficult to learn on your own. The differences and similarities between Java and C++ and Ada95 will also be discussed. Hands-on programming will be a key part of the course. This course is one of the Core Courses for the Graduate Minor in High Performance Computing, and will also be a technical elective in Aerospace Engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 425 Theory of Flight (3)** Advanced wing and airfoil theory, conformal mapping, slender body theory.

### **Theory of Flight (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 430 Space Propulsion and Power Systems (3)** Analysis and performance of chemical and nuclear rockets, electric propulsion systems. Introduction to solar, chemical, thermoelectric, and nuclear power sources.

### **Space Propulsion and Power Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 440 Introduction to Software Engineering for Aerospace Engineers (3)** Software engineering for safety- and mission-critical systems, including requirements, management, processes, designs, programming, validation/ verification, and other aspects of software development.

### **AERSP 440 Introduction to Software Engineering for Aerospace Engineers (3)**

This course is an introduction to software engineering. Software engineering includes all aspects of professional software production, and is especially important for safety-critical and mission-critical software. It includes documentation, management, processes, requirements, design models, computer programs, validation, verification, and other aspects of the development process.

Aerospace systems, including aircraft, spacecraft, onboard avionics, ground-based systems, flight simulators, and air transportation systems, rely heavily on software. Software is a major cost of all aerospace systems. For example, the Boeing 777 has more than 1000 onboard processors and more than 4 million lines of software which is primarily written in Ada. The F/A-22 fighter has more than 2 million lines of software onboard, and much of this is Ada also.

Aerospace systems also demand a level of reliability far beyond that of most other systems, which means the software must be designed using rigorous mission-critical and safety-critical procedures, which makes the software quite unique compared to most other software. The FAA and DOD are both involved in certifying aircraft software, for example, through the DO-178B and DOD-2168 standards.

This course is required option in Aerospace Engineering (take one of AERSP 440, E E 305, or E E 210). If not taken to satisfy that requirement, it can be used as a technical elective.

This course is a required option in Aerospace Engineering (take one of AERSP 440, E E 305, or E E 210). If not taken to satisfy that requirement, it can be used as a technical elective.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 450 Orbit and Attitude Control of Spacecraft (3)** Principles of mechanics and vector analysis applied to basic concepts of satellite motion and control, rocket ballistics, and gyroscopic instruments.

### **Orbit and Attitude Control of Spacecraft (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**AERSP 460 Aerospace Control Systems (3)** Design and analysis of feedback control systems for aerospace applications; stability, root locus, time- and frequency-domain, state-space methods.

### **AERSP 460 Aerospace Control Systems (3)**

This course is an introduction to the design and analysis of feedback control systems as applied to aerospace systems. The course covers control theory that is commonly used in the aerospace industry and presents practical applications of this theory to aerospace systems. The course does not emphasize rigorous mathematical derivation, but instead emphasizes the application of control theory. It provides a comprehensive overview of classical control theory and single-input/single-output (SISO) design methods. The course also presents an introduction to modern control theory and multi-input/multi-output (MIMO) design methods. Aerospace examples and applications are emphasized throughout the course.

The course builds upon a required junior-level course in system dynamics and controls (AERSP 304), which provides students with basic dynamic system theory and a brief introduction to feedback control. The course also supplements required senior-level courses in either aircraft or spacecraft dynamics (AERSP 413 and 450) which provides background on vehicle dynamics. AERSP 460 provides an additional level of depth in dynamics and control theory, and prepares students for entry-level work or graduate studies involving the design of automatic control systems for aircraft and spacecraft.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 470 Advanced Aerospace Structures (3)** Design and analysis of aerospace structures. Plates and sandwich panels; composite materials; structural dynamics; aeroelasticity; damage tolerance.

### **AERSP 470 Advanced Aerospace Structures (3)**

AERSP 470 covers important topics in aerospace structures beyond basic stress and deflection analysis of thin-walled beams. The objectives of the course are to help students: 1) appreciate the roles that structures and structural materials play in aerospace vehicles; 2) understand general design concepts for aerospace structures: vehicles, components, and materials; 3) develop the analysis tools and skills needed to analyze the static and dynamic performance of aerospace structures; and 4) gain experience identifying, formulating, and solving aerospace structural engineering problems.

AERSP 470 builds on structural, dynamics, and aerodynamics topics covered in PHYS 211, E MCH 011 & 013 (or 210), E MCH 215 & 216, AERSP 301, AERSP 306, and AERSP 304. It prepares students for entry-level work or graduate study in the analysis and design of aerospace structures. It also provides students with the strong background needed to contribute effectively to multidisciplinary trade studies in vehicle design activities.

AERSP 417 begins with a review of the general features of flight vehicle structures and aerospace structural design concepts. Then, the deflection and stress responses of flat plates and sandwich panels under lateral and in-plane loading are addressed. About a third of the course is devoted to the behavior of advanced composite panels, and another third to structural dynamics and aeroelasticity. The course finishes with treatments of joining and damage tolerance, both key topics with respect to the design of aerospace structures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 473 (E MCH 473) Composites Processing (3)** An introduction to the principles of mechanics governing manufacturing, computer-aided design, and testing of composite materials and structures.

### **Composites Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 490 (E E 471, NUC E 490) Introduction to Plasmas (3)** Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

### **Introduction to Plasmas (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 492** (E E 472) Space Astronomy and Introduction to Space Science (3) The physical nature of the objects in the solar system; the earth's atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

**Space Astronomy and Introduction to Space Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 494** Aerospace Undergraduate Thesis (1-3 per semester/maximum of 6) Individual problem investigations reported in written thesis and seminar lectures. Cooperative research with faculty guidance on topics of current interest.

**Aerospace Undergraduate Thesis (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 494H** Aerospace Undergraduate Thesis (1-3 per semester/maximum of 6) Individual problem investigations reported in written thesis and seminar lectures. Cooperative research with faculty guidance on topics of current interest.

**Aerospace Undergraduate Thesis (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 497A** Advanced Orbital Mechanics (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Advanced Orbital Mechanics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 497C** Wind Energy Engineering & Projects (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Wind Energy Engineering & Projects (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 497D** Special Topics in Aerodynamics (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics in Aerodynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 497I** Spacecraft/Environment Interactions (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Spacecraft/Environment Interactions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 504** Aerodynamics of V/STOL Aircraft (3) Jet wings, high lift devices, propellers and ducted propellers, circulation

and boundary layer control, unsteady airfoil theory.

### **Aerodynamics of V/STOL Aircraft (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 505** Aero- and Hydroelasticity (3) Interaction of elastic systems having several degrees of freedom with fluid flows in various configurations.

### **Aero- and Hydroelasticity (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 506** Rotorcraft Dynamics (3) Modeling and analysis techniques for dynamic response, vibration, aeroelastic stability, and aeromechanical stability of rotary-wing vehicles.

### **Rotorcraft Dynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 507** Theory and Design of Turbomachinery (3) Theory and principles of machinery design: compressors, turbines, pumps, and rotating propulsors; opportunity to work out design examples.

### **Theory and Design of Turbomachinery (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 508** Foundations of Fluid Mechanics (3) Mathematical review, fluid properties, kinematics, conservation laws, constitutive relations, similarity principles, the boundary layer, inviscid flow, vorticity dynamics, wave motion.

### **Foundations of Fluid Mechanics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1972

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 509** Dynamics of Ideal Fluids (3) Irrotational flow theory, two-dimensional and axisymmetric flows, airfoil theory, complex variables, unsteady phenomena; flow with vorticity, finite wing theory.

### **Dynamics of Ideal Fluids (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**AERSP 510** Compressible Flow (3) Classification and solution of compressible flow problems, high-speed gasdynamics, unsteady motion, transonic and hypersonic flows, atmospheric reentry.

**Compressible Flow (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 511** Aerodynamically Induced Noise (3) Review of fluid mechanics. General theory of aerodynamic sound. Noise radiation from jets, boundary layers, rotors and fans. Structural response.

**Aerodynamically Induced Noise (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 514** Stability of Laminar Flows (3) The stability of laminar motions in various geometries as influenced by boundary conditions and body forces of various kinds.

**Stability of Laminar Flows (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 518** Dynamics and Control of Aerospace Vehicles (3) Dynamical problems of aircraft and missiles, including launch, trajectory, optimization, orbiting, reentry, stability and control, and automatic control.

**Dynamics and Control of Aerospace Vehicles (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 524** (M E 524) Turbulence and Applications to CFD: DNS and LES (3) First of two courses: Scalings, decompositions, turbulence equations; scale representations, Direct and Large-Eddy Simulation modeling; pseudo-spectral methods; 3 computer projects.

**Turbulence and Applications to CFD: DNS and LES (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 525** (M E 525) Turbulence and Applications to CFD: RANS (3) Second in two courses: Scalings, decomposition, turbulence equations; Reynolds Averaged Navier Stokes (RANS) modeling; phenomenological models; 3 computer projects.

**Turbulence and Applications to CFD: RANS (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 526** (M E 526) Computational Methods for Shear Layers (3) Study of numerical solution methods for steady and unsteady laminar or turbulent boundary-layer equations in two and three dimensions.

### **Computational Methods for Shear Layers (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 527** (M E 527) Computational Methods in Transonic Flow (3) Numerical solution of partial differential equations of mixed type, with emphasis on transonic flows and separating boundary layers.

### **Computational Methods in Transonic Flow (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 530** Aerothermochemistry of Advanced Propulsion Systems (3) Physics and chemistry needed to analyze high performance rocket propulsion systems including reacting high temperature radiating gas and plasma flows.

### **Aerothermochemistry of Advanced Propulsion Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 535** (M E 535) Physics of Gases (3) An introduction to kinetic theory, statistical mechanics, quantum mechanics, atomic and molecular structure, chemical thermodynamics, and chemical kinetics of gases.

### **Physics of Gases (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 540** (NUC E 540) Theory of Plasma Waves (3) Solutions of the Boltzmann equation; waves in bounded and unbounded plasmas; radiation and scattering from plasmas.

### **Theory of Plasma Waves (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 550** Astrodynamics (3) Applications of classical celestial mechanics to space flight planning. Determination and construction of orbital parameters by approximation methods. Perturbation techniques.

### **Astrodynamics (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 560** Finite Element Method in Fluid Mechanics and Heat Transfer (3) Application of finite element techniques to viscous/unsteady fluid flow/heat transfer problems.

**Finite Element Method in Fluid Mechanics and Heat Transfer (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 571** (E MCH 571, M E 571) Foundations of Structural Dynamics and Vibration (3) Modeling approaches and analysis methods of structural dynamics and vibration.

**Foundations of Structural Dynamics and Vibration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 583** Wind Turbine Aerodynamics (3) Analysis of wind turbine performance, aeroacoustics, and loads; turbine selection for site-specific application.

**Wind Turbine Aerodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 597A** Advanced Experimental Methods and Projects (3) The goal of this course is to provide instruction in the advanced experimental methods used in a variety of research areas in Aerospace Engineering. Team projects will be chosen to design experiments and fabricate modifications to existing apparatus, conduct the experiments, process and interpret the data, and assemble progress reports and a final report.

### **Advanced Experimental Methods and Projects (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 597B** Rotorcraft Stability and Control (3) Development of a set of general equations of motion of a rotorcraft in maneuvering flight. The generalized trip problem. Linearized equations of motion and stability derivatives. Stability and control analysis of rotorcraft. Rotorcraft flight simulation. Handling qualities analysis and automatic flight control design for rotorcraft.

### **Rotorcraft Stability and Control (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 597D** Special Topics in Aerodynamics (3) Topics of subsonic aerodynamics.

### **Special Topics in Aerodynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 597G** GPS Theory and Application (3) GPS architecture, signals, measurement, performance and estimation of position, velocity and time. Augmentation such as differential GPS and carrier phase measurements.

### **GPS Theory and Application (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 597I** Spacecraft Environment Interactions (3) Aspects of spacecraft aerodynamics and interactions with the space environment; spacecraft design and the latest computational methods for calculating spacecraft aerodynamic forces and moments and thruster plume contamination.

### **Spacecraft Environment Interactions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in aerospace engineering courses.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**AERSP 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 880** Wind Turbine Systems (3) Wind turbine technology and the critical elements of turbine systems design.

**Wind Turbine Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 886** Engineering of Wind Project Development (3) An overview of the wind project development process and technical considerations for onshore and offshore applications.

**Engineering of Wind Project Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AERSP 897** Special Topics (1-9 per semester/maximum of 9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Afr Amer Studies (AF AM)**

**AF AM 401** Afro-American Studies Seminar (3) A seminar examining theoretical and methodological issues in Afro-American Studies.

**Afro-American Studies Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 409 (US)** (SOC 409) Racial and Ethnic Inequality in America (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

**Racial and Ethnic Inequality in America (3)**

General Education: None  
Diversity: US

Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 409U** (US) (SOC 409U) Racial and Ethnic Inequality in America (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

**Racial and Ethnic Inequality in America (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 410** Spirit, Space, Survival: Contemporary Black Women (3) How recent Black women have used spirit and space to survive.

**Spirit, Space, Survival: Contemporary Black Women (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 412** (US;IL) (THEA 412) African American Theatre (3) Exploration of the development of African American theatre from its roots in Africa through the Diaspora to the present time.

**African American Theatre (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 416** (US;IL) (S T S 416, WMNST 416) Race, Gender and Science (3) The class will focus on race and gender as products of science, and how societal values shape scientific activity.

**Race, Gender and Science (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 422** (US) (CAS 422) Contemporary African American Communication (3) A focused study on the continuities between African and African American culture and communication.

**Contemporary African American Communication (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 431** (US;IL) (HIST 431) Black Liberation and American Foreign Policy (3) This course deals with American foreign policy and Black liberation in Africa since 1945.

**Black Liberation and American Foreign Policy (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 432 (IL) (HIST 432) Between Nation and Empire: The Caribbean in the 20th Century (3)** An exploration of the political evolution of the Caribbean Region over the course of the 20th Century.

**Between Nation and Empire: The Caribbean in the 20th Century (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 445Y (US) (LER 445Y, PL SC 445Y) Politics of Affirmative Action (3)** Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S.

**Politics of Affirmative Action (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 460 (US;IL) (PHIL 460) African American Philosophy (3)** Major works by African American Philosophers, on topics of race, freedom, citizenship, nationhood, law and society.

**African American Philosophy (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 465 (US) (HIST 465) Civil Rights and American Politics 1933-1968 (3)** The civil rights struggle and its impact upon American politics.

**Civil Rights and American Politics 1933-1968 (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 469 (US) (ENGL 469) Slavery and the Literary Imagination (3)** The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans.

**Slavery and the Literary Imagination (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 494 Research Project (1-12 per semester/maximum of 12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 494H** Research Project (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 495** Internship (1-18 per semester/maximum of 18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships.

**Internship (1-18 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 496** Independent Studies (1-18 per semester/maximum of 18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 497** Special Topics (1-9 per semester/maximum of 9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 497C** Hurricane Katrina: Lessons & Legacy (3) Significance of Hurricane Katrina to national life. Disaster's impact on public culture, class, gender, and ethnic/race relations as depicted in media.

**Hurricane Katrina: Lessons & Legacy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 499** Foreign Studies (1-12 per semester/maximum of 12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 501** Seminar in African American Studies (3) A survey of the academic field of African American Studies.

**Seminar in African American Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 502** Blacks and African Diaspora (3) Seminar in the theory and history of Blacks in the African Diaspora.

**Blacks and African Diaspora (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 503** Sexual and Gender Politics in the African Diaspora (3) A seminar in the theory and history of sexual and gender politics in the Black Diaspora from the Colonial Era forward.

**Sexual and Gender Politics in the African Diaspora (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AF AM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## African Studies (AFR)

**AFR 405** African Studies Methodologies (3) Multidisciplinary research techniques for studying in and about Africa.

### African Studies Methodologies (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 434** (IL) (PL SC 434) War and Development in Africa (3) This course will examine the relationship between war and development in sub-Saharan Africa in the post colonial era.

### War and Development in Africa (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 440** (US;IL) (PL SC 440, I B 440) Globalization and Its Implications (3) This course explores the socioeconomic implications of globalization.

### Globalization and Its Implications (3)

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 443** (IL) (PL SC 443) Ethnic Conflict in Africa (3) This course explores the various causes and impacts of ethnic conflicts in the African context.

### Ethnic Conflict in Africa (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 446** (IL) (ART H 446) Topics in African Art (3 per semester/maximum of 9) Topics vary from "Arts of Eastern and Southern Africa" to "Art of West Africa."

### Topics in African Art (3 per semester/maximum of 9)

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Arts  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 447** (IL) (ART H 447) Topics in the Art of the African Diaspora (3 per semester/maximum of 6) Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

### Topics in the Art of the African Diaspora (3 per semester/maximum of 6)

General Education: None  
Diversity: IL

Bachelor of Arts: Other Cultures and Arts  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 454 (IL) (PL SC 454) Government and Politics of Africa (3)** Contemporary African Politics, institutions, and ideologies; patterns of change, social forces, and nation building in selected African states.

**Government and Politics of Africa (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 459 (IL) (PL SC 459) Culture and World Politics (3)** Role of culture in world politics.

**Culture and World Politics (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 464 (IL) (PL SC 464) Globalization, Extractive Industries, and Conflict in Africa (3)** Socioeconomic and environmental impacts of extractive industries in Africa.

**Globalization, Extractive Industries, and Conflict in Africa (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None



Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 501 Key Issues in African Studies (3)** A seminar to review leading issues in African Studies and African development.

### **Key Issues in African Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 527 (SOC 527) Migration, Urbanization, and Policy in the Developing World (3)** This course examines the dynamics of migration and urbanization processes, as well as their policy implications, in non-industrialized regions of the world.

### **Migration, Urbanization, and Policy in the Developing World (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 532 Environment and Livelihoods in Africa (3)** An enquiry into the relationships between the environment, resource control, resource conservation, rural livelihood systems and poverty in Africa.

### **AFR 532 Environment and Livelihoods in Africa (3)**

The seminar examines the relationships among the environment, resource control, conservation and rural livelihoods in sub-Saharan Africa. Readings will allow students to develop a critical understanding of the ideology and epistemology of environmental management, resource control, rural development and poverty in sub-Saharan Africa. Students will be encouraged to interrogate modernist doctrines such as population-environment narratives, poverty-stewardship narratives and related environmental ideologies/narratives that embody sustainability and rural (under)development in sub-Saharan Africa. Through case study examples, students will use these conceptual foundations to trace the relationships between sustainability and poverty in a number of livelihood systems and resource control regimes. Some examples are resource (land/water) management between the state and nomadic pastoral systems; land reform and rural peasant livelihood systems; mining and rural livelihood systems; and national parks, trans-frontier parks and rural livelihood systems.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 534** (PL SC 534) Political Economy of Energy and Extractive Industries in Africa (Oil and Mining) (3) Students will examine how the expansion of petroleum and mining industries has impacted Africa's political economies and external relations.

### **Political Economy of Energy and Extractive Industries in Africa (Oil and Mining) (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 537** (WMNST 537) Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship (3) A course about discourses of sexuality and gender in studies of Islam in Africa, with South Africa as a case study.

### **Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AFR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **African and African American Studies (AAA S)**

**AAA S 403** South Africa Today (3) A course examining the South African government's policy of apartheid: its history, why it exists, how it works, and the prospects for change.

### **South Africa Today (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**AAA S 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AAA S 530** Globalization in Africa (3) Students will examine globalization and its socioeconomic implications in Africa.

#### **AAA S 530 Globalization in Africa (3)**

The principal aim of this course is to examine how the post-Cold War episode of globalization has impacted the various aspects of Africa's socioeconomic development. The global socioeconomic system has undergone some notable changes over the last few decades. The bipolar configuration of global power has been radically altered, many former socialist countries have abandoned socialism in favor of the capitalist system, the welfare state has been weakened, and market-state relations have been radically reformulated. Liberalization of world trade and financial and investment systems has reorganized the global system of production and distribution. A homogenizing neo-liberal ideology has also risen to prominence. With these changes, the terms and conditions for Africa's integration into the global economic system have been modified. The continent's resources, especially oil have also attracted growing global attention. This course is designed to encourage students rigorously examine the implications of the new global order, which is widely known as globalization, on various aspects of Africa's socioeconomic development. Among the issues the course addresses are: state-society relations, state-building, governance and conflicts, human rights and investments on human development, land tenure systems and institutions of rural governance, and transformation of the subsistence peasantry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AAA S 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AAA S 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Agricult Biosecurity (AGBIO)**

**AGBIO 520** Agricultural Biosecurity: Protecting a Key Infrastructure (3) Course will explore intentional and unintentional threats to the agriculture- food system, history and current approaches for safeguarding this key infrastructure.

#### **Agricultural Biosecurity: Protecting a Key Infrastructure (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGBIO 521** (FD SC 521) Food Defense: Prevention Planning for Food Processors (3) Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply.

**Food Defense: Prevention Planning for Food Processors (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGBIO 594** Agricultural Biosecurity and Food Defense Capstone Experience (3) Culminating experience in the iMPS-HLS for the online Agricultural Biosecurity and Food Defense option.

**Agricultural Biosecurity and Food Defense Capstone Experience (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGBIO 801** (PATH 801) Veterinary Infectious Disease Diagnostic and Surveillance Systems (3) This course provides knowledge of diagnostic and surveillance systems used to detect infectious diseases and protect against animal agricultural biological attack.

**Veterinary Infectious Disease Diagnostic and Surveillance Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGBIO 802** (PPATH 802) Plant Protection: Responding to Introductions of Threatening Pests and Pathogens (3) This course provides knowledge of plant biosecurity, plant disease, regulations, and technologies using case study examples.

**Plant Protection: Responding to Introductions of Threatening Pests and Pathogens (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Agricultural Economics & Rural Sociology (AEREC)**

**AEREC 502** Economics of Natural Resources and Rural Development (3) Emphasis will be placed on the application of economic concepts to problems and policies in rural areas.

**Economics of Natural Resources and Rural Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 503** Agricultural Marketing (3) Economic analysis of food marketing firms and institutions; identification and measurement of dimensions of market performance; public policy.

**Agricultural Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 510** Econometrics I (3) General linear model, multicollinearity, specification error, autocorrelation, heteroskedasticity, restricted least squares, functional form, dummy variables, limited dependent variables.

**Econometrics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 511** Econometrics II (3) Stochastic regressors, distributed lag models, pooling cross-section and time- series data, simultaneous equation models.

**Econometrics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 519** Resource and Environmental Economics I (3) Theories and methods for economic analysis of natural resource and environmental policies with applications to current issues.

**Resource and Environmental Economics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 527** Quantitative Methods I (3) Quantitative techniques applied to agricultural economic issues.

**Quantitative Methods I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 533** (CEDEV 533) Rural Development Research Methods and Topics (3) Advanced theories and methods for rural economic development research.

**Rural Development Research Methods and Topics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 534** Agricultural Production Economics II (3) Current problems and methods of analysis in production economics research.

### **Agricultural Production Economics II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 536** Agricultural Commodity Markets (3) Specification, identification, and estimation of models for use in the evaluation and control of agricultural market behavior.

### **Agricultural Commodity Markets (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 541** Resource and Environmental Economics II (3) Key theories and analytical methods of resource and environmental economics.

### **Resource and Environmental Economics II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 550** International Economic Development and Agriculture (3) The economic development process with particular emphasis on agriculture.

### **International Economic Development and Agriculture (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of specific interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 597A** Applied Micro Econometrics (3) Advanced methods for analyzing micro-level economic data.

#### **Applied Micro Econometrics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 597B** Dynamic Production Analysis (1) The dynamic economic optimization is investigated given different primal and dual representations of the dynamic technology, with empirical implementation.

#### **Dynamic Production Analysis (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 597C** Micro Theory (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of specific interest.

#### **Micro Theory (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 597D** Renewable Resource Economics (1) The course will explore contemporary economic theory on the economic of renewable resources with an emphasis on biological populations.

### **Renewable Resource Economics (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 597E** Applied Microeconomic Theory (3) Microeconomic theory and concepts that provide a foundation for applied research and analysis.

### **Applied Microeconomic Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 598** Special Topics (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 599** (IL) Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 601** Thesis Preparation No description.

### **Thesis Preparation**

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEREC 611** Ph.D. Dissertation Part-Time No description.

**Ph.D. Dissertation Part-Time**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Agricultural and Biological Engineering (A B E)**

**A B E 500** (BRS 500) Research Methods (3) Foundation in research philosophies, methodologies, issues and policies; measures of research quality; critical thinking and discourse; research report writing; professional development; research ethics.

**A B E (BRS) 500 Research Methods (3)**

A B E/BRS 500 is a course designed to assist students entering and advancing in their research career to: better investigate and practice the art of scientific investigation; openly explore and discuss what it means to be a part of the scientific and research enterprise at a major academic setting; gain skills and experiences in critical evaluation and discourse; learn the process of developing and preparing a research proposal from initial concept to near-final written product; better understand the expectations for responsible and ethical conduct as a scientist/student/individual; and further develop their philosophies and capabilities as future scientists and professionals. During this course students will continually read, think, discuss, write, critique, re-read, re-think, re-write, and communicate with other students, faculty, and professionals. The course will provide a setting to allow them to further develop their personal, professional, academic, and scientific goals and capabilities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 500** (BRS 500) Research Methods (3) Foundation in research philosophies, methodologies, issues and policies; measures of research quality; critical thinking and discourse; research report writing; professional development; research

ethics.

### **A B E (BRS) 500 Research Methods (3)**

A B E/BRS 500 is a course designed to assist students entering and advancing in their research career to: better investigate and practice the art of scientific investigation; openly explore and discuss what it means to be a part of the scientific and research enterprise at a major academic setting; gain skills and experiences in critical evaluation and discourse; learn the process of developing and preparing a research proposal from initial concept to near-final written product; better understand the expectations for responsible and ethical conduct as a scientist/student/individual; and further develop their philosophies and capabilities as future scientists and professionals. During this course students will continually read, think, discuss, write, critique, re-read, re-think, re-write, and communicate with other students, faculty, and professionals. The course will provide a setting to allow them to further develop their personal, professional, academic, and scientific goals and capabilities.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 504 Mechanics and Properties of Particulate Materials (3)** Constitutive equations for cohesionless and cohesive particulate materials; measurement of properties; application to storage, flow, and consolidation.

### **Mechanics and Properties of Particulate Materials (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 513 Applied Finite Element, Finite Difference, and Boundary Element Methods (3)** Applications of numerical methods in the areas of structures, fluid dynamics, heat and mass transfer, and machine design.

### **Applied Finite Element, Finite Difference, and Boundary Element Methods (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 517 Surface Transport of Agricultural Pollutants (3)** Understanding and modeling the surface transport processes of agricultural pollutants; particularly erosion, sediment transport, and movement of sediment-attached constituents.

### **Surface Transport of Agricultural Pollutants (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 559 Biological and Agricultural Systems Simulation (3)** Continuous simulation modeling of biological and physical systems, numerical simulation techniques, validation and verification, difference measures, sensitivity analysis.

### **A B E 559 Biological and Agricultural Systems Simulation (3)**

This course enables the student to better understand system behavior and prediction, with a focus on biological and physical systems. Using a diagramming-based model development package and standard spreadsheet programs, the student will be able to: identify a system, labeling components, boundaries, and environment; represent a system in mathematical terms; develop a working simulation model; evaluate a model through statistical means. The applications used within this course are oriented towards graduate students in the Colleges of Agricultural Sciences and Engineering. The course is offered every Fall semester, with an expected enrollment of 10 students. Grading is based on homework and in-class assignments, and a final project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 562** (E MCH 562) Boundary Element Analysis (3) Numerical solution of boundary value problems using fundamental solutions; application to problems in potential theory, diffusion, and elastostatics.

### **Boundary Element Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 568** Food Safety Engineering (3) Predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, applied to plant layout, construction materials, and equipment design for microbial food safety.

### **A B E 568 Food Safety Engineering (3)**

This course introduces diverse topics in microbial food safety from an engineering perspective. Topics include the following: the roles of engineering, plant layout, construction materials, equipment design, predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, emergency contingency plans, and current responsibilities and regulations of federal agencies for food safety. Students will be evaluated through homework, exams, design project reports and presentations. The course will be offered every other Fall semester with expected enrollment of 10-15.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 589** Management and Design of Renewable Energy and Sustainability Systems (3) Real-world renewable energy systems projects using a systems analysis and case-study approach.

### **Management and Design of Renewable Energy and Sustainability Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in undergraduate Agricultural Engineering courses (1-499).

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 884** Biomass Energy Systems (3) Theories and applied technologies for production and conversion of biomass into energy and co-products.

### **Biomass Energy Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 885** Biomass Harvesting and Logistics (3) Biomass harvesting and handling scenarios and relevant cost analysis and systematic considerations.

### **Biomass Harvesting and Logistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 888** Conversion Technologies for Bioenergy Production (3) Applications of chemical, biochemical, thermochemical, and bioseparation technologies for the production of bioenergy.

### **Conversion Technologies for Bioenergy Production (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A B E 897** Special Topics (1-9 per semester/maximum of 15) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Agricultural and Extension Education (AEE)**

**AEE 400** Educational Programs in Agriculture for Developing Countries (3) Development and implementation of educational programs in agriculture in developing countries.

### **Educational Programs in Agriculture for Developing Countries (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 412** Methods of Teaching Agriculture and Environmental Science (4) Instructional strategies and media; directing individual and group learning activities; assessing student performance and quality of instruction in vocational agriculture.

**Methods of Teaching Agriculture and Environmental Science (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 413** Program Planning and Instructional Development (3-4) A course in planning, developing, and organizing school-based curriculum, summer programs, advisory councils, and facilities for environmental/ agricultural education.

**AEE 413 Program Planning and Instructional Development (3-4)**

Organization and administration of secondary programs of education in and about agricultural/environmental sciences, including Ag In The Classroom (Elementary School Agriculture), marketing, summer programs, and state vocational finances. Topics will include discussion of instructional techniques for secondary educators in agriculture, with emphasis on classroom management, discipline and motivation, and teacher evaluation.

The course is arranged in 10 units (for students who have completed AEE 100 as an undergraduate certification requirement) or 15 units (for returning adult students seeking certification who have already completed an Agricultural/Environmental Science undergraduate degree). Thus, this is a variable credit offering designed to meet the needs of these two groups of students.

In each unit there are objectives that need to be met by the students. The students "click" on the objective to open the lessons. Within the lessons are research materials, articles, textbook references (all copyright permission), additional WWW links, and other supporting resources. At the end of the article is an opportunity for students to enter the Penn State Coursetalk electronic "chat" room to engage in discussions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 434** Agricultural and Environmental Development (1-6) Intensive professional and technical treatment of various subject-matter fields to aid teachers in maintaining competence.

**Agricultural and Environmental Development (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 437 (AN SC 437)** Equine Facilitated Therapy (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

**AEE (AN SC) 437 Equine Facilitated Therapy (3)**

The primary goal of this course is to acquaint the participant to equine facilitated therapy (therapeutic riding) and to introduce them to individuals who benefit/participate in such programs through lecture, audio-visual media, discussions, program visitation, independent research and via a practicum at a therapeutic riding program. Additionally, this course is designed to introduce the participant to various exceptional characteristics and conditions which may benefit from exposure/participation in equine facilitated therapy and other animal related therapy programs.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 437 (AN SC 437)** Equine Facilitated Therapy (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

**AEE (AN SC) 437 Equine Facilitated Therapy (3)**

The primary goal of this course is to acquaint the participant to equine facilitated therapy (therapeutic riding) and to introduce them to individuals who benefit/participate in such programs through lecture, audio-visual media, discussions, program visitation, independent research and via a practicum at a therapeutic riding program. Additionally, this course is designed to introduce the participant to various exceptional characteristics and conditions which may benefit from exposure/participation in equine facilitated therapy and other animal related therapy programs.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 440 Communication Methods and Media (3)** Mass media techniques for reporting and promoting extension and related programs, including message preparation, presentation, and strategy development.

**Communication Methods and Media (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 450 Program Design and Delivery (3)** Principles, methods, and practices of extension education in agriculture, community resource development, family living, environmental affairs, 4-H, and youth programs.

**AEE 450 Program Design and Delivery (3)**

This course will help students develop a basic understanding of non-formal educational programs including Cooperative Extension and other non-credit granting educational opportunities where participation is typically voluntary. Students will learn how non-formal programs are planned, delivered and evaluated in community settings. In addition, students will select and critique existing extension programs developed for use in the United States and others in use around the world.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 460 Foundations in Leadership Development (3)** This course explores historical and contemporary leadership theories, models and perspectives within social, cross-cultural, and political contexts.

**AEE 460 Foundations of Leadership Development (3)**

This course is designed to provide students with a philosophical and theoretical framework of leadership by examining historical and contemporary theories, models and leadership styles within a social, political and global context. Students will explore leadership effectiveness and its relationship to issues of power, influence, persuasion, motivation and ethical decision-making. The overall objective of this course is to help students learn specific leadership competencies that will make them a more effective leader when addressing problems and seeking solutions in public and private domains.

Evaluation will be based upon quizzes, written projects, leader interview and a final paper in which students will be expected to demonstrate an integrated application of causes, barriers and key ingredients of successful leadership practices. This course will be part of a series on leadership development offered through the Department of Agricultural and Extension Education.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 465 Leadership Practices: Power, Influences, and Impact (3)** Explores the leader role as it relates to issues of purpose, social responsibility, political influences, and legal constraints.

**AEE 465 Leadership Practices: Power, Influences, and Impact (3)**

In this course, students will explore leadership roles as they relate to issues of purpose, social responsibility, political influences and legal constraints. It is designed to help students develop greater sensitivity to the variety of factors and forces impacting leadership processes and to acquire an increased understanding of key elements of successful leadership practices. The overall objective of this course is to help students learn specific leadership competencies that will make them a more effective leader when addressing problems and seeking solutions in public and/or private domains.

Evaluation will be based upon unannounced quizzes, several short written projects, and a final paper in which students will be expected to demonstrate an integrated application of causes, barriers and key ingredients of a leader they consider to be successful. This course will be part of a series on leadership development offered through the Department of Agricultural and Extension Education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 490 Colloquium (1-3)** Seminars consisting of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 494 Undergraduate Research (1-12)** Supervised student activities on research projects identified on an individual or small group basis.

**Undergraduate Research (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 495 Internship in Agricultural and Extension Education (1-15)** Participation in the total program of instruction in agriculture in a selected high school.

**Internship in Agricultural and Extension Education (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 495D Leadership Development Minor Internship (3)** Leadership Development Minor Internship.

**Leadership Development Minor Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 495D Leadership Development Minor Internship (3)** Leadership Development Minor Internship.

**Leadership Development Minor Internship (3)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 495D** Leadership Development Minor Internship (3) Leadership Development Minor Internship.

**Leadership Development Minor Internship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 497** Special Topics (1-9) Formal courses given on topical or special interest subjects which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 499A** (IL) Global School-Based Agricultural Education (3) Global School-Based Agricultural Education

**Global School-Based Agricultural Education (3)**

General Education: None

Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 501** Foundations of Agricultural and Extension Education (3) Historical development, social and philosophical foundations, and current status in relation to the total vocational-technical education program.

### **Foundations of Agricultural and Extension Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 505** (CEDEV 505) Leadership Development (3) Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

### **Leadership Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 508** Administration and Supervision of Agricultural and Extension Education (3) Basics of vocational funding, supervision, leadership, and management for agricultural education.

### **Administration and Supervision of Agricultural and Extension Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 509** Contemporary Research in Agricultural and Extension Education (1-6) Analysis of contemporary research issues in agricultural education and extension education through lecture, review of literature, discussion, speakers, and active participation.

### **Contemporary Research in Agricultural and Extension Education (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 511** Youth Leadership Development in the Agricultural and Life Sciences (3) This course will address youth leadership development theories and emphasize formal and nonformal youth programs in agricultural and life sciences.

### **AEE 511 Youth Leadership Development in the Agricultural and Life Sciences (3)**

The course will provide learners with an understanding of how adolescents develop and emerge as leaders in their families, schools, organizations, and communities. The overall objective for this course is to provide future and current leaders of youth organizations in the agricultural, natural resource, and/or life sciences the knowledge, skills, and experiences to develop and enhance the leadership skills and behaviors of the youth in their organizations. This will be accomplished through a variety of educational methods and techniques. Exposure to theories of youth leadership development will be shared within the context of adolescent development, group dynamics, and opportunities for growth and self-development. A variety of youth organizations and their respective leadership based programs, curricula, and philosophies will be shared and analyzed. Assignments and evaluative-based activities will focus on investigating and comparing youth organizations, analyzing leadership-based resources, analyzing youth/adolescent development theory, and developing a proposal to secure extramural funding to support youth leadership development.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 515** Engagement Through Outreach Scholarship in Higher Education (3) To develop an understanding of outreach scholarship as a nonformal educational system and its relationship to relevant social systems.

**AEE 515. Engagement through Outreach Scholarship in Higher Education (3)**

Through this course, students will develop an understanding of outreach scholarship as a non-formal educational system and its relationship to relevant domestic and international social systems. Students will explore the historical and legislative history of how higher education evolved. Drawing from both contemporary as well as historical resources, students will understand the "land-grant" philosophy and outreach scholarship in higher education in order to define an engaged university. Using their definitions, students then critique outreach scholarship as it is carried out through specific institutions of higher education, both in the United States and around the world. Alternative institutional missions, organizational policies and procedures as well as organizational structures and financial arrangements will be explored to demonstrate how distinct approaches to outreach scholarship evolve and their perceived value within an institution. Within this framework, students explore today's definition for scholarship and appropriate standards for scholarly performance through outreach. Case studies, interviews, and guest lectures supplement the current and historical literature. Students carry out individual capstone projects in order to allow each of them to synthesize course content in terms of their own professional interests within an engaged university.

Given the visibility of outreach scholarship in higher education today and the fluidity of its definition, implementation, and perceived value within institutions, this course reflects contemporary thought in addition to its historical underpinnings.

Faculty member proposing course: Dr. Joan S. Thomson

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 520** Scientific Method in the Study of Agricultural and Extension Education (1-4) Methods of procedure in investigation and experimentation in education, accompanied by a critical examination of studies made in agricultural education.

**Scientific Method in the Study of Agricultural and Extension Education (1-4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 521** Basic Applied Data Analysis in Agricultural and Extension Education (1-4) Continuation of AEE 520; emphasis upon statistical techniques for students' individual problems.

**Basic Applied Data Analysis in Agricultural and Extension Education (1-4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 524** Change in Education (1-3) Analysis of occupational needs of students and employment prospects; organization of courses of study and other activities of teachers.

**Change in Education (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 530** Teaching and Learning in Agricultural Science (3-4) Organization, planning and delivery of effective college teaching methods, matching/learning styles, evaluation of instruction and learning.

**Teaching and Learning in Agricultural Science (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 596** Individual Studies (1-9) Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 596A** Quantitative Analysis of Teacher Effectiveness Data (3) Multivariate analysis of national teacher effectiveness data using NCES data files.

**Quantitative Analysis of Teacher Effectiveness Data (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 596A** Quantitative Analysis of Teacher Effectiveness Data (3) Multivariate analysis of national teacher effectiveness data using NCES data files.

**Quantitative Analysis of Teacher Effectiveness Data (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 596B** SPSS Applications for Data Analysis (3) Using SPSS 21 and AMOS 21 to analysis data for graduate research applications.

**SPSS Applications for Data Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 596C** Qualitative Design and Research Implementation (3) Designing qualitative and mixed method studies and implementation of such designs and approaches.

**Qualitative Design and Research Implementation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 597B** Introduction to Program Design, Delivery, and Evaluation (3) This course is designed to help enrollees develop a basic understanding of planning, developing, delivering, and evaluating educational programs in formal and nonformal settings with a special emphasis on Cooperative Extension System in the United States and around the world. Enrollees will explore the principles, methods, models and practices of designing and delivering educational programs in non-formal settings. In addition, enrollees will complete a final project applying program design, delivery and evaluation principles and methods learned during class sessions.

**Introduction to Program Design, Delivery, and Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Involves experience in teaching undergraduate agricultural education courses under the supervision of the faculty.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 610** Thesis Research Off-Campus (1-15) No description.

**Thesis Research Off-Campus (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AEE 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Agronomy (AGRO)**

**AGRO 410W** Physiology of Agricultural Crops (4) Study of the relation of plants to their environment and the physiology of crop plant growth.

**AGRO 410W Physiology of Agricultural Crops (4)**

AGRO 410W is a course in plant physiology that presents fundamental aspects of plant metabolism and demonstrates how they are affected by environmental conditions such as light, water availability, temperature, and mineral nutrition. It describes how plants use photosynthesis to accumulate and partition biomass and how this contributes to crop productivity. The roles of abiotic stress such as drought and temperature extremes on crop productivity also are discussed. The course objectives are to 1] learn how plants 'work' at the molecular, cellular, whole plant and population levels; 2] develop critical thinking skills by planning and conducting experiments related to the course topics and reviewing journal articles; and 3] develop and enhance communication skills through a variety of writing assignments. This course is appropriate for upper level undergraduates or beginning graduate students with interest in plant and agricultural science disciplines including, horticulture, agroecology, plant pathology, ecology, meteorology and entomology; and meshes with courses in these areas. Students will be evaluated by examinations/quizzes, writing assignments and class participation. The course is offered annually and the optimal enrollment is 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 423** Forage Crop Management (3) Application of agronomic, ecological, and physiological principles to the production and management of pasture and forage crops.

### **Forage Crop Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 425** Field Crop Management (3) Application of agronomic, ecological, and physiological principles to management systems for the efficient production of the major field crops.

### **Field Crop Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 438** (AGECO 438) Principles of Weed Management (4) Weedy plant taxonomy, biology and ecology of weedy plant populations, and integration of biological, chemical, cultural and biological controls.

### **AGRO (AGECO) 438 Principles of Weed Management (4)**

The study of weeds and their management is a challenging and demanding task that requires diverse abilities. The term weed is an anthropocentric construct meaning it is a human colored definition. We will study the biology and ecology of weedy plants drawing on examples from a wide range of plant systems; those systems include agricultural fields (agronomic and horticultural crops) and forests. Of course our knowledge of the biology and ecology of weedy plant populations will then be used to underpin and assess control tactics and their integration. The discipline has a history of equating management with herbicidal control and in fact some 80% of the pesticides used in U.S. agriculture are herbicides. However through novel farmer designed management systems, through a research community focused on alternative methods of management and through increased focus on invasive species, exciting breakthroughs are occurring in alternative methods of management and prevention. This course seeks to introduce you to the breadth of management approaches in use and under study. The specific objectives are for students to be familiar with: 1) the local weed flora, 2) fundamental aspects of weed biology and ecology relevant to managed landscapes, 3) the control methods used in managing weed populations, 4) how control measures can be integrated to accomplish acceptable levels of pest suppression, 5) operationalizing a weed management plan, 6) how herbicides enter and move to their site of action in plants, 7) classifying herbicides by their site of action, and 8) the distinction between herbicide concentration in soils and plant available herbicide concentration.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 460** (BIOTC 460) Advances and Applications of Plant Biotechnology (3) This course provides a comprehensive overview and current status of plant biotech research. The course provides knowledge of plant systems that fall in the category of GMOs.

### **AGRO (BIOTC) 460 Advances and Applications of Plant Biotechnology (3)**

This course will provide a comprehensive overview and status of current plant biotech research. The focus is on providing knowledge of the biology of plant systems. Consequences of development of a transgenic plant either for food (crops) or as a tool to understand molecular, genetic, and inheritance mechanisms of a trait will be discussed in detail. The course will deliver the current literature and understanding of mechanisms involved in herbicide resistance in transgenic plants.

Specific topics that will be of interest to students from various disciplines include disease and insect resistance, quality traits, and secondary metabolites. Molecular biology of different pollination systems will be examined so that students will understand the concept of gene flow from transgenic to non-transgenic crops. Examples from recent developments on the beneficial use of transgenic plants as producers of modified compounds, starches, antibodies and their use in phytoremediation of toxic and organic pollutants will be discussed from the perspective of genetic and molecular plant systems. Gene expression of transgenic plant traits and the stability of an engineered crop will be discussed. Specific emphasis will be on different modes of inheritance that a transgenic plant can follow after its development and release into the environment. The course also prepares students for understanding the regulatory processes that are required for testing, moving, and environment release of transgenic crops. The laboratory component of the course will introduce students to the common technique of molecular biology that are used to detect expression in transgenic plants. Transgenic maize plants will be grown in a greenhouse and analyzed for expression of introduced genes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 489** Supervised Experience in College Teaching (1-3) Participate with instructors in teaching an undergraduate agronomy course; assist with teaching, evaluation, and development of instructional materials.

#### **Supervised Experience in College Teaching (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 490** (SOILS 490) Colloquium (1) Continuing written and oral presentations developed by students in consultation with the course instructor.

#### **Colloquium (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 495** Internship (1-5) Supervised field experience related to the student's major.

#### **Internship (1-5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 501** Graduate Student Dialogue (1) Orientation discussion group for incoming graduate students. Review departmental policies and learn about the diverse faculty programs in the department.

### **AGRO 501 Graduate Student Dialogue (1)**

The objectives of this course are to (i) provide orientation on departmental policies and procedures to incoming graduate students, (ii) introduce students to the wide array of faculty research programs in the department, and (iii) build camaraderie among the cohort of students. This course is required of new graduate students in the department, yet inapplicable to '500-level major field' credit requirement. The course is graded pass/fail with emphasis on weekly classroom participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 510** Ecology of Agricultural Systems (3) Examination of ecological concepts and research on agroecosystem processes and dynamics via discussion and analysis of review and research papers.

### **AGRO 510 Ecology of Agricultural Systems (3)**

This course covers agroecological components, processes, and dynamics. Emphasis is placed on learning via reading and discussing the recent agroecological research literature. Students also gain experience interpreting and critically analyzing scientific papers and theories. Students lead some of the class discussions on the assigned readings. They identify one or two articles that are relevant to their graduate research subject to read and discuss with the class. Students write review papers on the course themes and on agroecology research that is relevant to their graduate research topic. The course is offered in alternative years during spring semesters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 518** Responses of Crop Plants to Environmental Stress (3) Physiological and ecological aspects of the response of crop plants to environmental stresses in establishment, persistence, and reproduction.

### **Responses of Crop Plants to Environmental Stress (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 555** Effective Scientific Communications (2) Instruction and practice in verbal communication of scientific information to technical and non-technical audiences through realistic exercises with invited audiences.

### **AGRO 555 Effective Scientific Communications (2)**

The overall course objective is discovery of methods to effectively communicate scientific information to both fellow scientists and the lay community. A majority of the course will be devoted to preparing students to deliver oral and poster presentations technically appropriate for their target audience. Specifically, students will learn to present information in oral and poster formats used for scientific meetings, seminars, and proposal hearings. Additional emphasis will be placed on techniques for handling questions from the audience. Students will also determine appropriate scientific paper formats, and realize how outlines facilitate organized technical writing. Students will improve their critical listening, thinking, and interpersonal skills by participating in weekly topical discussions as well as peer reviews. This course is

unlike others in the Crop and Soil Sciences curriculum in that it teaches students how to communicate what they have learned during their research and academic endeavors. Enrollees will make two formal presentations based on their research, present their research as a scientific poster and conduct an exercise in writing a scientific journal article. Students will be evaluated on five criteria: participation, scientific poster presentation, technical oral presentation, non-technical oral presentation, and a scientific journal writing exercise.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 590** Colloquium (1-3 per semester/maximum of 3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 590** Colloquium (1-3 per semester/maximum of 3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 597C** Applied Computational Analysis (2) A 2-credit course that appraises experimental designs for agricultural and environmental field research, outlines methods of data collection and management, describes practical aspects of modern statistical analysis, and reviews computational techniques supporting critical analysis of field data.

**Applied Computational Analysis (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised training in teaching methodology for classroom and laboratory type instruction. Supervision provided by faculty member responsible for course.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AGRO 851** Applied Plant Population Biology (3) Lectures and exercises designed to develop student competency in plant selection to promote ecological diversity and genetically superior plants.

**AGRO 851 Applied Plant Population Biology (3)**

Even though the emphasis of this course will be on the applied aspects of plant population biology, students nevertheless require a fundamental understanding of the underlying science and theory on which to guide their land management decisions, with particular emphasis on plant materials. This course is designed to give potential superintendents and

managers of large land holdings (such as golf courses, highway roadsides, game lands, and military installations) the skills necessary for making sound ecological decisions regarding the choice and management of plant materials utilized in land restoration and revegetation. Emphasis will be made on the applied aspects of plant population biology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## American Studies (AM ST)

**AM ST 400** Early America to 1765 (3) American society and culture in the colonial period.

### **AM ST 400 Early America to 1765 (3)**

A study of early American history and culture from the Columbian encounter to the end of the colonial period in America. The course covers the results of contact between Native American civilizations and Europeans, forms of government and community that emerged in America, the formation of an American identity, and the creation of a distinctive, expanding American cultural landscape. The course satisfies the "area" requirement in history for undergraduate majors in American Studies, and is open to all majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 401** Revolution and Early Republic, 1765-1815 (3) American society and culture during the period of the Revolution and the Early Republic.

### **AM ST 401 Revolution and Early Republic 1765-1815 (3)**

American society and culture during the period of the Revolution and Early Republic. The course satisfies the "area" requirement in history for undergraduate majors in American Studies, and is open to all majors. An objective of the course is for students to understand the significance of this formative period on the emergence of the United States as a nation. Students will examine the mythology of the Revolution as well as its historical record. They will consider the development of social and political institutions in the early years of the new nation, including the creation of pivotal texts of the Declaration of Independence and Constitution.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 402** Antebellum and Civil War Era, 1815-1876 (3) Social and cultural conditions, sectional rivalry, political crises, warfare, and Reconstruction from 1815 to 1876.

### **Antebellum and Civil War Era, 1815-1876 (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 404** Industrial America (3) An analysis of American politics, literature, society, and economics from the 1870s to World War II.

### **Industrial America (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 405 Cold War (3)** Examination of social and cultural currents in American life from World War II to 1990.

**AM ST 405 Cold War America (3)**

Examination of social and cultural currents in American life after World War II to 1990. The course satisfies the "area" requirement in history for undergraduate majors in American Studies, and is open to all majors. Students will analyze the way that the confrontation between communist superpowers and the United States shaped politics, culture, and society. Among the events discussed are the nuclear bomb, space and arms race, Kennedy assassination, Watergate scandal, and Korean and Vietnam wars. The cultural expression of the period in film, television, literature, music, and art will be analyzed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 406 Contemporary America (3)** A study of the historic and cultural currents of life in the United States during the recent past.

**Contemporary America (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 412 American Eras (3)** Examination in depth of various and distinctive American time periods; subtitle expresses specific content. (May be repeated for credit.)

**AM ST 412 American Eras (3)**

Examination in depth of various and distinctive American time periods. The subtitle expresses specific content. May be repeated for credit. The course satisfies the "area" requirement in history for undergraduate majors in American Studies and is open to all majors. The course covers periods or eras in American history that are not covered or emphasized in other courses. Some eras to be studied are the Great Depression, World War II, and 1960s. In addition to analyzing major events of the period, students will consider social and cultural developments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 417 American Beliefs and Myths (3)** A study of symbols, beliefs, and myths in the American experience; subtitles express specific content. (May be repeated for credit.)

**American Beliefs and Myths (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 421 (PHIL 401) American Philosophy (3)** Survey of key figures and movements in American thought, including the Transcendentalists, the Pragmatists, and contemporary developments.

**American Philosophy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 422** (RL ST 422) Religion and American Culture (3 per semester, maximum of 6) Selected topics, problems, or historical movements in American religion; relation between religion and American culture.

**Religion and American Culture (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 430** (US) (WOMST 430) Women in American Society (3) A historical study of women's roles and experiences in the United States.

**Women in American Society (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 431** National Character (3) An examination of the characteristics of the American people and other national groups.

**AM ST 431 National Character (3)**

An examination of the characteristics of the American people and other national groups. The course reviews techniques that have been used in scholarship to characterize national groups in the United States and cross-culturally, including data gathering in polls, surveys, and censuses; behavioral observations of cultural "personality"; racial and ethnic categorizations; geographical and historical causation. The course analyzes the changes in attitudes toward nationality and "peoplehood" in American history and culture. The course satisfies the "area" requirement in society for undergraduate majors in American Studies, and is open to all majors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 432** Ethnicity and the American Experience (3) Theoretical and conceptual framework of ethnic studies: examination of specific issues related to major American ethnic and racial groups.

**Ethnicity and the American Experience (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 435** Americans at Work (3) A study of occupational and organizational cultures in America.

**AM ST 435 Americans at Work (3)**

A study of occupational and organizational cultures in America. The course examines historical and social changes in primary occupations of Americans, including agriculture, crafts and trades, mining and trapping, maritime, manufacturing, corporate, and service and information work. The role of unionism, individualism, and mobility in shaping attitudes toward work will be examined. Students will learn techniques of ethnography and historical analysis to interpret images of work in American society. Evaluation includes application of historical analysis and ethnographic observation of Americans at work in written essays, and two examinations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 439** American Regional Cultures (3-6) An interdisciplinary study of the culture of a region of the United States, such as the south or the west.

**American Regional Cultures (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 441 (US) (KINES 441)** History of Sport in American Society (3) Background, establishment, and growth of sport in America from colonial times to the present.

**AM ST (KINES) 441 History of Sport in American Society (3)**

Study of the background, establishment, and growth of sport in America from colonial times to the present, and the role of American sports in American culture and society. The course will examine the ways that sports have operated in the United States as the country has developed into a modern, mass society. Issues of national identity, commercialism, race, ethnicity, class, and gender will be discussed in relation to the popularity of sports. Another set of issues will center on language and media; students will employ methods of analysis such as ethnography and rhetorical criticism that emphasize the multiple layers of meaning inherent in sports culture.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 447 (US) (HIST 447)** Recent American History (3) Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945.

**AM ST 447 (HIST) Recent American History (3)**

This course covers the history of the United States from the end of World War II to the present. Topics include but are not limited to the Marshall Plan, the Cold War, the Korean War, the rise of television, atomic power, the Eisenhower presidency, the Civil Rights and Women's Movements, the Vietnam War and protests, the space race, Watergate, the Reagan presidency, the two Iraq Wars, the Dot-com revolution, 9-11 and the War on Terror, and the Obama presidency. While addressing major historical movements, the course will also explore the culture of the period –art, literature, music, sports, television, religion, and film. Even though the course covers a relatively short span of years, students will see that American society has undergone dramatic changes in this period as the result of social movements, immigration, wars, political scandal, and technological innovation. The course will close by speculating on the current direction of the United States in light of the serious challenges the nation faces.

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 448 (ANTH 448)** Ethnography of the United States (3) Ethnographic descriptions of various dimensions of life in the United States.

**AM ST (ANTH) 448 Ethnography of the United States (3)**

Ethnographic descriptions of various dimensions of life in the United States. The course covers uses of ethnography in American Studies toward an understanding of social and cultural communication and performance. The application of ethnography and concepts of cultural anthropology to complex societies such as the United States is discussed. The course teaches students to use ethnographic methods for research of American society and culture. Attention is given to the ethics and issues of ethnographic fieldwork. The course satisfies the "area" requirement in "society" for American Studies majors.

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 451** (COMM 451) Topics in American Film (3 per semester/maximum of 6) Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

**Topics in American Film (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 462** American Art and Architecture of the 20th Century (3) A survey of American painting, sculpture, decorative arts, and architecture of the twentieth century.

**American Art and Architecture of the 20th Century (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 472** (ENGL 434) Topics in American Literature (3) Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.)

**AM ST 472 (ENGL 434) Topics in American Literature (3)**

This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in American literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course satisfies the "area" requirement in culture for American Studies majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 475** (US) (ENGL 431) Black American Writers (3 per semester, maximum of 6) A particular genre or historical period in the development of Black American literature.

**AM ST 475 (ENGL 431) Black American Writers (3)  
 (US)**

A study of a particular genre or historical period in the development of Black American literature. This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in African-American literature. The flexibility of the course will allow faculty a forum in which to share current scholarship or to relate issues in African-American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course satisfies the "area" requirement in culture for American Studies majors.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 476** (ENGL 492, WMNST 491) American Women Writers (3) A study of selected American women writers.

**AM ST 476 (ENGL 492, WOMST 492) American Women Writers (3)**

A study of selected women writers, this course provides the opportunity to study writing by American women from an



historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will raise the question of the role that gender--as well as other differences such as race, class, and ethnicity--play in the selection of literary forms and the development of character, theme, symbol, and rhetorical strategy. It will also explore the dimensions American women have brought to the American literary tradition. The course satisfies the area requirement in culture for American Studies majors and is open to all majors meeting the prerequisite requirements.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 479 American Expressive Forms (3)** Examination in depth of various and distinctive American expressive forms; subtitle expresses specific content. (May be repeated for credit.)

**AM ST 479 American Expressive Forms (3)**

Examination in depth of various and distinctive American expressive forms. The subtitle expresses specific content. May be repeated for credit. The course satisfies the "area" requirement in culture for undergraduate majors in American Studies, and is open to all majors. The course covers periods or eras in American history that are not covered or emphasized in other courses. Some expressive forms to be studied are American essays, American humor, and American films. In addition to analyzing the traditions and patterns of these forms, students will consider the historical, social, and cultural context of these forms in the American experience.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 480 Museum Studies (3)** An introduction to the basic purposes, philosophies, and functions of a museum, with emphasis on the problems of museum administration. (May be repeated for credit.)

**AM ST 480 Museum Studies (3)**

An introduction to the basic purposes, philosophies, and functions of a museum, with emphasis on the problems of museum administration. The course examines applications of American Studies to mechanics of operation and development of core services including exhibits, structured educational programs, and special events. The course places these functions within the philosophy of the "experience economy," whereby museums and historical organizations are challenged to meet expectations of an increasingly sophisticated audience.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 481 Historic Preservation (3)** A study of preservation practices and programs in America.

**AM ST 481 Historic Preservation (3)**

A study of historic preservation practices and programs in America. This seminar will examine the historic preservation movement in the United States, including its history, function, and practice. Its role in government, economic development, and community and regional planning will be discussed. The ways that American studies scholarship has influenced historic preservation will be considered.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 482 Public Heritage (3)** A study of public heritage practices and programs in America. (May be repeated for credit.)

**AM ST 482 Public Heritage (3)**

A study of public heritage practices and programs, which encompasses interpretation and education projects in American history and culture, disseminated through institutions to the general public. The areas under public heritage include the practices and programs of museums, expositions and fairs, archives, historical and cultural agencies, government bureaus, foundations, community organizations, magazines, films, festivals, and computer sites. The course traces the changes that have occurred in the public heritage movement, especially the ways that American Studies scholarship has been distilled through various public institutions and programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 483 Oral History (3)** A study of oral history techniques and issues in America.

**Oral History (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 491W American Themes, American Eras (3-6)** Interdisciplinary American culture course on major themes and eras such as the American Revolutionary Era or the 1930s.

**American Themes, American Eras (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 493 (ENGL 493) The Folktale in American Literature (3)** A survey of the literary uses of the folktale and legendary materials, with particular concentration on the literature of America.

**The Folktale in American Literature (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None

Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 495** Internship (1-6) Supervised internship for undergraduate or graduate American Studies majors at a museum or another cultural, historical, or arts agency.

#### **Internship (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 500** Theory and Methods (3) Introduction to graduate work in American Studies through exploration of the approaches, materials, and interpretations of the field.

#### **Theory and Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 502** Problems in American Studies (3-6) A variable-content course, addressed each term to a specific problem, topic, or period in American culture.

#### **Problems in American Studies (3-6)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1970

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 510** U.S. Literature and Culture (3) Studies exploring the relationship between literature and culture in American Studies.

**U.S. Literature and Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 511** Pivotal Books (3-9) Exploration of a number of books which have been particularly influential in shaping thinking about American civilization.

**Pivotal Books (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 520** Topics in Popular Culture (3) A detailed exploration of aspects of American popular culture, including popular culture's relationship to society and scholarship.

**Topics in Popular Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 530** Topics in American Folklore (3) A detailed exploration of aspects of folklore and folklife in America.

**Topics in American Folklore (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 531** Material Culture and Folklife (3) Investigation of American material culture and folklife, including topics such as traditional design, cultural landscape, architecture, art, craft and food.

**Material Culture and Folklife (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 533** American Civilization in the Eighteenth Century (3-9) Detailed investigation of specific topics in eighteenth-century American civilization.

**American Civilization in the Eighteenth Century (3-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 534** American Civilization in the Nineteenth Century (3-9) Representative interdisciplinary investigation of social, historical, economic, and aesthetic forces predominant in nineteenth-century America.

**American Civilization in the Nineteenth Century (3-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 535** American Civilization in the Twentieth Century (3-9) Detailed investigation of specific periods or topics in twentieth-century American civilization.

**American Civilization in the Twentieth Century (3-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 536** American Civilization in the Twenty-first Century (3) Detailed investigation of specific topics in twenty-first century American civilization.

**American Civilization in the Twenty-first Century (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 540** Ethnography and Society (3) An advanced course on ethnographic theories, methods, and case studies, emphasizing current controversies and new strategies in field work.

**Ethnography and Society (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 550** Seminar in Public Heritage (3) A study of the ways Americans use and understand heritage in public settings.

**Seminar in Public Heritage (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 551** Seminar in Local and Regional Studies (3) Detailed investigation of local and regional historical themes and topics, emphasizing research methods.

**Seminar in Local and Regional Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 560 Seminar in Race and Ethnicity (3)** Studies exploring issues of race and ethnicity in America that can be addressed with theories and methods of American Studies.

**Seminar in Race and Ethnicity (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 561 Seminar in Gender and Culture (3)** Thematic study of gender issues in American history and culture.

**Seminar in Gender and Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 570 Topics in American Art (1-6)** Various themes within the American arts will be explored under this rubric.

**Topics in American Art (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 575 Museum Internship (3)** A supervised museum internship experience featuring a "hands on" introduction into aspects of the curatorial profession.

**Museum Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 579 Readings in American Studies (3-9)** Directed readings in selected areas of American Studies.

**AM ST 579 Readings in American Studies (3-9)**

This course will cover major readings in a selected area of American Studies. The readings are designed to represent past and current scholarship in an area of research undertaken by a student or students. The selection of readings will be directed by a faculty member in consultation with the student(s). The readings typically cover areas that are not covered in depth within other American Studies offerings. Outcomes of the course include historiographies and theoretical essays, annotated bibliographies, and book reviews.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 580** Projects in American Studies (1-6) Independent exploration within American Studies; evidenced by major paper, film, exhibition or specialized examination.

**Projects in American Studies (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 591** Seminar in American Studies (3) An advanced seminar covering particular themes and issues in American Studies.

**Seminar in American Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 592** Field Experience in American Studies (3) Field projects and study tours to off-campus sites using American Studies methodologies.

**Field Experience in American Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 600** Thesis in American Studies (6) A thesis supervised by the American Studies Program.

#### **Thesis in American Studies (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

#### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AM ST 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Anatomy-Hy (ANAT)**

**ANAT 503** Gross Anatomy (6) Gross structure, organization, and function of the human body with laboratories devoted to dissection of the human body.

**Gross Anatomy (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 505** Histology and Embryology I (2) Light and electron microscopic structure of cells, specialized tissues, organization, basic organogenesis, correlation between cellular structure and physiological function.

**Histology and Embryology I (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 506** Histology and Embryology II (2) Continuation of ANAT 505; microscopic structure of cells, specialized tissues, organization, basic organogenesis, correlation between cellular structure and physiological function.

**Histology and Embryology II (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 511** (NEURO 511) Neurobiology II (3) Structure and physiology of central and peripheral nervous system, including specific sense organs.

**Neurobiology II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 512** Human Embryology and Teratology (2) Study of developing human embryo including gamete production and fusion, implantation, organogenesis and major abnormalities of organ systems.

**Human Embryology and Teratology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 515 (NEURO 515) Developmental Neurobiology (2)** Development of the nervous system in all its aspects.

**Developmental Neurobiology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 584 (PHARM 584) Human Anatomy and Development A: Gross Human Anatomy (1)** Explore gross human anatomy providing orientation to organs and the overall relationship of organs and structures within the human body.

**ANAT (PHARM) 584 Human Anatomy and Development A: Gross Human Anatomy (1)**

This course will provide a concise but thorough description of the gross human anatomy. With the use of pre-dissected prosection or model representations of the human body, anatomic position, orientation (e.g., retroperitoneal, superficial, deep, ipsilateral), and identification of structures within major body cavities (thorax, abdomen) of the human body will be conducted. Evaluation of the musculoskeletal system will include structure of bones, classification of bones in the axial and appendicular skeleton, discussion of joints, skeletal muscles, and accessory structures related to muscle action including fascia. Evaluation of digestion system will include components involved with alimentary canal as well as accessory organs. Evaluation of the cardiovascular system will focus on the communication network, heart anatomy and blood flow through its chambers, pulmonary and systemic circulation, as well as relationship of arteries, veins, capillaries to the heart. Evaluation of the nervous system will identify and discuss major structures of the central nervous system including the brain and spinal cord, peripheral nervous system, and enteric nervous system. For each system, the focus will be knowledge necessary for understanding, utilizing, and appreciating the role of the human body in biomedical and translational research.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 585 (PHARM 585) Human Anatomy and Development B: Human Development (1)** Explores human embryology and organogenesis beginning at the third week of gestation through parturition.

**ANAT (PHARM) 585 Human Anatomy and Development B: Human Development (1)**

This course will provide a concise but thorough description of embryology of the major systems in the human. It will provide an awareness of how genetics, environment, and maternal-fetal relationships impact on normal human development, and the importance of understanding embryology for biomedical and translational research. An emphasis will be placed on the role of molecular biology in normal embryology and human development. Primary literature will be consulted for a description of major signaling pathways and key signaling molecules associated with each system. Some discussion of abnormal development will be included.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 586 (PHARM 586) Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine (1)** Exploration of stem cell biology and the role of stem cells in regenerative medicine.

**ANAT (PHARM) 586 Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine (1)**

This course will provide an evaluation of stem cell biology and regenerative medicine. In particular, discussions will focus on the five sources of embryonic stem cells (adult stem cells, amniotic fluid-derived stem cells, embryonic stem cells derived using *in vitro* fertilization technologies, somatic cell nuclear transfer cloning-derived stem cells, and stem cells derived by parthenogenetically-activating oocytes). In addition to providing detailed information on the biology underlying stem cells, group discussions will focus on ethical advantages and disadvantages for each of the five distinct types of stem cells. Work will then turn to current understanding of changes in transcriptome and proteome control of differentiation. As well, discussions will focus on attempts to use stem cells in regenerative medicine. This course will be designed as a mixture of didactic lectures with a particular focus on the current literature. This latter aspect of the course is essential in that much of our current understanding of stem cells has not yet made it into any common text books.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 602** Supervised Experience in College Teaching (1-6 per semester/maximum of 99) Supervised experience in the development of instructional materials, the organization and conduct of lectures/laboratories, the evaluation and counseling of students.

**Supervised Experience in College Teaching (1-6 per semester/maximum of 99)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 715** Human Gross Anatomy (6) This course will provide exposure to core human anatomical structures, emphasizing critical relationships and clinical significance.

**Human Gross Anatomy (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:  
Concurrent: Foundations of Patient Centered Care; Public Health and Socio- Ecological Medicine

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANAT 743** Musculoskeletal Advanced Anatomy (3) This course provides exposure to the relevancy of anatomy to the clinical setting and specifically covers topics related to musculoskeletal clinical presentations.

**Musculoskeletal Advanced Anatomy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Anesthesiology-Hy (ANSTH)**

**ANSTH 700** Anesthesia for Third Year Students (5) Introduction to clinical anesthesia practice, local and general and cardiopulmonary resuscitation.

**Anesthesia for Third Year Students (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANSTH 740** Anesthesia Acting Internship (5) The acting internship in anesthesia is designed to expand on the experiences obtained in courses ANSTH 700 and 770.

**Anesthesia Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANSTH 770** Anesthesiology Clinical Elective (5) The objectives for this course utilize the objectives of Ansth. 700 as a base.

**Anesthesiology Clinical Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANSTH 772** Pain Management (5) Includes evaluation, diagnosis, and treatment of complex chronic pain problems in an outpatient model. A hands-on approach will be emphasized.

**Pain Management (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANSTH 796** Anesthesia Individual Studies (5) Special studies program, usually involving investigative work, all hours and assignments by arrangement with a member of the anesthesia staff-faculty.

**Anesthesia Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANSTH 796A** Anesthesiology Individual Studies (2.5) Anesthesiology Individual Studies for 3rd year medical students.

**Anesthesiology Individual Studies (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

### **ANSTH 797 Anesthesia Special Topics (5) Anesthesia Special Topics**

#### **Anesthesia Special Topics (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Animal Science (AN SC)**

**AN SC 405 Advanced Canine Nutrition and Management (3)** Application of biological principles to the care and nutrition of dogs; interactive discussions of contemporary nutrition and management issues.

### **AN SC 405 Advanced Canine Nutrition and Management (3)**

Animal Science 405, Advanced Canine Nutrition and Management, is a 3 credit senior-level course emphasizing the application of biological principles to the proper care and nutrition of dogs. Students scheduling this course must first complete a junior level course in companion animal care and nutrition. Course objectives are to a) develop an appreciation for the role and importance of the dog in contemporary society; b) develop skills in formulating sound management plans for the selection, breeding, feeding, training, and health care of the dog; and c) encourage independent student thought, written communication, and oral communication of topics related to the care and management of canines. AN SC 405 is one of several "capstone" advanced management courses offered by the Department of Dairy and Animal Science for students with intensive interest in various animal species.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 405 Advanced Canine Nutrition and Management (3)** Application of biological principles to the care and nutrition of dogs; interactive discussions of contemporary nutrition and management issues.

### **AN SC 405 Advanced Canine Nutrition and Management (3)**

Animal Science 405, Advanced Canine Nutrition and Management, is a 3 credit senior-level course emphasizing the application of biological principles to the proper care and nutrition of dogs. Students scheduling this course must first complete a junior level course in companion animal care and nutrition. Course objectives are to a) develop an appreciation for the role and importance of the dog in contemporary society; b) develop skills in formulating sound management plans for the selection, breeding, feeding, training, and health care of the dog; and c) encourage independent student thought, written communication, and oral communication of topics related to the care and management of canines. AN SC 405 is one of several "capstone" advanced management courses offered by the Department of Dairy and Animal Science for students with intensive interest in various animal species.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 407 Advanced Horse Management (3)** Detailed study of anatomy and physiology of the horse as related to nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Detailed discussion of management practices, facility design and contemporary issues.

### **Advanced Horse Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 407** Advanced Horse Management (3) Detailed study of anatomy and physiology of the horse as related to nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Detailed discussion of management practices, facility design and contemporary issues.

#### **Advanced Horse Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 410** Advanced Dairy Herd Management (4) Application of dairy herd management principles using case studies and actual dairy farm situations.

#### **Advanced Dairy Herd Management (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 410** Advanced Dairy Herd Management (4) Application of dairy herd management principles using case studies and actual dairy farm situations.

#### **Advanced Dairy Herd Management (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 413** Transgenic Biology (3) The principles and concepts used to generate genetically engineered animals by pronuclear, knockout, and cloning methods; and applied biotechnology applications.

#### **AN SC 413 Transgenic Biology (3)**

The Transgenic Biology course is offered each spring semester for those students interested in learning the concepts, principles, and applications of genetic engineering in animals. The mouse is used as a model system, but the discussion encompasses large animals and commercial applications. Techniques covered are pronuclear, embryonic stem, and somatic-nuclear transfer generated animals. Content also includes the use of morpholinos and RNAi use to "knockdown" gene expression. Other systems discussed are Zebrafish and Xenopus as well as gene analysis by mutagenesis and gene trapping. The course objectives are (1) to provide the student with a working knowledge of the processes involved in functional analysis of gene expression using model animal systems and (2) to give the student understanding for the practical aspects of generating transgenic animals including microinjection, screening, breeding, and phenotypic analysis. Students are typically evaluated using several parameters including exams, presentations of current journal articles, abstracts of current journal articles, and a paper dealing with an aspect of transgenesis in the student's field of interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 413** Transgenic Biology (3) The principles and concepts used to generate genetically engineered animals by pronuclear, knockout, and cloning methods; and applied biotechnology applications.

#### **AN SC 413 Transgenic Biology (3)**

The Transgenic Biology course is offered each spring semester for those students interested in learning the concepts, principles, and applications of genetic engineering in animals. The mouse is used as a model system, but the discussion

encompasses large animals and commercial applications. Techniques covered are pronuclear, embryonic stem, and somatic-nuclear transfer generated animals. Content also includes the use of morpholinos and RNAi use to "knockdown" gene expression. Other systems discussed are Zebrafish and Xenopus as well as gene analysis by mutagenesis and gene trapping. The course objectives are (1) to provide the student with a working knowledge of the processes involved in functional analysis of gene expression using model animal systems and (2) to give the student understanding for the practical aspects of generating transgenic animals including microinjection, screening, breeding, and phenotypic analysis. Students are typically evaluated using several parameters including exams, presentations of current journal articles, abstracts of current journal articles, and a paper dealing with an aspect of transgenesis in the student's field of interest.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 415 Companion Animal Behavior (3)** Detailed study of companion animal behavior; including individual, developmental, and environmental bases of behavior with applied demonstration and discussion.

### **Companion Animal Behavior (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 417 Horse Judging (2)** Evaluation and selection of halter and performance horses, and presentation of oral reasons.

### **AN SC 417 Horse Judging (2)**

Animal Science 417 encompasses all of the information necessary for students to pursue competencies in horse evaluation. From external parts and evaluation of conformation of halter horses, rail and pattern classes, to special classes (trail, pleasure driving, etc.) students will expand the depth and breadth of knowledge for evaluating classes of stock-type horses. Following successful completion of AN SC 417, students will be eligible to compete for a position on the Penn State Intercollegiate Horse Judging Team (AN SC 426 Advanced Judging and Selection). Students who elect to take AN SC 417 and AN SC 426 will fulfill the writing and speaking skills requirement for the Animal Science major. Furthermore, this course serves as an elective for students outside of the major, Animal Science, who are enrolled in the Equine Sciences minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 417 Horse Judging (2)** Evaluation and selection of halter and performance horses, and presentation of oral reasons.

### **AN SC 417 Horse Judging (2)**

Animal Science 417 encompasses all of the information necessary for students to pursue competencies in horse evaluation. From external parts and evaluation of conformation of halter horses, rail and pattern classes, to special classes (trail, pleasure driving, etc.) students will expand the depth and breadth of knowledge for evaluating classes of stock-type horses. Following successful completion of AN SC 417, students will be eligible to compete for a position on the Penn State Intercollegiate Horse Judging Team (AN SC 426 Advanced Judging and Selection). Students who elect to take AN SC 417 and AN SC 426 will fulfill the writing and speaking skills requirement for the Animal Science major. Furthermore, this course serves as an elective for students outside of the major, Animal Science, who are enrolled in the Equine Sciences minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 418 (AGECO 418, SOILS 418) Nutrient Management in Agricultural Systems (3)** Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices.



**AN SC (AGECO/SOILS) 418 Nutrient Management in Agricultural Systems (3)**

Nutrient Management in Agricultural Systems is a senior level course that applies the fundamentals of animal and plant, sciences to the concept of a nation-wide food animal system. The regional concentration and consolidation of animal production enterprises has resulted in important economic savings for consumers. But these changes have also had some detrimental impacts on the environment. For example, some nutrients such as calcium and phosphorus and certain trace elements are mined, while others such as nitrogen and potassium are derived from crop production systems. In all cases, the nutrients are transported to areas of livestock concentration. A small portion of the nutrients leave the farm in the form of animal products, while 60 to 70% of the nutrients are excreted and applied to nearby crop land. The environmental implications of the net influx of these nutrients to livestock producing communities have only recently been recognized. These concepts will provide the background around which regulations are written and sound nutrient management strategies are developed and implemented.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 419W** Applied Animal Welfare (3) Assessment of management practices impacting animal welfare; devoted to livestock species, companion animals, captive exotic species, and animals in research.

**Applied Animal Welfare (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 420** Animal Nutrition and Feed Technology (4) Feedstuff evaluation, quality control, handling, storage: life cycle feeding of beef cattle, dairy cattle, sheep, swine, horses, and poultry.

**Animal Nutrition and Feed Technology (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 421** Poultry Evaluation and Selection (2) Introduction and application of standards and principles used to evaluate live poultry and poultry products.

**Poultry Evaluation and Selection (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 422** Dairy Cattle Evaluation and Selection (3) Methods used in evaluation of production and type traits and their role in selecting dairy breeding stock domestically and internationally.

**Dairy Cattle Evaluation and Selection (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 423** Comparative Physiology of Domestic Animals (3) A comparative approach to understanding body function in

domesticated avian and mammalian species.

### **Comparative Physiology of Domestic Animals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 424** Livestock Breeding Evaluation and Selection (3) Evaluation and selection of beef cattle, sheep, swine, and horses; critical analysis of performance records and genetic evaluations.

### **Livestock Breeding Evaluation and Selection (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 425** (VB SC 425) Principles of Avian Diseases (3) Principles of pathogenesis and control of diseases in poultry and other avian populations. Case material used where appropriate.

### **AN SC (VB SC) 425 Principles of Avian Diseases (3)**

This course discusses the major diseases of domestic poultry, with etiology, prevention, and treatment reviewed on each disease. Since many of these diseases also affect wild birds and pet birds these are also reviewed. Lastly, avian disease with zoonotic (human public health) potential are also discussed in the course. This course is required by those seeking a poultry minor.

Previous coursework in pathogenic microbiology is beneficial.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 426** Advanced Judging and Selection (2 per semester, maximum of 4) Development of critical thinking and communication skills through evaluation and selection of animals and animal products.

### **Advanced Judging and Selection (2 per semester, maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 427** Milk Secretion (3) Development and physiology of the mammary gland and factors which affect the amount and composition of milk produced.

### **Milk Secretion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 427** Milk Secretion (3) Development and physiology of the mammary gland and factors which affect the amount and composition of milk produced.

### **Milk Secretion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 429** Advanced Beef Cattle Production (3) Application of scientific and business principles to practical production and management issues using case studies or selected live settings.

#### **AN SC 429 Advanced Beef Cattle Production (3)**

This course was developed to train students to critically evaluate management, facility, and husbandry practices of working beef cattle operations. Students visit owner facilities where they gather necessary information by interacting with the owners and inquiring about the owner's practices. The students use knowledge gained through previous courses and material covered in class to make recommendations. The students work in teams to present to the owners possible solutions to their problems. Each team will present a 30 minute critical evaluation of each case study with the owners being present. Students interact and answer questions concerning their presentation from the owners, students, and faculty. Students are introduced to the NCBA and Cattle FAX which they can use to stay abreast of beef industry concerns after completion of the class. If available, a field trip to either national or Pennsylvania state agriculture offices will occur.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 431W** Physiology of Mammalian Reproduction (4) Physiological processes of reproduction in animals, including the use of current and emerging technologies.

#### **Physiology of Mammalian Reproduction (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 432** Techniques in Livestock Reproduction (2) Demonstration and practice in estrus detection, inseminating techniques, pregnancy detection, embryo recovery and transfer methods.

#### **AN SC 432 Techniques in Livestock Reproduction (2)**

This course is designed to train students in the areas of artificial insemination and pregnancy detection of livestock. Additionally, students will be familiarized with techniques in semen handling, embryo transfer, heat detection, and estrous synchronization. The primary focus of this course is hands on instruction of the techniques. However, lectures will also be included to broaden the instruction base and expose students to a multitude of advanced reproductive technologies that are currently available to livestock producers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 437 (AEE 437)** Equine Facilitated Therapy (3) Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

#### **AN SC (AEE) 437 Equine Facilitated Therapy (3)**

The primary goal of this course is to acquaint the participant to equine facilitated therapy (therapeutic riding) and to introduce them to individuals who benefit/participate in such programs through lecture, audio-visual media, discussions, program visitation, independent research and via a practicum at a therapeutic riding program. Additionally, this course is designed to introduce the participant to various exceptional characteristics and conditions, which may benefit from exposure/participation in equine facilitated therapy and other animal related therapy programs.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 437 (AEE 437) Equine Facilitated Therapy (3)** Equine Facilitated Therapy uses equine-related activities to contribute positively to the wellbeing of people with disabilities.

**AN SC (AEE) 437 Equine Facilitated Therapy (3)**

The primary goal of this course is to acquaint the participant to equine facilitated therapy (therapeutic riding) and to introduce them to individuals who benefit/participate in such programs through lecture, audio-visual media, discussions, program visitation, independent research and via a practicum at a therapeutic riding program. Additionally, this course is designed to introduce the participant to various exceptional characteristics and conditions, which may benefit from exposure/participation in equine facilitated therapy and other animal related therapy programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 447 Applied Equine Behavior (3)** Theory and application of behavior principles as they apply to horses in free-running and domestic situations.

**AN SC 447 Applied Equine Behavior (3)**

Applied Equine Behavior is an advanced course in equine science that examines the behavior of horses in free-running and domesticated situations. Outcome-based course objectives are as follows: 1) develop a working repertoire of behavior terminology and principles particularly as they apply to the horse; 2) apply critical thinking skills toward understanding and predicting behavior in horses under intensive management as it is modified from instinctive behavior seen in free running horses; 3) critically analyze and compare various training theories; 4) develop a new expertise in careful observation and analysis of behavior; 5) practice communication skills and increase information literacy, particularly in the study of behavior.

This course presupposes previous coursework in equine science or biology and complements other courses such as horse production and management, animal behavior/sociobiology, physiology, and genetics. Applied Equine Behavior is [will be] a supporting course for the Animal Science Major. Students will be able to make full use of the University horse herd and available data recording and analysis instruments and software.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 450 Dairy Farm Management Systems (3)** Capstone course emphasizing integration of dairy farm management principles into whole farm systems.

**Dairy Farm Management Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 450 Dairy Farm Management Systems (3)** Capstone course emphasizing integration of dairy farm management principles into whole farm systems.

**Dairy Farm Management Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 451 Dairy Systems Analysis (1-2 per semester/maximum of 2)** Students will evaluate all systems of a working dairy farm business.

**AN SC 451 Dairy Systems Analysis (1-2 per semester/maximum of 2)**

This course will provide an overview of all areas of dairy business management. This course is designed to complement the dairy production courses and is meant to train students to organize material in a farm evaluation format. Various instructors (within their areas of expertise) as well as industry experts and dairy producers will be utilized to provide students with current concepts in dairy management. Requirements of the course include working in teams to visit, evaluate and make a presentation about a dairy farm business including an action plan for improving the business.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

Concurrent: AN SC 450 prerequisite or concurrent: AN SC 410

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 457 Equine Reproduction and Breeding Farm Management (3)** Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares.

**AN SC 457 Equine Reproduction and Breeding Farm Management (3)**

Equine Reproduction and Breeding Farm Management is intended to expand on the knowledge of equine reproduction and breeding farm management acquired in other classes. The students will get hands on experience in artificial insemination of mares and semen collection of stallions.

Having completed the course, students will be able to:

A. Collect semen from a stallion.

B. Assess seminal characteristics and process the chilled semen to be sent to another farm.

C. Artificially inseminate a mare.

D. Apply scientific principles to make the decisions necessary to manage an equine breeding facility. The information covered will include but not be limited to reproductive management of the mare and stallion, foaling, and neonatology.

Evaluation will typically be based on written tests, research and presentation of a selected topic, and laboratory attendance and participation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 457 Equine Reproduction and Breeding Farm Management (3)** Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares.

**AN SC 457 Equine Reproduction and Breeding Farm Management (3)**

Equine Reproduction and Breeding Farm Management is intended to expand on the knowledge of equine reproduction and breeding farm management acquired in other classes. The students will get hands on experience in artificial insemination of mares and semen collection of stallions.

Having completed the course, students will be able to:

A. Collect semen from a stallion.

B. Assess seminal characteristics and process the chilled semen to be sent to another farm.

C. Artificially inseminate a mare.

D. Apply scientific principles to make the decisions necessary to manage an equine breeding facility. The information covered will include but not be limited to reproductive management of the mare and stallion, foaling, and neonatology.

Evaluation will typically be based on written tests, research and presentation of a selected topic, and laboratory attendance and participation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 467W** Equine Nutrition and Feeding (3) Equine gastrointestinal anatomy and physiology; energy and nutrient requirements for body functions; applied interrelationships between nutrition, health, and performance.

**AN SC 467W Equine Nutrition and Feeding (3)**

AN SC 467W, Equine Nutrition and Feeding, is a 3 credit junior or senior-level course emphasizing the application of biological principles to the proper nutrition of horses. Students scheduling this course must first complete AN SC 301. Course objectives are that upon completion of the course, students should be able to a) Apply an understanding of form and function of the equine gastrointestinal tract to actual feeding management problems associated with athletic performance or health concerns; b) Describe the nutrient and energy requirements of horses in different physiologic states and apply these in diet evaluation and formulation; c) Communicate to clients, customers and peers important information about equine nutrition, enabling them to improve the health and performance of their horse without having to take a course on equine nutrition. Each student will complete a 3000 to 3500 word paper on how some aspect of nutrition might be applied to improve equine health or performance. The writing project will involve an oral presentation, multiple drafts and require students to review and provide feedback on each others' work. Students will be evaluated via a series of assigned homework, exams, class participation, and the overall writing project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 477** Riding Instructor Training (1) Management of equestrian riding lessons, teaching techniques, lesson plans, program planning, time management, and handling of mounted groups.

**AN SC 477 Riding Instructor Training (1)**

The Equine Riding Instructor Training course relates to teaching, equestrian skills, developing lesson plans, program planning, events coordination, staff management, time management, and handling of mounted groups from beginners to more advanced level riders. There are many opportunities for riding instructors in the equine industry throughout the United States. Career areas include breed associations, cooperative extension, and equine facilities/stables. This course will help give students the tools to be safer and better-prepared equine riding instructors. Successful completion of the course implies students will be able to: Conduct horse riding lessons at all horsemanship skill levels, understand safe horsemanship; manage large mounted equestrian groups; and develop appropriate lesson plans.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 479** (BIOL 479) General Endocrinology (3) Endocrine mechanisms regulating the morphogenesis, homeostasis, and functional integration of animals.

**General Endocrinology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 496A** Animal Science Teaching Assistant (2) Creative projects, including research and design, which are supervised

on an individual basis and which fall outside the scope of formal courses.

### **Animal Science Teaching Assistant (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 496A** Animal Science Teaching Assistant (2) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Animal Science Teaching Assistant (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 496H** AN SC Honors Independent Study (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **AN SC Honors Independent Study (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 496H** AN SC Honors Independent Study (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **AN SC Honors Independent Study (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 497A** Natural Toxicants in Feedstuffs and Poisonous Plants: Effects on Animal Health and Productivity (3) An overview of plant toxicants and mycotoxins in cereal grains, roots and tubers, protein supplements, grain legumes, and forages, and the adverse effects that they cause when consumed by animals. Emphasis will be placed on the occurrence and chemical nature of plant and fungal toxins, their mechanism of action and metabolism, the pathological effects that they produce in livestock poultry, and companion animals, and strategies to overcome their toxicity.

### **Natural Toxicants in Feedstuffs and Poisonous Plants: Effects on Animal Health and Productivity (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 499A** (IL) German Poultry Industry Study Tour (2) The course will consist of an embedded program during Spring Break (7-day Study Tour of the German poultry industry as well as selected cultural and historical sites), pre-trip information sessions and faculty presentations, and post-trip student presentations. Students also will be required to write term papers on both a professional topic and a cultural or historical topic related to the Study Tour. The course will enhance student understanding of global poultry production systems, will increase student awareness of key issues facing the poultry industries of German and the European Union, and will introduce students to German culture, food, and history.

### **German Poultry Industry Study Tour (2)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 499B** (IL) Normandy France Equine Industry Studies (2.5) Students will explore/compare United States and French Equine Industry. Topics will include breeding, training, trade issues, agricultural trade policy, animal welfare, animal health and research, marketing, equestrian, event management, and farm management.

### **Normandy France Equine Industry Studies (2.5)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 499B** (IL) Normandy France Equine Industry Studies (2.5) Students will explore/compare United States and French Equine Industry. Topics will include breeding, training, trade issues, agricultural trade policy, animal welfare, animal health and research, marketing, equestrian, event management, and farm management.

### **Normandy France Equine Industry Studies (2.5)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 499C** (IL) Normandy France Equine Industry Studies (0.5) Students will explore/compare United States and French



Equine Industry. Topics will include breeding, training, trade issues, agricultural trade policy, animal welfare, animal health and research, marketing equestrian event management, and farm management.

### **Normandy France Equine Industry Studies (0.5)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 500** Foundation Readings in Animal Science (1 per semester/maximum of 2) Scientific articles that have significantly impacted the animal sciences will be read and discussed.

### **AN SC 500 Foundation Readings in Animal Science (1 per semester/maximum of 2)**

This course is intended for graduate students in the animal sciences. The Course Objectives are:

1. To discuss the attributes of a "classic" or foundation paper;
2. To discuss papers that, in hindsight, affected our thinking and practice in the animal sciences and industries;
3. To encourage students to gain insight into a variety of sub-disciplines within the animal sciences.

The class will meet for one period each week. Class format is a guided discussion. Selected guest instructors will be invited some weeks based upon the selected topic, and to add a broad perspective. The final grade will be based upon class participation (50%) and student performance on a final exam covering the class discussions (50%).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 502** Scientific Scholarship (2) Consideration of the scientific method and thinking relative to scholarship, grantsmanship, and the mechanism of grantsmanship.

### **Scientific Scholarship (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 506** (NUTR 506) Ruminology (3) Physiological, biochemical, and microbiological activities occurring within the rumen and the relation of rumen function to animal response.

### **Ruminology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 515** Advanced Physiology of Reproduction in Farm Animals (1-6) Advanced physiology of reproduction in farm animals.

### **Advanced Physiology of Reproduction in Farm Animals (1-6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 590** Colloquium (1-9; 1 per semester) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-9; 1 per semester)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 597A** Animal Genomics (3) Introduction to genomics, proteomics, epigenomics, and basic bioinformatics, and their applications in animal breeding, animal health and production, reproduction, nutrition, and medicine.

**Animal Genomics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**AN SC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Experience in developing, organizing, and conducting lectures/laboratories; evaluation and counseling students and related resident education activities.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AN SC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Anthropology (ANTH)**

**ANTH 401** Human Evolution: The Material Evidence (3) Human origins as seen in the fossil record and comparative biology of humans and their primate relatives.

**Human Evolution: The Material Evidence (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 403 Evolution of Human Walking (3)** An in depth analysis of the biology, biomechanics, evolutionary history of human walking and running.

### **Evolution of Human Walking (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 405 Primatology (3)** Nonhuman primate origins, evolution, comparative physical and behavioral characteristics, ecological context, phylogeny and taxonomy; and their importance in anthropology.

### **Primatology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 408 Anthropological Demography (3)** Analysis of demographic studies in traditional and very small populations.

### **ANTH 408 Anthropological Demography (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course examines population-related problems from an anthropological perspective. Special emphasis is placed on ecological and economic approaches to the study of population dynamics in small-scale, preindustrial societies. This is an advanced undergraduate course that builds upon introductory anthropology and leads the student into more difficult demographic problems that are linked with economics, politics, religion and other cultural factors that shape population and population change. While the course is designed to introduce any of the basic analytical methods of demography, attention is focused primarily on fundamental theoretical issues concerning population growth, resources, fertility, mortality, age structure, and household demography in traditional societies. Data is drawn from ethnographic studies of living populations, from historical demography, and from paleodemography (the reconstruction of population patterns from skeletal samples). There will be three take-home problem sets. These will be a mixture of short essay questions and simple numerical exercises that can be solved on a pocket calculator or a spreadsheet. This course fulfills a 3 credit 400-level requirement for the Anthropology major and minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 410 Osteology (4)** Introduction to the systematic study of the human skeleton from an evolutionary developmental biological perspective.

### **ANTH 410 Osteology (4)**

This course introduces students to the aspects of the human skeleton and dentition that are of anatomical, archaeological, forensic, and developmental significance. Topics include the identification of skeletal and dental structures; the distinction between normal and pathological bone; the estimation of age, sex, and stature from skeletons; bone metabolism; growth and development; and the functional aspects of musculoskeletal and dental systems. Up to one-half of the course is spent on bone identification and skeletal anatomy. Lectures are supplemented by labs that provide practical experience in the identification of individual bones and anatomical structures, age and sex estimation, and the differentiation of abnormal from normal bony structures. It is absolutely essential for students to attend labs to familiarize themselves with bone specimens and casts. At the close of this course, students are expected to be able to recognize human bones and be familiar with anatomical terms, the bony landmarks that define their shape, and the relation of those bones with various soft-tissue structures. Students will have a basic grasp of bone growth and development, as well as how to identify an individual's general characteristics from the skeleton, such as age, sex, and prior life-history events including disease and trauma. The course fulfills a 400-level elective for the Anthropology (BA)

major and minor, as well as the Archaeological Science and Biological Anthropology (BS) degree programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 411 Skeletal Forensic Anthropology (3)** An introduction to anthropological forensic science with an emphasis on what can be learned from human skeletons and archaeological recovery methods.

### **ANTH 411 Skeletal Forensic Anthropology (3)**

This course is a survey of forensic anthropology focusing on human skeletal remains and archaeological recovery methods. Emphasis is placed on field methods used to collect human remains from surface and buried contexts; taphonomic processes; estimating age, sex, stature, and ancestry from human skeletons; recognizing signs of trauma and scavenger damage; and identifying individuals from skeletons. Lectures are accompanied by class discussions and complemented by practical lab sections closely tied to lecture materials. There will be two exams, a midterm and a final, and students are responsible for preparing a poster and presenting a semester-long research project. This course is related to existing ANTH 410, Human Osteology, and proposed course ANTH 413, Molecular Forensic Anthropology. It fulfills a 400-level requirement for the anthropology major or minor, as well as the university's Forensic Science major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 412 Settlement Demography (3)** Examination of the demography and ecology of human settlement systems in the preindustrial past.

### **ANTH 412 Settlement Demography (3)**

This seminar will examine the population dynamics of human settlement systems in preindustrial societies, living, historic, and prehistoric. The focus will be on subsistence-level agrarian settlements, but some attention will also be paid to settlement patterns in hunter-gatherers, in market economics, and in complex societies. After reviewing basic assumptions and problems of working with spatial data, the course will examine processes determining settlement size, composition, and location on the micro-level (i.e. that of individual households, farmsteads, hamlets, and villages) and then pass on to regional patterns of transport, migration, and defense. The processes of site colonization, settlement expansion and contraction, site abandonment, and re-colonization will all be considered in detail. Since human settlements are always non-randomly distributed across spatially-heterogeneous landscapes, some basic landscape ecology will be presented in the course. Some fundamentals of geostatistical analysis will also be taught, although the course is not intended to be a survey of quantitative geography or spatial analysis. Rather, it is designed to be a more specialized follow-up to ANTH 408 (Anthropological Demography); the new course builds upon the basic explored in ANTH 408 by extending them into the spatial domain. During the last quarter of the semester, students will split into 2-3 teams, each of which will re-analyze settlement data from a region and time period of its choice for presentation to the rest of the class. The proposed course will provide 3 elective credits toward the undergraduate major and minor, and will be open to graduate students as well. The overall aim is to produce scholars who can think in creative ways about the dynamics of settlement systems in their own reading and research. The course should be of interest to archaeologists, anthropological demographers, ethnologists, and other students interested in human population science, especially as it relates to preindustrial society.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 413 Molecular Forensic Anthropology (3)** An introduction to the field of the application of DNA methods to estimating forensically useful phenotypes.

### **ANTH 413 Molecular Forensic Anthropology (3)**

This course is a survey of forensic anthropology focusing on human genetic methods. Emphasis is placed on laboratory methods for analyzing DNA variation, the genomic and geographical distributions of genetic variation, estimating genetic ancestry, sex, pigmentation, facial features, and other traits. Lectures are accompanied by class discussions and complemented by practical lab sections closely tied to lecture materials. There will be three exams and students are

responsible for preparing a poster and presenting a semester-long research project. This course is related to existing ANTH 411, Skeletal Forensic Anthropology. It fulfills a 400-level requirement for the anthropology major or minor, as well as the university's new Forensic Science major.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 416 The Evolution of Human Mating (3)** The Evolution of Human Mating is a science course designed to familiarize students with the primary literature on the evolution and development of human mating behavior and sex differences.

### **The Evolution of Human Mating (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 420 (J ST 420) Archaeology of the Near East (3)** Culture of the Near East and India from Paleolithic times through the Bronze Age.

### **Archaeology of the Near East (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 421 Intro to Geospatial Science in Anthropology and Archaeology (3)** This course is a practical, data driven, introduction to applications of Geospatial tools in anthropological and archaeological research.

### **ANTH 421 Intro to Geospatial Science in Anthropology and Archaeology (3)**

As anthropologists, we are interested in humans, how humans interact with each other, and how that interaction is modulated by space and place. The purpose of this course is to introduce students to the basic concepts of spatial theory in anthropology, and the use of GIS (Geographic Information Systems) as a tool in anthropological and archaeological research designs. Students will gain familiarity with geospatial technologies, their use as a tool for data creation, storage and manipulation, and a broad array of data analyses. The course is relevant to anyone documenting or investigating spatial dimensions of human social behavior. Students will gain familiarity with GIS software, its use as a tool for data creation, and a broad array of data analyses.

This class will be offered each Fall semester. It will introduce students to sources and uses of data in addressing anthropological or archaeological research questions. It will prepare the student for more advanced spatial analysis courses such as Advanced Geospatial Science for Anthropologists and Archaeologists. Students will be expected to develop a research project which uses GIS as a tool to address broader anthropological research questions. The class will culminate in the development of a research contract for a future fieldwork project. A list of sample topics is provided. Students will be expected to develop an original and functioning GIS which addresses their research question. The purpose of this exercise is to introduce the student to all stages in the development and operationalization of an anthropological research GIS in the development of an archaeological or anthropological project. There are two components to this class: classroom and labs. The classroom component will consist of lectures and discussions. The student will receive hands-on experience with GIS applications during the laboratory component of the class. The laboratory component will enable students to gain experience applying the concepts discussed in class to archaeological data through use of GIS programs in a technology classroom setting. Data used in the laboratory exercises derive from actual anthropological and archaeological fieldwork. Students are expected to complete labs in one of the several computer labs across campus that have GIS software installed. Grades are based upon the completion of 12 lab exercises, a draft of a proposed contract, the final contract and a short presentation of the proposed contract to the class. This course will fulfill three credits of the requirement in both the Minor and Major in Anthropology. This is the first part of a two part course. The second part of this course is called Advanced Geospatial Science for Anthropologists and Archaeologists.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 422** Meso-American Archaeology and Ethnography (3) Survey of ethnohistorical and ethnographic patterns of Meso-American society; origin and development of ancient civilization in Mexico, Guatemala, and Honduras.

**Meso-American Archaeology and Ethnography (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 423** The Evolution of American Indian Culture (3) Historic and archaeological sources used to trace American Indian lifestyles from the first immigrants to the period of Euro-American contact.

**The Evolution of American Indian Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 424** Andean Ethnology and Archaeology (3) Cultures of the Andes from earliest settlements to Inka Empire; includes discussion of life in modern Andean communities.

**ANTH 424 Andean Ethnology and Archaeology (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

When the Spanish conquistadors arrived in the Andes in 1532, they were astonished by the complexity and grandeur of the Inca Empire, which stretched along western South America incorporating a multitude of different societies that occupied a seemingly inhospitable landscape with coastal deserts, rugged mountain chains, and dense jungles. This course traces out the history and development of Andean cultures from the earliest peopling of the continent to the rise and fall of the Inca Empire. Using archaeological, historical, and ethnographic sources, students will learn about the relationship between Andean societies and their environments and landscapes, as well as the economic, social, and political changes that transformed small egalitarian communities through time into large, stratified states. Through the course, students will not only gain a strong background in pre-Columbian Andean history but will also hone their skills in the use of different lines of evidence to reconstruct the past while learning to critically evaluate existing interpretations. All students are expected to participate actively in discussions. Lectures will be supplemented by illustrations (slides, handouts, videos), and students will learn how societal dynamics are expressed in material culture and in the organization of architecture and settlements. Grades will be based on the results of three exams, a short paper, and participation in discussions. The course complements existing courses at the same (400) level on the archaeology of Mesoamerica (ANTH 422) and North America (ANTH 423). It continues the discussion (at a higher level) of some of the themes covered in ANTH 008 (Incas, Aztecs, Mayas). It fulfills the archaeology credits requirement for the major and is one of the 400-level courses that can be used for the minor. For students outside the major, it may be used to meet the Other Cultures or the Social Sciences requirement in Bachelor of Arts programs.

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 425** Zooarchaeology (3) Introduction to the systematic study of animal skeletal remains from archaeological sites.

**Zooarchaeology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 426W** Archaeological Laboratory Analysis (3) Scientific laboratory methods used in the analysis of ceramic and

lithic artifacts.

### **ANTH 426W Archaeological Laboratory Analysis (3)**

This course, Archaeological Laboratory Analysis, employs experiential learning to teach students how to ask and answer archaeological questions using real data. While students learn the fundamentals of interpretation in other courses using already processed computer (and internet) assembled data sets, this is not how archaeological data are analyzed. Archaeological data emerge from the ground covered with dirt and the analyst must learn how to identify and measure their important attributes, and interpret what they mean. This class will provide a hands-on learning experience where students learn how to examine and use physical remains to reconstruct and interpret human behavior.

Students in the Anthropology program currently learn this critical step on an *ad hoc* basis by working with faculty on individual research projects. This approach, while effective, is neither systematic nor comprehensive. This is a course on analytical systematics. It provides students with an introduction to problem formulation, artifact processing, artifact cataloging, attribute identification, artifact classification, analysis, data illustration and photography. At the same time, students will be introduced to two separate and distinct approaches to interpretation: 1) morphological/diacritical analysis, and 2) direct experimentation and replication.

Students will be graded on the completion of nine laboratory exercises. These exercises will require that students identify the research question being addresses, the theoretical assumptions used in the analysis, the data sample, the analytical method(s) employed, and the conclusions reached. The exercises will also request that students identify personal insights and difficulties encountered during the analysis.

This course fills a vital position in training undergraduate majors by providing them with practical training in research design and data analysis. It also provides the logical link between our general courses in prehistory, our courses on archaeological theory, and our method courses on field methods of data recovery. All of these courses intersect in the archaeological laboratory where data interpretations are made and new information about the past takes shape. In addition to contributing to both the BA and BS undergraduate majors and minors, this course will also provide a framework for training graduate students who enter the program with minimal field and laboratory training in archaeology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 427W Forensic Archaeology (3)** Application of archaeological techniques to crime scene investigations, with practical experience in field and laboratory contexts.

### **Forensic Archaeology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 428 Archaeological Methods and Theory (3)** Scientific methods as applied to archaeological data: evolution, ecology, diffusion, and cyclicity theory.

### **Archaeological Methods and Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 429 Paleoethnobotany (3)** Introductory course in paleoethnobotany, the study of the interrelationships between people of the past, natural environment, and plant resources.

### **ANTH 429 Paleoethnobotany (3)**

This course is a survey of the fast-developing field of paleoethnobotany-- also known as "archaeobotany" or "phytoarchaeology"-- that involves the extension of ethnobotany into the past, emphasizing archaeological plant remains and study of the historical dimensions, complex dynamics, and myriad interrelations between people and plant resources. The primary goals of the course are 1) to promote understanding of the vital interplay between the natural environment and human societies, with their diverse systems of belief and resource use, especially those of the past but with relevance to the present; and 2) to foster an appreciation for what modern paleoethnobotany involves as a subdiscipline or



specialization in archaeology, related to both anthropology and the plant sciences.

The course begins by considering the history and nature of the field, including parallel developments in plant biology. The first half of the semester entails weekly sessions that focus attention on the plant organism, sources of archaeobotanical data, taphonomic issues, and the major classes of archaeobotanical materials. Fundamental issues involved in fieldwork, and the variety of laboratory concerns and methodologies specific to paleoethnobotany as whole and with regard to individual subareas are addressed. Individual laboratory sessions highlight the different preservation states that affect ancient plant materials, as well as methods of identification and analysis. In the second half of the semester, attention is focused on theory and application, issues central to and/or addressed by paleoethnobotany as a subdiscipline of archaeological anthropology.

The course follows a seminar style, with substantial participation by students, including individual presentations, laboratory study, and analysis. Learning is augmented and enhanced by use of various visual aids, along with modern comparative specimens and actual archaeological plant remains.

ANTH 429 will fulfill 3 credits of the additional courses in the Anthropology minor and majors. Anth 002 is a prerequisite.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 430 The Aztecs (3)** This course examines the development and organization of the great Aztec culture of highland Mexico.

### **The Aztecs (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 431 Advanced Geospatial Science for Anthropologists and Archaeologists (3)** This course is an intensive, data driven, treatment of the use of geographic information systems in anthropological and archaeological research.

### **ANTH 431 Advanced Geospatial Science for Anthropologists and Archaeologists (3)**

As anthropologists, we investigate how humans evolved, behave, define groups, and interact socially. Examining how these processes are shaped by space and place is central to the anthropological enterprise. The use of geospatial science in anthropological and archaeological research is now commonplace. Geospatial technologies are now intimately involved in anthropological and archaeological research designs. The course objective is to expose students to advanced concepts and techniques of conducting geospatial science research in anthropological and archaeological contexts. The course is a continuation and development of the introductory geospatial science course and it will fulfill three credits of the requirement in both the major and minor in Anthropology. Students will develop an in depth understanding of anthropologically and archaeologically tailored geospatial project design and implementation. Students are expected to complete the work for the course in one of several computer labs across campus that has the appropriate software installed.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 432 Environmental Archaeology (3)** Introductory course in Environmental Archaeology, with emphasis on method and theory in the subfields archaeobotany, pediaeology, and zooarchaeology.

### **ANTH 432 Environmental Archaeology (3)**

This class is a survey of the fast-developing field of environmental archaeology, or archaeobiology, which encompasses archaeology, the earth sciences, plant biology, and zoology. Environmental archaeologists apply techniques and insights obtained from these fields to questions concerning the relationships among humans, cultural systems, and the natural world, as reflected in the archaeological record. The general goal of the course is to promote understanding of the vital interplay between human societies, with their diverse systems of belief and cultural practices, and the natural environment, with emphasis on human interactions with biotic resources. Instruction is by lecture, supplemented by laboratory sessions emphasizing hands-on experience. Weekly topics are explored through selected readings and class

discussions, augmented with laboratory assignments (practical exercises) variously focused on specific types or classes of archaeobiological materials.

ANTH 432 will fulfill 3 credits of the additional courses in the Anthropology minor and major, as well as the Archaeological Science major. Anth 002 is a prerequisite.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 433** Archaeological Ethics and Law (3) Introductory course that examines prominent ethical and legal issues in archaeology integral to modern applied research and practice.

### **ANTH 433 Archaeological Ethics and Law (3)**

This course explores the ethical, legal, and practical dimensions of modern archaeology through a consideration of the following topics: archaeology as a profession; archaeological ethics; the relationship between archaeology and others (the public, ethnic groups, avocationalists, collectors, etc.); international and national approaches to archaeological heritage management; the antiquities market; maritime law, underwater archaeology, and treasure hunting; cultural resource management in the United States; and archaeological outreach and education. Students are introduced to a variety of legal and ethical issues in archaeology that span local to international scales. Through lecture, discussion, and readings, students will consider the archaeology and ethics of ownership and stewardship, including issues centered on intellectual property rights, representation, repatriation, and reburial of cultural properties. They will be able to identify the various stakeholders in contemporary archaeology, and assess their values and interests in issues such as the treatment, ownership, and disposition of human remains, heritage sites, submerged cultural resources, and antiquities. They will consider growing problems with illicit collecting and excavation, illegal trade, and global concerns centered on the international trafficking of antiquities, and will be variously exposed to relevant national and international legislation involving cultural patrimony and management of antiquities, including international treaties such as the 1970 UNESCO Convention on Cultural Property, and related pieces of US federal legislation. The 1990 Native American Graves Protection and Repatriation Act (NAGPRA) and the Archaeological and Historic Preservation Act (ARPA) of 1974 figure prominently in the course. In general, upon completion of the course students will come to have a stronger appreciation of archaeological ethics and "archaeopolitics"; they will have a good understanding of the U.S. Secretary of the Interior's standards (36CFR61) for professional archaeologists and will be able to assess and evaluate contemporary issues of archaeological ethics and law in the context of modern practice.

ANTH 002 is a prerequisite of this course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 435 (IL)** Ancient Economy (3) The course examines the comparative organization and development of ancient economies in both the Old and New Worlds.

### **ANTH 435 Ancient Economy (3) (IL)**

**(BA)** This course meets the Bachelor of Arts degree requirements.

This course examines the origin and development of ancient economy from its earliest beginnings to the advent of complex monetary economies that existed prior to the industrial revolution. It examines the common economic structures found in ancient foraging, pastoral, and agricultural societies and how those structures were modified and transformed as these societies were integrated into more complex monetary economies. The goal of the course is to develop a comprehensive understanding of ancient economies, the function and purpose of their economic structures, and how those structures of production and distribution were modified and retained within the modern economies that we live in today. While the economy is often approached as its own field of study, this course shows how and why the economy was embedded in social, political and religious institutions that were so prominent in the ancient past. The course will discuss the domestic and institutional economy, the origin and organization of ancient market systems, the development of urban centers and the economies that supported them, the role of merchants in ancient societies, and origins of many of our 21st century institutions including money, banking, insurance, and the organization of craft production before the industrial revolution.

The class draws upon the rich literature in archaeology, history and ethnohistory that examines the structure of ancient societies. It employs a cross-cultural perspective to model ancient economies and to investigate how social forces influenced their development. A range of different historic and prehistoric societies are discussed each semester to illustrate the cross-cultural perspective. The societies discussed vary from semester to semester and include, but will not be limited to, the ancient Sumerian, Assyrian, Greek, Roman, Mongol, Aztec and Inka societies. Examples will be selected

that include societies at different scales of complexity from simple hunting and gathering groups to pre-industrial states. The course fulfills the Social and Behavioral requirements in Liberal Arts. It also fulfills specific major and minor requirements for the BA in Anthropology, the BS in Archaeological Sciences, and the BS in Bioanthropology. The course is also relevant for students in CAMS, History, and Ancient History that are interested in a comparative study of New and Old World civilizations.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 440** South American Tribal Societies (3) Ethnographic survey of tribal societies in South America. Special emphasis on non-Andean area.

### **South American Tribal Societies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 441** (IL) From Stone Ax to Uzi: Tradition and Change in the New Guinea Highlands (3) This course explores cultural change and innovation among tribal peoples of Highland New Guinea from stone tool technology to globalization.

### **ANTH 441 From Stone Ax to Uzi: Tradition and Change in the New Guinea Highlands (3) (IL)**

The indigenous peoples of Highland Papua New Guinea were unknown to the outside world until the 1930s and began to be seriously influenced by European contact only after the First World War. At first contact with Europeans, the million or so people living in the Highlands used a stone tool technology, had no knowledge of the wheel, and lived in small, politically and economically independent local groups. They presented a major population engaged in a way of life typical of human society in a technologically simpler past, and have been crucial in anthropology's discussion of the general characteristics of human culture and institutions. The study of these cultures also provides an opportunity to explore the processes through which these peoples have assimilated thousands of years of technological, political, and economic innovation in a very brief period, while simultaneously maintaining and recreating their cultural identity, despite the impact of colonial rule and global influences. Apart from the specific history of these populations, the course will also give students insight into the processes of globalization and internationalization that necessarily effect changes in traditional cultures, and will require that they consider the advantages and disadvantages that accrue from these processes.

Among the topics this course will cover are traditional and current approaches to dispute settlement, economic changes that entail moving from subsistence agriculture as the basis of the economy to cash cropping for a global market, the ecological effects of extractive industries such as mining and how those effects are translated into social and cultural domains, the reorganization of gender roles, the incorporation of politically independent tribal units into a centralized, powerful state, and the demise of traditional religion with the conversion to Christianity.

Students will be evaluated on contributions to class discussion, essay exams, a term paper and a brief oral presentation based on that paper.

The course will provide support and depth for more general courses dealing with warfare, gender, religion, politics and economics and specific understandings for programs devoted to exploring cultural variation and modernization.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 444** Primitive Warfare (3) Critical overview of the ethnography and theory of primitive warfare.

### **ANTH 444 Primitive Warfare (3)**

Anthropology 444 is concerned with the phenomenon of lethal group violence in tribal societies so called "primitive war". Through lectures, readings, and research projects, this course reviews anthropological approaches to the study of primitive war, focusing both on ethnographic examples and on theoretical approaches. The course covers topics such as explanations, traditional and modern, for the existence of warfare; the primate background to human warfare; and the

social causes and individual motives leading to warfare in tribal societies; as well as its consequences for those societies. Students become familiar with both general and particular manifestations of primitive warfare, and are exposed to individual ethnographic cases of primitive warfare as they motivate a variety of theoretical paradigms.

All students are expected to attend all lectures and to complete all weekly readings. At the last class meeting of each week, a rotation of students are assigned to organize and direct the class discussion of the week's readings in the light of the lectures earlier in the week. Performance in this activity constitutes 40% of the student's grade. Another 40% is earned in the research term paper each student must prepare. The final 20% of the grade is based on overall student contribution to class discussion, particularly during those weeks when the student is not a discussion leader. There is no final examination. This course can be used to fulfill major and minor requirements in Anthropology. Because warfare was and often still is a major activity in most tribal societies, this course provides an important complement to area-focused ethnography and archaeology courses such as ANTH 241 (Peoples and Cultures of Highland New Guinea), ANTH 422 (Mesoamerica), ANTH 423 (North America), ANTH 425 (American Southwest), ANTH 440 (Lowland South America), and ANTH 447 (Africa). This course is also relevant to topically focused course such as ANTH 450 (Comparative Social Organization), ANTH 451 (Economic Anthropology), ANTH 454 (Political Anthropology), and ANTH 456 (Cultural Ecology). On the graduate level, this course addresses central topics covered in ANTH 522-523 (Ecological Theory in Anthropology), ANTH 556 (Social Organization of Traditional Societies), and ANTH 559 (Behavioral Anthropology).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 445W Ethnographic Film (3)** Comparisons of written and visual ethnography; critical assessment of ethnographic film; cross-cultural variation.

### **ANTH 445W Ethnographic Film (3)**

Students will be presented with both written and filmed ethnographic material dealing with a number of cultural subsystems (e.g., kinship and family relations, religion, political systems) and with a number of different world cultures. The aim of the course is three-fold: 1) to convey through visual anthropology the complexity and inter-relations of cultural subsystems, which is often difficult to do in written sources; 2) to develop the skills of critical viewing of ethnographic film; and 3) to provide students with critiques of their written work that will enable them to learn and practice the skills of clear, organized and convincing writing. Towards these ends, students will be expected to read and view weekly assignments for selected topics, to write twelve critical essays that compare the written and filmed sources, and to evaluate the aims, effectiveness, and methods of the films. Essays will be graded for both content and form and will provide a basis for class discussion. Students will also be required to write a term paper focused on a particular ethnographic film of their choice (one not shown in class) supplemented by additional research. As an aid in the writing of the paper, at least one class period will be devoted to learning how to do library research in Anthropology.

This course will complement other courses in Anthropology such as ANTH 045 and ANTH 001. The course can be used to fulfill a requirement in both the major and minor in Anthropology, and will fulfill both a Writing Intensive requirement and a Bachelor of Arts social/behavioral science requirement. It will also provide students in other departments with the opportunity to study aspects of diverse, non-western cultures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 446 Mating and Marriage (3)** An examination of human mating mainly from the viewpoint of behavioral ecology, centering on the species-typical institution of marriage.

### **ANTH 446 Mating and Marriage (3)**

This course is an examination of human mating and marriage mainly (although not exclusively) from the viewpoint of evolutionary behavioral ecology. Its central concern is the species-typical and uniquely human institution of marriage. Why do all human societies recognize this peculiar institution, whose social and biological functions, apparently obvious, become mysterious on close examination? What, exactly, is marriage? What are its consistent characteristics and attributes--or does it have none? How are spouses chosen, and by whom? What does being married imply for the behavior of the spouses, and that of their children and other relatives? What are the evolutionary scenarios that might have led us to marriage? Although sexual behavior is clearly a key element in answering some of these questions, and receives considerable attention, this is not a course on human sexuality. Nor is it a course on kinship, even though kinship is also crucial to understanding marriage and also receives a good deal of attention. Rather, this course attempts to bring to bear on this central social institution bodies of knowledge from the biological and social sciences that may contribute to understanding how and why marriage arose as a universal feature of human societies, and how and why it is perpetuated in contemporary societies. We begin the semester with the posing of the central problem--what is marriage and why do we have it? For about half the course, we approach this question from an evolutionary, sociobiological point of view: We look into the biological background of human mating--its evolutionary history, its physiology, its behavioral ecology, etc.

as we go through a semi-popular book on the subject by a biological anthropologist. Next we turn to more academic readings, old and new, that further elucidate the ecological constraints and fitness consequences of various behaviors relating to mating and mate choice, child rearing, etc., in terms of reproductive success, survivorship, etc. In the second half of the course, we take a more social anthropological point of view. We look at what anthropologists have written about marriage and marriage customs over the years. We try to relate the traditional social anthropology to more modern human behavioral ecology. Finally, in a research project report, each student examines some specifics of marriage as it is manifested in ethnographically known societies. In these reports we are particularly interested in how and by whom mates and spouses are chosen, and who contributes what to the raising of children.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 448 (AM ST 448) Ethnography of the United States (3)** Ethnographic descriptions of various dimensions of life in the United States.

**ANTH (AM ST) 448 Ethnography of the United States (3)**

Ethnographic descriptions of various dimensions of life in the United States. The course covers uses of ethnography in American Studies toward an understanding of social and cultural communication and performance. The application of ethnography and concepts of cultural anthropology to complex societies such as the United States is discussed. The course teaches students to use ethnographic methods for research of American society and culture. Attention is given to the ethics and issues of ethnographic fieldwork. The course satisfies the "area" requirement in "society" for American Studies majors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 450 Comparative Social Organization (3)** Social structure and cultural change among nonliterate societies.

**Comparative Social Organization (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 450W Comparative Social Organization (3)** Social structure and cultural change among nonliterate societies.

**Comparative Social Organization (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 451 Economic Anthropology (3)** Different approaches to the study of the economics of non-Western societies, emphasizing the interrelationships between noneconomic factors and economic behavior.

**Economic Anthropology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 453 Anthropology of Religion (3)** Traditional and modern religions and historical and contemporary religious movements from an anthropological perspective.

**ANTH 453 Anthropology of Religion (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course will examine the origin, evolution and social function of religion from a cultural materialist perspective. It will begin with a general discussion of an anthropological approach to the study of religion, using numerous examples from different cultures for purposes of illustration. Following a discussion of several topics relevant to the anthropological study of religion --including magic, rituals, witchcraft and mythology-- the course will focus on the relationship between politics and religion: first discussing the role of religion as a mechanism of social and political control, and then examining the role of religion as a vehicle of sociopolitical change in the form of what anthropologists call revitalization movements. This course links to courses on the sociology, history, and philosophy of religion, to courses on intellectual history, and history of social sciences. Course evaluation will be based on 3 take-home essay examinations. Students will give the instructor 3 questions at indicated times; the instructor will return one question; the student will write an essay on the indicated question. Attendance is mandatory. This course will fulfill a 3 credit 400 level requirement for the Anthropology major and minor.

General Education: None

Diversity: None

Bachelor of Arts: Other Cultures and Social and Behavioral Sciences

Effective: Fall 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 455 Global Processes and Local Systems (3)** Ethnographic, comparative, historic, evolutionary treatment of global economic, political, and cultural processes and their consequences for local systems.

**ANTH 455 Global Processes and Local Systems (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

Students will learn about global economic, political, and cultural processes and their consequences for local systems, how anthropologists do ethnography in the modern world of villages and factories; varieties of anthropological approaches and theories and how to assess them and how to critically assess ethnographic work.

Students will write a series of book reviews in which they critically analyze the works they read in the course. Each review will present the main argument of the work; the theoretical assumptions the argument entails; the evidence the author used, the methods the author used to develop the evidence; the relationships among theoretical assumptions, arguments, evidence, and methods; and conclusions. Each review will assess the validity and reliability of the findings and the relationships of findings, arguments, and assumptions to the conclusions. These reviews will direct the student's attention to the salient points of scientific ethnography and anthropological theory with specific examples. Grades for the reviews will be assigned on the basis of how well each component of the review is completed, short in-class writing assignments to test reading comprehension and orient discussion, and a synthetic essay.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 456 Cultural Ecology (3)** Survey of the methods and concepts of cultural ecology, focusing on the interaction between cultural and geographical systems.

**Cultural Ecology (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1986

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 457 (US;IL) (J ST 457, SOC 457) Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3)** Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.

**ANTH (J ST/SOC) 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3) (US;IL)**

This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the

Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State's Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research. The course will be offered approximately once a year.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 458** Ethnographic Field Methods (3) Course introduces students to ethnographic field methods, includes student projects and simple analyses that don't require statistical sophistication.

### **ANTH 458 Ethnographic Field Methods (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is designed to introduce you to some (not all) ethnographic field methods. It will include actual projects you will have to carry out and other material that will make you a better ethnographer, such as how to pose questions that can be answered, how to select an appropriate sample for a project, how to take and use field notes. Because the emphasis is on field methods, we will do only simple analyses that don't require any statistical sophistication (e.g., descriptive statistics, chi square tests).

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 459** Applied Anthropology (3) A survey of the development of applied anthropology and the current issues facing anthropologists working in non-academic settings.

### **ANTH 459 Applied Anthropology (3)**

This course surveys the development of applied anthropology and the current issues that face anthropologists as they work in nonacademic settings.

Topics covered for 3 weeks each:

The roots and place of applied research in contemporary anthropology doing applied research Development--defined and evaluated Applied anthropologizing and contemporary problems in North America career. In this class students will learn what it means to be an applied anthropologist and to do anthropology outside of the academic setting. We will learn the historical development of applied anthropology and some of the special tools (and methods) applied anthropologists use in their work. We will also focus on the area of development and the role anthropologists play in their development as facilitators and critics. We will look at how applied anthropologists approach problems in North America from homelessness to drug addiction to AIDS and other diseases. Finally, we will survey the careers of various applied anthropologists to better understand the opportunities that are outside of the academic world. This course will fulfill the requirements for a 400-level course or elective for majors and minors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 460** (BIOL 460) Human Genetics (3) The human genome, its variation, origins, and relation to disease and other traits.

**ANTH (BIOL) 460 Human Genetics (3)**

The course considers many examples derived from the study of the genetics of human disease, and includes most general areas of interest, including simple Mendelian disorders, and complex chronic diseases such as cancer and cardiovascular disease, and variable special topics including immunogenetics and the genetics of imprinting or other processes. The course usually also touches briefly on the nature of forensic genetics and the problem of making inferences from individual genotypes. Finally, the course considers the bioethical and societal issues involving contemporary human genetics. The study of disease genetics is important for students preparing for graduate work in medicine and other health professions as well as for graduate studies in molecular and evolutionary genetics and related areas, including biological anthropology and bioethics. This course is relevant to requirements or appropriate electives for life science majors and graduate students (check with your academic advisor). Over the years, it has proven to be excellent preparation for subsequent graduate and professional work in these areas. The course is offered most years, in the fall semester. Depending on enrollment and other factors, the course may include graded homework or other components, but evaluation is predominantly based on exams during the semester and a comprehensive final. This course is cross listed as ANTH 460 and BIOL 460, but there is only one course, at the same time and place, for all students no matter how they register. In some years, a 4-credit Honors version is offered (ANTH 460H/BIOL 460H), that is identical to 460 but with an additional class period each week involving additional written and presentational assignments and term projects, along with the regular 460 exams, that combine to determine the final grade. Total enrollment is capped at about 100 students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 460H** (BIOL 460H) Human Genetics (4) Gene mapping in humans; molecular basis of genetic disease; genomic structure; immunogenetics; and genetic evidence for human evolutionary history.

**ANTH (BIOL) 460H Human Genetics (4)**

Students will explore interesting normal or pathological variation to understand first its biological nature, then its epidemiological distribution, genes and genetic mechanisms associated with the trait, phylogenetic origins or comparison, and the nature of relevant genotype-phenotype relationships. Alternatively, students may explore methods for identifying and characterizing gene action or structure, or historical subjects related to human variation and evolution. Ethical and societal aspects of these issues will be considered as well. Time will be taken for faculty or students to read and present current important papers appearing in the literature, relevant to the current course topics. As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course format of Human Genetics 460 which, while presenting material at a sophisticated level, will not have time to explore the more subtle, problematic, or challenging aspects. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when the instructor learns they have registered. The nature of the course will be described including semester-specific themes or focus that will apply (if any). Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. Students will be evaluated on the quality of their project work, including writing ability, presentation ability, and depth of thought. Several written assignments will be given and graded for content and expression quality. Although students will take regular Human Genetics 460 lectures, they may be given separate exams (corresponding to those given in the regular course) that will allow more freedom of expression than multiple-choice exams or homework assignments. Depending on the workload in any semester, there may be a separate written take home synthetic essay final exam. The Honors session each week will be highly interactive rather than passive, and students will be graded on attendance, participation and whether they have done assigned work in advance of the class. Students will be expected to have the stipulated background knowledge of biological anthropology, evolutionary biology, statistics and genetics. This course should count as 4 credits toward additional courses in biological anthropology required for the Anthropology major.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 461** Molecular Anthropology (3) Provides framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species.



**ANTH 461 Molecular Anthropology (3)**

The aim of this course is to provide students with the framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species. Basic methods in molecular biology, structure of the genome, molecular evolution, and human population genetics will be covered in the first part of the course. Once these tools are in place we will examine both classical and contemporary research reports on a number of topics, including the place of humans among the apes; mitochondrial Eve, DNA in forensics; Neandertal DNA and other applications of ancient DNA; reconstructing recent human evolution; the biological meaning of race; disease gene mapping; recent technological advances in genomics; skin, hair, and eye color genes; and the genetic future of our species. There will be three exams that will each count for 25% of the grade. Attendance and participation are mandatory and will count for 25% of the final grade. A portion of this participation grade is earned by presenting 10 min. summaries of particular readings. Each student will be expected to summarize a scientific paper four times during the semester. These summaries are not expected to be exhaustive reports on the material, but should reflect an effort on the part of the student to understand and discuss the material and may require some background work.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 465H Fifteen Great Biology Papers (3)** Reading and discussion of the most influential papers in the history of biology that illustrate exceptional insight and elegant reasoning.

**ANTH 465H Fifteen Great Biology Papers (3)**

Thousands of papers are published annually in the life sciences, but only a few have lasting impact on their field. These are usually characterized by elegant and thoughtful insight, and creative scientific thinking. For each of the fourteen weeks of the semester we will read and discuss a landmark paper of this type. The 15th paper? That will be the student's term project. The student will read one classic paper in the history of biological thought each week and discuss the paper in class. During the last half of each class in last third of the semester, the students will present the classics they have chosen for their term paper. The major topics covered in this course are: Weeks 1-4: Basic history of thought about origin and nature of variation in living organisms Weeks 5-8: Landmarks in the philosophy of science Weeks 9-12: History and development of ideas in evolutionary biology. Weeks 13-14: Foundations of 20th Century biology The objective of this course is to give students an experience with and appreciation for (1) the history and origins of science, biology in particular, (2) the nature of cogent critical thinking and expression, (3) the basis for fundamental ideas in biology today, (4) a sense of the nature of papers that had great influence on the future of the field, and (5) experience scouting, choosing, evaluating, and writing about papers of this nature. Evaluation will be based on class attendance and participation, critical thinking ability and effort as manifest in class, and a term paper (graded also to include quality of writing and research.) This course is generally related to all life science courses, and relevant to social and other sciences, philosophy, and history. This course can fulfill elective credits for Anthropology majors and minors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 466 The Skull (3)** Survey of the mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull.

**ANTH 466 The Skull (3)**

This course will provide a survey of what is known about the Mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull. The course will consist of lectures and a laboratory component. Students will learn about the basic skull architecture and be introduced to various specializations of extinct and extant species. The section on evolution will cover the evolution of the skull from the earliest jawless vertebrates through human evolution. During the section on development, we will discuss the nature of the formation of bone embryologically. Other topics include the ways in which bone changes shape and size during prenatal and postnatal growth, how changes in growth can result in evolutionary change in morphology. The section on the function of bone will focus on biomechanical interpretations of the morphology of the skull. The lectures will focus on human anatomy but provide contrasts with other mammals (e.g., horse, dog, mouse). The last section on variability will survey the major groups of mammals highlighting similarities and differences in bony architecture and skull morphology. This portion of the course will be more laboratory-based with students examining specimens, taking measurements and leading discussions on hypotheses regarding why skull architecture is so different among mammals. The objective of this course is to provide the student with a broad survey of information relating to the mammalian skull. Through assigned readings and lectures the student will become familiar with salient anatomical and osteological features, obvious differences in skull architecture and the various biological processes responsible for these differences. During the final laboratory part of the course the students will bring their knowledge to an assigned problem and specimen in order to apply what they have learned to a scientific question. Students will be required to attend all lectures and laboratories. Periodic quizzes will be

administered as well as an exam at midterm. A paper that focuses on the student's laboratory experience will be required at the completion of the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 468 Evolution and Development of Human Origins (3)** In depth analysis of the genetic and developmental basis for phenotypic variation and evolution of humans and primates.

### **ANTH 468 Evolution and Development of Human Origins (3)**

Recently biology has undergone a revolution regarding our understanding of the mechanisms underlying the evolution and development of animal form. This knowledge has a profound impact on the way we conduct and interpret morphological analyses pertaining to human evolution. In this course we will explore basic principles underlying Darwinian natural selection and our understanding of the evolution of complex characters. Then we will delve into developmental genetics to explore how the gene regulation can alter spatial and temporal expression patterns during development. We will next conduct a survey the basic embryology of key morphological systems of interest to biological anthropologists including: the axial skeleton and somite formation, limb buds, musculoskeletal system, skull formation, and dental and skin appendage formation. We will also explore issues concerning skeletal plasticity, fossil analysis, and comparative genomics. Discussion particular case studies related to human and primate evolution and morphological variation will illustrate the principles discussed in this course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 470H Our Place in Nature (3)** An evolutionary and genetic consideration of our understanding of human beings as a part of the natural world.

### **ANTH 470H Our Place in Nature (3)**

The title "Our Place in Nature" takes off from T.H. Huxley's famous book in 1863 that put humans in rather than outside of nature, and the idea of the course is to place humans in the context of organic evolution both specifically and as a kind of general "model" organism (for example, genomic, phylogenetic, and comparative perspectives will be included). We will take a theme (one or more related topics, depending on enrollment, timeliness, etc.), which students will be assigned to work on singly or in groups. We'll first read from the historical, comparative, and evolutionary literature to see how "Our Place in Nature", relative to that theme, was first argued. Then we will follow the literature in evolutionary, developmental and genetic biology to the present to see how our current understanding of the trait evolved. Current research, especially on developmental and genetic aspects of the trait, will be examined in depth. We'll pay special attention to research strategies, comparative and genomic approaches, and latent working assumptions that help or hinder our explanations. The sociocultural context will be considered throughout, including the implications for society of our changing scientific assessment of the trait.

As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course formats. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when I learn they have registered. Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. The course will assume the level of knowledge such as can be obtained in one of several recent "Evolution" texts, an understanding of modern genetics and genetic methodology, basic statistics, and a general work on the history and philosophy of science and evolutionary thinking (initially, probably J.A. Moore's *Science as a Way of Knowing*). This substantial background requirement is based on this being an upper-level class; for good students to get what good students deserve at a good university, we need to be able to start at a high level.

Evaluation will stress original synthetic thought and investigation rather than memorized factual recapitulation. Work groups will tackle particular problems, present them, and turn in written products. There will be a written take-home synthetic essay exam. There will be other written assignments summarizing assigned reading or topics to keep students on track. The class will generally be based on oral discussion and/or be run in Socratic Q&A format. Evaluation will include a major component related to attendance and to level and quality of in- class participation, acquired knowledge and quality of thought and communication. This course will build on, and incorporate, knowledge acquired in physical anthropology, evolutionary biology, statistics, and genetics courses and will count as 3 credits toward the additional courses in biological anthropology required for the Anthropology major.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 471H** Biology, Evolution, and Society (3) Exploration of the genetic theory of evolution and development, its history and application within Biology and beyond.

### **ANTH 471H Biology, Evolution, and Society (3)**

This will be a reading, discussion, and exploration course that looks at the way theory about the nature of life and its origins and diversity have developed over time into today's evolutionary theory. The course will examine the Darwinian theory, and then new elements that recent biological research have revealed about the nature of biological traits themselves and how genes produce them. These points were not part of evolutionary theory itself, but are an important supplement that could not have been made before results from the last 20 years have been available. A theory can be called a cosmology when its assumptions go beyond hypotheses to be tested, to become assumptions that are no longer under test but are used to devise future research and that then set the directions of science. This includes, but isn't restricted to the kind of cosmology that deals with life space. We have to use theory to order our work and to anticipate what we have not yet found (for example, that newly discovered species will be related to other known species). But in the case of biology, a modern 'biocosmology' has developed steadily since Darwin, increasingly centered on molecular genetics and genes as the ultimate units of biological causation. Sometimes that theory has become so unquestioned as to impair research and even to be somewhat misleading. Elements of biological theory, such as natural selection, are powerful and general, and are being borrowed by physicists and astronomers (a reverse of the borrowing that occurred in the last century), to account for aspects of the physical universe in explicit evolutionary terms (including natural selection). For somewhat similar reasons, also having to do with the role of science in society, modern biocosmology has routinely been extended to apply to sociopolitical issues, such as economic and educational policy, science funding decisions, and views about socially delicate issues such as behavior, sexuality, talents and abilities, and much else. This course will discuss how the modern theory of life has arisen historically and the evidence and research methods that have been used to develop that theory. A view of biological theory as a broader cosmology leads to the additional consideration of the nature of biological causation as a statistical rather than purely deterministic phenomenon, and the kinds of research approaches that are used to understand biological problems. The latter include the engineering of organisms, the health sciences, and the nature, evolution, and biological basis of behavior. The objective of this course is to give students a broad understanding of the evolutionary and genetic theory of life and a broader view of the way that theory extends to areas not yet understood, as well as to its origins in and relevance to human society. Everyone is familiar with Darwin's basic theory that life is historical and evolves via natural selection, and that genes are the basis of it all. But these ideas are often only superficially understood—sometimes even by biologists—and many clearly central aspects of life have been left out of the Darwinian theory. That theory explains how organisms evolve, but not what evolves or how genes make those traits possible. These are topics in gene function and developmental mechanisms. Along with some modifications to Darwin's ideas, largely involving elements of chance and population structure and ecology, the genetic theory evolution can be augmented by a few simple organizing principles to explain the nature of traits and flesh out a more comprehensive understanding of life. These principles are in daily use in research but it will be helpful for students to have them organized into a synthetic framework placed explicitly within evolutionary theory itself. This course will be generally related to all life science courses, and relevant to social and other sciences, philosophy, and history. But it is not tied to any particular other course, and as a kind of overview of the governing notions of life at the onset of the 21st century, complements the education of anyone in these related fields. This course will be of interest to students who have or will take courses in astrobiology, developmental biology, evolutionary biology and/or population genetics, or anthropological genetics and human evolution. The grade will be based on attendance and participation. Reading and/or research of some kind will be assigned most weeks, with students responsible for oral reporting or writing brief descriptions of what they have found. There will be a term paper or project, but no formal exams.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 472** The Ecology of Traditional Farming (3) This course will examine the ecology of traditional farming, focusing on the farming household, its farm, and its subsistence needs.

### **The Ecology of Traditional Farming (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 476W** Anthropology of Gender (3) Cross-cultural construction of gender and sex roles; theories of gender

construction; case studies and practical effects.

### **ANTH 476W Anthropology of Gender (3)**

Students will learn the current theoretical approaches in anthropology to the cultural construction of gender and sex roles. The first 2-3 weeks of the course will concentrate on exploring and understanding these theoretical approaches. The remaining weeks will focus on case studies of non-western gender systems, and on the practical effects of those systems, but students will also be encouraged to relate these systems to their own experience. Each meeting will be based on discussion of the readings assigned for that meeting and students will be expected to participate. During the period devoted to theoretical approaches, discussion will focus on the assumptions, advantages, and disadvantages of each approach. For the part of the course devoted to readings on individual societies, one reading each week will be the basis for a critical essay of approximately five pages. These essays will be expected to include: 1) an identification of the theoretical approach that informs the work, 2) a statement of the author's arguments or questions, 3) a discussion of the methods used to provide data in support of the arguments or to answer questions, 4) a critique of the adequacy of data, and 5) a statement suggesting which additional elements might make for a better study. These essays will be graded for both content and form and students will have the option of rewriting essays (and improving their grade) after they receive comments. These essays will provide 60% of the course grade, while participation in discussions will provide another 15%.

A short research paper will also be required. The paper must focus on a question or hypothesis concerning gender, and a preliminary proposal that includes the focus of the paper, its relevance to the course, and a beginning bibliography is required. A first draft of the paper will be required two weeks before the end of the semester. The research paper will provide 25% of the course grade.

The course complements other courses in Anthropology that deal with sex differences, but will provide a perspective on gender that is not available elsewhere in the curriculum. The course can be used to fulfill a Behavioral Anthropology requirement in both the major and minor in Anthropology and a writing across the curriculum requirement. It will also provide students in other departments with the opportunity to study aspects of diverse, non-western cultures. The course is currently identified as one that may be taken to fulfill the requirements of the Women's Studies minor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 477 (US;IL) Language, Culture, and Society (3) Relationships among language, culture and society, with an anthropological emphasis.**

### **ANTH 477 Language, Culture, and Society (3) (US;IL)**

Anthropologists have long acknowledged the importance of language as a major adaptive tool of the human species and as our principal means of transmitting culture. Indeed, it is often difficult to separate language, culture and society because of their intrinsic interrelatedness; language requires a social environment, while culture requires an efficient and expressive means of communication. This course will explore the relationship of language, culture and society, within an anthropological context that distinguishes it from the standard approach of linguistics courses. Linguistic anthropologists have focused on language as a way to make inferences about larger anthropological issues such as world view, semantic fields, the relationship between speech and socialization and the interaction of linguistic and social communities. The course will include a section on the structure of languages, emphasizing the similarities and differences in human languages and the expression of the general language code in particular languages. It will also deal with the origins of language and briefly explore language change, including contacts between members of different societies and the changes that those contacts entail. The major hypotheses concerning the relationship between language and culture will be assessed. Finally, a major part of the course will be devoted to the study of language and its social context, the ways in which speech is associated with social relations, how speech affects and is affected by social interaction. Students will gain an understanding of the importance of language in human adaptation and the transmission of culture and as a social marker both between and within social groups. Students will be evaluated through written exams, problem sets, contributions to class discussions and presentations. The course will provide 3 credits in the Major and Minor in Anthropology.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 478 (IL) Cannibalism (3) Explores the cultural institution of cannibalism, uses of the "cannibal" label, and cannibalism's meaning among those who practiced it.**

### **Cannibalism (3)**

General Education: None

Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 492** Intermediate Field Methods (3-6) On-site experience in collecting archaeological, behavioral, or biological data.

**Intermediate Field Methods (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 493** Field Techniques (3-6) Training in techniques involving analyses of archaeological, behavioral, or biological data.

**Field Techniques (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 497A** Peoples of South Asia (3) The course will cover nation states of Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka and Maldives. This course looks at the diverse peoples of South Asia and their dynamic cultures.

**Peoples of South Asia (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 497H** Evolution and Development of Human Origins (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Evolution and Development of Human Origins (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 501** Human Evolution: The Material Evidence (3) Human origins as seen in the fossil record and comparative biology of humans and their primate relatives.

**Human Evolution: The Material Evidence (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 508** Research Problems in Culture History (3-9) No description.

**Research Problems in Culture History (3-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 509** Research Design in Anthropological Fieldwork (3) A survey of research design, sampling strategies, potential biases, confounding problems, and the limits of inference in anthropological fieldwork.

**Research Design in Anthropological Fieldwork (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 521** Current Literature in Archaeology (1) Seminar designed to expand general knowledge of archaeology through exposure to current research and related issues in contemporary archaeology.

**ANTH 521 Current Literature in Archaeology (1)**

This seminar is designed to expand general knowledge of archaeology through exposure to current research and related issues in contemporary archaeology. We accomplish this by examining the best of recent journal literature. We may also occasionally read a chapter from an edited book. We will normally read and discuss one article per week, although we might increase that number in cases where articles have been followed by published debates. Articles should be selected from a list of approved journals that will be supplied in class. Each article must be approved in advance by the course professor. The presenter should follow the standard outline for article discussion that will also be supplied in class.

Faculty: Frances Hayashida, Kenneth Hirth, George Milner, Dean Snow, and David Webster

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 541** Current Literature in Cultural Anthropology (1) This seminar is designed to expand general knowledge of cultural anthropology through exposure to current research/related issues in contemporary cultural anthropology.

**ANTH 541 Current Literature in Cultural Anthropology (1)**

This seminar is designed to expand general knowledge of cultural anthropology through exposure to current research and related issues in contemporary cultural anthropology. We accomplish this by examining the best of recent journal literature. We may also occasionally read a chapter from an edited book. We will normally read and discuss one article per week, although we might increase that number in cases where articles have been followed by published debates. Articles should be selected from a list of approved journals that will be supplied in class. Each article must be approved in advance by the course professor. The presenter should follow the standard outline for article discussion that will also be supplied in class.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 545** Seminar in Anthropology (1-9) Critical analysis of research in selected areas of anthropology.

**Seminar in Anthropology (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 556** Social Organization of Traditional Societies (3) Cultural bases of social organization of traditional societies.

**Social Organization of Traditional Societies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 559** Human Ecology (3) Ecological anthropology, emphasizing the adaptive aspects of subsistence, including foraging and settlement pattern.

**ANTH 559 Behavioral Anthropology (3)**

The goal of this course is twofold: 1) to bring students to a level of competence in human ecology such that they can read the current scholarly literature in the field with an informed and critical intelligence; and formulate their own research questions in the field; and 2) to launch students in the practice of what most anthropologists do--research, teaching, and the presentation of professional papers in oral and written form.

Students are evaluated on their class performance in preparing and delivering presentations to the seminar on the assigned readings for each session (40%); and on their term papers (60%). This class is the higher level continuation of ANTH 456. It is required for graduate students in Cultural Anthropology and recommended for those in Archaeology and Biological Anthropology. It is offered every third semester

Faculty: Stephen Beckerman

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 560** History of Anthropological Theory (3) Survey of origin and development of anthropology in the Nineteenth Century and trends during the Twentieth Century.

**History of Anthropological Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 562** Laboratory Methods in Anthropology (3-9) Supervised laboratory research, utilizing materials from physical anthropology or archaeology or cultural anthropology.

**Laboratory Methods in Anthropology (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**ANTH 563** Current Literature in Biological Anthropology (1) Seminar designed to expand general knowledge of Biological Anthropology through exposure to current research and issues in contemporary Biological Anthropology.

**Current Literature in Biological Anthropology (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 566** Infectious Diseases in Anthropological Populations (3) Surveys infectious diseases in history and prehistory; introduces concepts from microbiology, immunology, and epidemiology, applies them to past human populations.

**ANTH 566 Infectious Diseases in Anthropological Populations (3)**

Throughout history, more people have died of infectious diseases than of any other causes. Such diseases are therefore of great importance in human ecology and demography. Yet anthropologists have paid scant attention to the implications of infectious diseases for human populations, especially populations in the past. This course attempts to correct that oversight.

The course is designed for graduate students and advanced undergraduates in anthropology and related fields (biology, population studies, health sciences). The primary focus will be the role of infectious diseases in human population ecology, but enough background will be provided on the biology of infectious diseases to make the course as self-contained as possible. Thus, we will review basic information about the biology of pathogen-host interactions, including some elementary microbiology and immunobiology. (Note that the course is not intended to replace introductory-level courses in those fields.)

We will also discuss the evolutionary arms race between the human host and its pathogens, especially in the evolution of pathogen virulence.

Once this basic background has been provided, the remainder of the course will deal with infectious diseases in past human populations. What was the role of infectious diseases in population regulation? How did human population structure affect infectious disease dynamics? How did infectious diseases contribute to the mortality "crises" that are known to have affected many preindustrial societies?

To address these questions, we will review recent insights based on mathematical models of the epidemic process. The focus will not be on the mathematics per se--indeed, students need not have any special mathematical background. But they will be expected to learn Stella, a computer language for dynamic modeling. (Stella was chosen because it is easy to learn, and yet allows construction of sophisticated models without requiring any attention to the underlying math.) Toward the middle of the semester, students will break into 2-4 groups, each of which will select a particular disease or class of diseases, develop some models of them using Stella, and present the results to the class as a whole. The entire class will then work together to explore and extend the models developed by the separate groups.

Grading will be based on the group presentations, in which all students are required to participate. Participation in general classroom discussion will also be taken into account. Since the class will combine formal lectures with a more seminar-like format, active student participation is essential for a good grade. This course will be offered once a year with an enrollment of 15.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 571** Principles of Human Evolutionary Biology (3) Mechanisms and quantification of human genetic variation and survey of evolutionary aspects of human ecology, life cycle, and population biology.

**Principles of Human Evolutionary Biology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 575** Population, Food, and Traditional Farming (3) This course explores the relationship between demographic processes (fertility, mortality, migration) and traditional farming, especially farming near the subsistence level.

**ANTH 575 Population, Food, and Traditional Farming (3)**

This course explores the complex relationship between demographic processes and traditional agriculture. It starts with the premise that traditional agriculture, at least agriculture near the subsistence level, is primarily demographic in its motivation: the main purpose of a small-scale, preindustrial family farm is to create and support a family – i.e. produce children (fertility) and keep them alive (survival). This idea will be the starting point for re-examining existing theories about population and agriculture, and for formulating new models of the traditional farming household as a demographic enterprise.

Some of the topics to be addressed include: (1) the slippery concepts of 'population pressure', 'over-population', 'population regulation', 'carrying capacity', and 'sustainability'; (2) some basic ecology and economics of subsistence production and consumption; (3) the debate over agricultural intensification; (4) the effects of under-nutrition on fertility and mortality; (5) the nature of the household labor force; (6) the household demographic life cycle and its economic implications; (7) seasonality and the allocation of household labor; (8) the demography of the 'hungry season' (9) risk management and food shortages; and (10) household wealth differentials and their demographic implications.

The first half of the course will be in lecture format, the second will be more like a seminar. At about the mid-point of the semester, students will split into groups of 2-4 (depending on class size). Each group will select an ethnographic/demographic/economic monograph on traditional agriculture from a list provided by the instructor, prepare and present a PowerPoint presentation on it, and lead an extended classroom discussion of it. Each presentation ought to take up at least two or three class periods. The course grade will be based on the presentation and on general seminar participation (approximately 80 percent presentation and 20 percent participation, including doing the required readings).

This course should appeal to graduate students and advanced undergraduates in anthropology, geography, crop and soil science, demography, rural sociology, agricultural economics, and behavioral ecology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 579 (SOC 579) Spatial Demography (3)** This graduate course will expose students to spatial analysis tools and analytical methods applied to demographic research.

### **ANTH (SOC) 579 Spatial Demography (3)**

The improved application of spatial data and methods to demographic research is a critical methodological challenge facing demographers today. This graduate seminar is designed to focus on substantive demographic research topics while exposing sociologists and demographers to challenges in, and opportunities for, using geographic information systems (GIS), spatial analysis, and spatial statistics in their own research. Substantive foci will include readings and discussions of spatial perspectives on topics such as racial/ethnic segregation, spatial mismatch/entrapment, poverty, crime/delinquency, migration, health inequalities, wellbeing, maternal and child health, environmental justice, and population and environment relations. Similarly, the seminar will highlight connections between spatial concepts and data availability (e.g., Modifiable Areal Unit Problem - MAUP; data privacy), other emerging methodological approaches to studying society (e.g., contextual modeling, multi-level modeling and the area of neighborhood effects) as well as the integration of different types of data (e.g. qualitative data and quantitative data). Throughout the course lectures and discussions will be complemented with lab sessions introducing spatial analysis methods and GIS and spatial analysis software. The lab sessions will include the use of among other software GeoDa, CrimeStat, R, and ArcGIS (including Geostatistical Analyst and Spatial Analyst extensions). These lab sessions will introduce many methodological and technical issues relevant to spatial analysis (e.g., error, data validation, data integration, cartography, exploratory spatial data analysis, spatial regression modeling, geographically weighted regression, point pattern analysis and geostatistics). Assignments for the courses include up to two writing assignments, up to four lab assignments, and a final project which will be presented as a short 15-minute presentation as well as submitted as a term paper. The writing assignments will include an annotated bibliography/brief literature review within a selected demographic theme area and a profile of a well-known demographer and their adoption of spatial thinking/perspectives/methods. The lab assignments will focus on building geospatial databases, basic spatial analysis, exploratory spatial data analysis, and spatial regression modeling. The courses will include other labs and assignments that will be completed for no grade; these are intended as mechanisms/opportunities for developing and enhancing familiarity with selected software, data resources, and analytic methods.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 588 Method and Theory in Archaeology (3)** Methodological strategies and tactics in archaeological research; major theories in cultural anthropology as applied to archaeological data.

### **Method and Theory in Archaeology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at the Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ANTH 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Appellate Team (APTEM)**

**APTEM 995A** Irving R. Kaufman Securities Law Team (2) See Handbook for description.

**Irving R. Kaufman Securities Law Team (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995B** Jessup International Law Team (2) See Handbook for description.

**Jessup International Law Team (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995C** National Appellate Moot Court Team (2) See Handbook for description.

**National Appellate Moot Court Team (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995D** Environmental Law Team (2) See Handbook for description.

**Environmental Law Team (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995E** Robert Wagner Memorial Labor Law Team (2) See Handbook for description.

**Robert Wagner Memorial Labor Law Team (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995F** Information and Privacy Law Team (2) See Handbook for description.

**Information and Privacy Law Team (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995G** Constitutional Law Team (2) See Handbook for description.

**Constitutional Law Team (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995I** Miscellaneous Appellate Moot Court Teams (2) See Handbook for description.

### **Miscellaneous Appellate Moot Court Teams (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APTEM 995K** BLSA Appellate Moot Court Team (2) See Handbook for description.

### **BLSA Appellate Moot Court Team (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Applied Behavioral Analysis (ABA)**

**ABA 500** Experimental Analysis of Behavior (3) This course covers the scientific, conceptual, theoretical, and philosophical roots of the experimental analysis of behavior.

### **ABA 500 Experimental Analysis of Behavior (3)**

This course is designed to serve as a foundation course for the Applied Behavior Analysis Masters Program by giving students the necessary scientific, conceptual, theoretical and philosophical background in the experimental analysis of behavior. The field of Applied Behavior Analysis, or the application of the principles of the experimental analysis of behavior to humans, was the result of decades of basic laboratory research with animals and humans. This course will provide students with a basic understanding of the field of behavior analysis, its roots and scientific and philosophical underpinnings. ABA 500 Experimental Analysis of Behavior is a required course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 20 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 511** Behavior Modification (3) Provides an overview of principles and procedures and use of behavior modification with individuals in diverse settings.

### **ABA 511 Behavior Modification (3)**

This course provides students with the principles and procedures of behavior modification. The course teaches students how to analyze, interpret, and develop programs for a wide range of clinical and educational populations. The course provides advanced discussion on the empirical and theoretical underpinning of behavior modification. This course is divided into six parts. Part 1 introduces behavior modification and its major areas of application. Part 2 covers the basic principles and procedures of behavior modification. Part 3 discusses motivation operations and ways in which to combine and apply principles. Part 4 presents detailed procedures for assessing, recording, and graphing behavior and methods for conducting functional assessments and behavioral research. Part 5 covers how the basic principles, procedures, and assessment and recording techniques are incorporated into effective programming strategies. Part 6 presents the history of behavior modification and discuss some of the ethical issues in the field. ABA 511 is a required course for graduate students of the Applied Behavior Analysis Masters Program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 522** Single Subject Research (3) This course aims to teach how to critique, design, and analyze single subject research.

### **Single Subject Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 533** Applied Analysis of Behavior (3) Overview of the application of behavior analysis in education, rehabilitation, medicine, business, counseling, and therapy across the age range.

### **ABA 533 Applied Analysis of Behavior (3)**

This course will provide students with a basic understanding of the application of behavior analysis to a wide variety of human conditions. The characteristics and history of applied behavior analysis will be covered as well as the use of behavioral principles to increase and decrease behavior. The role of assessment and generalization and maintenance issues will be stressed. Some applications that are highlighted include self-control, token economies, systematic desensitization, and stimulus control and modeling. Populations covered include geriatrics, children, adults, and individuals with special needs.

ABA 533 is a required course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 20 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 555** Behavioral Intervention in Autism (3) Overview of the use of Behavior Analysis in the education, assessment, and treatment of individuals with autism.

### **ABA 555 Behavioral Intervention in Autism (3)**

Behavior analysis has had significant contributions to autism over the past 40 plus years. Its success in early intervention efforts has created a great need for individuals trained in behavior analysis with special knowledge of the unique aspects of autism. This course will provide students with the knowledge and skills needed to work with individuals with autism not only in early intervention efforts but across the entire spectrum of settings, age ranges, and developmental levels. Autism will be addressed in terms of assessment, education, and treatment. Some specific areas targeted that are characteristic of autism will include language, social skills, self-injury, sleep disorders, and self-stimulatory behavior. Some specific educational strategies emphasized will include discrete trial training, incidental teaching, prompting and fading. The students will gain a knowledge of the major issues related to the use of behavior analysis with individuals with autism including education issues such as due process and inclusion and legal and ethical issues surrounding the certification of behavior analysts. Students also will learn how to evaluate the various treatments and educational practices for autism. Competency-based methods of caregiver training will be covered.

ABA 555 is an elective course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 566** Behavioral Pediatrics (3) Overview of behavioral pediatrics and discusses the role of Behavior Analysis within this field.

**ABA 566 Behavioral Pediatrics (3)**

Behavior analysis has had significant contributions to the field of behavioral pediatrics. This course will provide an overview of behavioral pediatrics and discuss the role of the behavior analyst in pediatric healthcare. Pediatric problems commonly addressed by behavior analysts will be discussed in terms of both assessment and treatment. These pediatric problems will include pediatric feeding problems, disorders of elimination, gastrointestinal disorders, sleep problems, and childhood obesity. This course also will cover the integration of behavior analysis in the areas of adherence to medical procedures, pain management, medical rehabilitation, and brain injury rehabilitation. Behavioral approaches to health promotion and injury prevention will be discussed. The management of common childhood behavioral issues and competency-based methods of caregiver training will be covered. The course will explain the use of behavior analysis in a range of pediatric healthcare settings.

ABA 566 is an elective course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 10 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 577 Behavioral Assessment and Treatment of Behavior Disorders (3)** Overview of the use of Applied Behavior Analysis in the assessment and treatment of individuals with behavior and emotional disorders.

**ABA 577 Behavioral Assessment and Treatment of Behavior Disorders (3)**

Behavior analysis has had significant contributions to treating children with a wide variety of behavioral and emotional disorders. This course will provide students with the knowledge and skills needed to work with people with behavioral and emotional problems across all environments, age ranges, and developmental levels. Behavior disorders throughout the age ranges will be addressed. Students will be taught to use applied behavior analysis for the assessment, intervention, and understanding of these problems. The students will gain knowledge of the major issues related to the use of behavior analysis including legal and ethical issues. Students also will learn how to evaluate the various treatments for behavior and emotional problems.

ABA 577 is a elective course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 588 Ethics and Legal Issues in Applied Behavior Analysis (3)** This course will cover ethical and legal issues related to applied behavior analysis research and practice.

**ABA 588 Ethics and Legal Issues in Applied Behavior Analysis (3)**

The purpose of ABA 588 Ethics and Legal Issues in Applied Behavior Analysis is

- 1) to teach the Ethical Principles of the American Psychological Association (adopted by the Association for Behavior Analysis). Students will be presented with the ethical codes, the application of the codes, and the possible dilemmas involved in following the codes. Students will be responsible for applying the ethical codes by evaluating ethical dilemmas.
- 2) to teach the legal issues related to applied research with humans. Federal and State treatment and Educational Laws and issues related to the practice of Applied Behavior Analysis will be covered. Actual cases covering a variety of populations, locations and issues will be presented. Students will learn how to identify and avoid litigious situations.

ABA 588 Ethics and Legal Issues in Applied Behavior Analysis is a required course for graduate students of the Applied Behavioral Analysis Masters program and a prerequisite for ABA 594A and ABA 595.

This class will be offered annually with an enrollment limit of 25 students. The frequency will be adjusted if enrollment trends suggest an adjustment is necessary.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**ABA 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 594A** Research Topics (3-9 per semester/maximum of 18) Supervised research project in behavior analysis for degree candidates.

**Research Topics (3-9 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 594A** Research Topics (3-9 per semester/maximum of 18) Supervised research project in behavior analysis for degree candidates.

**Research Topics (3-9 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABA 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Applied Linguistics (APLNG)

**APLNG 410** Teaching American English Pronunciation (3) Study and application of principles of North American English phonetics and theories of teaching pronunciation.

**APLNG 410 Teaching American English Pronunciation (3)**

**(BA) This course meets the Bachelor of Arts degree requirements**

This course, for teachers who deal with speakers of other languages, integrates research and theory on the acquisition and development of pronunciation, as well as current pedagogy, to enable them to construct their own principled theory of teaching pronunciation. Students are introduced to the characteristics of the consonant and vowels systems of English. In addition, students are introduced to variations in the production of consonants and vowels by speakers of languages other than English. Students are expected to understand and to be able to describe the stress rhythm, and intonation of English as well as the adjustments that are made in connected speech. Students will learn how grammar and orthography influence the pronunciation of phonemes. Students will learn how to diagnose an individual's difficulties in the production of North American English and will learn how to develop appropriate curriculum. By focusing on instructional strategies from fields as diverse as theater arts, psychology, and instructional technology, students will be able to individualize their instruction by providing alternative ways to better respond to second language speakers' learning styles and preferences. Moreover, this course requires students to develop and implement appropriate curriculum for both hypothetical, real tutorial, and whole class instruction.

The objectives of this course are for teachers 1) to develop a satisfactory understanding of the phonetics of North American English, including consonants, vowels, rhythm, stress, intonation and prominence, 2) to develop an understanding of the relationship between listening and pronunciation, as well as orthography and pronunciation, 3) to develop an ability to explain these phonetic concepts appropriate to students with varying learning styles using a variety of techniques such as kinesthetic and tactile reinforcement, 4) to develop an ability to diagnose speakers' particular pronunciation difficulties and to create instructional materials in response, 5) to develop a coherent philosophy of the teaching of pronunciation, and 6) to develop an ability to evaluate pronunciation textbooks and materials and supplement them when necessary.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 412 Teaching Second Language Writing (3)** This course provides opportunities for exploring various perspectives on theory, research, and pedagogical applications in second language writing.

**APLNG 412 Teaching Second Language Writing (3)**

This course has been designed to provide opportunities to explore various perspectives on theory, research, and pedagogical applications in second language writing. Through readings, writing, class discussion, and development of practical applications, students may develop an understanding of how research and theory can inform their practice, as well as an awareness of how personal and professional factors come together to inform their own theory of second language writing. By engaging in instructional activities, such as evaluating writing, responding to writing, and developing materials, students may begin to develop an understanding of how to implement theory in practice aligned with understanding. The overriding objectives are for students to help develop self-awareness as a writer and a teacher of writing, develop their own philosophy of teaching composition in an additional language context and to develop curriculum that embodies this philosophy. Students will be evaluated on reading journals, tutoring in the Writing Center, literature review, materials development project and developing of materials. APLNG 412 is an elective course in the M.A. TESL program and/or PhD option in Applied Linguistics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 482Y (IL) Introduction to Applied Linguistics (3)** Application of theories of language to psycholinguistics, philosophy of language, anthropological linguistics, sociolinguistics, bi/multilingualism, second language acquisition and teaching.

**APLNG 482Y Introduction to Applied Linguistics (3) (IL)**

This is a survey course concerned with the application of theories of language to issues in the areas of psycholinguistics, philosophy of language, anthropological linguistics, sociolinguistics, bi/multilingualism, second language acquisition, and second language teaching. Specifically, the course focuses on: a) how language influences the way people think and bring meaning to what they do, b) how language users match their utterances to specific functional purposes within specific social contexts, c) how the language practices of a particular culture are closely tied to the beliefs and conceptual principles by which people in the culture live, d) how language is used by speakers of different races, genders, and ethnic backgrounds, and e) how language is acquired, used, and perceived within bi/multilingual societies. Through reading, writing, and discussing the major issues in each of these areas students will come to understand how theories of language have influenced the way we think and bring meaning to what we do, the ways we communicate within different cultures and societies, and the way languages are learned and used.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 484** Discourse-Functional Grammar (3) Develop a working knowledge of the structure of English and apply such knowledge to research and/or classroom situations.

**APLNG 484 Linguistic Structures for English as a Second Language (3)**

This course is designed to enable prospective and practicing ESL/EFL teachers to understand the linguistic structures of the English language. Through the use of transformation grammar, students will interpret and analyze the basic grammatical structures of the English language. Students will apply their developing skills of linguistic analysis to recognize, and analyze, and remediate both oral and written grammatical errors in ESL/EFL instructional contexts. Students will understand the current theoretical issues related to pedagogical grammars and develop an appreciation for the practical and theoretical relevance of linguistics analysis for second language educators.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 491** Theory: Second Language Acquisition (3) An investigation into current issues in the theoretical bases of second language acquisition.

**APLNG 491 Theory: Second Language Acquisition (3)**

This course considers the relationship between second language acquisition (SLA) theory and language teaching. An examination of various aspects of first language (L1) and second language (L2) learning/acquisition processes provides a framework for consideration of basic questions in SLA research and interpretation of findings to date. Of particular interest is the relationship of this research to teaching materials and methods. The questions addressed include the following: What is SLA? What are the methods and aims of SLA Research? How are theories of SLA related to major theoretical models of human language and human learning? What have been or could be important interdisciplinary perspectives in SLA?

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 493** (IL) Teaching English as a Second Language (3) Theory, research, and pedagogy that focus on the teaching of English to speakers of other languages in varied contexts.

**APLNG 493 Teaching English as a Second Language (3) (IL)**

This course focuses on the teaching of English to speakers of other languages. Specifically, the course explores the multidimensional nature of the teacher as a learner of teaching, the context of schools and schooling within which teaching occurs, and the activities and content of second language teaching and learning.

Throughout the semester, students will engage in a range of theoretical, pedagogical, and reflective activities that will enable them to: 1) understand their own beliefs and knowledge about language learning and language teaching and become aware of the impact of such knowledge and beliefs on their classroom practices, 2) recognize the highly situated and interpretative processes involved in language teaching and be able to reflect on, critically analyze, and evaluate their own teaching practices, 3) become sensitive to the complex social, cultural, political, and institutional factors that affect language teaching and students' language learning, 4) come to recognize students' strengths and development as learners and language learners, 5) understand subject matter content from an instructional perspective and learn to anticipate areas that may require additional instructional support, 6) use their knowledge of theory to inform their instructional practices, 7) participate in professional collaborations with other teachers as they learn about language teachers, language teaching, and language learning.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 500** Practice Teaching in ESL (3) Provides instructional support and professional mentoring for second language teachers during the practice teaching experience.

### **Practice Teaching in ESL (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 510** Health and Aging in Multilingual Contexts (3) This course focuses on anthropological approaches to health and aging in multilingual contexts.

### **Health and Aging in Multilingual Contexts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 511** Applied Linguistics and Health Sciences (3) A theoretical and practical introduction to concepts and methods associated with multilingualism and health care services and research.

### **Applied Linguistics and Health Sciences (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 512** Language and Adult Lifespan Development (3) The effects of adult cognitive development and decline on the production and comprehension of language in mono- and multilinguals.

### **APLNG 512 Language and Adult Lifespan Development (3)**

This graduate seminar is designed to provide a theoretical and practical introduction to research on adult lifespan development and language processing among multilinguals. It will be offered every other year as one of the course options in language in society, an area of concentration for both the MA TESL and PhD in APLNG degree programs in LALS. This course is also part of a LALS sequence in Language, Health, and Aging. While the main draw will be graduate students in LALS, the course may be of interest to graduate students in bio-behavioral health, gerontology, and human development and family studies. The expected total enrollment is 15. Topics covered in course readings and activities include: theories of adult lifespan development and cognition; language processing among monolingual young, middle-aged, and older adults; multilingualism and adult lifespan development, with particular attention to the effects of aging on bilingual processing, second language acquisition, and language attrition; and research methods proper to cross-sectional and longitudinal studies of language development over time. Over the course of the semester, students will also plan, prepare, and conduct a quantitative experiment or qualitative study on one of these topics. Through participation in a variety of activities, students will 1) become familiar with the research literature on language processing and adult lifespan development, with particular attention to multilingualism, 2) develop critical skills in interpreting and comparing cross-sectional and longitudinal research designs in adult development studies, 3) develop practical skills in conducting such research and analyzing the results. Evaluation of students includes three components: 1) weekly presentation of results from required readings, 2) participation in an empirical research project conducted by the group, 3) summary paper describing the results of that research project.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 570** Second Language Reading (3) Theoretical and practical introduction to concepts, methods and practices of research and instruction of second language reading development.

### **APLNG 570 Second Language Reading (3)**

This graduate seminar is designed to provide a theoretical and practical introduction to the assumptions underlying and principles embodying a variety of approaches to second language reading development and instruction. In addition, it seeks to explicate the role of second language reading in the larger context of second language development. It will be offered every other year as one of the course options in language learning and teaching, an area of concentration for both the MA TESL and PhD in APLNG degree programs in LALS. While the main draw will be graduate students in LALS, the course may be of interest to graduate students in the foreign language departments and linguistics. The expected total enrollment is 15. Topics addressed in course readings and activities include: 1) the epistemological underpinnings of the notion of second language literacies; 2) psycholinguistic, critical and sociocultural approaches towards second language reading; 3) variables affecting second language reading performance; 4) strategies and instruction to influence second language reading development; 5) assessment of second language learners' reading performance, and 6) critical evaluation of instructional materials for a variety of second language learning contexts. Through participation in a variety of activities, it is expected that students will: 1) develop an understanding of second language literacies, 2) develop critical understanding of the variables and processes involved in L2 reading, 3) develop a principled conception of L2 reading instruction, 4) integrate L2 reading into the broader disciplinary area of second language learning and L2 proficiency, and 5) develop practical skills of designing and evaluating L2 instructional materials. Evaluation of students learning includes the following components: 1) completion and discussion of required readings; 2) presentation of key instructional approaches; and 3) completion of a paper addressing a theoretical, instructional or research issue in second language reading.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 571** 'Foreign' Language Materials Development (3) This course focuses on the development and critical analysis of 'foreign' language teaching materials in applied linguistics and language learning.

### **APLNG 571 'Foreign' Language Materials Development (3)**

The goal of this seminar is to develop a critical awareness of the processes of language teaching and learning materials development. We will consider a range of commercially developed materials designed for what is commonly called an 'FL' setting, both past and present, from the perspectives of the author, instructor, and learner in terms of their stated goals, organizational framework, and the nature of the activities or experiences they provide. Theoretical discussions of various approaches to curriculum design and materials development will provide a basis for analysis. These will include structural, notional-functional and situational frameworks along with so-called 'content-based' and 'task-based' approaches. The cultural values implicit in the materials will be given particular focus. Is there representation of a Second Language culture or cultures? If so, how can it be characterized in terms of breadth and balance? How are learners expected to react vis-a-vis this representation?

Consideration will also be given to market forces and author incentives important for commercial materials development. What constitutes a "successful" series? What are the advantages and disadvantages of locally prepared as opposed to

imported materials? What major changes have occurred in language materials development and dissemination in recent years? What interpretations can be found of various pedagogical terms currently in wide-spread use, e.g. communicative language teaching, interaction, learner-focused, process-oriented? How is computer-aided instruction (CAI) being implemented in various settings and why? What is the influence of high stakes public examinations on teaching and learning materials?

The culminating activity will be an individual or team project that either develops a set of materials for a defined setting or takes a critical look at materials currently in use.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 572** Communication in Second Language Classrooms (3) The study of communication in second language classrooms.

### **APLNG 572 Communication in Second-Language Classrooms (3)**

This course focuses on investigating and understanding the dynamics of communication in second/foreign language instructional settings. Students will examine different variables that influence the nature of communication in second/foreign language classrooms including: teachers' control over the patterns of classroom communication, students' perceptions of the patterns of classroom communication, students' knowledge and use of language, and students' use of language for learning and second language acquisition. Each variable will be evaluated for its theoretical and pedagogical contribution to communication, learning, and second language development.

In addition, through understanding the basic theoretical tenants of and actively participating in reflective teaching, students will examine, frame, and manage the dilemmas of classroom practice, become aware of and question the assumptions and values they bring to teaching, become attentive to the institutional and cultural contexts in which they teach, and recognize their responsibilities for their own professional development. Finally, students will be exposed to sociocultural perspectives on mediated language and literacy instruction and recognize their relevance for second language teaching, learning, and classroom communication.

Faculty: Karen E. Johnson

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 573** Communicative Language Teaching (3) Cognitive, linguistic, and sociocultural foundations of communicative language teaching (CLT) as reflected in current international language teaching policies/practices.

### **APLNG 573 Communicative Language Teaching (3)**

This is a seminar to allow for in-depth analysis and individual research on a topic that has become central to discussion of second/foreign language teaching worldwide. An examination of primary theoretical sources in linguistic and SLA theory along with perspectives in sociocultural context in language teaching and curricular innovation provide the basis for an individual research project on some facet of CLT. Students will be encouraged to explore their own experiences and interests to ultimately determine the content of the seminar and the focus of their individual research. A diversity of national backgrounds including Asia, Europe, South and North America is expected to enhance discussion and learning. Students will develop scholarly research and writing skills as they are guided through drafts of project proposals and written reports. Class discussion will encourage learners to appreciate language teaching as a complex social phenomenon. SPCOM 573 meets the requirement for 500-level electives in the MATESL program. Also, it can be used to meet requirements for the College of the Liberal Arts multidisciplinary Ph.D. Minor in SLA.

The evaluation methods for the course are: participation and leadership in class discussion (25%), and final written research report (75%). The course will be offered once a year.

Faculty: Sandra Savignon

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 574** World Englishes: Pluralizing Policy, Pedagogy, and Proficiency (3) This course explores the global spread of

English, the diversification of its norms, and their pedagogical and policy implications.

**APLNG 574 World Englishes: Pluralizing Policy, Pedagogy, and Proficiency (3)**

This course analyzes how the English language aids globalization and how globalization changes English. English now features multiple grammatical systems and norms in diverse speech communities, adopts new modes of literacy and discourse practices, and enters into fluid relationships with other languages and cultures. These changes call for a reconceptualization of language standards, linguistic identities, literacy practices, and English language teaching. After studying the historical and geopolitical bases for the rise of English, the course explores the implications of contemporary forms of transnational relations, digital technology, and popular culture for diversifying the structure, norms, and usage of the English language.

The course aims to develop in students a sensitivity to the changing norms in English, provide pedagogical resources for teaching English according to local repertoires, examine strategies for facilitating intercultural communication, and articulate policies on the role of English in a multilingual world. While students specializing in teaching English as a second language (TESL) will find this course useful to inform their teaching of English worldwide, doctoral candidates in applied linguistics will find it important to understand how the plural norms of English invite new research on issues such as language acquisition, discourse analysis, and sociolinguistic identities. The course will be of interest to students of English who are increasingly interested in the way World Englishes affect multilingual creative writing and composition practices. In addition, the course will be of interest to students in Education who have to address the diversification of English in the changing demography of students in national and international classrooms.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 575 Language Ideology (3)** This course is designed to offer a range of perspectives on language ideology as an analytical construct.

**Language Ideology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 576 Language Socialization across Home, School, and Community Contexts (3)** A survey of research on language socialization from a variety of sociocultural groups across a range of sociolinguistic contexts.

**Language Socialization across Home, School, and Community Contexts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 577 Language Analysis (3)** An overview of cognitive/conceptual/functional approaches to language analysis with applications to research, second language acquisition, and language pedagogy.

**Language Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 578 Computational and Statistical Methods for Corpus Analysis (3)** A hands-on introduction to the core and advanced computational and statistical methods for analyzing corpus data.

**APLNG 578 Computational and Statistical Methods for Corpus Analysis (3)**

This course will provide a hands-on introduction to the core and advanced computational and statistical methods for

analyzing corpus data.

Topics to be covered include basic UNIX tools and python scripting for text processing; state-of-the-art computational tools for automatic and computer-assisted corpus compilation and annotation; computational tools for querying and analyzing raw and linguistically annotated corpora; and statistical methods used in interpreting information extracted from text corpora. Prior experience in computational and statistical analysis is not assumed. By the end of the course, students will be expected to have a good grasp of the computational and statistical techniques necessary for processing, annotating and analyzing corpus data, and to be able to implement these methods in their own corpus-based research projects.

This course will be highly applied, and there will be substantial opportunities for demonstrations, exercises, and discussions. Students will be evaluated on participation in in-class activities and discussions, completion of a series of lab assignments designed to help them practice the computational and statistical techniques introduced, and a final research project.

This course serves as the methods component of the two-course sequence in corpus linguistics offered in the Department of Applied Linguistics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 580** Proseminar in Applied Linguistics (1) This team-taught seminar introduces PhD students to the scholarly areas and research perspectives in Applied Linguistics represented by department faculty.

### **APLNG 580 Proseminar in Applied Linguistics (1)**

This team-taught pro-seminar is the cornerstone of the PhD program in Applied Linguistics. Its aims are to foster an intellectual community among incoming PhD students and department faculty and to provide the students with an overview of the scholarly expertise and research perspectives in Applied Linguistics represented by department faculty. The areas to be covered include: second and foreign language and literacy development and pedagogy; technology and language learning; language testing and assessment; language policy and planning; language uses in community, workplace, professional and academic settings from local, national, and international perspectives; language and identity; language and health; sociocultural theory; discourse and conversation analysis; and corpus linguistics.

This is a required course for those entering the PhD program in Applied Linguistics and will be offered every fall. The enrollment will depend on the number of admitted students to the PhD program with a maximum number of 10.

Through participation in discussions with individual faculty members, and readings when appropriate, it is expected that students will become familiar with 1) the scholarly expertise of the participating faculty members and 2) key concepts and research perspectives associated with their areas of specialization in the field of Applied Linguistics.

Evaluation of student learning includes completion and discussion of readings. The department's Director of Graduate Studies will be responsible for scheduling the weekly meetings, for collecting feedback from individual faculty members on student contributions/performance and for assigning grades to students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 581** (CAS 581) Discourse Analysis (3) Overview of theories and approaches to the analysis of spoken and/or written discourse.

### **APLNG (CAS) 581 Discourse Analysis (3)**

This course is designed to provide an overview of the various theories of and approaches to the analysis of spoken and written discourse, e.g., speech act theory, conversation analysis, pragmatics, contextual analysis, functional/cognitive grammar, grammar and interaction. These and other approaches are intended to serve as analytic tools and frameworks for students to ultimately design and carry out their own research projects within the course of the semester. Research projects may focus on any aspect of language use, such as language and grammar, language and interaction, language and culture, language socialization, language and cognition; projects may center on some phenomenon of English or may involve other languages, as long as the student is capable of conducting an in-depth analysis of the particular phenomenon under investigation in that language.

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 582 Seminar in Approaches to Language Use (3)** Examines the historical and contemporary landscape of research on language use.

### **Seminar in Approaches to Language Use (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 583 Methods of Language Assessment (3)** Introduces methodology for selecting, developing, applying, and analyzing tests and questionnaires for research and evaluation in communication and language education.

### **APLNG 583 Methods of Language Assessment (3)**

This course introduces standard methodology for selecting, writing, and analyzing language tests and research questionnaires. Major focus will be given to reliability and validity issues and the study of current testing research paradigms. Course activities will include reading texts and articles, completing assigned exercises, writing and analyzing a testing/questionnaire instrument, and the preparation and presentation of a research paper reporting test development findings or addressing an approved assessment issue.

The course is aimed at promoting the skills necessary to be effective judges and developers of language tests. This will involve learning to conduct item analyses, to understand principles of classical and item response measurement theory, to appreciate current and past language assessment issues, to carry out appropriate statistical analyses by computer or calculator, and to produce assessment research of publishable quality. In addition, the course will provide introduction to issues in latent trait/item response theory, item banking, computer adaptive testing, and instructional program evaluation.

Faculty: Karen Johnson

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 584 Sociocultural Theory and Second Language Learning (3)** The course is an introduction to research on second language learning from a sociocultural theoretic perspective.

### **APLNG 584 Sociocultural Theory and Second Language Learning (3)**

The course is designed to be a graduate level introduction to research on second language learning and teaching informed by sociocultural theory of mind and cognitive development. The course will initially focus on the general principles of the theory as laid out in the writing of L. S. Vygotsky, his colleagues and modern interpreters of the theory. It will then consider in detail the research that has been carried out over the past 15 years on L2 learning and teaching from a sociocultural perspective. Topics to be covered include the following: a brief history of cultural psychology; mind as a mediated cultural construct; activity theory; the genetic method; internalization and appropriation; the zone of proximal development; inner and private speech (including gesture); collaborative learning, prolepsis, and scaffolding; the role of artifacts and social relationships in development; interface between sociocultural research and language pedagogy; language testing from a sociocultural perspective; regulation in a first and other languages; metacognition in a first and other languages; identity in a first and other languages; the relationship of sociocultural theory to other theories of second language acquisition. The course has two primary objectives: to provide students with a solid foundational and critical understanding of the principles of sociocultural theory and for them to carry out a research project on second language learning using the genetic method and sociocultural theory principles to interpret data. Given that second language acquisition has become a dominant paradigm within applied linguistics, developmental psychology, and educational psychology, the course is particularly relevant for students not only in the graduate program in Linguistics and Applied Language Studies (LALS), but also to those working in psychology and education, as well as those pursuing the applied linguistics concentration in the language departments. It also serves as a complement to the other courses in applied linguistics offer by LALS in that it exposes students to a very theoretical perspective from what is often encountered in graduate courses in applied linguistics. As such, it challenges them to think in different ways about mind, learning, development, teaching, and assessment. The requirements for the course are: completion of required readings; in-class presentation of one research study selected from the L2 literature; submission of two brief (4-5 pages maximum) critical analyses of two research studies drawn from the relevant research literature; completion of a significant research project (topic to be negotiated with the professor). Course to be offered every other year beginning 2003-04. Maximum enrollment 1

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 586** Analyzing Classroom Discourse (3) A theoretical and practical introduction to concepts and methods associated with the analysis of classroom discourse.

**Analyzing Classroom Discourse (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 587** Theory & Research in L2 Teacher Education (3) Examines the historical and contemporary landscape of theory and research in second language teacher education.

**Theory & Research in L2 Teacher Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 588** Design and Research of Technology-Mediated Language Learning (3) Using computer and multimedia technologies to support materials development and second language acquisition research.

**Design and Research of Technology-Mediated Language Learning (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 589** (CMLIT 589, FR 589, GER 589) Technology in Foreign Language Education: An Overview (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)

**Technology in Foreign Language Education: An Overview (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 591** Seminar in Second Language Acquisition (3) Seminar in second language acquisition by second/foreign language learners and implications for language pedagogy and assessment.

**APLNG 591 Seminar in Second-Language Acquisition (3)**

This course focuses on the foundational research and theories of second language acquisition. Course content covers the theoretical underpinnings of models and research on the acquisition of second languages and communicative competence with direct implications for language pedagogy and assessment.

Faculty: Sandra Savignon

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 592** Qualitative Research in Applied Linguistics (3:2) This course offers an introduction to qualitative research methods in applied linguistics.

### **APLNG 592 Introduction to Qualitative Research in Applied Linguistics (3)**

This course is designed to acquaint students with the background, methods, and current status of qualitative research in the field of applied linguistics. The main goals of the course are: 1) to familiarize students with a range of contemporary qualitative approaches to second language research; 2) to develop students' ability to select appropriate methods for particular research questions, 3) to develop critical awareness of issues related to validity and ethics in research design and writing; 4) to enhance students' skill in the collection and analysis of qualitative data. The class will review a range of approaches to qualitative research (e.g., ethnography, conversation analysis, diary study, case study) as well as issues of ethics and quality in research design, implementation and presentation. Students will be evaluated on reading and discussion (20%), assignments (30%), book and article reviews (20%), and final project (30%). APLNG 592 is a required course for the Ph.D. in Applied Linguistics, one of two courses on research methods contributing to the core curriculum. In addition, this course will be beneficial to students in Applied Linguistics options in the foreign languages (French, Spanish, and German).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 593** Experimental Research on Language (3) Standard methodologies for planning, conducting, interpreting, and reporting research in Applied Linguistics.

### **APLNG 593 Research Design and Methodology in Applied Linguistics (3)**

This course introduces standard methodologies for planning, conducting, interpreting, and reporting research in Applied Linguistics. Course activities will include reading texts and articles, completing assigned exercises, participating in group discussions, criticizing research articles, and conducting formal research projects. Students are encouraged, but not required, to focus the research project around their individual thesis or dissertation research and/or to target the research project for publication in a professional journal.

The course is aimed at promoting the skills necessary to being effective consumers and producers of research. This will involve learning to formulate research questions, to select appropriate research designs, to appropriate statistical analyses by computer and/or calculator, and to interpret and report the results of studies.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597A** Gesture in Second Language Learning and Teaching (3) Course focuses on an important component of meaning that has been, until very recently, overlooked in L2 research: the synchronization of speech and gesture in utterance production.

**Gesture in Second Language Learning and Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597A** Gesture in Second Language Learning and Teaching (3) Course focuses on an important component of meaning that has been, until very recently, overlooked in L2 research: the synchronization of speech and gesture in utterance production.

**Gesture in Second Language Learning and Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597A** Gesture in Second Language Learning and Teaching (3) Course focuses on an important component of meaning that has been, until very recently, overlooked in L2 research: the synchronization of speech and gesture in utterance production.

**Gesture in Second Language Learning and Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597B** Cognitive Linguistics and Second Language Teaching (3) This course will introduce to the students the literature on what Cognitive Linguistics has to offer to second language research and instruction.

**Cognitive Linguistics and Second Language Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597B** Cognitive Linguistics and Second Language Teaching (3) This course will introduce to the students the literature on what Cognitive Linguistics has to offer to second language research and instruction.

**Cognitive Linguistics and Second Language Teaching (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 597C** Pragmatics in Language Learning and Teaching (3) In this course, students will survey the literature on the development of pragmatic abilities among learners in classroom, technology-enhanced, and immersion/study abroad environments.

**Pragmatics in Language Learning and Teaching (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Students experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 802 Focus on English: Teaching Form, Meaning and Use (3)** Develops an understanding of the various domains of the English language as relevant for adult English language learning and teaching.

**APLNG 802 Focus on English: Teaching Form, Meaning, and Use (3)**

This course explores various domains of the English language (phonological, lexical, grammatical, pragmatics) in relation to adult English language learning and teaching. Attention is paid to the various components (form, meaning, and function) of these domains and how each component works within larger stretches of discourse. Students will come to understand: language as communication, meaning-making, social practice; grammar as both structure, arrangement, rules and choices; and language teaching concerned with both language form and language use. The major topics covered include the sound system, lexicon, grammar, tense & aspect, modality, spoken & written texts, discourse & genre, and pragmatics. Students will engage in a variety of data analysis activities that assess their knowledge of the various domains of language and engage in practical activities that require them to apply these understandings to adult English language teaching. This course is one of four required courses that make up the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 804 Focus on Learners: Identity, Community and Language Learning (3)** Explores how individual identities shaped by cultural differences, social positioning, institutional roles and structures influence English language learning and teaching.

**APLNG 804 Focus on Learners: Identity, Community, and Language (3)**

This course explores how individual identities shaped by cultural differences, social positioning, and institutional roles and structures influence the learning and teaching of English in an increasingly globalized world. This course will enable students to: a) recognize the multiple dimensions of one's cultural, linguistic, and educational backgrounds, b) understand the roles and values associated with varieties of English, c) become sensitive to the complex social, cultural, political, and institutional factors that affect adult English language teaching and learners' language learning in diverse instructional settings, d) create culturally responsive curricula that is appropriate for adult English language learning communities in diverse instructional settings. The major topics covered include: developing an understanding of language identities; recognizing diverse instructional settings as cultural contexts of learning; and applying these understandings to adult English language teaching. Students will engage in a variety of practical activities in which they reflect on their own language learning and cultural experiences, conduct an exploration of a bi/multilingual/cultural community and its related instructional settings, and write a final reflective paper that examines learners' identity, community and English language learning in diverse instructional settings. This course is one of four required courses in the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 806 Focus on Classrooms: Planning and Supporting Language Learning (3)** Develops a critical awareness of one's teaching practice and highlights instructional planning and classroom interactions with adult English language learners.

**APLNG 806 Focus on Classrooms: Planning and Support Language (3)**

This course will guide candidates to analyze the interactional patterns and discourse of diverse instructional settings and the factors that impinge upon planning and supporting effective instruction for adult English language learners. Students will: a) examine their own beliefs and knowledge about language learning and language teaching and become aware of the impact of such knowledge and beliefs on instructional practices; b) recognize the highly situated nature of teachers' instructional decisions and practices and develop an awareness of instructional language & classroom discourse that supports English language development; c) devise, select, and/or adapt a wide range of curricular resources to meet the linguistic, social, cultural and educational needs and goals of English language learners; d) develop lesson plans, evaluate curricular units and write teaching objectives; e) connect instruction to local and global activities and problem-solving using the imagination, collaboration, computer and other technological resources. Students will observe several English language instructional settings, recognize instructional models and classroom interactional patterns, review and adapt

textbooks, and develop their own materials using authentic language texts. A focus will be on writing clear teaching objectives and lesson plans and the use of new technologies to support adult English language learning. This course is one of four required courses in the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**APLNG 808 Focus on Instruction: Teaching and Assessing Language Learning (3)** Develops an understanding of and ability to use effective teaching and assessment practices that support adult English language learning.

### **APLNG 808 Focus on Instruction: Teaching and Assessing Language (3)**

This course facilitates the candidate's understanding of and ability to use effective teaching and assessment practices that support adult English language learning. Students will: a) recognize the highly situated and interpretative processes involved in English language learning and teaching and be able to reflect on, critically analyze, and evaluate their own instructional practices; b) understand subject matter content from an instructional perspective, learn to anticipate areas that may require additional instructional support, and carry out a range of appropriate instructional strategies and activities that support English language development; c) demonstrate an understanding of the central issues and current approaches to the teaching of English language speaking, listening, reading, writing, grammar, as well as approaches to language instruction that are content-based and focused on English for specific purposes; d) recognize the interconnectedness of teaching and assessment, assess students' knowledge using multiple forms of assessment, and address students' diverse needs, backgrounds, and English proficiency as they plan instruction. Major topics will include concepts surrounding second language assessment as well as classroom strategies to evaluate and monitor adult learners' English language learning. Also, students will explore the central issues and techniques for teaching oral communication (listening and speaking), literacy (reading and writing), and grammar. Students will complete a curricular development project, teach and videotape classroom lessons for mentor instructor feedback. A focus will be on guiding students to develop their own teaching practices appropriate to a group of adult English language learners in the specific context in which they live and work. This course is one of four required courses that make up the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Applied Youth, Family and Community Education (AYFCE)**

**AYFCE 438 (US) Living in an Increasingly Diverse Society (1-3)** Students in this course will explore selected dimensions of diversity through lecture, discussion, speakers, active participation, and experiential learning.

### **Living in an Increasingly Diverse Society (1-3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 455 Extension Youth Development Programs and Volunteer Management (3)** A study of 4-H/Extension youth programs and the variety of roles played by volunteer leaders.

### **Extension Youth Development Programs and Volunteer Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 495** Internship in Youth and Family Education Programs (6-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.

**Internship in Youth and Family Education Programs (6-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 535** Youth Civic Development (3) This course critically examines processes enabling youth to become members of local communities and "citizens" of nations and global societies.

**Youth Civic Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**AYFCE 550** Program Development and Evaluation in Youth, Families and Communities (3) Examination of concepts, theories, models, and procedures relative to program development and evaluation in youth, families and communities.

**Program Development and Evaluation in Youth, Families and Communities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 555** Volunteer Program Management (3) The study and application of concepts and principles of volunteerism and administration relevant to volunteer program management.

**Volunteer Program Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 840** Applied Youth Development (3) Background and current issues related to youth development programs in their application to actual youth programs in community settings.

#### **Applied Youth Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**AYFCE 845** (CI ED 845) Intergenerational Programs and Practices (3) Background, intervention strategies, and issues related to developing intergenerational programs and practices aimed at addressing vital social and community issues.

#### **Intergenerational Programs and Practices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Architectural Engineering (A E)**

**A E 401** Design of Steel and Wood Structures for Buildings (3) Application of principles of engineering mechanics to layout, analysis, design, and detailing of structural elements in steel and wood of simple buildings.

#### **A E 401 Design of Steel and Wood Structures for Buildings (3)**

A E 401 is a first course in structural steel and wood design taken by all undergraduate Architectural Engineering students in the 6th or 7th semester. It applies the principles of engineering mechanics to layout, analysis, design, and detailing of structural steel elements. The course covers the principles of structural design, structural safety, structural stability, steel as a material, methods of structural steel design, design of tension members, design of columns, design of beams (flexure, shear, deflection, bearing, web crippling, web yielding), combined stresses (beam columns), fasteners/connections. It also treats wood design, including material characteristics, beam design, column design, and fasteners. After completion of the course students will be able to design simple wood and steel structures.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 402 Design of Concrete Structures for Buildings (3)** Application of principles of engineering mechanics to layout, analysis, design, and detailing of structural elements in concrete of simple buildings.

### **A E 402 Design of Concrete Structures for Buildings (3)**

This course is designed to provide all Architectural Engineering students with an ability to analyze and design reinforced concrete and an understanding of the theoretical behavior of reinforced concrete members. The primary focus is on the analysis and design of one-way systems comprised of slabs, beams, and columns. Evaluation methods include, but are not limited to, exams and homework assignments. A prerequisite knowledge of structural analysis is necessary. It is a required course in the Architectural Engineering curriculum. Additionally, this course provides the necessary prerequisite knowledge for several upper level concrete courses in both Civil and Architectural Engineering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 403 Advanced Steel Design for Buildings (3)** Continuation of A.E. 401. Advanced analysis, design, and detail of the structural elements in wood and steel.

### **A E 403 Advanced Steel Design for Buildings (3)**

A E 403 is designed for 4th year Architectural Engineering students in the structural option, to build on the design and analysis base developed in the first course in steel design. This course is intended to develop competency in analysis and design of multi-story steel buildings subjected to gravity, wind and earthquake loadings, including study of connections, framing systems, composite design and plastic design of steel members.

The course prerequisites include determinate and indeterminate analysis and structural design of steel members. It will cover such topics as types of construction, the design process, loading and load cases, floor systems, floor vibration, moment rotation characteristics of connections, plastic analysis, multi-story frames, braced and unbraced frames, seismic design, leaning columns, drift, composite design and connections.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 404 Building Structural Systems in Steel and Concrete (3)** Basic analysis, design, and detailing of steel and concrete structural elements for buildings, emphasizing systems design and comparisons. A E 404 is not permitted for AE Structural Option students or for Architecture students.

### **A E 404 Building Structural Systems in Steel and Concrete (3)**

The course is designed for architectural engineering students in the Construction, Mechanical Systems and Lighting/Electrical options to gain an ability to design simple building members in steel and concrete using current professional standards, specifications and guidelines. Students will learn to combine these members into simple structural systems and compare the performance and load carrying characteristics of these systems. The course will also address general performance parameters of these materials, construction issues and key systems-integration issues for beams, columns, flooring and roofing systems, and lateral bracing systems constructed in steel and concrete. This course is considered to be the terminal course for non-structural option AE students, and is designed to provide a general understanding of design, construction and integration issues that affect these structural systems. This course may be taken by AE Structural Option students or Architecture students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 421 Architectural Structural Systems I (3)** Qualitative and quantitative analysis and design of architectural structures,

force flow; structure configurations; measurement and experiments; design studio critique.

### **Architectural Structural Systems I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 422 Architectural Structural Systems II (3)** Continuation of A E 421, with emphasis on structural configuration and construction assemblies.

### **Architectural Structural Systems II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 424 Environmental Control Systems I (3)** Fundamental principles and applications of environmental systems in buildings. This course is intended for Architecture students.

### **A E 424 Environmental Control Systems I (3)**

This course is a complement to A E 211. Environmental control systems other than the thermal environmental systems are covered in this course. A E 424 introduces architecture students to building illumination, acoustical, fire protection, electrical and plumbing design issues. Emphasis is placed on building design as a response to the technical, environmental and societal challenges.

The course utilizes lectures, practicums, examinations, projects, presentations and field trips to deliver and reinforce the technical content. The course offers students opportunity to work in team settings and to present their work orally to their peers. The broad coverage of the technical and social issues and professional skills intentionally involves students in discussion and application of social and ethical responsibilities. The course is required for students enrolled in the undergraduate architecture program. A E 211 is a prerequisite for this course. The course is not available to architectural engineering students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 430 Indeterminate Structures (3)** Classical methods of analysis for beams, frames, arches, and secondary stresses as applied to buildings; introduction to modern methods.

### **Indeterminate Structures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 431 Advanced Concrete Design for Buildings (3)** Continuation of A.E. 402. Advanced analysis, design, and detail of concrete masonry, prestressed and reinforced concrete.

### **A E 431 Advanced Concrete Design for Buildings (3)**

This is the last course in reinforced concrete design in the Architectural Engineering curriculum, and builds on previously learned skills in reinforced concrete design and analysis of statically determinate and statically indeterminate systems. Successful students will come away with sufficient understanding of the theoretical basis of concrete design to be able to learn any further aspect of concrete design on their own, and a set of specific critical skills needed by any structural designer involved with reinforced concrete structures. These skills include:

- Identification of the assumptions and weakness of the theory of reinforced concrete members.

- Detailed design of reinforced concrete beams and girders.
- Design of reinforced concrete slabs by the direct design method.
- Design of reinforced concrete slabs by the equivalent frame method.
- Analysis of reinforced concrete members subjected to torsion, to determine bending and torsional moments.
- Design of reinforced concrete members subjected to torsion.
- Design of reinforced concrete columns, slender and non-slender.
- Design of reinforced concrete columns in biaxial bending.

This course is taught by a combination of lectures, solution of example problems, and design projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 432 Design of Masonry Structures (3)** Analysis and design of unreinforced and reinforced masonry: non-bearing walls, bearing walls, shear walls, masonry building systems.

### **A E 432 Design of Masonry Structures (3)**

This course is intended to prepare students in Architectural Engineering and related disciplines such as Civil Engineering and Agricultural and Biological Engineering to design load-bearing and non load-bearing masonry structures. Although the emphasis will be on reinforced masonry, the design of unreinforced masonry will also be covered. The course will begin with a discussion of the materials used in masonry construction: clay units, concrete units, mortars, grout, and reinforcement. Since masonry is designed by allowable stress methods, a discussion of allowable stress design, as compared to load and resistance factor design, is necessary from the outset. The first design applications to be discussed will be non load-bearing walls, reinforced and unreinforced. This will be followed by a brief coverage of the topic of columns. The next topic will be load-bearing walls, reinforced and unreinforced. The discussions of load-bearing walls will describe two methods for their design: the use of a straight-line interaction formula and the construction of interaction diagrams. The analysis of systems of shear walls will be described in detail, followed by shear wall design. The design of particular building systems, both low-rise and mid-rise will either be covered by lectures, or by other exercises.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 439 Modern Structural Systems (3)** Analysis and design of building structures of unusual types.

### **Modern Structural Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1981  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 444 Micro CADD Applications for Buildings (3)** Application of microcomputer based CADD systems to architectural engineering problems including graphics, system customization, and AI programming techniques.

### **Micro CADD Applications for Buildings (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 454 Advanced Heating, Ventilating, and Air Conditioning (3)** Engineering design and performance analysis procedures for complex commercial building systems, including energy conservation techniques; design project.

### **Advanced Heating, Ventilating, and Air Conditioning (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 455** Advanced Heating, Ventilating, and Air Conditioning System Design (3) Design of several different systems for a course project building; control strategy; economic comparisons using life-cycle cost techniques.

**Advanced Heating, Ventilating, and Air Conditioning System Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 456** Solar Energy Building System Design (3) Solar radiation, collectors, and thermal storage; design and analysis of a heating system using system-simulation computer program.

**Solar Energy Building System Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 457** HVAC Control Systems (3) Theory of automatic control. HVAC control applications. Control system components, control loops, development and documentation of control logic, control commissioning.

**A E 457 HVAC Control Systems (3)**

The objective of the course is to develop the knowledge and skills necessary to understand, design, document, and diagnose problems in HVAC control systems. The course builds on knowledge of HVAC system function and design obtained in prior courses in the curriculum and prepares students for advanced design courses and the capstone project. The course begins with an introduction to concepts and terminology of automatic control, followed by detailed study of control system components: sensors, controlled devices, and controllers. Understanding of these fundamentals is then applied to the development and documentation of controls for common HVAC systems and the commissioning of control systems. Relevant standard and guideline documents are referenced as necessary.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 458** Advanced Architectural Acoustics and Noise Control (3) Advanced consideration of noise control in buildings; ventilating system noise and vibration; acoustic design variables.

**Advanced Architectural Acoustics and Noise Control (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 461** Architectural Illumination Systems & Design (3) Lighting units & photometry; lighting equipment; design criteria, calculation methods; the design process; energy codes.

**A E 461 Architectural Illumination Systems & Design (3)**

This course will prepare students to design basic lighting systems by providing them with background information and experience to do the following:

1. Develop their knowledge of lamp, luminaire, and control types and evaluate their applicability to a particular design situation.
2. Establish fundamental design criteria for a variety of lighting applications.
3. Conduct appropriate and accurate analyses of lighting systems to assess system performance and evaluate its ability to meet design criteria.
4. Implement a completed design by specifying all of the components of the system and providing an appropriate system layout.

This is the first full-semester lighting course that students receive in the Architectural Engineering Department's Lighting/Electrical Option.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 464** Advanced Architectural Illumination Systems & Design (3) Flux transfer theory; advanced lighting and control systems; emergency lighting; daylighting; visual performance issues; psychological aspects of lighting.

### **A E 464 Advanced Architectural Illumination Systems & Design (3)**

This is the final undergraduate architectural lighting course in the Lighting/Electrical Systems Option. The course focuses on advanced topics related to lighting design such as luminous flux transfer and its application to lighting analysis procedures, advanced issues in photometry, advanced control systems, and advanced topics in lighting design. The light design topics include the psychological aspects of lighting, and design for complex spaces such as museums, stores, and video conferencing.

The course includes a weekly hands-on practicum experience, homework, exams and a design project.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 466** Computer Aided Lighting Design (3) Design and analysis for outdoor area; floodlighting; and interior applications, including design criteria; economic analysis; modeling algorithms; and visualization.

### **A E 466 Computer Aided Lighting Design (3)**

The goal of this course is to cultivate an understanding of good lighting design practice through a series of design and analysis problems. Course topics include design criteria, design practice, and the application of lighting hardware and analysis procedures for outdoor area lighting, economic analysis of lighting systems, interior lighting design and lighting system visualization.

Commercially available computer software is applied to approximately seven design projects, which students present in either PowerPoint or submit in a short report format. Students, faculty and outside professionals critique the project solutions. The critiques enhance the learning experience for all students through the evaluation of different lighting solutions applied to the same design problem.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 467** Advanced Building Electrical System Design (3) Design of electrical systems for commercial and industrial facilities emphasizing design practice and integration with codes and standards.

### **Advanced Building Electrical System Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 470 Residential Building Design and Construction (3)** Managerial aspects; architectural and code considerations; cost estimating, design, and construction of structural, plumbing, HVAC, and electrical systems.

### **Residential Building Design and Construction (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 472 Building Construction Planning and Management (3)** Construction organization and contracts; preconstruction services; estimating; scheduling; cash flow; site planning and preparation; building construction sequences; construction business presentations; value engineering.

### **A E 472 Building Construction Planning and Management (3)**

The objective of A E 472 is to introduce students in the construction management option of the Architectural Engineering program to the process in which building construction contractors acquire building projects, and the range of services typically provided on these projects. Upon completion of this course, students will have a working understanding of the preconstruction process and methods of acquiring negotiated work in building construction. They will be capable of assembling estimates, schedules, cash-flow curves, and site plans for building projects, and will have a working knowledge of competitive presentation strategies and develop professional presentation skills.

The content of the course centers upon the process in which companies plan for and acquire projects as construction managers and general contractors. Specific topics include schematic estimating and scheduling, design coordination of structural, architectural, and mechanical systems, value engineering processes, and site planning. The financial aspects of construction work are also presented, including project financing, cash flow, and accounting. A significant portion of the course is also devoted to the development of strategic and competitive business presentation, including risk assessment, fee structure, team dynamics, and technical presentation skills.

The class relies heavily upon the application of all content by students in the context of a team project. The project involves the distribution of a "Request for Proposal" for which students prepare a competitive proposal for an actual building construction project planned on the Penn State University Campus. Class activities include the presentation of key issues followed by in-class or independent exercises to reinforce themes and strategies to be applied in the project proposal. Students are assessed on their performance on discussion quizzes on ANGEL, independent exercises, class participation, a team presentation, and exams.

For A E students, the prerequisite for the course is the successful completion of A E 372. For non-A E majors, students are admitted at the discretion of the instructor. A E 472 is a prerequisite course for A E 473.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 473 Building Construction Management and Control (3)** Building construction project planning; construction cost, schedule, quality and safety control systems; project cost accounting; change management; construction company management.

### **A E 473 Building Construction Management and Control (3)**

The goals of this course are for students to learn how to perform detailed construction planning, identify potential problems during construction, and manage changes throughout a construction project. By completing this course, students will better understand the role of the general contractor/construction manager in analyzing the construction aspects of a building project and designing the construction engineering and management systems to effectively execute the project.

The main course objectives include learning how to perform and implement detailed planning for a construction project together with monitoring the project progress and performance including detailed cost control. Other course objectives emphasize gaining knowledge of the key decisions that construction executives make when managing a construction company and identifying potential projects to pursue. Students will also be introduced to the management of changes which occur throughout a project and how to negotiate changes. Finally, ethical standards for a professional engineer and their impact on decisions within the construction industry are important course learning objectives.

The course is taught via a combination of teaching methods that rely on problem based learning through both in and out of class activities; lectures by faculty and industry experts; project case studies; student presentations; and team and individual assignments. Completion of A E 472 is a prerequisite for this course.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 474 Building Construction Estimating (3)** Construction estimating and cost engineering fundamentals; quantity take off; pricing, bid preparation; estimating, cost accounting by computer.

### **Building Construction Estimating (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 475 Building Construction Engineering I (3)** Project planning, supervision, inspection of architectural and structural operations in major buildings; mobilization, coordination of trades; offsite testing and fabrication.

### **Building Construction Engineering I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 476 Building Construction Engineering II (3)** Construction of mechanical and electrical systems in major buildings; fire protection, sound control, elevating; trade coordination; manufacturers' developments; computer application.

### **Building Construction Engineering II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 481W Comprehensive Architectural Engineering Senior Project I (4)** Building project selection and preparation of overall plan; preliminary investigation of building design and construction issues; creation of individual Capstone Project Electronic Portfolio (CPEP) and project proposal required.

### **A E 481W Comprehensive Architectural Engineering Senior Project I (4)**

The course sequence of A E 481W and A E 482 comprises the capstone engineering design program for Architectural Engineering students. A E 481W is taken by all undergraduate architectural engineering (A E) students and also serves as the writing intensive course requirement in A E. Based on an actual building project model, students will investigate the building, perform technical analysis, develop project criteria and prepare a written proposal for more detailed work to be accomplished in A E 482. Evaluation methods include but are not limited to written reports, verbal and written presentations, faculty consultations and development of a capstone project electronic portfolio (CPEP).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 482 Comprehensive Architectural Engineering Senior Project II (4)** Continuation of A E 481W. Engineering analysis of building systems; emphasis on analysis and design of building structural, mechanical, lighting/electrical, and construction related systems. Final written report, web-based project portfolio and verbal presentation are required.

### **A E 482 Comprehensive Architectural Engineering Senior Project II (4)**

A E 482 is the second half of the capstone engineering design project for Architectural Engineering students. The course is taken by all undergraduate architectural engineering and serves as a direct follow up to A E 481W. Students perform detailed option specific work in conjunction with individual proposals written in A E 481W. Students are also required to demonstrate work in the breadth areas of architectural engineering. Evaluation methods include but are not limited to written reports, verbal and written assignments, faculty consultations, maintaining their capstone project electronic portfolio, a final comprehensive written report and a verbal presentation to a faculty jury.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 486 Professional Engineering Practice (3)** A study of the influences which affect the practice of architectural engineering, particularly codes, ethics, legal considerations, and contract documents.

### **Professional Engineering Practice (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 496A Ancient Rome and Medieval Structural Design (3)** Study of structural design employed in ancient Rome and other medieval locations. Offered on location in Rome.

### **Ancient Rome and Medieval Structural Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 496F Study of Urbanization in China (2)** The course provides both local and regional background awareness for overseas students concerned with urbanisation and city development issues in contemporary China. Offered on location in Hong Kong.

### **Study of Urbanization in China (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 496G Building Project Case Studies (3)** Study of the building developments in China using case studies of contemporary projects in China. The factors include economics, social/ political, and technologies. Students will tour the projects and interact with on site personnel. Offered on location in China.

### **Building Project Case Studies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 496K** International Construction Seminar (3) Seminar in project engineering in international construction. Offered on location in Beijing, China.

### **International Construction Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 497A** Ancient Rome and Medieval Structural Design (3) Study of structural design employed in ancient Rome and other medieval locations. Offered on location in Rome.

### **Ancient Rome and Medieval Structural Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 497E** Building Electrical and Communication Systems (3) This course addresses specialized topics in building electrical and communication systems that are typically the responsibility of the electrical engineer in a building design firm, including: emergency power, coordination and fault studies, alternate and sustainable power sources, fire alarm systems, voice, video and data communication systems, and HVAC control systems.

### **Building Electrical and Communication Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 497F** Load/Energy Simulation (3) Developing models of the time dependent loads on building system on the basis of fundamental conservation of energy and heat transfer relationships; energy utilization modeling skills that allow alternative building system designs to be explored.

### **Load/Energy Simulation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 498** Special Topics (1-9) Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 520** Room and Building Acoustics (4) Sound propagation in enclosures. Transmission through partitions. Design of spaces for optimum listening and industrial buildings for low noise.

**Room and Building Acoustics (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 530** Computer Modeling of Building Structures (3) Theory and application of structural analysis using the direct stiffness method. Modeling assumptions, validation, interpretation of computer output.

**A E 530 Computer Modeling of Building Structures (3)**

This course addresses the theory and application of structural analysis using the direct stiffness method with matrix formulation, applying computer programs to the analysis of two- and three-dimensional structures. Topics include validation and interpretation of results from computer analyses, as well as practical analysis techniques and the design of building structures to satisfy building code requirements.

The course is designed to provide students with the ability to create computer models representative of actual building response and in line with prevalent modeling techniques implemented using commercial structural analysis software. Primary objectives include developing an understanding of the process used by computers to solve structural systems, with emphasis on the use of computer models in the analysis and design process to satisfy building code requirements.

This is a mandatory course for students in the structural option within the integrated undergraduate-graduate degree program in architectural engineering (B AE/M AE), and it is a valuable course for all structural engineering graduate students.

Students must have completed an undergraduate course in structural analysis of determinate and indeterminate systems. Since some homework problems require proportioning structural members to resist combined loading conditions, the course prerequisites include introductory courses on the design of steel and concrete members. Also required is the knowledge of elementary matrix algebra and exposure to advanced programming of electronic spreadsheets.

This course involves significant instruction in the AE Department computer laboratory, which is equipped with several commercial structural analysis software programs capable of handling large structural models.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 534** Analysis and Design of Steel Connections (3) Connection analysis and design for steel buildings with an emphasis on the AISC Specification.

**A E 534 Analysis and Design of Steel Connections (3)**

This course covers the theory of steel connection analysis and design including member, bolt and weld limit states as described in the AISC Specification and the *Manual of Steel Construction*. With sound knowledge in the basics of steel connection limit states, specific shear, moment and bracing connections are studied in detail. Along with the fundamental theory applied to each connection type, use of the applicable design aids contained in the *Manual of Steel Construction* is covered. This course is expected to be particularly useful for students entering the structural design profession upon graduation or those engaging in steel connection research. This course is required of students enrolled in the MAE Structural Option in the Architectural Engineering Department. Additionally, this course is commonly taken by structural engineering graduate students in both the Architectural Engineering and Civil and Environmental Engineering

Departments. Student evaluations are based on their performance on a mid-semester exam, a final exam, out of class assignments, projects, and presentations. This course will generally be offered each fall, with an anticipated enrollment of 25-35 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 536** Stability of Building Structures (3) Elastic and inelastic buckling of beams, beam-columns, frames; applications to design of multi-story buildings.

### **Stability of Building Structures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 537** Building Performance Failures and Forensic Techniques (3) This course provides a background in identification, evaluation, and analysis of a broad set of architectural and structural performance failures.

### **Building Performance Failures and Forensic Techniques (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 538** Earthquake Resistant Design of Buildings (3) Introductory engineering seismology, basic principles of structural dynamics, application of earthquake design provisions of model building codes to design of buildings.

### **Earthquake Resistant Design of Buildings (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 542 (C E 542)** Building Enclosure Science and Design (3) The building enclosure: nature, importance, loadings; building science: control of heat, moisture, air, hygrothermal analysis; design: walls, windows, roofs, joints.

### **A E (C E ) 542 Building Enclosure Science and Design (3)**

The building enclosure, or envelope, is the environmental separator in any building and is, like the superstructure and the service systems, one of the major physical components of the building. The primary objective of this course is to develop an understanding of the nature, importance, functions, and performance of the building envelope in general. The necessary building science--concerning primarily heat, moisture, and air--is covered, and hygrothermal analysis procedures are developed. A generalized categorization system for enclosure elements, i.e., walls (both above- and below-grade), roofs, and other enclosure sub-assemblies is proposed. General design strategies are developed. The design of specific wall systems (both above- and below-grade), roof systems, base floors, windows, and their joints is then addressed in some detail. The integration of structures (composite action, restraints, etc.), service systems (especially energy consumption), and finish (exterior and interior) is considered in sonic detail. Evaluation is based on an equal combination of assignments (6) and examinations (2). This course complements courses in architecture, civil engineering, architectural engineering, and mechanical engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 543 Research Methods in Architectural Engineering (3)** Research skills, critical thinking, academic writing, presentations, use of electronic media, and experimental design applied to AE research topics.

**A E 543 Research Methods in Architectural Engineering (3)**

This is a course intended primarily for graduate students in Architectural Engineering. Other students interested in Architectural Engineering research may also take the course. The main objective of the course is to build research skills for students pursuing an M.S. or Ph.D. degree in Architectural Engineering. The research skills to be targeted are critical thinking, academic writing, presentation, oral communication, and use of electronic media, based on materials from architectural engineering projects and literature. These skills will be developed through a series of lectures and exercises to include architectural engineering research topics, such as novel building physical characteristics and occupant performance/environmental perceptions.

Lectures in academic writing will cover proposal, report, paper, and thesis writing requirements for Architectural Engineering students. Students will write several assigned essays and term project to gain experience in different academic writing forms as well as architectural engineering research topics. Students are encouraged to use their actual research for the semester project. Based on the project content, each student will then be required to develop an in-class presentation. This part of the course will cover presentation preparation and the critical thinking that is embedded into oral communication skills. The electronic media portion of the course will cover topics such as electronic databases relevant to architectural engineering research topics, search engines, publishing, use of web materials, ethics, and legal considerations. All of the assignments are designed to develop critical thinking through instructor and peer feedback.

In addition to the three major targeted areas of research skills development, this course will begin and end with a focus on architectural engineering research topics. The introductory part of the course covers the topics and methods for the four focus areas within the Architectural Engineering program, while the closing portion emphasizes interdisciplinary research efforts and encourages students to thinking in that direction. For example, while experimental design is directly applicable to each individual focus area, the specific instrumentation is area (focus) dependent. Nevertheless, knowledge of different specific data collection methodologies from multiple Architectural Engineering options can enhance the understanding of integrated architectural engineering research topics. Overall, the communication established in all of the course assignments can be used to help develop new architectural engineering research ideas and polish existing ones, which will be helpful to students who are taking the course during their first or second semester in residence.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 551 Combined Heat and Power System Design for Buildings (3)** Thermodynamic and thermo-economic analyses methods for determination of optimal, on-site, total energy systems for commercial buildings.

**A E 551 Combined Heat and Power System Design for Buildings (3)**

Building systems consume about 40% of the primary energy resources utilized in the United States each year and are responsible for a proportional fraction of air contaminants (NO, SO, fine particulates, CO) and greenhouse gas, CO<sub>2</sub>. A conventional energy supply mix for building (grid electricity, site fossil fuel heating) results in approximately 50% primary fuel energy utilization. Advances in scalable, low emissions, electric power generating devices are leading to incorporating on-site power production into the building design. The "waste heat" general is of such a quality that it can be utilized at the site in heating, hot water, absorption cooling, and dehumidification applications. The simultaneous utilization of a primary fuel to generate both the electrical and thermal components in Building Combined Heat and Power (BCHP) can result in total primary fuel utilization values of 85% or greater, electric power reliability increases and significantly reduced emissions, particularly greenhouse gases.

This course examines the underlying thermodynamic principles involved in BCHP, pollutant and greenhouse emission mechanisms and levels associated with both Separate Heat and Power (SHP) and BCHP designs for a given building site. Economic and regulatory principles that govern the application feasibility of a BCHP design for a given building configuration are examined. At the end of the course, students will have the skills and tools necessary to perform an assessment of the feasibility of a BCHP application to a given building site. Specific combinations of distributed, electric power generation equipment (micro-turbines, fuel cells, diesel engines, wind-power) and thermal "waste" utilization from these generating systems will be discussed and analyzed. Case studies are utilized to illustrate the evaluation processes.

Using the SHP design methods and principles (ducted air supply systems, hydronic heating and cooling systems, etc.) covered in A E 454 (Advanced HVAC) and central system methods covered in A E 557 (Centralized Cooling Production and Distribution Systems) or A E 558 (Centralized Heating Production and Distribution Systems) for commercial buildings, students will learn how to achieve and establish the same building performance objectives using Combined Heat and Power (CHP) technologies. Since the use of CHP for various building types requires reducing transients in thermal and electric load profiles, the relationship of the structural characteristics of the building (thermal mass) and the use of combinations of artificial lighting vs. day-lighting to the utilization of CHP is investigated.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 552 Air Quality in Buildings (3)** Indoor air pollutants, their sources and health effects; transport of pollutants; modelling of pollutant concentration in buildings.

### **Air Quality in Buildings (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 553 Building Energy Analysis (3)** Fundamentals of building energy dynamics and the simulation of energy flows in a building; validation of programs; practical applications.

### **Building Energy Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 554 Building Thermal Systems Design and Optimization (3)** A study of building thermal comfort systems emphasizing analytical peak and off-peak design performance modeling, simulation, optimization and economics.

### **Building Thermal Systems Design and Optimization (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1989

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 555 Building Automation and Control Systems (3)** Advanced techniques in the theoretical analysis and practical design of the automatic comfort controls used in building thermal systems.

### **A E 555 Building Automation and Control Systems (3)**

A E 555 complements and expands upon the material covered in the undergraduate HVAC control systems course. The objectives of this course are to provide students with an enhanced capability to design advanced building control systems and to ensure proper operation through the use of comprehensive design and analysis tools and evaluation methods. Particular emphasis will be placed on systems integration, fault detection, diagnosis and correction, optimization and performance monitoring. Reference materials will be drawn from recent technical papers and conference proceedings and cover both model-based predictive control and data-driven modeling and control. Students will develop skills to stimulate building control system performance for a wide range of system designs and to implement advanced control strategies and sequences relevant to modern integrated building systems.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 556 Solar Engineering of Thermal Processes (3)** Advanced quantitative methods of predicting transient active and passive solar process performance with an emphasis on building solar applications.

### **Solar Engineering of Thermal Processes (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 557** Centralized Cooling Production and Distribution Systems (3) Central cooling plant and distribution components and systems; thermal, hydraulic, and economic modeling for planning and design.

### **Centralized Cooling Production and Distribution Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 558** Centralized Heating Production and Distribution Systems (3) Description and analysis of central heating plant and distribution components and systems; thermal and economic modeling for planning and design.

### **Centralized Heating Production and Distribution Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 559** Computational Fluid Dynamics in Building Design (3) Theory and applications of building environmental modeling with Computational Fluid Dynamics (CFD).

### **A E 559 Computational Fluid Dynamics in Building Design (3)**

This course will be a primary interest to Architectural Engineering graduate students in the Mechanical Systems emphasis. Other students interested in the application of Computational Fluid Dynamics (CFD) to Architectural Engineering may schedule the course if they have satisfied the prerequisites. The main objective of this course is to build the knowledge necessary for successful simulations of building indoor and outdoor environments using CFD. The skills developed in the course build on the knowledge of fluid mechanics and building mechanical systems. The course will also add to the available pool of electives for students in the integrated BAE/MAE program.

The first part of the course covers general CFD topics on the solution of Navier-Stokes partial differential equations. Different concepts necessary for the solution of the partial differential equations expressing the conservation laws will be introduced along with a CFD software package. In this phase, the course focus will be on the derivation of different equations and their solutions. Analytical solutions will be derived when possible, while most of the problems will require use of numerical solutions. Several homework assignments will require development of small computer programs. The introduced CFD software package will prepare students for the second part of the course that is more applied.

The use of CFD in building design is different from its use for other engineering applications because of the domain size and specific boundary conditions such as diffuser airflow, wind, or solar radiation. Most of the time, appropriate boundary conditions distinguish successful from unsuccessful applications of CFD. To address the issues of quality control in CFD simulations, the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) recently developed CFD guidelines that the course will follow from the beginning. The actual guidelines will be introduced to fortify everything learned during the course.

Evaluation will be based primarily on analytical homework assignments (30%), two projects (30%), a mid-semester quiz (20%), and a final examination (20%). This course will be offered each Spring, with an anticipated enrollment of 10 students

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 561** Science of Light Sources (3) In-depth scientific principles of light generation in modern electric light sources, and the resultant characteristics that influence their use for buildings.

### **Science of Light Sources (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 562 Luminous Flux Transfer (3)** Radiative transfer applied to lighting analysis; methods for computing direct and interreflected illumination; nearfield photometry.

**Luminous Flux Transfer (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 563 Luminaire Optics (3)** Optical design of reflectors and refractors for lighting systems; manufacturing methods.

**Luminaire Optics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 564 Lighting Design for Visual Appearance (3)** Color; the impact of light on materials, architectural spaces, and human perception.

**Lighting Design for Visual Appearance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 565 Daylighting (3)** Design concepts, solar position, sky luminance distribution models, integration of daylighting and electric lighting controls, physical modeling, computer analysis techniques.

**Daylighting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 569 Research Topics in Illumination Engineering (3)** Seminar on prior and current research in illumination engineering which define current recommendations and design practice.

**Research Topics in Illumination Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 570 Production Management in Construction (3)** Applications of production management tools to capital facility projects; theory of production systems in construction; development of production control manual.

**A E 570 Production Management in Construction (3)**

A E 570 explores the use of production management to efficiently manage the delivery processes of capital facility projects. Students will learn about fundamental models of managing project processes and about tools to manage projects as production systems. The procurement, design, and construction processes that are used in capital facility projects are not usually through of in production process terms. Yet, doing so can develop a deeper understanding of the

complexities of capital facility projects and enable project production to be efficiently managed. Production management emphasizes managing projects as complex wholes focusing on the relationships between the parties and tasks to optimize total process performance.

A E 570 analyzes the latest production thinking and management tools to manage capital facility projects. The learning objectives of this course are for students to:

- a) recognize that capital facility projects are complex production systems and understand how principles of production relate to construction projects;
- b) understand the principles and methods of new production management methods like lean construction;
- c) be able to apply specific production management tools to specific problems identified on projects, especially those encountered on high performance sustainable building projects; and,
- d) understand how to use the latest production management planning and control tools to improve the management of capital facilities projects.

A E 570 will be offered each spring with an anticipated enrollment of 25 students. This course uses classroom demonstration, case-based materials, in-class game simulation, and computer software to demonstrate key concepts and production tool applications. Assessment is conducted through out-of-class assignments, homework exercises, and a major project requiring appropriate tool to remedy the problem. The final grade for this course will be based on:

Construction process analysis assignment - 15%  
 Experiment design assignment - 25%  
 Homework exercises and classroom participation - 25%  
 Major project, including class presentation - 35%

Students entering this course are expected to have knowledge of the construction industry, project delivery processes, and construction means and methods.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 571** International Construction Management and Planning (3) Evaluation of international project environments and participants, modeling and planning international projects.

### **International Construction Management and Planning (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 572** Project Development and Delivery Planning (3) Methods employed by owners and developers to initiate capital facility projects; defining project objectives, constraints, participants, financing, and delivery methods.

### **A E 572 Project Development and Delivery Planning (3)**

The course explores the methods used by capital facility owners and developers to initiate a project. Many vital decisions are made and critical activities performed early in a project that have major bearing on how the project is completed. These include defining the project objectives, identifying constraints, recognizing stakeholders, and selecting financing and delivery methods. The course explores the latest project development and delivery techniques used to support these decisions. Students will learn how early development activities shape a project, and how building industry professionals are helping to support these activities. Students will develop knowledge and perspective to help their decision-making skills. As the course title implies, special focus will be on high performance delivery planning.

The learning objectives of the course are for students to:

- 1) Understand what occurs in the early stages of project formation as capital facility owners and developers initiate a project;
- 2) Understand the methods owners and developers use to progress through the capital facility process;
- 3) Understand the different types of acquisition strategies, project delivery methods, and contractual systems to achieving capital facility owner objectives; and,
- 4) Understand the decision-making needs of high performance sustainable building projects.

Offered in the Fall semester, the course uses case-based materials, hands-on computer simulation, and other classroom demonstration. Case study projects assigned by the instructor, individual homework exercises, and a group project requiring students to apply development techniques to a current downtown State College capital facility development site from the assessment for the course.

Students entering this course are expected to know how the construction industry operates, including project delivery methods, engineering economics, preconstruction, and construction means and methods.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 573 Strategic Management in Construction (3)** Analysis tools and principles for design of effective construction organizations' strategy and structure in various markets.

**Strategic Management in Construction (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 597B Historical Methods of Structural Analysis (3)** Quantitative investigation of historical methods of structural

analysis. Graphic statics, arch, dome, vault analysis, indexing methods for trusses, Clapeyron's method.

### **Historical Methods of Structural Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 597E** Color Science for Illuminating Engineering (3) Basis for color in illuminating engineering. Foundations for: theoretical CMFs, color spaces, chromaticity, color temperature, color rendering, color appearance, and color difference.

### **Color Science for Illuminating Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 597F** Virtual Facility Prototyping (3) Computer modeling tools to develop virtual prototypes for building design and construction projects.

### **Virtual Facility Prototyping (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 597G** Building Information Modeling Execution Planning (3) This course will focus on the skills and information needed to create a building information modeling execution plan for building construction project.

### **Building Information Modeling Execution Planning (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 598C** Sustainable Construction Project Management (3) Theory, methods, and practices of high performance building design and construction.

### **Sustainable Construction Project Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**A E 598D** Legal Aspects of Engineering and Construction (3) Legal doctrines, contractual relations between parties, analysis of construction contract clauses, contract performance, and professional practice problems.

**Legal Aspects of Engineering and Construction (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the professional at the Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 862** Distributed Energy Planning and Management (3) Theories and practices of distributed energy production and management in the context of regional and integrated energy grid structures.

**Distributed Energy Planning and Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 868** Commercial Solar Electric Systems (3) Theories and practices of solar electric systems including component selection, performance simulation, grid interconnection, codes, and design documentation.

**Commercial Solar Electric Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 878** Solar Project Development and Finance (3) Economic analysis of solar energy projects, project development process, energy policies, finance methods, and economic analysis tools.

**Solar Project Development and Finance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A E 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Architecture (ARCH)**

**ARCH 412** Integrative Energy and Environmental Design (3) Concepts and strategies for the environmentally conscious design of the built environment.

**Integrative Energy and Environmental Design (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 417** The Language of Boundaries in Architecture and the Landscape (3) This course examines the development and significance of boundaries in the construction of human space and time. Students who have taken other courses from Architecture Visual Arts, Geography, or Philosophy that treat some aspect of spatial perception, conception, construction, or visualization, or who have completed equivalent study independently, may enroll with the permission of the program.

### **ARCH 417 The Language of Boundaries in Architecture and the Landscape (3)**

This course is composed of eight chronologically arranged units of study that examine the major developments in the human use of boundaries in the creation of architecture and landscapes — those actually constructed as well as those created through literature, myth, art, and film.

Human boundary behavior is complex. While we tend to describe space and time as 'transitive' (rational), our actual experience of them is intransitive. Because descriptive systems tend to disregard the role of time, they favor a constructed descriptive objectivity over subjective accuracy. Conflicts between representations and experiences reflect psychological and cultural conflicts expressed as symptoms and dysfunctions.

Both the lectures and supplemental films are directed at helping students understand, reflect upon, and critically think about the trans-cultural and ubiquitous quality of boundary behavior.

The thrust of the course is historical and critical rather than professional, and the intent of the course is to provide students with a comprehensive overview of the issues that surround the human use of boundaries. Because boundary issues are the result of humans' mental apprehension of the world, psychology, philosophy, critical studies, literature, and other humanities are intrinsically involved. But, because boundaries are a part of a way of conceiving the world mathematically, ideas from topology, number theory, and circuit logic are also key.

Each unit of study will be accompanied by exemplary films that illustrate some aspect of boundary behavior. The course includes approximately 12 important films for required study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 431** Architectural Design V (6) Continuation of ARCH 331 and 332, with design and research in program option areas.

### **ARCH 431 Architectural Design V (6)**

The fourth-year architecture studio emphasizes the development of skills in research, documentation, analysis and presentation of project-related physical and cultural information. The studio will investigate the implications of a rigorous pre-design process in the design of architecture. The studio curriculum seeks to investigate the role of the architect in urban design, especially the design relationship between individual buildings, groups of buildings, exterior spaces, streets and streetscapes. Students will explore the synthesis of individual landmark buildings, building groups, urban landscape and service systems.

The studio explores the difference between the roles and responsibilities of public and private clients. In particular the implications of establishing levels of control within the built environments, such as design guidelines, circulation systems and utility networks.

Emphasis will be placed on the development of the following design skills:

- Cooperation and collaboration in research and design.
- Understanding the implications of existing patterns on subsequent design.
- Understanding attitudes toward contexts: cultural, physical, economic, personal, political, organizational (bureaucratic).
- Integration of scale: Development of logics (orders) for the use of the site and continuity of logic across scales of building.
- Developing culturally meaningful relationships between the ordering of land-use and space throughout related buildings.
- Design of exterior space using architectural relationships between multiple buildings
- Investigation of the implications of design controls on the single building.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**ARCH 431A** (IL) Architectural Design V--Foreign Study (6) A studio offered in Rome, Italy, which emphasizes urban planning and architectural design in an urban context.

**ARCH 431A Architectural Design V--Foreign Study (6)  
(IL)**

This studio course focuses attention on the urban design components of architectural design. Using the city of Rome and its unique position in the history of human development, the design projects are selected for their actuality in the current situation of Rome, Italy. The building sites are actual or expected project sites based on the current planning directives of the city planning offices. Students are asked to produce designs that respond to multifaceted programs that will usually include institutional, residential, and commercial activity in the same building/site.

The project will usually last the full semester with all phases of design included. Beginning with site planning and site design issues, the project runs through design concept and design development phases. The last two weeks are often focused on elevation studies and material details. A complete presentation of site, building, and details design is expected at the final presentation.

Studio course meetings with the instructors are scheduled three times per week. Approximately every three weeks, there are formal presentations often to invited guest critics. A mid-term presentation is made at the design development conclusion phase. The final presentation is organized with guest critics at the end of the term.

**Learning Objectives:**

- To achieve a complete urban architecture project design and presentation.
- To understand the implications for architectural design of the city of Rome and its unique history.
- To apply an interpretation of history to contemporary design problems.
- To apply contemporary needs and requirements for architecture to a traditional city site.
- To learn how to adapt design to a non-American culture and tradition of building.

ARCH 431A is the required foreign study architecture design studio taught in Rome, Italy. This course is available to Architecture majors only.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

Concurrent: ARCH 499B and ARCH 499C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 432** Architectural Design VI (6) A continuation of ARCH 431, this course explores in greater depth urban planning and architectural design in an urban context.

**ARCH 432 Architectural Design VI (6)**

ARCH 432 is a continuation of ARCH 431 with a focus on architecture in urban environments and urban/community planning issues of greater complexity. The class will collaborate in the research and documentation of the existing conditions of an urban site and the forces that influence it. This will include the study of precedents. The class will prepare a pre-design presentation, individual architecture projects, base models, and a book of the semester's work.

Based on the pre-design information, small student groups will develop a master plan for a large program. This exercise will include the preparation of the plan, supported by concept diagrams and models, land use diagrams, open space diagrams, landscape plans, pedestrian and vehicular circulation/parking/servicing diagrams, written and graphic site and building design guidelines, and a utilities diagram.

The architectural component of the master plan will be selected for development as the studio architectural design project. Each student will prepare an architectural project based on the general logic and concepts of the group plan.

Major topics addressed in the course include working collaboratively in teams, understanding fundamental ordering principles of cities and towns, understanding urban contexts, urban plans, land-use controls, and economic plans, the design of urban spaces, and the design of a single building or complex of buildings in an urban environment.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 432A** (IL) Architectural Design VI--Foreign Study (6) A continuation of ARCH 431, this course explores urban planning and architectural design in an urban context in Rome, Italy.

**ARCH 432A Architectural Design VI--Foreign Study (6)**



**(IL)**

A continuation of ARCH 431A, this course explores urban planning and architectural design in an urban context in Rome, Italy. The design studio takes full advantage of the city of Rome and its unique position in the history of human development. Students will build on the knowledge of urban situations gained in ARCH 431A and apply that background to projects which utilize building sites based on the current planning directives of the city planning offices.

Students are asked to produce designs that respond to multifaceted programs that will usually include institutional, residential, and commercial activity in the same building/site.

The project will usually last the full semester with all phases of design included. Beginning with site planning and site design issues, the project runs through design concept and design development phases. The last two weeks are often focused on elevation studies and material details. A complete presentation of site, building and detail design is expected at the final presentation.

Studio course meetings with the instructors are scheduled three times per week. Approximately every three weeks there are formal presentations often to invited guests critics. A mid-term presentation is made at the design development conclusion phase. The final presentation is organized with guest critics at the end of the term.

**Learning Objectives:**

To achieve a complete urban architecture project design and presentation.

To understand the implications for architectural design of the city of Rome and its unique history.

To apply an interpretation of history to contemporary design problems.

To apply contemporary needs and requirements for architecture to a traditional city site.

To learn how to adapt design to a non-American culture and tradition of building.

ARCH 432A is the required foreign study architecture design studio taught in Rome, Italy. This course is available to Architecture majors only.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

Concurrent: ARCH 499B and ARCH 499C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 441 Architectural Design Analysis (3)** Studies in principles and elements of design; planning for human use; the relationship of space to physical and social environment. Architectural Engineering majors only.

**ARCH 441 Architectural Design Analysis (3)**

Studies in principles and elements of design; planning for human use; the relationship of space to physical and social environment.

The objective of this course is to explore various approaches to architectural design and to reinforce the concept that there is no "right" or "wrong" answer to a design problem. "Design" is decision-making in itself -- the key to a successful project lies not only in the final product, but in the process leading up to it as well. In order to be successful, design solutions must respond to both formal ideas as well as human, environmental and technical realities. Thus, the interaction between art and technology becomes imperative.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 442 Architectural Design Analysis (3)** Continuation of ARCH 441, with emphasis on functional relationship of space, form, structure, and building groups. Architectural Engineering majors only.

**ARCH 442 Architectural Design Analysis (3)**

Continuation of ARCH 441, with emphasis on functional relationship of space, form, structure, and building groups.

The objective of this course is to explore various approaches to architectural design and to reinforce the concept that there is no "right" or "wrong" answer to a design problem. "Design" is decision-making in itself -- the key to a successful project lies not only in the final product, but in the process leading up to it as well. In order to be successful, design solutions must respond to both formal ideas as well as human, environmental and technical realities. Thus, the interaction between art and technology becomes imperative.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 443** Architectural Design Analysis Inspection Trip (1) Faculty guided trip to metropolitan areas to investigate noteworthy architecture and building construction and to visit professional offices.

### **Architectural Design Analysis Inspection Trip (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 451** Architectural Professional Practice (3) A study of architectural practice in today's society: education, registration, office practice, codes, standards, construction industry, contracts, and legal documents.

### **ARCH 451 Architectural Professional Practice (3)**

ARCH 451 is a required course in the BARCH curriculum. It is intended to prepare students for the professional practice of architecture. The course explores the historical influences and current trends that shape the relationship between the architect, client and builder in contemporary society. This course provides an overview of the changing roles of the architect through history as well as a detailed examination of the architectural profession in today's rapidly changing world. ARCH 451 reviews internship, architectural licensing procedures and requirements, professional development (life-long learning), architectural practice including office organizational structures, the architect's administrative role, construction cost control, professional organizations, the architect's professional, legal and ethical responsibilities (including life-safety and accessibility), leadership in the profession and the community as well as alternative architectural / design related careers.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Concurrent: ARCH 491

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 480** Technical Systems Integration (3) Presentations of buildings' analyses from a multiplicity of viewpoints: architectural, spacial, environmental, mechanical, construction assembly.

### **ARCH 480 Technical Systems Integration (3)**

This course is a synthesis of topics previously introduced in the AE sequence—such as structural, mechanical, electrical, and other systems related to a building's technical performance. Students will practice the purposeful integration of all technical aspects of a buildings design, providing them with a working knowledge of matters related to energy efficiency, sustainability, lighting, and acoustics.

The focus of the course lies in questioning how technical requirements and design intentions should be integrated during the design process, so as to enhance the aesthetic and performance qualities of an architectural project. This course combines lectures, field trips, and technical assignments, along with analysis and implementation of energy, day lighting, electrical lighting, and acoustical concepts in the student's design efforts.

In addition to the synthesis of building design and technical systems, this course will further develop the student's knowledge of active/passive techniques for sustainable architecture. A focus on the collaborative workings/environment of the architectural practice helps students to translate systems integration strategies into graphic/digital representation, and reinforces the interdisciplinary nature of designing and constructing successful works of architecture.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

Concurrent: ARCH 431

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 480** Technical Systems Integration (3) Presentations of buildings' analyses from a multiplicity of viewpoints: architectural, spacial, environmental, mechanical, construction assembly.

**ARCH 480 Technical Systems Integration (3)**

This course is a synthesis of topics previously introduced in the AE sequence—such as structural, mechanical, electrical, and other systems related to a building's technical performance. Students will practice the purposeful integration of all technical aspects of a buildings design, providing them with a working knowledge of matters related to energy efficiency, sustainability, lighting, and acoustics.

The focus of the course lies in questioning how technical requirements and design intentions should be integrated during the design process, so as to enhance the aesthetic and performance qualities of an architectural project. This course combines lectures, field trips, and technical assignments, along with analysis and implementation of energy, day lighting, electrical lighting, and acoustical concepts in the student's design efforts.

In addition to the synthesis of building design and technical systems, this course will further develop the student's knowledge of active/passive techniques for sustainable architecture. A focus on the collaborative workings/environment of the architectural practice helps students to translate systems integration strategies into graphic/digital representation, and reinforces the interdisciplinary nature of designing and constructing successful works of architecture.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

Concurrent: ARCH 431

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 481 Digital Design Media (3)** Advanced course in digital modeling, rendering, animation and non-linear video for architectural investigations.

**Digital Design Media (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 491 Architectural Design VII-Thesis (6)** Problems in architectural planning and design; programming and/or implementation methodologies and applications for various environmental design scales.

**ARCH 491 Architectural Design VII-Thesis (6)**

It is the goal of this program that, upon completion of the fifth year, each student will have the ability to pursue an architectural idea in a rigorous, in-depth manner and be able to express the knowledge of and implication of that idea through the completion and presentation of a "thoroughly considered building design project." It is the intent of the fifth-year component of the Bachelor of Architecture program to foster the spirit of in-depth design inquiry and research, and to build upon and reiterate design awareness, skills, and methods introduced in previous years; and to introduce, discover and develop new ones. To these ends the primary educational vehicle is the use of a propositional thesis as a way of directing the study toward the linking of theory and building in a meaningful manner.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

Concurrent: ARCH 451

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 492H Architectural Design VIII-Thesis (6)** Continuation of ARCH 491 with concentration and specialization options.

**Architectural Design VIII-Thesis (6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

Concurrent: ARCH 480

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 495** Advanced Architectural and Related Design/Construction Work Experience II (1-3 per semester/maximum of 6) Supervised off-campus, nongroup instruction including field experiences, practica, or architectural and related design/construction work experience.

**ARCH 495 Advanced Architectural and Related Design/Construction Work Experience II (1-3 per semester/maximum of 6)**

Supervised off-campus, non-group instruction including field experiences, practica, or architectural and related design/construction work experience.

A final presentation of activities will be evaluated by a faculty member in the Department of Architecture.

Number of credits will be determined based on the total number of hours of approved work experience under the direct supervision of a registered architect or other approved professional:

- 1 credit: 75-149 hours
- 2 credits: 150-239 hours
- 3 credits: 240+ hours

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 496H** Independent Study - Honors (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study - Honors (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 497C** Building Materials Reclamation & Reuse (3) This course is a hands-on, project-based seminar focusing on the practice of building material salvage and recycling. This course consists of a variety of design-build projects where students learn and practice the methods and techniques of reclamation and explore the design possibilities of reused material.

**Building Materials Reclamation & Reuse (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 498** Special Topics (1-15) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 499A** (IL) Foreign Study--Architectural Design VI (6) Individual or group instruction conducted in a foreign country.

### **ARCH 499A Foreign Study - Architectural Design VI (6)**

The semester abroad design work will focus on the difficult problem of creating new construction in the presence of an historic structure. This is an inevitable problem in the city of Rome where one can hardly avoid confronting historic or monumental buildings. However, as every place is preceded by a history, either natural, political or material, these issues are important outside of this context, the course aims to help students define critical strategies that will serve them beyond their semester abroad.

Fifteen weeks is a short time to experience a place as complex and interesting as Rome, Italy. For many students, it may be a chance of a lifetime to live in and study a place as challenging and full of opportunity as this. Students are expected to approach the semester with even more seriousness than they would a semester at home. A semester in this program is not a mere travel experience but an academic exploration of a foreign and historic environment. Every activity of this studio is designed to these ends. Therefore, we have selected a very direct and limited building program, a site in the historic center, and exercises that require students to spend time in the field as well as in the studio.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 499B** (IL) Architectural Analysis (3) Comparative study of architectural elements and building types through on-site drawing, recording, measurement, sketching and decomposition activity.

### **ARCH 499B Architectural Analysis (3) (IL)**

Architecture is amplified and embodied in cities. Since most architecture is set in cities and the city is itself an architecture, it becomes necessary for us to evaluate the relationships that affect the making of buildings for cities and the organization of buildings into a meaningful whole. This course will explore the two meanings of the term "the architecture of cities." It will propose questions leading to an analytical de-composition of the situation of cities in general and Rome in particular.

The course is loosely divided into three sections. The first, Historical Overview, presents the evolution of early settlements focusing on the significance of built form. The second, Revolutions and Modernity, demonstrates the qualitative shift in emphasis that settlements undergo from the Enlightenment, through the Industrial Revolution, to the Information Revolution. The third section, the Current Debate, will present some contemporary issues and techniques proposed for the resolution of apparent problems of city architecture.

Since this course is given in a unique setting, it takes full advantage of Rome, its history and its problems, to highlight the

universal design elements that are part of an analytical understanding, but also of a synthetic design understanding of cities.

This course is theory based and, as such, will provoke thinking, a taking apart mentally, more than a making of architecture. The studio design problem, also set in this city, is the operative dimension of thoughts generated here. In this class, students are expected to articulate thought and some clear graphic analysis concerning architecture. These thoughts, if manipulated with discipline and commitment, will become a source of illumination for design activity.

**Learning Objectives:**

- \* To learn the meaning of cities in Western culture
- \* To understand the significance of foundation and other rites concerning building the human environment.
- \* To understand the meaning of urban architecture
- \* To understand the reasons for the form of streets, buildings and open spaces in Western cities
- \* To achieve the analytical skills necessary to take apart the component systems and material elements of architecture

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

Concurrent: ARCH 431A or ARCH 432A and ARCH 499C

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 499C (IL) Urban Studies Topics (3)** A presentation of the history of Rome through the medium of its maps and walking tours of the city.

**ARCH 499C Urban Special Topics (3)  
(IL)**

The course is a presentation of the history of Rome through the medium of its maps. The well documented cartographic history of the city is presented along with the morphological changes that are evident in the city today. The material of Rome's physical development is presented in two distinct ways. The first involves slide presentations of Roman maps and engraving images organized by specific routes (vie consolari and others) into and out of the city. The second is by on-site walks through the same routes with the instructor.

The approximately twelve routes involve a lecture presentation usually given on Tuesdays, followed by an on-site walk usually given on Thursday. Students are then assigned their own route map of the same study area to generate over the weekend. These are graded and discussed in the following sessions.

**Framework:**

- \* Introduction: The definition of the Urbs through maps
- \* 14th-15th century: Limbourg, Taddeo di Bartolo
- \* 16th century: Bufalini, Duperac
- \* Renaissance planning and the expanding city
- \* 17th century: Maggi, Falda
- \* 18th century: Nolli
- \* 19th century: Catasto Piano
- \* 20th century: Lanciani, Sanjust

**Themes:**

- \* 14th-15th century: Derivation of the iconic map from Mappaemundi and city images in art
- \* 16th century: Images of pre-Sistine in-city and extension planning vs. Sixtus V's city outside the city
- \* 17th century: Illustrating the Baroque point developments: Urban theater
- \* 18th century: The new orientation and precision measurement of the Age of Reason. Nolli and Piranesi: the contemporary vs. the archaeological city
- \* 19th century: Stasis and expansion: Nolli retreats and the master Plans for the new Capital city
- \* 20th century: Recapitulation and expansion: Lanciani's new Forma Urbis and images of the boundless city

**Learning Objectives:**

- \* To learn the history of the development of one of the most important cities in the world.
- \* To learn the importance of mapping and way-finding in the understanding of architecture.
- \* To learn the reading of traces of the past morphological development of a city.
- \* To understand how cities are built, change, and grow over time.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

Concurrent: ARCH 431A or ARCH 432A and ARCH 499B

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 499D (IL) International Architectural Design Studio (4)** Architectural design studio in an international setting; the relationship of designed space in an urban context. Architectural Engineering majors only.

**International Architectural Design Studio (4)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 511** Theoretical Perspectives in Architecture (3) The impact of rationalism and romanticism on contemporary developments and theoretical postures in architectural design.

**Theoretical Perspectives in Architecture (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 512** Critical Theory in Architecture (6) Inquiry into paradigms of critical theory in architecture theory, practice, and teaching. Evaluation of central texts, methods, theories, and outcomes.

**ARCH 512 Critical Theory in Architecture (6)**

ARCH 512 is composed of six chronologically arranged units of study that examine the major developments in the evolution of discursive practices that ground architecture theory, teaching, and practice.

Modern and post-Modern critical theories in architecture have borrowed from a number of tangent disciplines, such as Phenomenology, Positivism, Existentialism, Narratology, Structuralism, Deconstruction, Grounded Theory (social sciences), Cognitive-Behaviorism, Neo-Kantianism, Psychoanalysis, Reception Theory, etc. Historical methodology, Archaeology, Anthropology Art History, and other disciplines have also had their impact. As a result, critical theory in architecture typically lacks uniform methodologies and stable definitions. In recent years, many disciplines have undergone attempts to consolidate discourse around the influence of language and culture within the historical context of evolving world ideologies and their effect on communication, material culture, and the physical environment. Architecture has responded to this general trend in a number of ways that invite cross-disciplinary comparisons and methodological adaptations.

The course will take advantage of featuring visiting scholars whose expertise in diverse areas of study will provide participants with direct contact with the widest possible range of theoretical perspectives. The strategy of the course will be a comparison and critical evaluation of what appear to be the most effective research methods within the pressing concerns of environment, population growth, material resource depletion, and international conflict. The aim will be to establish relevance as well as research competence and effective expression.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 520** Methods of Inquiry in Architecture and Urban Design (3) Introduction to the methods of research and inquiry commonly used in architecture and urban design.

**Methods of Inquiry in Architecture and Urban Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 536** Design-Inquiry (1-12) Integration of research with the designing of architectural and urban settings.

**Design-Inquiry (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 541** Topics in Theory (3) A series of presentations on the development of contemporary architectural theory.

### Topics in Theory (3)

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 542** Topics in Community and Urban Design (3) Community and urban design as an area of design inquiry and interdisciplinary practice.

### ARCH 542. Topics in Community and Urban Design (3)

The intention of this course is to introduce students to the fundamental elements of community and urban design practice within the fields of architecture, landscape architecture, and planning. An investigation into the diverse traditions of design practice- -technical, esthetic, and theoretical -- will highlight the role that design plays in the urban and community context and also serve as a powerful medium for analyzing the confluence of the social, economic, political, and ecological dimensions that give form to cities and communities. An objective of the course will be to develop a critical perspective in architectural design vis-a-vis the restructuring of urban and community space.

Topics to be covered in the course include: history of the discipline, contemporary urban and community issues, methodologies and techniques in community action research and participatory design, and introduction to the case study method of analysis. It is expected that students will actively participate in class discussions, present a case study of a project related to the topics covered in the class, and submit a research paper on the selected case study.

ARCH 542 will be offered as a 3-credit course on an annual basis during the spring semester. Students with graduate standing in architecture and landscape architecture will be given priority for enrollment. However, a limited number of other students may enroll pending consent of the instructor.

Faculty member proposing course: Michael Rios

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 543** Topics in Digital Design (3) Inquiry into digital design paradigms of architecture and related disciplines; exploration design principles and operations supported in digital/virtual design environments.

### Topics in Digital Design (3)

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 545** Pedagogical Practices in Architectural Education (3) Review and application of pedagogical topics in studio teaching. Comparative evaluation of accepted and experimental practices.

### ARCH 545 Pedagogical Practices in Architectural Education (3)

ARCH 545 is composed of six chronologically arranged studio projects involving intensive interaction among students and instructors about strategic options available to the architectural experiment. (The course is held in conjunction with an undergraduate summer studio; students in ARCH 545 are the instructors of the undergraduate course.)

Running in parallel with ARCH 512, ARCH 545 carries theory to the pedagogical studio where it is employed in a variety of strategic interventions involving the idea of displacement. The studio student's activities are directed towards the design and production of a performative space where the division between audience and stage is thematized in a variety of ways permuting but not violating the traditional division of viewer and viewed. Students of ARCH 545 take the role of instructors whose actions are continually reviewed in light of their pedagogical intent, theoretical presuppositions, and educational outcomes. Various models of intellectual growth will be employed: dialectic (learning from the instructor), experimental (learning through 'planned accident'), parallel stages (learning through the creation of multiple levels of



production), etc.

Studio education in architecture contains many traditional elements (sketch study, material development, critique, revision, etc.) and some controversial but common elements (design-to-failure, inversion, covert coding, etc.) Students, as instructors in the pedagogical laboratory of the undergraduate studio, will document the results of each week's activities and summarize the outcomes in terms of paradigms of discovery.

ARCH 545 is a hybrid lecture-online course, with materials summaries and project descriptions and results archived on a course web site.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 550** Ethics in Architecture (3) Ethics in Architecture focuses on the nature of human interactions with natural and artificial worlds.

**Ethics in Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 591** Architectural Research (2-12) Guided research project.

**Architectural Research (2-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ARCH 897** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Art (ART)

**ART 402** Portfolio Design and Professional Practices (3) This course emphasizes the development of presentation skills for digital artists in audience/client interactions.

**ART 402 Portfolio Design and Professional Practices (3)**

ART 402 PORTFOLIO DESIGN AND PROFESSIONAL PRACTICES (3) is the concluding experience for all students enrolled in the Digital Arts Certificate (DAC) program. The course provides opportunities for students to learn about the practical application of professional practices and portfolio development tools specific to careers that require knowledge of digital art and design principles and culminates in the development of a professional-quality creative portfolio. The course prepares the DAC student with the skills, knowledge, and ability to 1) communicate a critical understanding of his/her work through the articulation of goals, critique, and self-assessment; 2) identify, assess, and evaluate tools and information necessary to maintaining current and effective techniques for written and visual self-presentation; and 3) prepare and present online a professional-quality creative portfolio of digital art/design works and appropriate supporting documentation.

The course is taught fully online and comprises coursework supported by online presentations and guest talks, assigned readings, and other resources and reference materials relevant to the professional development of digital artists and designers. Course topics include: 1) the role of the portfolio, 2) selecting portfolio ingredients and how to adapt them for different audiences, 3) selecting/composing supporting documentation for the creative portfolio, 4) developing a professional-level online presentation of the digital portfolio, 5) locating and evaluating resources for the digital arts/design professional and 6) identifying professional practices relevant for individuals working in digital art and design. Students engage in both individual and team-based projects and interactions via activities such as asynchronous group discussions and guest talks delivered by streaming media.

Assessment is based on the quality of the student's work and participation in individual and team-based projects and activities that include online discussions, peer-reviews, collaborative research, and the development of an online presentation for the creative portfolio. Students receive regular individual and group feedback throughout the course in the form of instructor and peer reviews and critiques. Formal assessment occurs at regular intervals in a manner that evaluates both individual and group components of assigned tasks and activities. Students are expected to positively contribute to the course through active engagement in online discussions, team-based work and activities, and peer reviews. Course assignments include creative and written components and provide multiple ways for students to engage in various forms of professional development, self-evaluation, and critique.

Students are required to have access to the Internet.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 405** Advanced Studio Art (3 per semester/maximum of 9) Advanced work in drawing and painting, with an emphasis on individual development.

**Advanced Studio Art (3 per semester/maximum of 9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 409** (ART H 409) Museum Studies (3) An introduction to the professional activities that occur in art museums.

**ART (ART H) 409 Museum Studies (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course introduces students to the broad field of art museum work, specifically museum administration, education, curatorial work, registration, and exhibition design. Readings by authors in each field provide current theoretical and philosophical frameworks for all areas, which are then followed by discussions and practical experiences with professional museum practitioners, including the staff of a museum, for example, the Palmer Museum of Art, and invited guests. Museum Studies is open to students who have complete six credits in art, art education, or art history. This course is especially beneficial for majors in art, art education, and art history who are considering a career in an art museum or who want to become more aware about how an art museum functions. In addition to providing an in-depth introduction to art museum work, the course encourages students to build the critical thinking and response skills that are crucial to success in the real-world environment of a museum. The readings provide a solid foundation for later reference or further study in the student's chosen field. Offered every spring, this course will have a maximum enrollment of 20 students. Grades are based on class participation, four out-of-class projects, and a final project. Extra credit is offered for an off-campus visit to a museum, among other options.

General Education: None

Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 411 (US) Seminar in Contemporary Art (3 per semester/maximum of 6)** Trends in contemporary art investigated within the framework of studio visitations, museum tours, and through other related avenues of encounter.

### **ART 411 Seminar in Contemporary Art (3)**

This seminar on contemporary art exposes students to artistic practices and to the advanced-level critical discourses accompanying them. It is relevant to all students interested in expanding their knowledge of contemporary art and essential to BFA students who are encouraged to take the course more than once. The only prerequisite for this course is ART 122W. The seminar's intimate format allows for discussions and a convivial examination of the pluralistic expressions of contemporary art while articulating it with theory and criticism.

From an international perspective, this seminar focuses on art since the 1960s. Besides more traditional artistic expressions such as painting, sculpture, photography, installation, performance and video, the course examines networked collaborations before and after the Internet, art and social activism, and a range of new media and new genre artistic practices. The conceptual issues these works raise include among others the dematerialization of the art object, issues of site-specificity and public art, and institutional critique. The course approaches these developments through artists' writings and essays in contemporary theory and criticism. Works of art are presented through videos, power points, films, performances, gallery visits, field trips, and discussions of related essays. Critical "reading" includes an extensive introduction to the work's historical contexts, readings from primary source materials, and the exploration of critical methods of analysis. From a cross-disciplinary perspective—including historical, esthetic and philosophical approaches—this course examines principles, assumptions, and tensions inherent in artist's works as well as in our responses to them.

Student evaluation is based on short written papers such as an exhibition review or an interview, participation in class discussions, and a creative project (ranging from a web site to an installation, artist's book, or a performance), which must reflect a general understanding of the issues addressed in the course. The course is offered at least once a year with the enrollment of 15 students.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Arts  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 413 Performance Art (3)** The development, production, and presentation of performance art works, and the study of performance art theory and history.

### **ART 413 Performance Art (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will consist of lectures, readings, demonstrations, critiques, and studio practices in performance art. The course will begin with introductory exercises aimed toward the use and understanding of objects, images, materials, and actions of the body as performance elements. Performance assignments will range from autobiographical works to those which will address political issues effecting art and the body today such as sexuality, ethnicity, health, ecology, the art market, government intervention, and others. Reading and discussion assignments will cover the theory and history of performance art in the twentieth-century.

**Performance Art Paper:** One week after the second performance project, students will be required to submit a paper that defines performance art. The paper should be typewritten, double-spaced, and three pages in length. In addition, it should contain a page for references that indicates at least five sources that have been used from the course reading list to support arguments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 415 Integrating Media: Convergence in Practice (4 per semester/maximum of 12)** A studio course concentrating on the integration of new media technologies in contemporary art practice.

### **ART 415 Integrating Media: Convergence in Practice (4)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will concentrate on the integration of technologies into contemporary studio art practice. Emphasis will be placed on the convergence of digital, interactive, and time-based experiences within current studio practice. Assignments will cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, and media authoring. The course will culminate in a final large-scale collaborative media project, group show, installation, video screening, and/or class web presentation. This course will be offered fall and spring semesters.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 416** Advanced Web and Net Art: Multimedia Publishing (4 per semester/maximum of 12) A studio course concentrating on multimedia online "net art" practice and Web publishing.

**ART 416 Advanced Web and Net Art: Multimedia Publishing (4 per semester/maximum of 12)****(BA) This course meets the Bachelor of Arts degree requirements.**

This is a studio art class that focuses on creating, authoring, exhibiting, and discussion online art practice. "Net Art" has become an important form of new media art creation and exhibition. The course explores experimental uses of new media in the visual arts with emphasis on integrating net art and design practice in cyberspace with current studio practices in two, three, and four (time based) dimensional art. In addition to the actual creation of new media artworks, the course will engage students in research methods to advance their skills in new media art and design and help them to develop an understanding of the critical evaluation and assessment of new media artworks created specifically for the web. The course will also explore various methods and strategies for exhibiting and publishing artworks on the web and creating online portfolios.

The course will examine and explore the potentials of net-based art through lectures, readings, demonstrations, creative practice in studio, critiques, and actual web-published exhibitions. Assignments will cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, and media authoring.

The course will culminate in an online exhibition and personal portfolio sites published on the web.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 417** Metal Art/Technology III (4 per semester/maximum of 12) Advanced exploration of current and emerging metal art technologies and processes as medium for conceptual, aesthetic, and functional artworks.

**ART 417 Metal Art/Technology III (4 per semester/maximum of 12)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course will continue exploration of metal art technologies at an advanced level. This course will also cover technologies related to professional preparation, such as mass production options, presentation approaches, and interfacing with suppliers. The convergence of metal art technologies as source material (ART 217) and its further integration with emerging technologies (ART 317) will serve as the basis for students; creative works that intersect art, function, and technology. Through this advanced exploration of a wide range of metal art technologies, the student will be able to create new artworks not otherwise possible. These artworks will use the presented technologies to address concepts, aesthetics, and functions directly relevant to the visual arts.

Assigned projects will involve a wide variety of skills, techniques and processes at an advanced level that include the application of design principles, advanced metal forming techniques, research and construction of mechanical, kinetic, and electronic systems, and independently focused explorations. This project-based learning will be reinforced through slide lectures, demonstrations, readings, reflective writings, and critiques.

This labor-intensive studio relies upon cumulative learning experience through increasingly advanced projects. Competency is expected in numerous new skills and techniques, and creative innovation in the use and application of these technologies is essential to the success of completed artworks. Projects and assignments will be based upon the advanced integration of concepts and ideas.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 419** Advanced New Media: Capstone (4 per semester/maximum of 8) A new media and digital arts capstone course concentrating on the integration of art and technology in advanced thesis projects.

**ART 419 Advanced New Media: Capstone (4 per semester/maximum of 8)**

This is an advanced senior level capstone experience for new media. The course concentrates on advanced media theory and discourse, the integration of new media technologies into contemporary studio art and design practice, and on the creation and documenting of senior thesis projects. The course will focus on the final preparation of professional portfolios. The course will follow a studio/seminar model.

Student thesis projects may cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, 2D, 3D, 4D media authoring, etc. in relation to their focus in new media art and design practice.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 421** Drawing (4 per semester/maximum of 12) Drawing for advanced students, with total emphasis on sustained individual approaches.

**Drawing (4 per semester/maximum of 12)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 422** Advanced Figure Drawing (4 per semester/maximum of 8) Concentrated work in recording and understanding the human figure.

**Advanced Figure Drawing (4 per semester/maximum of 8)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Fall 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 430** Advanced Sculpture (4 per semester/maximum of 12) Advanced work in sculpture, with an emphasis on individual development.

**Advanced Sculpture (4 per semester/maximum of 12)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 431** Installation Art (4) Study and production of original visual statements through installation work as an art form.

**Installation Art (4)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**ART 440** Advanced Printmaking (4 per semester/maximum of 12) Individual projects in one or more of the printmaking processes. Emphasis is on developing a portfolio of prints.

**Advanced Printmaking (4 per semester/maximum of 12)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Fall 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 446** Artists Books (4) Study and production of original visual statements through the book as an art form.

**ART 446 Artists Books (4)**

This course will consist of lectures, demonstrations, and studio practice in production of artists books. Lectures and demonstrations will include hand papermaking, signature binding, book design, new and alternative book forms, and container construction. Each student will produce six either unique or editioned books during the semester; each book will have a mock up, title, colophon page, and will be signed. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 447** Photo Based Printmaking (4) Study and production of original visual statements through photographic based printmaking as an art form.

**ART 447 Photo Based Printmaking (4)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will consist of lectures, demonstrations, and studio practice in production of graphically based art prints. Each student will produce original prints in each of the printing techniques presented.

Specific lectures, demonstrations, and projects will include photo based prints through: 1)Serigraphy, 2)Intaglio, 3)Gum Bichromate, 4)Cyanotype, 5)Van Dyke Brown, 6)Adobe Photoshop

A particular emphasis will be placed upon the use of the computer as a tool in the production of images. The digital negatives produced during the computer instruction in this course will be employed in all of the other printing processes.

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 2000

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 450** Advanced Painting (4 per semester/maximum of 12) Development of the artist through a series of commitments; each semester serves as a contractual agreement along professional lines.

**Advanced Painting (4 per semester/maximum of 12)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 455** Advanced Painting Critique (4 per semester/maximum of 8) The painter in relation to his peers and his profession.

**Advanced Painting Critique (4 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 465 Individual Approaches I (3)** An advance studio where students are expected to explore personal themes and individual concepts in their art work.

### **ART 465 Individual Approaches I (3)**

ART 465 is an advanced studio course concentrating on creating art within a series. Students will be asked to complete 4-6 pieces that stem from an individual idea. Medium is open and can be traditional or non-traditional. Students will be required to document and maintain a journal outlining the steps needed to complete each piece. Weekly formal and/or informal critiques will allow students constant feedback of their progress.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 466W Individual Approaches II (6)** An advance studio/lecture addressing the preparation for potential employment and/or entrance into graduate studies.

### **ART 466W Individual Approaches II (6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ART 466W is the Visual Art Studies capstone experience where students are given the opportunity to experience the professional aspects of a practicing artist. In addition to completing the last 2-4 pieces toward their exit portfolio students will address vital activities surrounding applying for employment and graduate school. Students will create "packets" including resumes, cover letters, post cards, slides, and portfolio CDs that can be used directly out of school for various calls and job listings. In addition topics that will be addressed in depth are photo-documentation, and inventory of work through database maintenance. All of these issues will culminate with small group exhibitions which will be curated, installed, and promoted by the students.

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 468 The Intermediate Digital Medium (3)** An advanced studio course using the computer as an artistic media.

### **ART 468 The Intermediate Digital Medium (3)**

This course will provide the much needed advanced technological/digital component wherein computing will be discussed as a media, rather than a tool. Students will be engaged in the creation of graphic/moving/three-dimensional imagery and sound that explores themes and concepts introduced in class. While most of the course will center around the use of industry standard computers there will be some forays into hardware associated with production, sound, and projection of images.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 469 Methods and Materials II (3 per semester/maximum of 9)** A studio course that focuses on specific media or techniques reflecting varied faculty expertise.

### **ART 469 Methods and Materials II (3)**



This course provides students the opportunity to experience particular areas of visual art in which faculty members have gained significant expertise. Topics will vary as faculty members rotate responsibility for offering the course. The course may be about a specific method, material or theme in which a faculty member is involved. The course is in depth in nature, and students may gain an advanced understanding of a specific art form. Students are given the opportunity to explore several types of Art made by scheduling this course more than one semester. One of the goals of this course is to provide students with ways of visually communicating concepts and themes/issues.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 475 (US) (ART H 475) Contemporary Women Artists (3)** An interdisciplinary course that investigates women artists who were integral to the production of contemporary art primarily in the Americas, Europe, and Asia.

### **Contemporary Women Artists (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Arts  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 476 (ART H 476) History and Theory of Digital Art (3)** History and theories of contemporary digital art emphasizing humanistic approaches to technology.

### **ART (ART H) 476 History and Theory of Digital Art (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Approaches to Digital Art is a survey class that will offer the web designer, cyberspace architect, MUD traffic controller or enthusiastic surfer an opportunity to examine the humanistic aspects of contemporary digital art. Through readings and direct interaction with digital media and digital artists, the class will develop an appreciation of the ways in which the interface between human beings and technology has been historically constructed and is subject to critical investigation. The goal of the class is to prepare each student so that she or he may engage with digital media in a way that is every more historically and socially self aware.

Students will address the ways in which digital technologies transform artistic practices such as museum display, the writing of art criticism, the definition of works of art, changing role of the artist and the changing space of the art studio. More important, however, by engaging with digital works of art students will learn to think critically about technology and its engagement with culture at large. They will be encouraged to think about the political, economic and social impact of digital technologies. This humanistic approach to technology would make this course particularly useful to students of art history, philosophy, comparative literature, art education, and the visual/plastic arts. A significant portion of the course will be devoted to the ways in which art on the internet and digital art in general challenge the integrity of categories such as race and national identity. For example, students will have an opportunity to engage with African American artists such as Keith Obadike, whose on-line performances include an attempt to put his "blackness" up for sale on ebay.com in August of 2001. Students may also look at the ways in which net.art (Art made to be viewed on the internet) can critique commercial cooptation of global culture: etoy.com, for example, is an international and collaborative artist's group that satirizes global capital by camouflaging itself as a multinational corporation.

This class will depend largely upon written responses and class discussion, rather than upon tests. Thus, students will learn how to approach difficult theoretical sources that have been assigned to them, and they will learn how to ask the kinds of questions that will help them understand such sources. This course will emphasize critical thinking rather than memorization, so students will develop analytical skills that will be useful in many other contexts. Because students will be given weekly writing assignments, they will be able to improve their skills in composition.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 480 Advanced Ceramic Arts (4 per semester/maximum of 12)** Individual exploration of ceramic materials and construction leading to graduate study or career development as a professional potter.

### **Advanced Ceramic Arts (4 per semester/maximum of 12)**

General Education: None

Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 481 Ceramic Materials and Glaze Calculation (3)** The study of raw materials and their use in formulating clays and glazes.

**ART 481 Ceramic Materials and Glaze Calculation (3)**

The purpose of this course is the study of raw materials and their use in formulating clays and glazes. Emphasis will be placed upon proper, safe handling of materials, accurate and effective combinations, and the correlation between chemical interactions and their aesthetic and functional outcomes. All explorations will be integrated into completed ceramic works of art comprising a new portfolio of work. Readings, lectures, movies, and demonstrations will introduce students to the materials and techniques used in the various ceramic materials and glaze calculation processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 490 View Camera Photography (4)** Experience with diverse camera formats and applications; particular emphasis on view camera.

**ART 490 View Camera Photography (4)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ART 490 will provide students with experience in diverse camera formats and application with particular emphasis on view camera and its creative applications.

The course will give students background in the history of large format photography and understanding of its application in specialized fields such as architectural photography, portraiture, and landscape photography. Students will gain experience in view camera operation and the creation of large format photographs in a variety of different applications.

Grading will be based on a minimum of five projects that will account for 80% of the semester grade. The remaining 20% of the semester grade will be based on participation in class critiques. The final course grade will be dropped one full grade for each absence or late submission beginning with the second late submission or absence.

ART 490 will be offered in the fall semester each year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 494H Research Projects Courses (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Projects Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 496H** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497A** Compositing in 3D (4) This course covers intermediate to advanced 3D compositing techniques like color correction, render pass and post effects for 3D video.

#### **Compositing in 3D (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497A** Compositing in 3D (4) This course covers intermediate to advanced 3D compositing techniques like color correction, render pass and post effects for 3D video.

#### **Compositing in 3D (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497B** Ceramic Surface Decoration (4) The history of decoration and ornamentation will be learned and explored as

ceramic ornamentation using clay techniques.

**Ceramic Surface Decoration (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497B** Ceramic Surface Decoration (4) The history of decoration and ornamentation will be learned and explored as ceramic ornamentation using clay techniques.

**Ceramic Surface Decoration (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497C** (ART 397B) Digital Hand Advanced (3) Advanced approaches to digital fabrication techniques and an exploration of their impact on the technical and conceptual processes of sculpture.

**Digital Hand Advanced (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497C** (ART 397B) Digital Hand Advanced (3) Advanced approaches to digital fabrication techniques and an exploration of their impact on the technical and conceptual processes of sculpture.

**Digital Hand Advanced (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497D** 3D Digital Arts II (4) This studio course provides students who have advanced knowledge of 3D tools with an environment to create animated 3D works.

**3D Digital Arts II (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497D** 3D Digital Arts II (4) This studio course provides students II (4) who have advanced knowledge of 3D tools with an environment to create animated 3D works.

**3D Digital Arts II (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**ART 497E** Constructing the Graphic Novel: Theory and Practice (4) Exploring the graphic novel. The concept of story, sequential art, and the graphic image will culminate in authorship of a graphic novel.

**Constructing the Graphic Novel: Theory and Practice (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497E** Constructing the Graphic Novel: Theory and Practice (4) Exploring the graphic novel. The concept of story, sequential art, and the graphic image will culminate in authorship of a graphic novel.

**Constructing the Graphic Novel: Theory and Practice (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497F** Advanced Body Issue Objects (4) Advanced creating representations of the human body and related objects as a means of sculptural expression.

**Advanced Body Issue Objects (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497G** Art & Life: Where They Intersect (3) The connection between life & art will be explored from both a personal and cultural perspective. Taking risks is expected.

**Art & Life: Where They Intersect (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 497I** Multiples (4) The concept of Multiples is explored via the processes of model making, mold making, slip casting and press molding.

**Multiples (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 499** (IL) Foreign Studies--Art (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies--Art (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 501** Art Research (2-6) Original study and practice in art relating to material, concept, or technique.

**Art Research (2-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 505** Graduate Seminar (2 per semester, maximum of 8) Seminar covering special topics at the graduate level, emphasizing interdisciplinary discourse including criticism and review of graduate work.

**Graduate Seminar (2 per semester, maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 511** Issues in Contemporary Art (1-3 per semester, maximum of 6) A critical survey of issues in contemporary art.

**Issues in Contemporary Art (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 515** New Media Art I (1-7 per semester/maximum of 14) Individual problems in new media arts practice leading to development of a body of work representative of the artist.

**New Media Art I (1-7 per semester/maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 516** New Media Art II (1-7 per semester/maximum of 14) Individual problems in new media arts practice leading to development of a body of work representative of the artist.

**New Media Art II (1-7 per semester/maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 530** Sculpture I (1-7 per semester/maximum of 14) Individual problems in sculpture leading to the development of a collection or body of work representative of the artist.

**Sculpture I (1-7 per semester/maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 531** Sculpture II (1-7 per semester, maximum of 14) Individual problems in sculpture leading to the resolution of a collection or body of work representative of the artist.

**Sculpture II (1-7 per semester, maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 545** Printmaking I (1-7 per semester/maximum of 14) Individual problems in printmaking leading to the development of a collection or body of work representative of the artist.

**Printmaking I (1-7 per semester/maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 546** Printmaking II (1-7 per semester, maximum of 14) Individual problems in printmaking leading to the resolution of a collection or body of work representative of the artist.

**Printmaking II (1-7 per semester, maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 550** Painting I (1-7 per semester/maximum of 14) Individual problems in painting leading to the development of a collection or body of work representative of the artist.

**Painting I (1-7 per semester/maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 551** Painting II (1-7 per semester, maximum of 14) Individual problems in painting leading to the resolution of a collection or body of work representative of the artist.

**Painting II (1-7 per semester, maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 570** Graphic Design I (1-7 per semester/maximum of 14) Individual projects in design with special emphasis on specialized topics of graphic design.

**Graphic Design I (1-7 per semester/maximum of 14)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 571** Graphic Design II (1-7 per semester, maximum of 14) Individual problems in design, with special emphasis on professional practice in the area of graphic design.

**Graphic Design II (1-7 per semester, maximum of 14)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 580** Ceramics I (1-7 per semester/maximum of 14) Individual problems in ceramics leading to the development of a collection or body of work representative of the artist.

**Ceramics I (1-7 per semester/maximum of 14)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 581** Ceramics II (1-7 per semester, maximum of 14) Individual problems in ceramics leading to the resolution of a collection or body of work representative of the artist.

**Ceramics II (1-7 per semester, maximum of 14)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 592** Photography I (1-7 per semester/maximum of 14) Individual problems in photography leading to the development of a body of specialized work representative of the artist.

**Photography I (1-7 per semester/maximum of 14)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2000

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 593** Photography II (1-7 per semester, maximum of 14) Individual problems in photography leading to the resolution of a collection or body of work representative of the artist.

**Photography II (1-7 per semester, maximum of 14)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 602** Supervised Experience and College Teaching (1-3 per semester/maximum of 6) Supervised and graded teaching experience.

### **Supervised Experience and College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Art Education (A ED)**

**A ED 401** Curricula, Pedagogy, and Assessment in Art Education (3) Preparation of curricula, pedagogical, and assessment strategies for elementary/secondary school and museum art education programs.

### **Curricula, Pedagogy, and Assessment in Art Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 440** Cultural Institutions (3) Role of the educator and educational programming in museums and other cultural

institutions.

### **A ED 440 Cultural Institutions (3)**

A ED 440 is the final course before an extended internship in the Museums and Cultural Institutions option of the BS in Art Education. It provides students with the opportunity to study the roles of educators and educational programming in various types of cultural institutions and agencies, from art museums and historic houses to community arts centers and arts councils. It enables students to learn about professional and vocational opportunities and to prepare for a career in the arts and cultural education.

Through reading, discussion, and field trips, the course explores the implications of past coursework for educational programming in cultural institutions. By preparing and presenting a case study, students understand and assess the effectiveness of educational programming in one institution. By preparing their own educational materials, program, or installation, they learn how to apply what they have learned to a specific setting.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 488 Cultural Institutions Practicum (1-3)** Supervised field experience in a museum or other cultural institution, including planning, implementation, and evaluation of an educational project.

### **A ED 488 Cultural Institutions Practicum (1-3)**

This course provides 1 to 3 credit hours of field experience for students enrolled in the Museums and Cultural Institutions Option of the BS major in Art Education. The course will provide students with a structured and supervised experience working with an educator in one of a variety of possible educational settings in museums and other cultural institutions in the local community and nearby region, including the Palmer Museum of Art. The field experience will allow students to apply what they have learned in coursework in a practical setting, plan and implement an educational project or program, and prepare for their extended 15-credit internship in A ED 495.

The nature of the field experience will vary depending upon the institutional setting, upon whether the student is working alone or as part of a team, upon the needs of the institution and the nature of the educational project, and upon the number of credit hours earned. In some cases, the course may be extended over two semesters. The course may be taken as an independent study, or structured around a group of students engaged in a joint project. Each student will be supervised by an educator in the setting in which the field experience takes place, as well as by an instructor from the Art Education program at the University.

Each student will become familiar with the role of education in the particular institutional setting and participate in providing educational experiences for the people served by the institution. As his or her primary assignment, each student will carry out an educational project in the setting, either individually or as part of a team. These projects may include, but not be limited to, an educational program, a set of educational materials, a marketing campaign, or educational installation. Each project will include preparing a written plan, conducting formative evaluation to field test the plan, implementing the project, evaluating its effectiveness, and preparing and presenting a final written report.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:  
Concurrent: A ED 490

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 489 Advanced Practicum (3)** Supervised observation, unit planning, and teaching in Saturday Morning Arts School: analysis of creative expressions and art programs for learners.

### **Advanced Practicum (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:  
Concurrent: A ED 490

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 490 Capstone Course in Art Education (3)** Synthesis of preservice art education coursework; introduction to professional practices and standards; completion of teaching and learning portfolio.

**A ED 490 Capstone Course in Art Education (2)**

The capstone course has four major objectives for student learning:

- Each student will synthesize the experiences and understandings developed through prior courses in the undergraduate art education program.
- Students will become aware of emerging trends in art education and reflect on implications of those trends for their future teaching and learning.
- Each student will complete, and publicly present, a teaching and learning portfolio that includes evidence of professional preparation, biographical information, samples of artwork and writings on art/visual culture, and reflective statements explaining the selection and significance of specific items.
- Students will gain understanding of the importance of professional standards and practices in art education.

Student learning will be evaluated through assessment of the preprofessional teaching portfolio, and through a combination of written assignments, individual and small group oral presentations, and active participation in class discussions. Students will collaborate on a final installation, performance or exhibition demonstrating their readiness for the final internship. Since this is the final course in the major prior to student teaching or the internship, attendance is very important and will count toward part of the final grade. Students need access to a computer lab.

The capstone course in the art education major should be taken in the final semester before student teaching or a final internship. Since one goal of the course is helping students synthesize what they have learned in their prior courses, successful completion of all of the required courses in the major is prerequisite to enrollment in the capstone course. Students will have been introduced to the teaching and learning portfolio in their introductory art education course and should have developed pieces for their pre-professional teaching portfolios in most of their earlier art education courses. Much of the work of the capstone course will, therefore, focus on reflection, refinement, and synthesis.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

Concurrent: A ED 489 majors in the Schools option

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 494 Schools and Museums (3)** Museum education: issues, theories of aesthetic education and practices in schools, museums, and community art centers.

**Schools and Museums (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 494H Schools and Museums (3)** Museum education: issues, theories of aesthetic education and practices in schools, museums, and community art centers.

**Schools and Museums (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 495 Internship in Art Experiences (15)** Comprehensive instruction in craft, health, cultural, museum, studio, gallery or social agency. Students supervised by University personnel and arts personnel.

**Internship in Art Experiences (15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1989

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 495A Art Education Student Teaching Practicum (7)** The elementary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

**A ED 495A Art Education Student Teaching Practicum (7)**

The Pittsburgh-based elementary or middle-level field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School District University Collaborative in Pittsburgh Public Schools. An on-site Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparing for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work completed in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

Concurrent: A ED 495B

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 495B Art Education Student Teaching Practicum (8)** The secondary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

**A ED 495B Art Education Student Teaching Practicum (8)**

The Pittsburgh-based middle-level or secondary field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School District University Collaborative in Pittsburgh Public Schools. An on-site Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparation for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work complete in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

Concurrent: A ED 495A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 495C Art Education Student Teaching Practicum (7)** The elementary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

**A ED 495C Art Education Student Teaching Practicum (7)**

The Centre Region-based elementary or middle-level field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School of Visual Arts at Penn State in cooperation with public schools in the Centre Region. An Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparing for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work completed in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce

multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:  
 Concurrent: A ED 495D

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 495D Art Education Student Teaching Practicum (8)** The secondary student teaching practicum fulfills requirements for Pennsylvania certification to teach Art in both elementary and secondary schools.

#### **A ED 495D Art Education Student Teaching Practicum (8)**

The Centre Region-based middle-level or secondary field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School of Visual Arts at Penn State in cooperation with public schools in the Centre Region. An on-site Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparing for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work complete in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:  
 Concurrent: A ED 495A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 495E Internship in Museums and Cultural Institutions (15)** Twelve week, full time supervised internship in education in museums or other cultural institutions.

#### **A ED 495E Internship in Museums and Cultural Institutions (15)**

The internship at a museum or other cultural institution completes the requirements for the Museums and Cultural Institutions option for the BS in Art Education. It is generally scheduled full-time for a period of 12 consecutive weeks during a double summer session, although it may also be taken during the fall or spring semester. The internship enables interns to meet their own educational objectives through participation in a supervised experience that moves them out of the classroom into the workplace. Prospective interns are encouraged to select internship sites that offer educational experiences relevant to their professional goals and desired careers.

The internship incorporates guidelines consistent with the *Standards and Guidelines for Museum Internships* prepared by the New England Museum Association and published by the American Association of Museums (1993, 2000). A formal written internship agreement signed by the intern supervisor at the sponsoring museum or cultural institution, and by the prospective intern and university supervisor outlines the objectives of the internship, the intern's duties and responsibilities, the responsibilities of the museum and university supervisors, and the means by which the intern's work will be evaluated. Interns are integrated into the ongoing work and education programs of the museum and treated as staff members. They assume professional responsibilities and are expected to complete a project or some discrete portion of a major project that is being undertaken by the education department of the museum. Interns become acquainted with functions, programs and departments of the museum in addition to those to which they have been assigned in order to understand the relationship of their educational work to that of the museum, to the community, and to the museum field in general. Interns may participate in any workshops, lectures, professional courses, and staff training seminars that may occur at the museum during period of internship. They are also encouraged to seek professional employment after completion of the internship, and reasonable accommodation is made to allow them time to look for positions, prepare application materials, and attend interviews.

Interns submit a weekly journal of activities and reflections to the university supervisor, as well as a summary report at the end. The museum supervisor submits an evaluation documenting the intern's actual working/learning experiences and critically assessing these experiences. The final evaluation is based on this assessment, on the intern's weekly journal and

final report, and on the university supervisors's onsite observations and interviews.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 502** Research in Art Education (3) Examination of past and present research in art education, an introduction to general methods of research, and critical evaluation of research in art education.

### **Research in Art Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 505** Foundations of Art Education (3) An examination of classic theories in art education and their relevance to current developments.

### **Foundations of Art Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 536** Curriculum Development in Art Education (3) Factors affecting art curriculum decisions, analysis, selection,

organization, preparation of curriculum. Evaluation and sources of art curriculum improvement and innovation.

### **Curriculum Development in Art Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 541 Theories of Child Art (3)** Study of current theories of child art; application of recent psychological and anthropological theories to understanding child art.

### **Theories of Child Art (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 570 Artistic Creation and Theories of Knowing (3)** A thematically organized course that makes connections between art-making and art as a way of knowing and inquiry.

### **Artistic Creation and Theories of Knowing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 588 History of Art Education (3)** Historical development of philosophies in art education in the United States and abroad.

### **History of Art Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 594 Research Topics (1-18)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**A ED 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 597A** Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research (3) The course includes a symposium with controversial artist, Judy Chicago, to coincide with campus exhibitions of Chicago's art and teaching.

**Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 597A** Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research (3) The course includes a symposium with controversial artist, Judy Chicago, to coincide with campus exhibitions of Chicago's art and teaching.

**Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 597A** Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research (3) The course includes a symposium with controversial artist, Judy Chicago, to coincide with campus exhibitions of Chicago's art and teaching.

**Judy Chicago @PSU: Art, Pedagogy, Exhibition & Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 597B** Participatory Inquiry in the Public Sphere (3) The course requires students to examine, theorize and engage in visual practices of participatory and public action.

**Participatory Inquiry in the Public Sphere (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of undergraduate art education classes under the supervision of two members of the graduate faculty.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 603** Foreign Academic Experience (1-12) Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 611 Ph.D. Dissertation Part-Time (0)** No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 811 New Media and Pedagogy (3)** Exploration of relationships between communication technologies and beliefs about the nature of knowledge and the nature of art.

**A ED 811 New Media and Pedagogy (3)**

Due, in part, to contemporary processes of globalization and the development of digital technologies and the Web—new issues, possibilities, and opportunities regarding media communities and art pedagogy emerge in the field of art education. This is the focus of this course. Course participants have the opportunity to explore the aesthetic communicative and pedagogical implications of intertextual Webs, hypertext and hypermedia, blogs, wikis, simulations, the body interfaced in virtual reality, threaded dialogue, WebQuests, online games, media communities, adaptive and assistive technologies, and media-rich essays.

Learning activities will be in the form of explorations and creation with the links and resources provided, and focused discussions about these explorations and how to teach this content at participants' teaching sites. Following 5 thematic explorations, course participants write a capstone essay to construct a speculative fiction of a teaching scenario based on the content of the course imagined in a future teaching site. The main priorities in Exploration 1 are to imagine possibilities of human-technology interfaces for creating and critiquing art. In Exploration 2, participants select a social networking tool from the course's resources to conduct a collaborative mini-project concerning self-representation online and power relational networks of social, physical, technological, and discursive inscriptions or conditions. Exploration 3, involves using the Internet as a primary medium for art creation and involves developing criteria to critique interactive Net art. The focus of Exploration 4 is free, downloadable authoring programs outside of a commercial economy, which enables the creation of interactive experiences without the need for specialized programming knowledge or database support. Exploration 5 involves participants creating a socially responsive visual culture WebQuest, which is an inquiry-oriented activity in which learners construct knowledge through interacting with, evaluating, and connecting diverse, and sometimes contradictory, resources on the Internet in order to form new insights that they share in a tangible form intended to make a difference in the world.

This is one of the required courses for the M.P.S. in Art Education. There is no prescribed sequence and no prerequisites for art education courses in the M.P.S. program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 812 Diversity, Visual Culture, and Pedagogy (3)** Diversity issues in museum and K-12 art education contexts.

**A ED 812 Diversity, Visual Culture, and Pedagogy (3)**

This course examines diversity, visual culture, and pedagogy in various settings: the artworld, popular media, and cultural settings such as schools and museums. Diversity pertains to gender, sexual identity, social class, ethnicity, ability, age, and other attributes that shape our identities. This course pays special attention to issues of power and privilege in relation to diversity and visual culture. It examines ways that various forms of visual culture, situated in various social contexts, teach us who we are, what is "normal" in our society, and how we might change oppressive social conditions that currently exist. As defined in the course, visual culture includes paintings, sculptures, prints, and other forms of fine art as well as advertisements, news images, scientific images, television programs, and films. It includes toys, comic books, children's art—and more. Visual culture includes all manifestations of cultural life that are significant for their visual features. Pedagogy refers not only to formal methods of instruction, such as teaching and learning in classrooms. It also includes informal instruction through the arts, the media, popular forms of entertainment, and other social practices. Pedagogy includes being positioned by, or addressed in certain ways by various forms of visual culture. It includes the ways we actively interpret, use, and recreate forms of visual culture in our lives.

Objectives of the course include understanding diversity as defined in relation to various forms of visual culture; understanding the complex interactions of ethnicity, class, gender, sexual identity, and other aspects of diversity in visual culture; understanding issues of power and privilege in relation to visual culture; and understanding pedagogical issues related to visual culture, including forms of address and interpretation, as well as pedagogical practices such as teaching

and learning in classrooms. By the end of the course, participants should be able to critically examine social constructions of race, class, gender, sexual identity, and other aspects of diversity in visual culture through both written and visual analyses. Participants should also be able to develop and implement units of instruction related to visual culture, and reflect on their own and others' teaching practices in schools and museums.

This is one of the required courses for the M.P.S. in Art Education. It is offered every other year with a maximum enrollment of 15 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 813 Public Pedagogy (3)** Inquiry into the public pedagogy of contemporary visual culture for relevancy to museum and K-12 art education contexts.

### **A ED 813 Public Pedagogy (3)**

This course prepares art teachers to become producers of a socially just world by becoming critical public art pedagogues who extend their teaching environment. As defined in the course, critical public pedagogy of art, as an educational and artistic practice, is a critical stance concerning socio-pervasive artifacts, processes, and interfaces that acculturate and assimilate values, beliefs, and sensitivities. Public pedagogy is the use of a public medium and/or space such as the Internet, films, television, magazines, shopping malls, and sports arenas to influence behaviors and beliefs. Public pedagogy enacts societal curricula that are easily consumed because of its ubiquitous nature. Awareness of consumption of public pedagogy is important because of its global reach. Educators need to be versed in how to facilitate investigations of public pedagogy and how to guide students to develop critical public pedagogical practices. From spheres of influence radiating from art to a multidirectional layered matrix of sensibility, this course explores contemporary art that addresses and enacts public pedagogy through (inter)actions of cultural interfaces such as humans, technologies, localities, and politics. Such artworks are performed networks of relations. Contemporary artists' praxis involving intertextuality, palimpsest, remix, code-switching, double-coding, subversion, and hypersignification is explored through video, installation, performance, and other contemporary art forms.

Objectives of the course include understanding processes of consumption and production of public pedagogy, and understanding contemporary art practices. By the end of the course, participants should be able to develop and implement units of instruction related to contemporary art and public pedagogy, and reflect on their own and others' teaching practices in schools and museums.

This is one of the required courses for the M.P.S. in Art Education. It is offered every other fall semester with a maximum enrollment of 15 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 814 Informal Learning (3)** Pedagogy and contexts for learning in museums and other cultural institutions.

### **A ED 814 Informal Learning (3)**

The course introduces participants to theories and practices of informal learning, and to the possible contexts including museums, schools and other cultural institutions in which informal, free choice learning may occur. These provide a framework for participants to use in preparing, implementing, and evaluating a learning project or other intervention in their own institutions or communities. The course includes a strategic and policy analysis of the contexts in which free choice learning projects may occur, a review of the social and economic significance of informal, free choice learning in an information age and global economy, an introduction and critical discussion of constructivist theories of informal learning, a review of specific pedagogical practices that may be effective in implementing informal learning for school-age students, adults, and senior citizens, an introduction to tools for evaluating the effectiveness of these practices, and the development, implementation and assessment of an informal learning project or intervention by each participant using other participants as consultants in the process.

This is one of the required courses for the M.P.S. in Art Education. It is offered every other year with a maximum enrollment of 15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**A ED 815 Action Research in Art Education (3)** Develop a reflective process to improve strategies, practices, and knowledge of the environments within which art education is practiced.

### **A ED 815 Action Research in Art Education (3)**

This course prepares M.P.S. in Art Education candidates to conduct action research in their teaching context as part of a community of practice by recognizing and sharing existing tacit knowledge about teaching and learning conceptualized in specific social and physical environments. Action research is a reflective and iterative inquiry process with the aim of improving strategies, practices, and knowledge of the environments within which one teaches. Course participants will learn how to conduct research that develops, leads to, implements, and assesses a genuinely well-informed social action in the midst of an emerging teaching and learning landscape.

The course uses a blend of Web technology, print, and other media to maximize flexibility without sacrificing professor and student interaction. Communication tools, including bulletin boards and e-mail, are used to foster a collaborative environment, providing participants with the opportunity to learn from one another about the unique schools and cultural institutions each comes from and as well as their varied professional experiences.

A ED 815 will be offered via World Campus as an online course will be offered every spring semester. Enrollment will be limited to 15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Art History (ART H)**

**ART H 401 (IL)** Greek Art and Architecture (3-9) Developments in Greek art and architecture, tenth century B.C. to first century B.C.; emphasis on the importance of Greek sanctuaries.

### **Greek Art and Architecture (3-9)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 402 (IL)** The Illuminated Manuscript (3) Specific stylistic periods in manuscript painting from A.D. 500-1500 in Western Europe and Byzantium.

### **The Illuminated Manuscript (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 405 (US;IL)** Pioneers of Modern Architecture (3 per semester/maximum of 6) Selected period or theme in the development of modern architecture during the nineteenth and/or early twentieth centuries.

### **Pioneers of Modern Architecture (3 per semester/maximum of 6)**

General Education: None

Diversity: US;IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 409** (ART 409) Museum Studies (3) An introduction to the professional activities that occur in art museums.

### **ART H (ART) 409 Museum Studies (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course introduces students to the broad field of art museum work, specifically museum administration, education, curatorial work, registration, and exhibition design. Readings by authors in each field provide current theoretical and philosophical frameworks for all areas, which are then followed by discussions and practical experiences with professional museum practitioners, including the staff of a museum, for example, the Palmer Museum of Art, and invited guests. Museum Studies is open to students who have complete six credits in art, art education, or art history. This course is especially beneficial for majors in art, art education, and art history who are considering a career in an art museum or who want to become more aware about how an art museum functions. In addition to providing an in-depth introduction to art museum work, the course encourages students to build the critical thinking and response skills that are crucial to success in the real-world environment of a museum. The readings provide a solid foundation for later reference or further study in the student's chosen field.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 410** Taste and Criticism in Art (3) History and literature of art criticism demonstrating the varied philosophic, cultural, iconographic, technical, and visual approaches.

### **Taste and Criticism in Art (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 411** (IL) Roman Art (3-9) Roman sculpture and painting from Augustus to Constantine.

### **Roman Art (3-9)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 412** (IL) The Gothic Cathedral (3) Specific aspects of Romanesque and Gothic church architecture of western Europe, especially France and England, between 1000-1500.

### **The Gothic Cathedral (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 413** Architecture of the Medieval Monastery (3) This course will examine design, construction, function and symbolism in the monastic architecture of Western Europe during the Middle Ages.

### **Architecture of the Medieval Monastery (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 414 (IL) Italian Baroque Painting (3)** Survey of Italian Baroque painting from sixteenth-century proto-Baroque masters to painters of the late Baroque and Rococo periods.

**Italian Baroque Painting (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 415 (US) The Skyscraper (3)** Origin and evolution of the skyscraper as seen against the background of cultural conditions and technological factors.

**The Skyscraper (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Arts  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 416 (US) Studies in American Art (3 per semester/maximum of 6)** Selected time periods and/or issues in the art of the United States.

**Studies in American Art (3 per semester/maximum of 6)**

General Education: None  
Diversity: US  
Bachelor of Arts: Arts  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 416 (US) Studies in American Art (3 per semester/maximum of 6)** Selected time periods and/or issues in the art of the United States.

**Studies in American Art (3 per semester/maximum of 6)**

General Education: None  
Diversity: US  
Bachelor of Arts: Arts  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 420 (IL) Russian Architecture (3)** Russian architecture from the first Orthodox churches of the late tenth century to the end of the Soviet Union.

**Russian Architecture (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 422 (IL) Studies in Medieval Sculpture (3-9)** Specific studies of western European sculpture, 300-1500, with attention to sources, styles, type, and iconography.

**Studies in Medieval Sculpture (3-9)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 423 (IL)** Studies in Italian Renaissance Art (3-9) Specific studies of Italian Renaissance art, including the work of artists such as Leonardo da Vinci, Michaelangelo, and Raphael.

**Studies in Italian Renaissance Art (3-9)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 424 (IL)** Masters of Northern Baroque Art (3) Seventeenth-century painters in Flanders and Holland, including the works of artists such as Rubens, Rembrandt, and Vermeer.

**Masters of Northern Baroque Art (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 426 (US;IL)** Iconoclasm: Powerful Images and their Destruction (3) Iconoclasm: exploring the political, religious, and social motivations behind the destruction of powerful imagery throughout history.

**ART H 426 Iconoclasm: Powerful Images and their Destruction (3) (US;IL)**

**(BA)** This course meets the Bachelor of Arts degree requirements.

Images have been granted extraordinary powers in many human societies, and their purposeful destruction has been a recurrent feature of political, religious and social strife around the world. This course explores how and why humans have granted such power to images, and the subsequent reactions that have resulted in periodic outbreaks of iconoclasm. Topics include the historical specificity of image destruction, the role of art and its detractors in precipitating the Protestant Reformation, and the manipulation of iconoclasm in modern mass media. Victimized images covered may include the bronze bust of Sargon (3rd millennium BCE) and early Renaissance altarpieces through the statues of Saddam Hussein and beyond. We will read primary and secondary materials ranging from Biblical texts to letters to the editor in the New York Times. Through careful consideration of iconoclasms' historical contexts, we will explore art's ability to function as a societal lightning rod. This course has two major objectives: to introduce students to a subject matter that holds great relevance for our time, and to train them in the methods and ethics of scholarly research.

This course fulfills elective and 400-level requirements in Art History and General Education (US and IL), but it is intended also to complement concentrations in History, Visual Studies, Religion, and Communications. It would be offered every two to three years. Evaluative criteria include analytical reading and discussion, written components such as critical essays and a research projects, and analysis of relevant current events and their media coverage. Requires a classroom with digital audio-visual capability. Course may include museum visits or field trips where appropriate.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Arts  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 429 (IL)** Studies in Baroque Art (3) Selected topics in the painting, sculpture, and architecture of seventeenth-century Italy, France, Flanders, Holland, and Spain.

**ART H 429 Studies in Baroque Art (3) (IL)**

This course addresses aspects of European art of the seventeenth century, a rich and complex period in which illusionism and powerful visual effects in the arts reached maturity. Baroque painters went beyond the realism of their Renaissance predecessors to explore both the sensuous aspects of the medium of oil painting and their own increasingly subjective vision. In all the visual arts Baroque masters explored space, mass, and form with a heretofore unheard of freedom and drama. Lectures and discussion in the course may focus on painting, sculpture and/or architecture, in Italy, Flanders, France, Holland, and/or Spain. The course may include selected artists such as Bernini, Borromini, Caravaggio, A. Gentileschi, Poussin, Rembrandt, Rubens, Velazquez, and/or Vermeer. The style and meaning of Baroque art may be studied within its political and cultural setting. For example, new approaches in the visual arts in Italy, and particularly in Rome, may be explored in relation to the rise of the counter reformation. The Spanish war in the Netherlands, and the Dutch struggle for freedom, may be connected with the art of Flanders and Holland. Attendant developments in other fields such as natural philosophy (science) and literature may be related to the visual arts. For example, the use of the camera obscura may be discussed with the art of Jan Vermeer and the poetry of Giambattista Marino may be related to the art of Nicolas Poussin. Aesthetic, critical, interpretive, and theoretical ideas of major artists and writers of the seventeenth century as well as of today's art and cultural historians may be considered. The emergence of new genres such as landscape and still-life may be examined, as well as the continuing themes of mythology, portraiture, and religion. Course objectives may include students' understanding of the national and regional development of styles and schools within seventeenth-century art, the particular approaches to style and meaning by major artists of the period, the analysis of symbolism and meaning within art works of the period; the interrelationship between the art of the period and other disciplines such as natural philosophy and literature, and particular ways in which seventeenth-century art relates to the politics of particular countries, regions, and patrons. This course may serve as an elective for undergraduate students interested in the visual arts and art history, and for graduate students seeking a deeper exposure to art history. Evaluation may be accomplished through a combination of exams, quizzes, term papers, special projects, and participation in class discussion. Special facilities include a darkened room with dimmable spot lighting, computer, computer projector, and a large projection screen.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 435 (IL) Studies in Modern Art (3-6)** Lectures focusing on a selected movement of nineteenth- or twentieth-century art.

#### **Studies in Modern Art (3-6)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 440 (IL) (ASIA 440) Monuments of Asia (3-9 per semester/maximum of 9)** An exploration of major Asian sites and monuments through a focus on their historical and cultural significance.

#### **ART H (ASIA) 440 Monuments of Asia (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In this course, major Asian monuments are introduced in their physical, historical and cultural contexts. Students are also exposed to various theoretical approaches through which these monuments will be studied. Some of the themes around which the course is structured include patronage, religious practice, cultural meaning, political relevance and the shifting meanings of monuments over time. Students will learn to understand and discuss ways of defining monuments, their formal character and lineage, historical and cultural contexts and their representation across space and time. Each semester monumental sites will be organized around a common theme such as, "Hindu and Buddhist Sites across Asia: Historical Significance and Contemporary Relevance," "Patronage and Religion," "Islam across Asia: Global Ideas and Local Contexts," "Political and Symbolic Centers in Asia: Between Early Modernity and the Nation State" or "Early Modern Asia: Empire and the Built Environment." Alternately, these topics will be incorporated within a multi-themed structure. The objective of the course is to expose students to the histories and cultures of Asia in a globalizing world. Another objective is to equip students with the methodological tools of art history as a discipline, even as they learn about specific monuments. The course will build on the foundation laid by survey courses in Art History, Architectural History and Asian Studies. Weekly readings will be assigned and discussed in class. The development of analytical and writing skills will be stressed, and grades will be based partly on essay exams and short response papers. In addition, students will write a research paper, to be completed by the end of semester.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Arts  
 Effective: Summer 2012



Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 442 (IL)** Late Antique and Early Christian Art (3) Survey of the architecture, painting, and minor arts of Christian society from the beginning to the mid-sixth century.

**Late Antique and Early Christian Art (3)**

General Education: None

Diversity: IL

Bachelor of Arts: Arts

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 445 (IL)** Oceanic Art (3) Survey of the arts of Oceania (Polynesia, Micronesia, Melanesia), including masks, sculpture, textiles, architecture and other art forms.

**ART H 445 Oceanic Art (3)  
(IL)**

**(BA)** This course meets the Bachelor of Arts degree requirements.

This course is a one-semester survey of the sculpture, masks, textiles, architecture and other traditional art forms of the Pacific Ocean area known as Oceania, which is usually divided into the sub-areas of Polynesia, Micronesia and Melanesia. The material examined during the semester is organized according to ethnic groups and culture areas. Objects are discussed on the basis of style, style relationships, iconography and the uses to which they were put in their traditional religious, political or social contexts. The time period covered is primarily from the period of European contact up to the present, with occasional references to archaeological findings such as the Lapita culture's (3,000 – 4,000 years ago) tracing of the movement of peoples into Polynesia. Lectures, films, reading assignments, quizzes, writing requirements (term paper) and exams will aid in providing students with an extensive introduction to the region's cultural and artistic diversity.

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Arts

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 446 (IL)** (AFR 446) Topics in African Art (3 per semester/maximum of 9) Topics vary from "Arts of Eastern and Southern Africa" to "Arts of West Africa."

**ART H (AFR) 446 Topics in African Art (3 per semester/maximum of 9)  
(IL)**

**(BA)** This course meets the Bachelor of Arts degree requirements.

Each time this course is taught, it will focus upon a specialized topic in African Art. Using "Art and Archaeology of Ancient Africa" as an example of one semester's topic. This course is a one semester survey of some of the most important historical art traditions of sub-Saharan Africa. Topics to be covered will include prehistoric rock paintings; art from archaeological sites such as Djenné, Nok, Igbo Ukwu and Sanga; and ancient kingdoms such as Ife, Benin and Great Zimbabwe. The time period covered ranges from the first and second millennia BCE. for some of the early terracotta sculpture and rock paintings, to the 11th through 19th centuries CE. for the later ancient kingdoms. Students will learn how both artistic and archaeological evidence combine to help us reconstruct the religious, political and social contexts in which these early African art forms were used. Other possible topics for this course are "Arts of Eastern and Southern Africa," "Arts of Central Africa," and "Arts of West Africa."

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Arts

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 446 (IL)** (AFR 446) Topics in African Art (3 per semester/maximum of 9) Topics vary from "Arts of Eastern and Southern Africa" to "Arts of West Africa."

**ART H (AFR) 446 Topics in African Art (3 per semester/maximum of 9)**

(IL)

**(BA) This course meets the Bachelor of Arts degree requirements.**

Each time this course is taught, it will focus upon a specialized topic in African Art. Using "Art and Archaeology of Ancient Africa" as an example of one semester's topic. This course is a one semester survey of some of the most important historical art traditions of sub-Saharan Africa. Topics to be covered will include prehistoric rock paintings; art from archaeological sites such as Djenné, Nok, Igbo Ukwu and Sanga; and ancient kingdoms such as Ife, Benin and Great Zimbabwe. The time period covered ranges from the first and second millennia BCE. for some of the early terracotta sculpture and rock paintings, to the 11th through 19th centuries CE. for the later ancient kingdoms. Students will learn how both artistic and archaeological evidence combine to help us reconstruct the religious, political and social contexts in which these early African art forms were used. Other possible topics for this course are "Arts of Eastern and Southern Africa," "Arts of Central Africa," and "Arts of West Africa."

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Arts

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 447 (IL) (AFR 447) Topics in the Art of the African Diaspora (3 per semester/maximum of 6)** Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

**ART H (AFR) 447 Topics in the Art of the African Diaspora (3 per semester/maximum of 6) (IL)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores selected topics of the arts of the African Diaspora by examining the aesthetic, philosophical and religious patterns of the African descendants in South American countries such as Brazil, Surinam and Ecuador; the Caribbean and the United States. Some African cultural practices and art forms will be examined for background information and to establish a comparative basis. The major emphasis will be on such topics as examining the modes of transmission of African artistry to the Americas and exploring the significance of the preservation and trans-formation of artistic forms from the period of slavery to the present. Emphasis will be placed on the full range of art forms, including the sculptural and performance traditions as well as architecture, textile, basketry and pottery art forms. Two possible topics are "African Diaspora in the Americas" and "Brazil, Carnival, Samba and Candomblé."

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Arts

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 447 (IL) (AFR 447) Topics in the Art of the African Diaspora (3 per semester/maximum of 6)** Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

**ART H (AFR) 447 Topics in the Art of the African Diaspora (3 per semester/maximum of 6) (IL)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores selected topics of the arts of the African Diaspora by examining the aesthetic, philosophical and religious patterns of the African descendants in South American countries such as Brazil, Surinam and Ecuador; the Caribbean and the United States. Some African cultural practices and art forms will be examined for background information and to establish a comparative basis. The major emphasis will be on such topics as examining the modes of transmission of African artistry to the Americas and exploring the significance of the preservation and trans-formation of artistic forms from the period of slavery to the present. Emphasis will be placed on the full range of art forms, including the sculptural and performance traditions as well as architecture, textile, basketry and pottery art forms. Two possible topics are "African Diaspora in the Americas" and "Brazil, Carnival, Samba and Candomblé."

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Arts

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 450 (US;IL) The History of Photography (3)** The history of photography from 1839, with particular emphasis on the relationship with the plastic arts.

**The History of Photography (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Arts  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 452 (IL) Byzantine Art (3)** Monumental and minor arts of Byzantium and related areas from the reign of Justinian to the Turkish conquest of Constantinople.

**Byzantine Art (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 456 (IL) Renaissance and Baroque Palaces (3)** This course examines palace architecture and decoration in Italy, France, England, and Germany from 1450-1700.

**Renaissance and Baroque Palaces (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 458 (IL) Baroque Capitals of Europe (3)** This course examines the architecture and urbanism of European capital cities from 1600-1800.

**ART H 458 Roman Rococo Architecture and the Dawn of Neoclassicism (3)**

Most scholars agree that the modern European capital was created in the seventeenth and eighteenth centuries. This course will examine what transformed the cities into centers of power, culture, and learning. We will look at new building types, the creation of civic institutions, and changes in the urban plan. The course will therefore provide an overview of the architecture and urbanism of the period and also explore the political and social contexts that made them possible. Topics include capitals of great political importance such as Paris and London as well as smaller centers like Turin and Nancy that underwent major urban and architectural transformations. The social function of buildings that mark these capitals, from poor houses to opera houses, will also be explored. Units covered may include Rome of Alexander VII, London Before and After the Great Fire, Convents and Capitals, and the City Destroyed and Rebuilt. Primary and secondary reading, ranging from Pepy's Diary to Habermas' examination of the public sphere will offer period accounts as well as conceptual frameworks for understanding the capital. The objective is to challenge students to think deeply about our urban environment and its debts to this earlier era. This course fulfills elective and 400-level requirements in Art History and General Education (IL), but it is also designed to complement concentrations in History, Music, and Architecture. It would be offered every two to three years. Students will be evaluated based on class participation, four exams, group presentations, and critical essays.

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 460 (IL) Art and Empire: Aztec, Inca and Spanish (3)** This course is a comparative study of the artistic production used in Aztec, Inca and Spanish empires.

**ART H 460 Art and Empire: Aztec, Inca and Spanish (3)  
(IL)**

**(BA)** This course meets the Bachelor of Arts degree requirements.

This course compares the diverse visual culture of the pre-Columbian world's two most powerful empires, the Aztec and Inca, to ascertain how art, architecture and public ritual functioned as tools of hegemony. In the aftermath of the Spanish physical and "spiritual" conquests of the sixteenth century, colonists continued to exploit the central role played by Aztec and Inca imagery as a means to assert and maintain colonial control, co-opting preexisting channels of training and also imposing foreign sign systems. This course queries, how did the visual arts effectively communicate competing imperial ideologies, how was art production appropriated as a site of indigenous resistance, and how do these artifacts continue to construct communal identities, both past and present?

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Arts  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 462 (IL) Studies in Latin American Art (3 per semester/maximum of 6)** Specific studies of the visual and material culture created in Latin America from the colonial through the modern era.

**ART H 462 Studies in Latin American Art (3 per semester/maximum of 6) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course analyzes the art and architecture created in Latin America from the first moments of European contact (1492) until the modern era. Each time it is taught, the class will refine its focus to study the artistic production of a specific time period (such as the early colonial period, the nineteenth century, or the modern period), a specific geographic expanse (such as the modern nation state of Mexico), or perhaps a distinct cultural group (indigenous artists). Core to this course is the study of the interaction of seemingly divergent social groups and the ways in which artistic production both reflects and reinforces the resulting cultural systems.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Arts  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 464 (IL) French Baroque Painting (3)** Examination of seventeenth-century French painting, including Italian influences; the provincial, Classical, and official styles in France.

**French Baroque Painting (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 470 Contemporary Art (3 per semester/maximum of 9)** A focused investigation of a special topic relating to art made after 1940.

**Contemporary Art (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 470 Contemporary Art (3 per semester/maximum of 9)** A focused investigation of a special topic relating to art made after 1940.

**Contemporary Art (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 475 (US) (ART 475) Contemporary Women Artists (3)** An interdisciplinary course that investigates women artists who are integral to the production of contemporary art primarily in the Americas, Europe, and Asia.

### **Contemporary Women Artists (3)**

General Education: None

Diversity: US

Bachelor of Arts: Arts

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 476 (ART 476) History and Theory of Digital Art (3)** History and theories of contemporary digital art emphasizing humanistic approaches to technology.

### **ART H (ART) 476 History and Theory of Digital Art (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Approaches to Digital Art is a survey class that will offer the web designer, cyberspace architect, MUD traffic controller or enthusiastic surfer an opportunity to examine the humanistic aspects of contemporary digital art. Through readings and direct interaction with digital media and digital artists, the class will develop an appreciation of the ways in which the interface between human beings and technology has been historically constructed and is subject to critical investigation. The goal of the class is to prepare each student so that she or he may engage with digital media in a way that is every more historically and socially self aware.

Students will address the ways in which digital technologies transform artistic practices such as museum display, the writing of art criticism, the definition of works of art, changing role of the artist and the changing space of the art studio. More important, however, by engaging with digital works of art students will learn to think critically about technology and its engagement with culture at large. They will be encouraged to think about the political, economic and social impact of digital technologies. This humanistic approach to technology would make this course particularly useful to students of art history, philosophy, comparative literature, art education, and the visual/plastic arts. A significant portion of the course will be devoted to the ways in which art on the internet and digital art in general challenge the integrity of categories such as race and national identity. For example, students will have an opportunity to engage with African American artists such as Keith Obadike, whose on-line performances include an attempt to put his "blackness" up for sale on ebay.com in August of 2001. Students may also look at the ways in which net.art (Art made to be viewed on the internet) can critique commercial cooptation of global culture: etoy.com, for example, is an international and collaborative artist's group that satirizes global capital by camouflaging itself as a multinational corporation.

This class will depend largely upon written responses and class discussion, rather than upon tests. Thus, students will learn how to approach difficult theoretical sources that have been assigned to them, and they will learn how to ask the kinds of questions that will help them understand such sources. This course will emphasize critical thinking rather than memorization, so students will develop analytical skills that will be useful in many other contexts. Because students will be given weekly writing assignments, they will be able to improve their skills in composition.

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 494H Research Projects - Honors (1-12 per semester/maximum of 12)** Supervised student activities on research projects identified on an individual or small group basis.

### **Research Projects - Honors (1-12 per semester/maximum of 12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written or oral critique of activity required.

### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 496H** Independent Studies - Honors (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies - Honors (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 497A** Rome: A City on Film. A Century of History, Fantasy, and Realism (3) Viewing and critical analysis of films from the silent era to the present; examines the representation of Rome.

**Rome: A City on Film. A Century of History, Fantasy, and Realism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 497A** Rome: A City on Film. A Century of History, Fantasy, and Realism (3) Viewing and critical analysis of films from the silent era to the present; examines the representation of Rome.

**Rome: A City on Film. A Century of History, Fantasy, and Realism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 497B** Forging Aliances: Post-War Japanese Art at Penn State (3) Culminating in an exhibition at the Palmer Art Museum, this course examines art as a catalyst in international relations.

**Forging Aliances: Post-War Japanese Art at Penn State (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 497I** Multiples (4) The concept of Multiples is explored via the processes of model making, mold making, slip casting and press molding.

**Multiples (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 499** (IL) Foreign Study--Art History (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Study--Art History (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Arts  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 511** Seminar in Ancient Art (3-12) Selected topics from the history of Greek and Roman art.

**Seminar in Ancient Art (3-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 512** Seminar in Medieval Art (3-12) Original research into problems dealing with the art of the Middle Ages.

**Seminar in Medieval Art (3-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 513** Seminar in Renaissance Art (3-12) Investigations in the area of Renaissance art, centering around major masters and monuments.

**Seminar in Renaissance Art (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 514 Seminar in Baroque Art (3-12)** Investigations in the area of baroque art, centering around major masters and monuments.

**Seminar in Baroque Art (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 515 Seminar in Modern Art (3-12)** Lectures, readings, reports, and discussions in the field of modern art.

**Seminar in Modern Art (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 522 Seminar in Byzantine Art (3-12)** Specific iconographical and stylistic problems in Byzantine art and its relation to classical antiquity, the medieval West, and Islam.

**Seminar in Byzantine Art (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 525 Seminar in Modern Architecture (3-12)** Investigation into the works and problems of modern architecture as they relate to the culture of our times.

**Seminar in Modern Architecture (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 551 Historiography of Art History (1-6)** The relationship between the definition of, and approach to, art-historical problems from Vasari to the present.

**Historiography of Art History (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 552 Problems in Connoisseurship (3)** A study of the problems of authenticating, attributing, and dating paintings and sculpture through internal evidence.



**Problems in Connoisseurship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 560** Methods of Research in Art History (3) Preparation of graduate students for professional careers in academia and museum work, involving creation of publishable articles and grant writing.

**ART H 560 Methods of Research in Art History (3)**

In the academic world, and particularly in the humanities, the publication of articles and books is understood to be a marker of success and, along with teaching skills, the basis on which appointments are made and tenure granted. Essential to this body of production is the execution and placement of one's research undertakings, skills that the "Methods Seminar" is designed to hone.

No less valued by those who make appointments and offer promotion are the grants and fellowships that a candidate has won. Indeed, since research in art history involves travel to and residence at museum, library and archive sites—whether these be in North America or abroad—financial support is a necessity for most aspiring professionals and is regarded as evidence of external validation of their investigations. Training in "grant writing" is also covered in the seminar.

Even before field work is undertaken, the investigator must be aware of the "state of research," work normally undertaken at one's own university library. In this domain there are better and worse ways of taking notes. The seminar discusses these methods and goes beyond them to consider the optimum means by which such records are organized and assembled prior to the delivery of papers and the production of articles. The nature of an oral presentation and a publishable paper are distinct activities and this difference needs to be learned. The more complex skills involved in the writing of articles, the securing of photographs and concomitant permissions, and the choice of the journal to which the "finished" piece should be submitted are dealt with at even greater length.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 597A** Graduate Seminar: Primitivism (3) The history and development of European and American twentieth-century art have been influenced in a number of ways by the "discovery" of "Primitive art" and the often associated, notions of "Primitivism." The terms "Primitivism" and "Primitive art" have now become problematic and are rarely used because of such issues as colonialism, racism, and the continued economic disparities between the so-called "Developed" and "Third" Worlds. The terminology, however, was frequently used throughout the twentieth century and so is retained for our purposes to trace the historic development and use of these terms, rather than implying that the art referred to was either

crude or unsophisticated. This seminar examines how fascinations with all things "Primitive" have shaped Western art, revealing more about the Western Imagination than the "Other".

**Graduate Seminar: Primitivism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 597A** Graduate Seminar: Primitivism (3) The history and development of European and American twentieth-century art have been influenced in a number of ways by the "discovery" of "Primitive art" and the often associated, notions of "Primitivism." The terms "Primitivism" and "Primitive art" have now become problematic and are rarely used because of such issues as colonialism, racism, and the continued economic disparities between the so-called "Developed" and "Third" Worlds. The terminology, however, was frequently used throughout the twentieth century and so is retained for our purposes to trace the historic development and use of these terms, rather than implying that the art referred to was either crude or unsophisticated. This seminar examines how fascinations with all things "Primitive" have shaped Western art, revealing more about the Western Imagination than the "Other".

**Graduate Seminar: Primitivism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience for teaching assistants in art history.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ART H 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Asian Studies (ASIA)**

**ASIA 401** East Asian Studies (3-6) An interdisciplinary, variable content, lecture-discussion course on the history, culture, politics, and international relations of China, Japan, and Korea.

### **East Asian Studies (3-6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 404 (IL) (CMLIT 404)** Topics in Asian Literature (3) Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan.

### **Topics in Asian Literature (3)**

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Humanities

Effective: Fall 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 404Y (IL)** Topics in Asian Literature (3) Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan, taught with focus on written analysis and interpretation.

### **ASIA (CMLIT) 404Y Topics in Studies of Asian Literatures (3)**

This course focuses on Asian literature in a comparative and international frame. Different iterations of this course will have different topics as well as different historical or geographic foci, but may include literatures from the countries of East Asia (China, Japan, Korea), Southeast Asia (Thailand, Vietnam, Laos, Indonesia, Cambodia), or South Asia (Bangladesh, India, Pakistan). The various course modules will incorporate writing to allow students to further explore their understanding of Asian literatures. Because the course is comparative, it will highlight relationships between and among literary traditions of Asia, or between Asia and the rest of the world, whether in the fields of poetry, drama, or fictional and non-fictional prose. The course will provide students with opportunities to develop writing skills necessary for academic scholarship in comparative literature and Asian Studies.

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Humanities

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 405** Seminar in Asian Studies (3-6 per semester/maximum of 6) Advanced seminar in Asian Studies

**ASIA 405 Seminar in Asian Studies (3-6 per semester/maximum of 6)****(BA) This course meets the Bachelor of Arts degree requirements.**

This seminar focuses on advanced topics in the field of Asian Studies and is intended to function as a senior capstone course for majors, as well as an upper-level, research-intensive course for any student seeking to gain in-depth knowledge of a specific issue relevant to Asian culture.

The course will have very different focuses in different semesters, depending on the research expertise of the instructing professor. (Potential topics might include, for instance, an examination of human rights policy in Asia, an exploration of maritime empires in the premodern period, an historical archeology of the Islamicization of western Asia, a literary investigation of vernacular literatures, or an art historical examination of urbanization and the built environment in major Asian cities.)

Regardless of focus, extensive topic-specific readings will be required, and the goal of the course will be to help students develop and polish advanced research skills in Asian Studies.

General Education: None

Diversity: None

Bachelor of Arts: Other Cultures and Humanities

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 405Y (IL) Seminar in Asian Studies (3-6 per semester/maximum of 6)** An advanced, writing-focused seminar in Asian Studies.

**Seminar in Asian Studies (3-6 per semester/maximum of 6)**

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Humanities

Effective: Fall 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 440 (IL) (ART H 440) Monuments of Asia (3-9 per semester/maximum of 9)** An exploration of major Asian sites and monuments through a focus on their historical and cultural significance.

**Monuments of Asia (3-9 per semester/maximum of 9)**

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Arts

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 489 (IL) (HIST 489, PL SC 486) International Culture in East Asia (3)** Study of the role of culture in East Asian regional and East-West international relations.

**ASIA 489 (PL SC 486/HIST 489) International Culture in East Asia (3) (IL)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course will examine the place of culture in international history through a comparative look at the role of cultural circulation and exchange in relations among China, Korea, and Japan (and between East Asia and the West) from the propagation of Buddhism in the first century A.D. to present-day circulation of popular music, movies, and comics. We will explore the international politics of culture and the politics of international culture, considering questions of what constitutes culture, whether it is ever entirely separate from politics, and how that separation has evolved over time. These larger themes of the course will be tackled by following the historical movement of concrete objects and people throughout the region. This is a course in international history; historical events, problems, and issues will be at the center of our weekly discussions. But it also seeks to explore aspects of international relations.

This course is intended to examine the role of cultural exchange in international relations. The goals of the class are not only to gain an understanding of the uses and impact of culture in international relations, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through readings, discussions, presentations, and the final project, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing.

Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen student's appreciation of the assigned readings, to help

them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytic and expressive abilities. Evaluation will emphasize student performance on a day-to-day basis and as expressed in a final research project. A possible break down would be as follows:

This course is designed to respond to strong student interest in East Asian international history. This course will complement and extend popular survey and upper-level courses such as HIST 172/174/175/480/481/483/484/485/486.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 501** Proseminar in Asian Studies I (1-3) A seminar for graduate students in the Asian Studies dual-degree PhD programs.

#### **Proseminar in Asian Studies I (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 502** Proseminar in Asian Studies II (1-3) Introduction to theories, methods, and disciplines of Asian Studies.

#### **Proseminar in Asian Studies II (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASIA 600** Thesis Research (1-15 per semester/maximum of 99) No description.

**Thesis Research (1-15 per semester/maximum of 99)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Astrobiology (ABIOL)

**ABIOL 570 Astrobiology Field Experience (2)** Geological field excursions to sites where the early evolution of life and the environment is revealed and to modern analogues.

### **ABIOL 570 Astrobiology Field Experience (2)**

Astrobiology is a new, multidisciplinary field of science encompassing astronomy, biology, biochemistry, genomics, chemistry, atmospheric chemistry, geochemistry, paleontology, geology, and many other fields of science and technology. Astrobiology includes the study of the origin of life, the connections between the evolution of life and of environments, the potential for life and life's actual distribution in our solar system and beyond, and future of life on Earth and in space. This course is intended to expose students to a variety of rock units (paleosols, sedimentary rocks, glacier deposits, ore deposits, and igneous rocks) formed under a variety of environments during the period between 3 billion years and 400 million years ago in order to give them some ideas about the environments of the early Earth. Students will also be exposed to a variety of geochemical, paleontological, and geological methods to investigate these ancient rocks in order to obtain information about the biological and chemical environments of the early Earth.

The field excursion will be held for about two weeks during the Summer semester. It will be preceded by a short series of seminar-style meetings late in Spring semester to discuss the objectives of the excursion and to outline the major features of the field sites to be examined. Possible sites for the excursion will be selected from the Precambrian rocks in Ontario - Quebec, Canada, Michigan, Minnesota, Wisconsin, New York, Virginia, West Virginia, and Maryland and modern microbial ecosystems in the Bahamas and Green Lake (NY). One to three days will be spent at each of the major sites.

This is a required course for all students in Dual Title Degree Program in Astrobiology, but is open to any graduate student. This will also be a suitable course for undergraduate students, seniors preferred, with the permission of the instructor. There is no prerequisite. Grading will be based on a term paper submitted within one month after the excursion. The term paper will be based on literature review and field observations on a topic selected by each student.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABIOL 574 Planetary Habitability (3)** Aspects of star and planet formation, habitable zones, biospheric evolution, life in extreme environments, planet and life detection.

### **ABIOL 574 Planetary Habitability (3)**

This course introduces graduate students to the foundations of the field of Astrobiology. Astrobiology is a new, multidisciplinary field of science encompassing astronomy, biology, microbiology, biochemistry, genomics, chemistry, atmospheric chemistry, geochemistry, paleontology, geology, and many other fields of science and technology. Astrobiology includes the study of the origin of habitable planets, origin of life, the connections between the evolution of life and of environments, the potential for life and life's actual distribution in our solar system and beyond, and future of life on Earth and in space.

Students will expand their knowledge base beyond their discipline while considering such issues as the origins of stars and planets, environmental conditions of the prebiotic Earth, the origin of life on Earth, the nature of the universal "tree of life", the establishment of evolutionary patterns and rates, the causes of global glaciations and their use as analogues for life on planets or moons such as Europa, how life survives in extreme environments on Earth, what determines planetary habitability, how planets in other solar systems are detected, and how we might detect life on other planets.

This is a required course for all students in Dual-Title Degree Program in Astrobiology, but is open to any qualified undergraduate or graduate student. There is no specific prerequisite. Grading will be based on participation and performance on a midterm and final examination, problem sets, and laboratory exercises.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABIOL 590 Astrobiology Seminar (2)** Student-led presentations and discussions of current and classic literatures relevant to the themes of Astrobiology.

### **ABIOL 590 Astrobiology Seminar (2)**

Astrobiology is a new, multidisciplinary field of science encompassing astronomy, biology, biochemistry, genomics, chemistry, atmospheric chemistry, geochemistry, paleontology, geology, and many other fields of science and technology. Astrobiology includes the study of the origin of life, the connections between the evolution of life and of environments, the potential for life and life's actual distribution in our solar system and beyond, and future of life on Earth and in space. This course is conducted as a seminar series led by the 16 principal investigators of the Penn State Astrobiology Research Center (PSARC) and their students. Classic literature relevant to the themes of Astrobiology will be introduced, but the main focus of discussions will be on new and important research developments made by the PSARC members and other astrobiologists.

The seminars will be given once a week, typically on Friday afternoons, during the Fall semester each year. At each seminar, a faculty member will present a ~ 30 minutes summary of important questions and current knowledge on the topic. This will be followed by summaries by two or three students on selected papers (~ 40 minutes) and by discussions involving all students and faculty (~ 50 minutes). This is a required course for all students in the Dual Title Degree program in Astrobiology, but is open to any undergraduate and graduate student. There is no prerequisite. Grading will be based on the degree of participation in discussions and on a short (10 page) term paper. The term paper may be based on the paper(s) discussed in the seminars or on students' own research projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ABIOL 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Astronomy and Astrophysics (ASTRO)**

**ASTRO 400H** Honors Seminar (1 per semester, maximum of 2) Presentations of various branches and modes of modern astrophysical research, based on lectures, visits to telescopes and facilities, and discussions.

#### **Honors Seminar (1 per semester, maximum of 2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 401** Fundamentals of Planetary Science and Astronomy (4) Overview of the techniques used and results from studies of the Solar System, stars, and galaxies.

#### **ASTRO 401 Fundamentals of Planetary Science and Astronomy (3)**

This course will focus in core content areas in planetary science and astronomy. Students will explore the fundamentals in robotic exploration of the Solar System, how astronomers map and navigate the night sky, our understanding of the nature and evolution of stars, and the nature and evolution of galaxies. Students will engage with real data from Solar System missions as well as ground-based and space-based telescopes. Through the use of many databases and data archives from missions and observatories, the students will become familiar with the census of astronomical objects in various categories.

A particular emphasis will be placed on examples of qualitative and quantitative problem solving in these content areas. In addition, students will explore how scientists communicate their results to the public, and they will get hands-on experience, such as planning and executing a planetarium show.

General Education: None  
Diversity: None



Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 402** Astronomical Telescopes, Techniques, and Data Analysis (3) Properties and use of optical telescopes, imaging and spectroscopy, multi-wavelength techniques, data analysis and statistics, practical research methods.

### **ASTRO 402 Astronomical Telescopes, Techniques, and Data Analysis (3)**

This course will provide practical experience and understanding of the telescopes and techniques by which astronomers obtain data and conduct research. The study of telescopes will include optical, infrared, radio, ultraviolet, X-ray, and gamma ray observations, and students will learn to set up and use optical telescopes. In-depth coverage of the instruments used for imaging and spectroscopic observations of a variety of astronomical objects will be provided. Applications will include topics in planets, stars, galaxies, and cosmology. Detailed examples of data analysis will be given, including the relevant statistical techniques. Finally, the process by which research in astronomy is conducted will be reviewed, from proposing observations, to obtaining them, to analyzing and interpreting them, to writing up the results.

This course is a requirement for students in the Planetary Science and Astronomy major and minor. It may be taken by any students with the needed pre-requisites, but cannot be counted towards the required 400 level courses for the Astronomy and Astrophysics major or minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 410** Computational Astrophysics (3) Applications of numerical methods and computer programming to astrophysics, including stellar physics and cosmology.

### **Computational Astrophysics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 414** Stellar Structure and Evolution (3) Theory of Stellar structure and evolution including energy generation and transport and an examination of stellar models.

### **ASTRO 414 Stellar Structure and Evolution (3)**

ASTRO 414 covers the theory of stellar structure and evolution at an introductory level. It includes the basic physical processes that influence the structure of a star, such as energy generation in stellar cores, the transport of energy to the surface via photon diffusion and convection, equilibrium conditions, etc. It examines realistic stellar models as they apply to stars of different masses, for example, polytropes and other approximations. The treatment of stellar evolution includes gravitational collapse, stable stellar configurations on the main sequence, and the fast-paced late stages of evolution, leading up to the formation of compact objects. Realistic stellar models will be employed to illustrate the structures of different types of stars and the influence of various physical processes on these models.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 420W** Planets and Planetary System Formation (3) Solar system properties, star formation, protoplanetary disks and planet formation, solar system model, extrasolar planets, and astrobiology.

### **ASTRO 420W Planets and Planetary System Formation (3)**

The course explores the wide variety of physical and chemical processes that govern the motions and properties of

planets. Observations of the planets, moons, asteroids, comets and planetary rings in our Solar System are described. The properties of extrasolar planets are also emphasized. The process of planetary formation is discussed in the context of the solar system and in the context of extrasolar planets. The prospects of life and the effect of life on such planets will also be discussed.

It will be taken by roughly half of the juniors and seniors majoring in Astronomy and Astrophysics (about 10 people). The course will include writing papers on current issues of debate in the areas of solar system and extrasolar planets and will satisfy the "Writing Across the Curriculum" requirement.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 440** Introduction to Astrophysics (3) Theoretical investigation of physical processes in astronomical objects and systems; modern physical interpretation of astronomical phenomena.

### **Introduction to Astrophysics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 451** Astronomical Techniques (3) Practical methods of modern observational astronomy, detectors, filters, instrumentation for both ground-based and space observations, and data analysis.

### **ASTRO 451 Astronomical Techniques (3)**

ASTRO 451 will introduce students to the techniques and technologies for modern observational astronomy, emphasizing the development of practical skills as well as understanding through computer-based investigations integrated with traditional lecture content. Beginning with a summary of probability theory, the students will be introduced to standard techniques of statistical analysis including hypothesis testing and the characterization of uncertainties. Subsequent lectures and computer exercises will discuss the physics and design of astronomical detectors, the principles of telescope and spectroscope design, and the data analysis methods used in processing astronomical datasets. Significant emphasis will be placed on estimation of signal-to-noise ratios for various observing scenarios. The effects of the Earth's atmosphere, interstellar matter, and the expanding Universe on the propagation of astronomical signals will also be discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 475W** Stars and Galaxies (3) Astronomical studies concerning the distribution and evolution of stars and gas in our and other galaxies.

### **Stars and Galaxies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 480** Nebulae, Galaxies, and Cosmology (3) Emission-line spectroscopy, structure and evolution of galaxies, physics of galactic nuclei and quasars, observational cosmology.

### **Nebulae, Galaxies, and Cosmology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 485** Introduction to High-Energy Astronomy (3) The study of black holes, neutron stars, white dwarfs, supernova remnants, and extragalactic objects through x-ray and gamma ray observations.

### **Introduction to High-Energy Astronomy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1994

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 497A** Fundamentals of Planetary Science and Astronomy (3) Overview of the techniques used and results from studies of the Solar System, stars, and galaxies.

### **Fundamentals of Planetary Science and Astronomy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 501** Fundamental Astronomy (3) Concepts, tools and techniques, and essential background in stellar, Galactic, extragalactic astronomy and cosmology.

### **Fundamental Astronomy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 502** Fundamental Astrophysics (3) Fundamental tools and results of modern astrophysical theory. Gravitation; gas dynamics; radiation processes; radiative transfer; atomic structure and transitions.

### **Fundamental Astrophysics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 504** Extragalactic Astronomy (3) Properties and evolution of galaxies including their stellar, interstellar, black hole and Dark Matter components.

### **Extragalactic Astronomy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 513** Observational Techniques in Astronomy (3) Theoretical and practical aspects of modern multiwavelength observational astrophysics including detector physics, imaging techniques, spectroscopic techniques, and data analysis principles.

### **Observational Techniques in Astronomy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 527 (PHYS 527)** Computational Physics and Astrophysics (3) Introduction to numerical methods for modeling physical phenomena in condensed matter, atomic and high energy physics, gravitation, cosmology and astrophysics.

### **ASTRO (PHYS) 527 Computational Physics and Astrophysics (3)**

This course provides an introduction to applications of numerical methods and computer programming to physics and astrophysics. Numerical calculations provide a powerful tool for understanding physical phenomena, complementing laboratory experiment and analytical mathematics. The main objectives of the course are: to survey of the computational methods used for modeling concrete physical and astrophysical systems; to assess the reliability of numerical results using convergence tests and error estimates; and to use scientific visualization as a tool for computer programming development and for physical understanding of numerical results.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 530** Stellar Atmospheres (3) The structure, physics and observational manifestations of atmospheres of stars.

### **Stellar Atmospheres (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 534 Stellar Structure and Evolution (3)** Physics of stellar interiors, stellar structure, and evolutionary changes of stars from pre-main sequence through final states.

### **Stellar Structure and Evolution (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 542 Interstellar Medium and Star Formation (3)** Theory and observation of the interstellar medium of our Galaxy and the process of star and planet formation.

### **Interstellar Medium and Star Formation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 545 (PHYS 545) Cosmology (3)** Modern cosmology of the early universe, including inflation, the cosmic microwave background, nucleosynthesis, dark matter and energy.

### **ASTRO (PHYS) 545 Cosmology (3)**

Cosmology is the scientific study of the universe as a whole: its physical contents, principal physical processes, and evolution through time. Modern cosmology, which began in the early 20th century, is undergoing a renaissance as a precision science as powerful ground- and space-based telescopes allow us to observe the formation of the first stars, galaxies and galaxy clusters; the echoes of the inflationary epoch as they are impressed upon the cosmic microwave background; and evidence for and clues to the nature of the mysterious dark energy, which is driving the accelerating expansion of the universe. This course will introduce students to the key observations and the theoretical framework through which we understand the physical cosmology of the early universe.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 550 High Energy Astrophysics (3)** Theory and observations of X-rays, gamma-rays and other high energy radiation from Galactic and extragalactic sources.

### **High Energy Astrophysics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 585 Topics in Astronomy and Astrophysics (3)** Advanced study of issues in planetary, stellar, galactic, extragalactic and theoretical astronomy and astrophysics.

### **ASTRO 585 Topics in Astronomy and Astrophysics (3)**

This 3-credit topics course will be offered as part of the regular sequence of graduate offerings, and can be used to fulfill the graduate degree course requirements on an equal basis with ASTRO 501-580 3 credit courses. The purpose here is to provide a flexible environment for full courses on subjects that are not covered in the courses with fixed curricular content and are important to Penn State faculty, research Centers, and students.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 589** Seminar in Current Astronomical Research (1) Contemporary issues in instrumental, observational and theoretical astronomy and astrophysics.

#### **ASTRO 589 Seminar in Current Astronomical Research (1)**

This seminar will be offered as part of the regular sequence of graduate offerings, and is also used to fulfill the graduate degree course requirements for 1-credit seminars. Their purpose is to treat focused issues of current research interest. Examples are: Physics of Gamma-ray Bursts, Design of Precision Spectrographs, Quasar Surveys, Protoplanetary Disks. This course is taught by Department faculty, researchers and visitors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**ASTRO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 801** Planets, Stars, Galaxies, and the Universe (3) Overview of the structure, formation, and evolution of planets, stars, galaxies, and the universe.

**ASTRO 801 Planets, Stars, Galaxies, and the Universe (3)**

Observations by modern ground-based and space-based observations have fueled significant changes in our understanding of the Universe. The Solar System contains only 8 planets but has many thousands of Kuiper Belt Objects, including Pluto. Large area sky surveys have taken inventory of the stars in the Milky Way Galaxy and galaxies in the Universe and determined that only 4% of the mass of the universe is found in luminous objects. Besides the mysterious "dark matter," we know that the energy budget of the universe is dominated by "dark energy," which is causing the expansion of the Universe to accelerate. This course will provide science educators with a strong foundation in astronomy, allowing them to critically evaluate the evidence for the most recent advances in our understanding of the Solar System, our Galaxy, and the Universe.

Astronomers use observations of the light from distant sources to discover the nature of these objects and their environment. ASTRO 801 will lead students to an understanding of light and the instruments for its detection. They will see how careful analysis of these observational data and theoretical models are used to solve the mysteries of the Universe.

ASTRO 801 will combine digital video, audio, simulation models, and the wealth of astronomical imagery from NASA's Hubble, Chandra, and Spitzer Great Observatories. Students will use highly detailed planetarium software and simulated observing experiences to directly explore the night sky to make the same observations that research astronomers perform in their work. ASTRO 801 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms.

The overarching goal of the course is to provide secondary science teachers with the necessary content background to convey the astronomy topics required by their mandated state standards. The ASTRO 801 students will be provided with

materials for presenting the course content in their classrooms and will be granted license to use the courseware developed for this course in their own secondary classrooms.

Students will be required to complete weekly assignments. There are 12 lessons in ASTRO 801, plus a course introduction and orientation. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles related to the objects in the Universe and their environments. Each lesson will conclude with an open book, on-line assessment, which will rely on a variety of types of exercises. These exercises will include brief math problems and short essay questions, some of which will require additional internet research to complete. Several simulated lab exercises will also be required, which will allow the students to enrich their understanding of the concepts through inquiry-based, active learning.

Students will also complete a capstone project, where they will use the content knowledge and skills to create material for their classroom. There will be several options for this project, but one example is that students will create a set of 3-5 laboratory exercises, including instructions, data sheets, and lists of materials that teach content from the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 897** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 897A** Black Holes for Educators (2) Workshop for educators grades 9-12 with a content area focus on the study of black holes.

### **Black Holes for Educators (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ASTRO 897B** Telescopes for Educators (2) Workshop for educators with a content area focus on telescopes.

### **Telescopes for Educators (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Bar Preparation (BPREP)**

**BPREP 900** Fundamental Skills for the Bar Examination (2) The course provides students with a substantive review of selected material routinely tested on the bar exam, primarily through problems and exercises in a bar exam format designed to familiarize students with the exam and techniques for answering multiple choice questions. Individualized feedback is provided every week to assist each student identify areas of strength and weakness. The goal is to enhance student ability to prepare for the bar exam and is intended to supplement, not replace, commercial bar preparation courses. This course is not focused on any particular state, so all students will benefit regardless of where they are sitting for the bar exam. Students enrolled in BPREP 900 are not permitted to use laptops, phones or other devices during class. This course is not recommended for students ranked in the top third of their class. BPREP 900 is graded on a pass/fail basis but is not subject in any other respect to the Pass/Fail Option.



**Fundamental Skills for the Bar Examination (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BPREP 997** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Behavior Infl Health (BIH)**

**BIH 722** Behavioral Influences on Health (3) Fundamental course addressing the physician's role in teaching the importance of individual choice and responsibility in maintaining health.

**Behavioral Influences on Health (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Behavioral Sci-Hy (BEHSC)**

**BEHSC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BEHSC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be OFFERED INFREQUENTLY.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Biobehavioral Health (BB H)**

**BB H 402** (IL) African Health & Development (3) Course will address African health and development strategies in the

context of health promotion programs.

**BB H 402 African Health & Development (3)  
(IL)**

This course is designed to address African health and development strategies in the context of health promotion programs. Students will analyze the cultural, educational, social, economic, political and environmental impact of health and development in Africa. Emphasis will be on development of health promotion strategies that locate program implementation and evaluation within their cultural contexts.

The objectives are to prepare students to:

1. discuss and debate the roles of culture, social contexts, gender, and political economic impact on health behaviors in Africa;
2. critique some of the theory and models used to inform public health programs in Africa;
3. examine the role of historical, spiritual, linguistic, and political impacts on health projects in different countries in Africa; and
4. analyze health priorities in Africa and their impacts on such global initiatives as the Millennium Development Goals;
5. discuss issues related to human rights, population identities in the world and examine their impact on health in Africa.

Attendance is required. Students will be expected to participate actively by critically reviewing assigned readings, engaging in class discussions, and preparing and delivering in-class presentations. Grading is based on attendance, participation, presentations, exams and a final research paper.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 407 (IL) Global Health Equity (3) Health, social disparities, and equity in the global environment.**

**BB H 407 Global Health Equity (3)  
(IL)**

This course focuses on issues related to health, social disparities, and equity in the global environment. It examines the theories of health disparities and equity from the vantage point of Western and non-Western countries. It explores epidemiologic data and the relationships between social structure, culture, demography, health promotion/disease prevention, and health policy of various countries and international health organizations.

The course objectives are to: 1. discuss and critique the history, conceptual frameworks, and policy implications of global health disparities and equity; 2. examine epidemiologic data and studies pertaining to major global health issues and cross-national and comparative research; 3. discuss the role of social structure, culture, gender roles, and government policies in preventive health behaviors and health promotion in the global context; 4. critique theories and models used to inform health and development programs in non-Western nations.

Evaluation of students will include class participation, group assignments and presentations, two class exams, and a term paper on a topic related to global health.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 410 Developmental and Health Genetics (3) Discussion of genetic influences on development and the interrelationships between genetics and health.**

**Developmental and Health Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 411W Research and Applications in Biobehavioral Health (3) Research methods, multi-level analyses, and applications in biobehavioral health.**

**BB H 411W Research and Applications in Biobehavioral Health (3)**

This is an upper-division course on research and applications in Biobehavioral Health and is the designated writing intensive (W) course for the major. The primary goals of this course are to provide the student the ability to effectively: 1) find, organize, integrate, and critique existing knowledge and research in biobehavioral health; 2) generate and analyze new data related to a specific domain through the conduct of original research; 3) interpret, evaluate, and communicate—to both scientific and lay audiences--the results of the original research; and 4) integrate these findings--with due concern for strengths and limitations of the research--back into the body of knowledge on the biobehavioral health topic.

In this course the instructor will first introduce the student into a body of knowledge related to a domain involving health and health-related behaviors. Example domains may include areas such as, stress and health, drug/alcohol addictions and health, hormonal impacts on health, smoking cessation programs, obesity and health, sexual behaviors and health, etc. Students will go through the steps involved in original research (e.g., Introduction, Methods and Procedures, Results, Discussion, Summary, Abstract, Bibliography) and written assignments will be involved for each step. Depending on the instructor, the original research may involve laboratory work, collection of survey data, analyses of publically available data, or existing data sets based on faculty's research program. Students will learn how to use available tools to descriptively summarize and analyze data using computer-assisted software.

This is a required course in the Biobehavioral Health major. The course is designed to give skills to acquire, integrate, and critique health-related information and to communicate to professional and non-professional audiences. The course is appropriate for students intending to obtain positions in health promotion and disease prevention and to students seeking to advance to post-baccalaureate graduate and professional programs in medicine, public health, health policy and planning, and other health-related careers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 416 Health Promotion II: Planning, Implementation, and Evaluation (3)** Planning, implementation, and evaluation of health promotion, prevention, and intervention programs; emphasizing evaluation.

**Health Promotion II: Planning, Implementation, and Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 417 Advanced Applications in Health Promotion (3)** Advanced learning experience in health promotion applications in which students will actively participate in planning, implementing, evaluating health programs.

**Advanced Applications in Health Promotion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 420 Developing Stress Management Programs (3)** Planning, developing, and implementing strategies for stress management programs for health education professionals in school, community, and corporate settings.

**Developing Stress Management Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 432 Biobehavioral Aspects of Stress (3)** Comprehensive discussion on the mechanisms of stress-induced diseases.

**Biobehavioral Aspects of Stress (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 440 (US;IL) (H P A 440) Principles of Epidemiology (3)** Theory of epidemiology and significant case studies; potential applications to health care.

**BB H (H P A) 440 Principles of Epidemiology (3)  
 (US;IL)**

This course is designed to provide students with a basic understanding of the principles of Epidemiology and to familiarize students with the methods and applications of epidemiology to understanding the bases for heterogeneity of disease and health among populations.

The goals of the course are: 1) recognize and use basic principles, concepts, terminology, and techniques in Epidemiology as applied to the study of infectious disease, chronic diseases, and other health-related problems; 2) examine and understand measures of risk and burden of illness on populations defined in terms of age, race, gender, class, time, and other relevant socio-cultural and demographic factors; 3) be able to interpret and critique epidemiological research reports on the identification of risk factors and casual factors for diseases in populations; 4) assess the health status and burden of diseases and health problems of populations at multiple levels of analysis for the purpose of planning health promotion activities and health care services; 5) have a basic understanding of the epidemiology tools for disease screening and other methods for primary and secondary prevention of disease and health problems; 6) examine the validity and applicability of various health interventions used to improve health status and the barriers for successful interventions; and 7) have a basic understanding of the epidemiology of the major causes of morbidity and mortality in the U.S. and for other selected regions and nations of the world.

This is a required course in the Biobehavioral Health major and an elective course in the Health Policy and Administration major. The course is also appropriate for students intending to advance to post-baccalaureate graduate and professional programs in medicine, public health, health policy and planning, and other health-related careers.

Students will be evaluated based on their performance on a combination of written assignments, a term paper or project, and exams.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 440U (US;IL) (H P A 440U) Principles of Epidemiology (3)** Theory of epidemiology and significant case studies; potential applications to health care.

**Principles of Epidemiology (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 446 Human Sexuality as a Health Concern (3)** Examination of human sexuality as a integral part of basic health education and health care for persons of all ages.

**Human Sexuality as a Health Concern (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 451 Pharmacological Influences on Health (3)** Biological and behavioral aspects of therapeutic and recreational drug use and misuse, and their relationships to health.

**Pharmacological Influences on Health (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 452 (US) (NURS 452, WMNST 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

### **Women's Health Issues (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 452 (US) (NURS 452, WMNST 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

### **Women's Health Issues (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 458 (GS) (WMNST 458) Critical Issues in Reproduction (3)** Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

### **Critical Issues in Reproduction (3)**

General Education: GS  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 458 (GS) (WMNST 458) Critical Issues in Reproduction (3)** Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

### **Critical Issues in Reproduction (3)**

General Education: GS  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 468 Neuroanatomical Bases for Disorders of Behavior and Health (3)** An examination of the anatomical/cellular/molecular bases for human central nervous system disorders and their impacts on victims/families/caregivers.

### **BB H 468 Neuroanatomical Bases for Disorders of Behavior and Health (3)**

This course will examine in detail and in depth the neuroanatomical and cellular/molecular/genetic bases for selected disorders of the human central nervous system (e.g. Parkinson's, Alzheimer's, stroke, etc.) and their impacts on the victim, his/her daily life and his/her family and care givers. Damage to, or malfunctions of, any part of the central nervous system causes specific and characteristic disruptions of normal processes, which manifest as abnormal and/or absent behaviors. Current research on the anatomical, cellular, molecular, and genetic bases for the disorders and the current/future trends in prevention/treatment of the disorders will be studied. Upon successful completion of the course, the student should be able to: a) describe the physical signs, symptoms, causes, effects on the patient and his/her family & care givers, prognoses, treatments, and support systems available to these patients, of the neurological disorders covered in this course; b) describe the neuroanatomical, cellular, and molecular bases for these conditions; c) describe the

current research on these disorders and the new prevention/treatment approaches being developed. The evaluation of students' performances in the course will be typically based on multiple choice examinations and a library research paper. This course will count toward fulfilling the BB H major requirement, "Take 15 credits in Biobehavioral Health."

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 469** (BIOL 469) Neurobiology (3) Comprehensive examination of neuroanatomy and physiology designed to integrate the principles of neurochemistry, neuroendocrinology and molecular biology.

### **Neurobiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 470** (BIOL 470) Functional and Integrative Neuroscience (3) Neurobiological function in motivated behaviors, motor and sensory function, learning and memory, development, sexual differentiation, and pathology.

### **Functional and Integrative Neuroscience (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 494H** Senior Honors Thesis (1-6) Independent study related to a student's interests directed by a faculty supervisor and culminating in the production of a thesis.

### **Senior Honors Thesis (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 496H** Independent Honors Study in BB H (1-3 per semester/maximum of 6) For non-thesis independent study/research by Schreyer Honors College scholars.

**Independent Honors Study in BB H (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 497A** Biobehavioral Issues in Immigrant Health (3) The demography of American communities is changing dramatically. Each year, immigrants from African, Asian, Eastern European and Latino backgrounds make the United States their new home. However, immigration from another country can have important effects on health - both positive and negative. In this course, we will review the demographic, cultural, economic, social, political, and ethical factors that impact the health of immigrants to the United States. This will be accomplished by providing an overview of current research issues and theories concerning the mental and physical health of immigrant populations in the United States. Topics to be addressed include: acculturation and identity theory, immigration, social support, and biopsychosocial patterns that shape health and illness.

**Biobehavioral Issues in Immigrant Health (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 497A** Biobehavioral Issues in Immigrant Health (3) The demography of American communities is changing dramatically. Each year, immigrants from African, Asian, Eastern European and Latino backgrounds make the United States their new home. However, immigration from another country can have important effects on health - both positive and negative. In this course, we will review the demographic, cultural, economic, social, political, and ethical factors that impact the health of immigrants to the United States. This will be accomplished by providing an overview of current research issues and theories concerning the mental and physical health of immigrant populations in the United States. Topics to be addressed include: acculturation and identity theory, immigration, social support, and biopsychosocial patterns that shape health and illness.

**Biobehavioral Issues in Immigrant Health (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 497B** Health Works (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Health Works (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 497C** Clinic Volunteer Training (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Clinic Volunteer Training (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 497D** Clinic Volunteers Training (2) Training for clinic volunteers.

#### **Clinic Volunteers Training (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 501** Biobehavioral Systems in Health and Development: Theory and Processes (3) Examination of theories and basic processes for understanding individuals as dynamic biobehavioral complex systems functioning through continual interactions.

#### **BB H 501 Biobehavioral Systems in Health and Development: Theory and Processes (3)**

Understanding the etiology of illness and the design of intervention strategies for promoting healthy development, preventing illness, and accomplishing remediation and rehabilitation require a multidisciplinary understanding of the theoretical basis of normal healthy human development and the complex biological processes that form the basis of health and development. This course (BB H 501) presents the theoretical framework of humans as complex dynamic systems, followed by modules on processes of cell biology and genetics as complex systems. The second course (BB H 503) continues with modules of the processes of neurobiology, endocrinology, immunology, and pharmacology followed by a section on integrative biology and health. The modules of biological processes are developed from the perspective of how the physiological aspects of the area of biology is relevant to behavioral development and on what aspect of this area of biology is linked to behavior. These processes are considered in the context of their role in the comprehensive theoretical models developed in the first section of the course. Similar integration with a primary emphasis on behavioral processes is offered in other courses that form the core graduate curriculum in Biobehavioral Health. Evaluation of the theories section will be by written exam, oral presentation, and seminar participation. Evaluation of the cell biology, genetics, and neurobiology components will be by written exam for each component. This initial required course in the biobehavioral health sequence is designed to provide a multidisciplinary framework of theory and knowledge of biobehavioral processes and their implications for health and illness on which other biobehavioral health courses can build. It is the first of a two-course sequence (BB H 501 and BB H 503). It will be required by all graduate majors in Biobehavioral Health. It will be available to students in other doctoral programs it could be a part of a Biobehavioral Health minor for other students. This course will be offered every fall semester beginning with the first fall semester after approval and will enroll a maximum of twenty students.

Faculty: George Vogler and Byron Jones

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**BB H 502 (PSY 502) Health: Biobehavioral Perspectives (3)** Introduction to the role of psychology in maintaining health and in treating nonpsychiatric disorders.

**Health: Biobehavioral Perspectives (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 503 Biobehavioral Systems in Health and Development: Processes and Integration (3)** Examination and integration of basic processes for understanding individuals as dynamic biobehavioral complex systems functioning through continual interactions.

**BB H 503 Biobehavioral Systems in Health and Development: Processes and Integration (3)**

Understanding the etiology of illness and the design of intervention strategies for promoting healthy development, preventing illness, and accomplishing remediation and rehabilitation require a multidisciplinary understanding of the theoretical basis of normal healthy human development and the complex biological processes that form the basis of health and development. This course is the second course in a two-course sequence (BB H 501 and BB H 503) that is designed to provide first-year graduate students with a multidisciplinary understanding of the biobehavioral health perspective. This views humans as complex dynamic systems of integrated component processes that interact with the environment to influence development and health. The first course (BB H 501) presents the theoretical framework of humans as complex dynamic systems, followed by modules on processes of cell biology and genetics as complex systems. This course (BB H 503) continues with modules of the processes of neurobiology, endocrinology, immunology, and pharmacology followed by a section on integrative biology and health. The modules of biological processes are developed from the perspective of how the physiological aspects of the area of biology are relevant to behavioral development and what aspect of this area of biology is linked to behavior. Similar integration with a primary emphasis on behavioral processes is offered in other courses that form the core graduate curriculum. These processes are considered in the context of their role in the comprehensive theoretical models developed in the first section of the two-course sequence. Evaluation of each of the five modules will be by written exam. This required course in the biobehavioral health sequence is designed to provide a multidisciplinary framework of theory and knowledge of biobehavioral processes and their implications for health and illness on which other biobehavioral health courses can build. It is the second of a two-course sequence (BB H 501 and BB H 503). This course will be required by all graduate majors in Biobehavioral Health. It will be available to students in other doctoral programs. It could be a part of a Biobehavioral Health minor for other students. This course will be offered every spring semester beginning with the first spring semester after approval and will enroll a maximum of twenty students.

Faculty: George Vogler and Byron Jones

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 504 Behavioral Health Intervention Strategies (3)** Evaluation of intervention strategies from a biobehavioral health context. Theories of change processes as they pertain to health are analyzed.

**Behavioral Health Intervention Strategies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 505 Behavioral Health Research Strategies (3)** Research strategies in behavioral health investigations are examined. Designs and data analytic models relevant to biobehavioral research are included.

**Behavioral Health Research Strategies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 521** Structural Equation Modeling (3) Structural Equation Modeling with LISREL and Amos. Confirmatory factor analysis; regression and path analysis with manifest/latent variables; special applications.

### **Structural Equation Modeling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 551** World Health Promotion (3) Analysis of the various health problems that affect humans throughout the world; emphasis will be placed on personal health issues.

### **World Health Promotion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 597A** Introduction to SAS (1) An introductory (5 week) course to accompany a basic statistics course.

**Introduction to SAS (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 597B** NRSA/NIH Grant Preparation (1) The focus of this course is to educate students to prepare a successful NIH F31 NRSA Grant application.

**NRSA/NIH Grant Preparation (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 597C** Ethnographic Methods and Study Design (1) The course is designed to teach students an array of approaches for collecting qualitative data.

**Ethnographic Methods and Study Design (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 600** THESIS RESEARCH (1-15) NO DESCRIPTION.

**THESIS RESEARCH (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 601** PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION FULL-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) NO DESCRIPTION.**

**SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 610 Thesis Research Off-Campus (1-15) No description.**

**Thesis Research Off-Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BB H 611 PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.**

**PH.D. DISSERTATION PART-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Biochm Micrb & Molbi (BMMB)**

**BMMB 501 Core Concepts in Biomolecular Science (5)** Introduction to broaden one's understanding of biochemical and biophysical principles and the basic aspects of eukaryotic and prokaryotic cell biology.

**BMMB 501 Core Concepts in Biomolecular Science (5)**

This is a required course to be taken by all BMMB graduate students during their first fall semester. It will be team taught with a mixed textbook/literature approach. Material will be presented primarily in the form of lectures. The objective is to provide training in core concepts that will be essential for the students to pursue more specialized areas of study in Biomolecular Science. The course will prepare students for taking graduate electives in more specialized areas, it is not intended to be a comprehensive survey of all of the topics relevant to all of the program options in BMMB. Topics will include: acid/base theory, thermodynamics, chemical equilibrium, electron transfer, electrochemistry, and sizes and shapes of molecules, protein and nucleic acid structure, enzyme kinetics and catalysis, chromosome structure, DNA replication, cell cycle, recombination, transcription, RNA processing, and translation, intracellular compartmentalization and trafficking and cell signaling. Each student's mastery of the material will be evaluated by written examinations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 507 Seminar in Biochemistry, Microbiology, and Molecular Biology (2 per semester/maximum of 4) No description.**

**Seminar in Biochemistry, Microbiology, and Molecular Biology (2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 507 Seminar in Biochemistry, Microbiology, and Molecular Biology (2 per semester/maximum of 4) No description.**  
**Seminar in Biochemistry, Microbiology, and Molecular Biology (2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 509 Ethics in Biomedical Science (1) Discussion of ethical issues relevant to scientific research in the biomedical sciences.**

**Ethics in Biomedical Science (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 510 Current Literature in Molecular Biology (1) Discussion and analysis of recent scientific papers that form the core of current literature in molecular biology and related disciplines.**

**Current Literature in Molecular Biology (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 511 (IBIOS 511, VB SC 511) Molecular Immunology (2) The study of molecular and biochemical events that influence immune responses and define current questions in immunology.**

**BMMB 511. (IBIOS 511, V SC 511) Molecular Immunology (2)**

The goals of the course are to integrate the current questions of immunology with other disciplines, in particular cell biology and biochemistry, and to provide training in critical thinking and evaluation of data and experiments. The course will be approximately 2/3 lecture by the instructor and 1/3 student presentations of papers related to the material. In addition, written critical reviews of recently published papers and a short research proposal will be assigned.

By focusing on the mechanisms involved in immunity and disease, this course complements several existing courses on immunology, virology, and biochemistry. The prerequisites of MICRB 410 and B M B 400 assure that the students enrolling in the course have a general understanding of immunology and biochemistry. This course is projected as a requirement for the Molecular Medicine and Immunobiology Options in the IBIOS graduate program and is an elective for the Pathobiology and BMMB graduate programs. The course will be offered in the fall semester with an enrollment limit of 20 students.

Faculty member proposing course: Andrew Henderson

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 515 (VB SC 515) Macrophage Biology (2) The role of macrophages at the interface between innate and adaptive immunity.**

**BMMB (VB SC) 515 Macrophage Biology (2)**

The overall purpose of this course will be to provide second and third-year graduate students, the opportunity to study current concepts of macrophage biology. The course will be offered in the fall semester every other year. The class will

meet once a week for two hours to review and discuss 3-4 papers on a chosen topic. For each class, the instructor will be responsible for choosing papers that reflect the most recent advances in the area of research to be covered and for providing background information on the topic. The students will be responsible for reading the papers prior to class and leading and/or participating in a critical discussion of the papers assigned for that week. This course will provide students with a detailed understanding of macrophage biology as well as a forum for developing skills in critical evaluation and discussion of current research. The materials covered in this course will build on information presented in MICRB 410 (Principles of Immunology), VB SC/B M B/MICRB 432 (Advances in Immunology: Signaling in the Immune System) and is designed to complement VB SC/BMMB/IBIOS 511 (Molecular Immunology).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 518** (VB SC 518) T Cell Recognition and Development (2) An in-depth analysis of the mechanisms of T cell recognition, activation and development, and the acquired immune response.

### **BMMB (VB SC) 518 T Cell Recognition and Development (2)**

The goals of the course are to provide second and third-year graduate students, and in-depth analysis of T cell recognition and development. The course will be offered in the spring semester every other year.. The class will meet once a week for two hours to review and discuss 3-4 papers on a chosen topic. For each class, the instructor will be responsible for choosing papers that reflect the most recent advances in the area of research to be covered and for providing background information on the topic. The students will be responsible for reading the papers prior to class and leading and/or participating in a critical discussion of the papers assigned for that week. This course will provide students with a detailed understanding of T cell recognition and development as well as a forum for developing skills in critical evaluation and discussion of current research. The materials covered in this course will build on information presented in MICRB 410 (Principles of Immunology), and VB SC/B M B/MICRB 432 (Advances in Immunology: Signaling in the Immune System) and is designed to complement VB SC/BMMB/IBIOS 511 (Molecular Immunology).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 521** Microbial Biology I (4) Survey of cutting-edge aspects of microbial ecology, phylogenetics, physiology, molecular biology, pathogenesis and genomics.

### **Microbial Biology I (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 525** (CHEM 525) Analytical Separations (3) Fundamentals and applications of modern chromatographic separations.

### **Analytical Separations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 531** Biomolecular Structure (2) Crystal structure determination and analysis of protein and nucleic acid three-dimensional structures.

### **BMMB 531 Biomolecular Structure (2)**

This course is taught in two parts. In the first part, students will learn the fundamentals of X-ray crystallography of bio-molecules. Topics covered include: What X-rays are and how to produce and use them safely, how protein crystals are

grown, how X-rays interact with crystals to yield 3-dimensional diffraction data, how to solve a crystal structure and how to refine the structure. Basic mathematics and physics involved in this technique will be discussed. The students will also learn how to analyze a published crystal structure and how a crystallography laboratory works. The second part will focus on understanding how protein and DNA structure relate to the function of these macromolecules. The students will visualize macromolecular structures in class using videos and using interactive molecular graphics software on their own to develop an understanding of three-dimensional structures. Particular topics include: fundamentals of protein structure, enzymes, signal transduction molecules, Immune molecules, protein-DNA interactions, and other related topics.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 533 Protein Evolution (2)** Consequences of evolution of protein-coding sequences: structures and functions.

### **BMMB 533 Protein Evolution (2)**

Most biological functions are carried out by proteins, and evolutionary logic can be used to infer functions. This course will focus on evolution of protein-coding sequences, conformations and functions of proteins. Different species show varying characteristics of structure, metabolism, and regulatory control networks. Most of these differences are the product of the evolution of protein-coding sequences. DNA mutations can change amino acid sequences, protein structures and protein functions; and favorable mutations are selected, in ways that are integrated to form an organism adapted at both macroscopic and molecular levels.

The availability of large databanks of protein amino acid sequences, and protein three-dimensional structures, and the annotation of protein function in the entries in these databanks, has allowed investigation of evolutionary changes that impact proteins. One of the goals of the course will be to describe these databanks and the computational tools available to apply them in research in molecular biology. Many students will find these tools useful in their own research projects.

The evolutionary divergence of proteins has shown several types of effects.

In some cases, related proteins in different species retain similar functions, but show differences in amino acid sequence and structure. The nature of observed changes in sequence and structure will be described and the relationship between sequence changes and structural changes examined in several well-documented examples, including globins, and serine proteases.

In some cases, proteins diverge within a single species to form large families of related molecules with specialized functions. For example, the human genome encodes hundreds of odorant receptors.

The comparison of related proteins that have adopted novel functions reveals how cells can expand their functional repertoire. In most cases it is easier to adapt an existing structure to a new function than to create a new protein "from scratch". For example, the proteolytic enzymes of the chymotrypsin family are related to haptoglobin, an iron scavenger that has lost its enzymatic activity.

Beyond the description of individual proteins and individual protein families, there is the more general question of how changes in functions of individual proteins are integrated to create a smoothly-running cellular "operating system". The evolution of sequences encoding regulatory proteins to achieve this will be discussed.

Methods of bioinformatics to address these questions will be presented, with emphasis on study and comparison of structures with computer graphics.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 538 (CHEM 538) Spectroscopic Methods in Bioinorganic Chemistry (3)** Foundations in spectroscopic methods employed for the determination of the geometric and electronic structure of transition metal clusters in nature.

### **Spectroscopic Methods in Bioinorganic Chemistry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 539** (CHEM 539) Biochemical Reaction Mechanisms (3) Mechanisms of the most important biochemical reactions, with emphasis on enzyme catalysis.

### **Biochemical Reaction Mechanisms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 541** Molecular Biology of Animal Development (3) The course emphasizes comparative molecular genetic analyses of developmental gene networks using vertebrate and *Drosophila* model systems.

### **BMMB 541 Molecular Biology of Animal Development (3)**

This is a required course for graduate students in the IBIOS Cell and Developmental Biology Program. Approximately half of the class sessions will consist of lectures and class discussions related to lecture material. The other half will consist of primary literature presentations by the students and class discussion pursuant to these. The course will provide students with a broad overview of essential signaling pathways and gene regulatory networks that coordinate cellular activities to establish and maintain the complex communities of cells that comprise animal tissues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 542** Eukaryotic Cell Biology (3) This course covers current areas of cell biology research, focusing on processes affecting the cell as a whole.

### **BMMB 542 Eukaryotic Cell Biology (3)**

This course in eukaryotic cell biology will provide a foundation for those students whose thesis research focuses on cell biology or the cellular aspects of development. The primary focus will be to understand how the cell functions as a unit. Areas to be covered include compartmentalization of the cell and transport between different sub-cellular compartments; the control of cell shape and how cell shape and polarity changes drive cell movement and tissue shape; the life cycle of cells; and the regulation of these processes by extracellular signals. We will also investigate current research techniques and tools that are used to investigate these processes.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 551** (IBIOS 551) Genomics (3) Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics.

### **BMMB (IBIOS) 551 Genomics (3)**

IBIOS/BMMB 551 will deal with the structure and function of genomes including the use of some current web-based tools and resources for studies and research in genomics. The overall objective is to learn current information about the structure and function of genomes, to develop facility in the many web-based tools and resources for further studies and research in genomics, and to appreciate the power and limitations of current resources and knowledge. This course is designed as a basic course for any student in the life sciences who needs to exploit the developments and tools in genomics in their own research and who wants to broaden their understanding of the current knowledge and research in the life sciences that are increasingly drawing on genomics advances. The course will be taught by a team of faculty (members active in genomics research and will be video-conferenced. Students' grades will be based on take home exams or assignments that require their understanding of the concepts in genomics and the hands-on use of web-based analysis tools, as well as on class discussion participation. Students will be assigned one or more projects, tutorials, problem sets or essays to complete. Reading assignments will further help students explore the materials, do the



assignments and participate in classroom discussions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 572** (CHEM 572) Nucleic Acids Chemistry (3) Biophysical and biochemical approaches for studying structure-function relationships in nucleic acids.

**BMMB (CHEM) 572 Nucleic Acids Chemistry (3)**

The goal of this course is to provide a foundation in biophysical approaches for studying the quantitative and structure-function relationships in nucleic acids systems, including DNA, RNA, and their interactions with proteins, salt, and water. Lectures include basic physical chemistry and statistical mechanics principles along with current literature in the biochemical sciences. At the end of the course, you should be able to meaningfully dissect molecular biological papers at the level of the physical chemistry of these processes. Current topics are introduced through reading and presenting papers from the literature.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 573** (CHEM 573) NMR Spectroscopy for Synthetic and Biological Chemistry (3) Nuclear magnetic resonance approaches for characterizing the structure and dynamics of synthetic compounds, natural products, and biological macromolecules.

**NMR Spectroscopy for Synthetic and Biological Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 597C** Computers in Molecular Biology (3) Apply maximum likelihood methods for data analysis and model testing on molecular biology, biochemistry and structural biology.

**Computers in Molecular Biology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 597D** Bioinformatics: Analyzing High Throughput Sequencing Data (2) Introduce life scientists to level appropriate data analysis techniques via computers.

**Bioinformatics: Analyzing High Throughput Sequencing Data (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 598F** Algorithms and Data Structures in Bioinformatics (3) Suffix trees, hidden Markov models, de Bruijn graphs, breakpoint graphs, the Burrows-Wheeler transform, network flow, clustering.

**Algorithms and Data Structures in Bioinformatics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of biochemistry undergraduate laboratory and recitation classes under faculty supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMMB 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Bioengineering (BIOE)**

**BIOE 401** Introduction to Bioengineering Research and Design (3) Challenges and constraints of bioengineering research and design. Emphasis on immunoresponse, tissue mechanics, biological transport phenomena, and biomaterials.

### **BIOE 401 Introduction to Bioengineering Research and Design (3)**

In this course, students explore how engineering principles can be used to advance healthcare, develop cutting-edge bioengineering technologies, and develop a fundamental understanding of biology. Representative design problems include the application of bio-continuum mechanics, biology-surface interactions, bioelectrical phenomena, and bio-transport to the design of novel implantable blood vessels. Students will use analytical and computational techniques to explore these topics, and to develop their own design interests. Educational outcomes will include an understanding of the process of integrating biology and engineering to improve research and design, and an appreciation of the societal and ethical implications of new directions in bioengineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:  
Concurrent: BIOE 404

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 402** Biomedical Instrumentation and Measurements (3) Biomedical measurements, including consideration of techniques, equipment, and safety.

### **BIOE 402 Biomedical Instrumentation and Measurements (3)**

This course is designed to introduce students to the principles, applications, and design of instruments used in biomedical research and applications. The emphasis is on engineering design and analysis with supplemental discussion of relevant physiological principles. Students will learn to analyze and design systems through in-class examples, homework problems, and active participation. Grading is based on homework problems, quizzes and a final exam. Topics covered include: sensors, biopotential signal origin, filtering, amplifiers, electrodes and signal processing; pressure and flow measurement in the cardiovascular and respiratory systems, and medical imaging modalities.

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 403 Biomedical Instrumentation Laboratory (1)** Biomedical measurements laboratory including measurement of biopotentials, experiments in medical imaging techniques, and use of cardiovascular and pulmonary system instrumentation.

**BIOE 403 Biomedical Instrumentation Laboratory (1)**

Laboratory course to accompany BIOE 402, Medical Instrumentation. The class is comprised of studies in medical circuits and transducers for static and dynamic biological inputs, and includes measurement of actual biomedical signals. For preparation for industry or research, proper laboratory documentation techniques are taught along with basic skills for presenting data as a scientific journal paper. Students work together in teams to perform the experiments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 404 Data Analysis and Experiment Design (1)** Statistical measures of data, and selection of experiment sample size to meet criteria.

**BIOE 404 Data Analysis and Experiment Data (1)**

Upon completion of this course students will be able to determine confidence limits and establish hypothesis tests for the difference in means of data sets using normal and t-test measures. Students will understand the application of single and multivariable analysis of variance (ANOVA) procedures, and hypothesis tests based on these procedures. Students will know how to select the number of subjects to test for a given specified accuracy of a statistical measure.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:  
 Concurrent: BIOE 401

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 406 Medical Imaging (3)** Physical principles and clinical applications of medical imaging methods.

**BIOE 406 Medical Imaging (3)**

The course covers all four major diagnostic medical imaging modalities including x-ray, ultrasound, radioisotope imaging, and magnetic resonance imaging. Physical principles, instrumentation, diagnostic procedures, and biological effects of these modalities will be discussed. It requires background in physics and electrical circuits. It is a lecture course and graded by homework, a mid-term and a final exam. The prerequisite is Physics 212.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 409 Biofluid Mechanics (3)** The fundamental relations in fluid mechanics and their application to biofluids including steady/unsteady flows, diseased states, devices and biorheology.

**BIOE 409 Biofluid Mechanics (3)**

This course is a first course in fluid mechanics, with application to biomedical problems. This course incorporates understanding of fluid properties of biological materials and applies the fundamental laws (mass, momentum, and energy) that govern fluid mechanics to solve biofluid applications such as those in the cardiovascular system, including diseased states. The course will enable students to use approximation methods and constraints in fluid mechanics to help model and solve biofluid examples. Biorheology and cardiovascular prosthetics in the context of fluid mechanics will be discussed. The students will be able to understand and apply problem solving techniques to steady and unsteady biological flows and be exposed to wave propagation theory and oscillatory flow. Students will be exposed to biofluid

devices and flow measurement techniques used to assess these devices. This course is required for students in the Bioengineering BS program for completion of either the mechanical engineering or the chemical engineering option.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 410 Biomedical Applications of Microfluidics (3)** Study of fluid mechanics at small length scales. Low Reynolds number flow, electrokinetic flows, bioseparations in microfluidic devices.

### **BIOE 410 Biomedical Applications of Microfluidics (3)**

Microfluidics is the study of flow phenomena at small length scales with characteristic channel dimensions typically less than the diameter of human hair. Small length scale effects become important as surface forces such as viscous drag and surface tension govern flow behavior rather than body forces (inertia) as seen in macroscale fluid mechanics. Miniaturization of fluid handling systems also allows the development of micro Total Analysis Systems (microTAS) or so called "lab on a chip" which combines biological sample preparation, separation and analysis in a single device. Topics explored in this class include: fundamental understanding and derivation of constitutive balances in fluid mechanics (e.g., Navier Stokes equation), exploration of electrokinetic flow phenomena for electrophoresis, fabrication techniques for microfluidics, overview of (microTAS) systems especially capillary electrophoresis and miniaturized polymerase chain reaction for biochips, and exploration of integrated microfluidics for personalized medicine and drug delivery.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 413 Bioengineering Transport Phenomena (3)** An integrated study of the fundamentals of mass transport processes with emphasis on the analysis of physiological systems.

### **BIOE 413 Bioengineering Transport Phenomena (3)**

This course provides an introduction to mass transport phenomena in biological systems. The course builds upon thermodynamic concepts of phase and chemical equilibrium to analyze ion transport and cell membrane potentials including Nernst potentials, Gibbs-Donnan equilibrium and osmotic pressure. In particular, the course provides fundamental understanding of the diffusion of gases, electrolytes and non-electrolytes in biological applications. Furthermore, the principles of oxygen transport in tissues are specifically described and analyzed using the Krogh Cylinder Modes and hemoglobin-oxygen binding relationships. The transport of substances across biological membranes is discussed and analyzed for various biological transport mechanisms including: passive diffusion, active transport and facilitated transport. Convective transport through porous media is introduced using Darcy's Law and the Brinkman Equation. Finally, fundamental concepts of pharmacokinetic modeling are introduced and utilized for the analysis of drug transport and distribution within tissues. This is a lecture course, graded by means of quizzes and a final exam. A general knowledge of physiology and knowledge of continuum-mechanics, and thermodynamics is prerequisite.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 419 Artificial Organs and Prosthetic Devices (3)** Analysis of function and consideration of design concerns for biomedical implants, including prosthetic joints, electrical stimulators, and cardiovascular pumps.

### **Artificial Organs and Prosthetic Devices (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 423 Reaction Kinetics of Biological Systems (3)** Chemical kinetics and reaction equilibria with applications to the

analysis of physiological function and the design of synthetic organs.

### **BIOE 423 Reaction Kinetics of Biological Systems (3)**

Chemical reactions are the underlying mechanism for numerous biological processes such as energy metabolism, biosynthesis pathways, mass transport, and detoxification. This course will introduce the basic concepts in chemical equilibrium and reaction kinetics. The course will then apply these chemical kinetics and analytical approaches to understand the underlying mechanisms of selected biological and physiological processes, which will include metabolic engineering, catalysis, bioreactors, and drug discoveries. Due to the analytical nature of this course, basic knowledge of thermodynamics, mathematics, differential equations are required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 440 Clinical Corelations (1)** Engineering analysis applied to common disease states and therapies.

### **BIOE 440 Clinical Corelations (1)**

This course applies analysis of physiologic systems and processes covered in other Bioengineering courses to the understanding of common diseases and their treatments. Each topic will include a basic description of the disease from a medical physiology perspective, identification of the applicable engineering principles, and application of those principles to understanding the disease process or therapy. Sample topics include heart failure, kidney failure and dialysis, diabetes, and surgical correction of vision.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 443 (MATSE 403) Biomedical Materials (3)** Describe properties of materials and composites and their in vivo interactions.

### **BIOE 443 (MATSE 403) Biomedical Materials (3)**

Metals, polymers, and ceramics, and their composites, which are capable of emulating the functions of hard and soft tissues, are the subjects of this course. The subject matter shall be confined to implanted materials; external appliances, such as casts, braces, etc are not considered. The topical content of this course will be grouped into four areas. A general introduction to selected aspects of physiology will be presented. This will provide the background necessary to appreciate the factors which govern the selection of biomedical materials. Specific emphases will be placed on polymerization of biopolymers (polypeptides and polysaccharides) and the general relationships between conformation and biological function, the biochemistry of blood and blood surface interactions, the formation of teeth and bone and the relationships between microstructure, composition and function, the immune responses to implanted materials, the resorption of bone (osteoporosis) and the development of caries. The perspective placed on these topics will be that of materials science. The selection of ceramics for hard tissue prosthesis will be discussed. Orthopaedic and dental applications for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses and pyrolytic carbons. Various classes of inorganic cements, gypsum, zinc phosphates, zinc carboxylates, silicates, and glassionomer cements will also be considered as ceramics. Hydroxyapatite, Hap-based composites and Hap-metal interactions will be discussed in particular. Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described. Dental and orthopedic applications of metals will be described. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated. Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and vitallium, used in prosthetic applications, will be described and their properties and limitations discussed. The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particular debris in the vicinity of an implant will be discussed in particular. Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications it is desirable that a polymeric material biodegrade while in others property retention is desirable.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 444 (IL) (MATSE 404) Surfaces and the Biological Response to Materials (3)** Focus is on special properties of surface as an important causative and mediating agent in the biological response to materials.

**BIOE 444 (MATSE 404) Surfaces and the Biological Response to Materials (3)**

This course factors the classical picture of the biological response to materials into spatial and temporal components, identifying the special properties of surfaces as an important causative and mediating agent. Biophysical mechanisms are emphasized that lead to formulation of structure property relationships and the biological response to materials. Contact activation of the blood plasma coagulation cascade, bioadhesion, and protein adsorption are used as example biological responses to material surfaces to illustrate concepts and principles. Leading theories attempting to correlate both kind and intensity of biological responses to surface and interfacial energetics will be compared and contrasted through a process that will quantify important surface thermodynamic properties of materials. The hydrophobic effect and related phenomena, especially as this pertains to water solvent effects in biology, receives special emphasis. Course materials are drawn from a selection of relevant library reserve texts.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 445 Tissue Engineering: Concepts, Calculations and Applications (3)** Introduction to interdisciplinary tissue engineering concepts, associated biochemical and biomechanical engineering calculations, and cardiovascular, musculoskeletal, and other tissue application examples.

**BIOE 445 Tissue Engineering: Concepts, Calculations and Applications (3)**

Tissue engineering is a field of research dedicated to the design and construction of living tissues for use in repairing or regenerating tissue structures and functions compromised by disease or trauma. This course provides an introduction to interdisciplinary tissue engineering concepts, associated biochemical and biomechanical engineering calculations, and cardiovascular, musculoskeletal, and other tissue application examples. Topics covered in this course will span the entire process of creating an engineered tissue, including, among other topics: techniques for cell isolation, recovery, and expansion; biodegradable polymer synthesis and degradation; scaffold design, fabrication, and cell seeding; bioreactors and engineered tissue mechanobiology. This is a lecture course, graded by means of quizzes on assigned readings, homework, and three exams. General knowledge of cell structure and function, physiology, chemistry, mechanics of fluids and solids, and elementary differential equations are prerequisites.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 450W Bioengineering Senior Design (3)** Application of engineering and physiological principles to design of artificial organs and life supportive devices.

**BIOE 450W Bioengineering Senior Design (3)**

For preparation for the transition to industry, the course prepares students to work together as a team and effectively communicate scientific information. This course utilizes the student's knowledge in physiology and engineering which the student has accumulated to this point. Students develop teamwork, communication and leadership skills. The course begins with the students identifying a medical device or procedure which can be improved utilizing their engineering skills. A proposal is prepared and presented for design review. Students meet with the instructor on a regular basis for progress assessment. Notebooks are carefully maintained and critiqued. At the end of the semester, students demonstrate their project in a formal presentation and prepare a written report.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 490 Colloquium (1)** Technical presentations related to research and industry concerns, and by students doing senior projects.

**BIOE 490 Colloquium (1)**

This is a 1-credit course, providing an overview of major Bioengineering current topics by faculty and other invited speakers and providing students or student teams with an opportunity to present an oral senior projects or other appropriate talks. All students are expected to do an oral presentation. Topics include medical instrumentation developments, physiology experiments and medical products industry issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 494H Honors Thesis (1-3 per semester/maximum of 6)** Independent study research and design, leading towards honors thesis.

### **BIOE 494H Honors Thesis (1-3)**

Independent study for students who are completing honors thesis in Bioengineering. Course is taken during last two semesters before graduation. Student must have a faculty advisor for the thesis project. This advisor is in charge of supervising the independent study and grading. At the end of the first semester, students write a proposal in NIH format documenting the aims, background, preliminary results, and plan for ongoing research. At the end of the second semester, student submits Honors thesis. The final grade is determined by quality of proposal or thesis and quality of laboratory work.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 497D Polymers in Bioengineering (3)** A foundational course in biomedical polymer design, synthesis, characterization, and processing with applications such as devices, therapeutics, and regenerative medicine.

### **Polymers in Bioengineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 497G Drug Delivery (3)** Engineering and life science topics critical in drug delivery system design, focusing on physiological barriers, transport and drug design.



**Drug Delivery (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 497K** Bioengineering Mechanics and Techniques Laboratory (3) Experimental laboratory that includes measurements related to biomechanical phenomena (e.g. tissue viscoelasticity and blood flow) and blood separation.

**Bioengineering Mechanics and Techniques Laboratory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 499** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 501** (CH E 501) Bioengineering Transport Phenomena (3) Application of the equations of mass, energy, and momentum conservation to physiological phenomena and to the design of artificial organs.

**Bioengineering Transport Phenomena (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 503** (CH E 503) Fluid Mechanics of Bioengineering Systems (3) Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

**Fluid Mechanics of Bioengineering Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 503** (CH E 503) Fluid Mechanics of Bioengineering Systems (3) Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

**Fluid Mechanics of Bioengineering Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BIOE 505 Bioengineering Mechanics (3)** Passive and active mechanical properties of tissues, rheological materials, models of muscle contraction, pulmonary mechanics, forces in muscular- skeletal system.

**Bioengineering Mechanics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 506 Medical Imaging (3)** Medical diagnostic imaging techniques, including generation and detection of ultrasound, x-ray, and nuclear radiation; instrumentation and biological effects.

**Medical Imaging (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 508 (MATSE 508) Biomedical Materials (3)** Properties and methods of producing metallic, ceramic, and polymeric materials used for biomedical applications.

**BIOE (MATSC) 508 Biomedical Materials (3)**

The topical content of this course will be grouped into 4 areas. A general introduction to selected aspects of physiology will be presented. This will provide the background necessary to appreciate the factors which govern the selection of biomedical materials. Specific emphases will be placed on the polymerization of biopolymers (polypeptides and polysaccharides) and the general relationships between conformation and biological function, the biochemistry of blood and blood surface interactions, the formation of teeth and bone and the relationships between microstructure, composition and function, the immune responses to implanted materials, the resorption of bone (osteoporosis), and the development of caries. The perspective placed on these topics will be that of materials science.

The selection of ceramics for hard tissue prosthesis will be described. Orthopaedic and dental applications for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses. Various classes of inorganic cements, gypsum, zinc phosphates, zinc carboxylates, silicates, and glass-ionomer cements will also be considered as ceramics. Hydroxyapatite, HAp-based composites and HAp-metal interactions will be discussed in particular. Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described.

Dental and orthopaedic applications of metals will be described. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated. Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and stainless steel used in prosthetic applications will be described and their properties and limitations discussed. The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particulate debris in the vicinity of an implant will be discussed in particular.

Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications, it is desirable that a polymeric material biodegrade while in others property retention is desirable. Because of the spectrum of applications for polymers, the topics to be covered will be limited with the intent to concentrate on hemocompatible polymers, acrylics used as bone cements, polyethylene used as bearing surfaces in prostheses, and dental resins and bonding materials. Other relevant polymers and their applications will be discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 509 Mechanobiology (3)** This course explores the molecular bases of cell mechanics and the role of mechanics in cell biology

**Mechanobiology (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 510 Biomedical Applications of Microelectromechanical Systems (BioMEMS) and Bionanotechnology (3)** Introduction to BioMEMS and Bionanotechnology. Topics include: electromechanical and chemical biosensors, microfluidics microscale separations, and surface patterning for cellular engineering.

### **BIOE 510 Biomedical Applications of Microelectromechanical Systems (BioMEMS) and Bionanotechnology (3)**

Microelectromechanical systems (MEMS) have been developed for a wide range of applications from automotive to medical devices. Nanoscale devices within MEMS have a particular usefulness in biological applications due to their small volumes, low energy sensing, and minimal force actuators. Increased efficacy of instruments and new areas of application are also emerging from specific and successful biomedical applications of MEMS (bioMEMS). Advanced development of nanotechnology and bioMEMS for biomedical and biotechnological applications requires basic foundations from biophysics, biochemistry, solid state devices, and polymer engineering.

The objectives of this course are: to build a basic foundation for understanding of mechanisms on electrical, mechanical, chemical, and optical transducers in the context of biomedical applications; and, to teach critical thinking considering microengineering design and fabrication, material compatibility with biological systems, and cellular interaction at the interface. Finally current MEMS activities will be reviewed with emphasis on the examination of the viability of nanoscale devices and bioMEMS technology in particular biomedical applications.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 512 Cell and Molecular Bioengineering (3)** Graduate level cell and molecular biology course for engineers emphasizing molecular mechanisms.

### **BIOE 512 Cell and Molecular Bioengineering (3)**

This course investigates the molecules and mechanisms underlying cellular function from an engineering perspective, utilizing physical, chemical and quantitative approaches. Material covered includes the structure and chemistry of biological molecules, enzyme kinetics, DNA replication and repair, gene expression, recombinant DNA technology, subcellular organization, cell motility, signaling and cell division. Applications in medicine, biotechnology, bionanotechnology and tissue engineering are addressed. This is a lecture course graded by means of exams, homework assignments, and a final paper. A general knowledge of physics, chemistry, and some physiology is required; the analytical approach of the course will also require an ability to work with mathematical equations and simple models. It is geared towards engineering students and is also suitable for physics, chemistry, and materials science graduate students. Previous molecular and cell biology knowledge is not required. Three credits, generally offered each fall semester. No formal prerequisites.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 513 Bioengineering Laboratory Techniques (3)** Laboratory techniques in cell molecular biology, protein biochemistry and cell culture with an emphasis on engineering analysis and quantification.

### **BIOE 513 Bioengineering Laboratory Techniques (3)**

BIOE 513 is a three-credit laboratory course for engineering graduate students designed to introduce laboratory techniques used in bioengineering/biomedical research. The course objectives are to build a basic foundation for understanding biological assays in the context of biomedical engineering applications and to introduce the student to the integration of biology with design and fabrication of devices. Consideration is also given to compatibility between biological systems and medical devices, and cellular interactions at the interface between biology and engineering. Emphasis is placed on cell and molecular biology, protein biochemistry, bacterial transformations, and mammalian cell culture with particular attention to engineering analysis and quantification. This course requires a substantial amount of laboratory work outside of designated meeting periods.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 514** Quantitative Microscopy (3) Application of advanced microscopy to quantification of cellular and molecular function.

### **Quantitative Microscopy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 515** Cell Mechanics and Biophysics (3) Advanced topics and recent developments in cellular engineering; applications of engineering science to cell biology.

### **Cell Mechanics and Biophysics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 517 (MATSE 507)** Biomaterials Surface Science (3) Special properties of surfaces as an important causative and mediating agent in the biological response to materials.

### **BIOE 517. (MATSC 517) Biomaterials Surface Science (3)**

This course will factor the classical picture of the biological response to materials into spatial and temporal components, identifying the special properties of surfaces as an important causative and mediating agent. Emphasis will be on biophysical mechanisms and the biological response to materials. Contact activation of blood plasma coagulation cascade, bioadhesion, and protein adsorption will be repeatedly used as example biological response to materials surfaces to illustrate concepts and principles. Leading theories attempting to correlate both kinds of intensity of biological responses to surface and interfacial energetics will be compared and contrasted through a process that will quantify important surface thermodynamic properties of materials. The hydrophobic effect and related phenomena, especially as this pertains to water solvent effects in biology, will receive special emphasis. A general background in chemistry and/or biology is required, but prerequisites are purposefully limited, reflecting the interdisciplinary aspects of the subject and to draw students from different specializations.

Faculty member proposing course: Erwin Vogler

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 519** Artificial Organs Design (3) Basic techniques and principles of a multidiscipline approach to artificial organs design.

### **Artificial Organs Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 520** Biophotonics (3) Physical and engineering underpinning of different modalities of laser microscopy and spectroscopy in biophysics, biomedical engineering, and life science applications.

### **BIOE 520 Biophotonics (3)**

Biophotonics is a new frontier of interdisciplinary research techniques that combines light (i.e., photons) and engineering to investigate biological systems. BIOE 520 is a 3-credit course for graduate students in both engineering and the life sciences. This interdisciplinary course is designed to introduce students to the physical and engineering principles of non-invasive and quantitative biophotonics techniques for research applications in biomedical engineering, biophysics, chemistry, biochemistry, and biology. Students will learn the physical and engineering underpinnings of laser technology, fluorescence microscopy (both linear and non-linear), optical manipulation, and fluorescence spectroscopy for both single-molecular and ensemble studies of biomolecular assemblies. Emphasis will be on selected applications of biophotonics in quantitative biophysics and biomedical engineering analysis of biomolecules (proteins, DNA, RNA), and biomembranes in living cells and tissues. Biophotonics in nanotechnology, medicine and drug discovery will also be discussed. Comparison with complementary, large-scale imaging techniques (e.g., MRI, ultrasound, X-ray) will also be discussed to highlight advantages and disadvantages.

BIOE 520 is designed for active learners who are expected to participate fully in this course. Students will be able to discuss and derive the fundamental equations for each biophotonics technique with full knowledge of the assumption being made, experimental designs, experimental observables and their biological significance, and error analysis. A portion of the course will be dedicated to special applications of particular interest to the registered students. The course requires a substantial amount of mathematics, discussions of current literature, and active class participation. In addition to visiting relevant research laboratories in bioengineering and chemistry, students will be provided with typical experimental results (from the instructor's own laboratories in Bioengineering) for quantitative analysis.

Interested students should have taken, as a minimum, undergraduate courses in molecular and cell biology, mathematics, chemistry, optics, and quantum mechanics.

Grades will be based on: homework (30%), class presence and participation (20%), a semester paper and presentation (30%), and a final examination (20%). This course will be offered in the fall of every other academic year, with anticipated enrollment of 12-20 students from Bioengineering and various colleges, departments, and programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 552 (I E 552) Mechanics of the Musculoskeletal System (3)** Structure and biomechanics of bone, cartilage, and skeletal muscle; dynamics and control of musculoskeletal system models.

### **BIOE (I E) 552 Mechanics of the Musculoskeletal System (3)**

The course focuses on the upper limbs and its musculoskeletal components, including mechanical properties and models; work-related musculoskeletal injuries, techniques, models, and instruments to measure and quantify the risks for developing such injuries. Specific topics covered in the first third of the course include an introduction to basic biomechanical principles, the anatomical structure of the musculoskeletal system including soft tissue, neuromuscular physiology, and motor control including muscle receptors. The second third covers various muscle models starting from basic mass/spring/dashpot viscoelastic models as in Hill's 3-element model and continuing on to Hatze's multi-element model, frequency analysis, control theory approaches. More complex models include static and dynamic aspects of tendon-pulley models and multiple muscle-tendon systems. The final third covers basic epidemiology as applied to musculoskeletal disorders and risk factors including instrumentation to measure them and various analysis tools (e.g., the PSU CTD Risk Index) to assess the not only the overall risk for injury but the reliability and validity of such assessments. Time permitting applications to hand tools and office environment with computer work stations are examined. Two exams and a modeling project are given. The course is typically offered Spring Semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 553 (I E 553) Engineering of Human Work (3)** Physics and physiology of humans at work; models of muscle strength, dynamic movements; neural control; physical work capacity; rest allocation.

### **Engineering of Human Work (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1985  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 576** Bioengineering of the Cardiovascular System (3) Experimental and analytical studies of network branching patterns, regional blood flow, rheology and mechanics of blood cells and vessels.

**Bioengineering of the Cardiovascular System (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 590** Bioengineering Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Bioengineering Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 591** Bioengineering Ethics and Professional Development (1) Problem solving methods in ethical decision making, best practices in research communication, and strategies for professional development.

**Bioengineering Ethics and Professional Development (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 597D** Mechanobiology (3) This course explores the molecular bases of cell mechanics and the role of mechanics in cell biology.

**Mechanobiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 597F** Applications of Soft Lithography in Bionanotechnology (3) Soft lithography techniques and applications in biological sciences with an emphasis on studies of mechanobiology, tissue engineering, and biochemical pathways.

**Applications of Soft Lithography in Bionanotechnology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 597G** Nanobiomaterials (3) An in-depth foundation in the synthesis, fabrication, properties, and applications of nanobiomaterials in tissue engineering, drug/gene delivery, cancer therapy, and bioimaging.

**Nanobiomaterials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 597K** Regenerative Medicine (3) Foundation in regenerative medicine, the integration of cell biology with biomaterials and engineering to develop strategies for regeneration of tissues.

**Regenerative Medicine (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOE 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Bioethics (BIOET)

**BIOET 501** (PHIL 571) Perspectives and Methods in Bioethics (3) This course explores a variety of theories and methods in bioethics and applies them to a selection of current topics.

**Perspectives and Methods in Bioethics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 502** (PHIL 572) Perspectives in Macro-Bioethics (3) This course explores systemic and structural issues in bioethics, and the theories and methodologies required to address them.

**Perspectives in Macro-Bioethics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 503** (PHIL 573) Ethics and the Responsible Conduct of Biomedical Research (3) Provides an understanding of ethical issues arising in the responsible conduct of biomedical research and frameworks for critically analyzing them.

**Ethics and the Responsible Conduct of Biomedical Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 533** Ethical Dimensions of Renewable Energy and Sustainability Systems (2) Examination of ethical issues relevant to research procedure, professional conduct, social and environmental impacts, and embedded values in research and practice.

**Ethical Dimensions of Renewable Energy and Sustainability Systems (2)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 590** Bioethics Colloquium (1-3 per semester/maximum of 36) Continuing seminars in bioethics that consist of a series of individual presentations by faculty, students, or outside speakers.

**Bioethics Colloquium (1-3 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 594** Research Topics (1-12 per semester/maximum of 15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-12 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 595** Internship (1-12 per semester/maximum of 12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships related to bioethics.

**Internship (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 596** Individual Studies (1-9 per semester/maximum of 9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 596A** Independent Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 597** Special Topics (1-9 per semester/maximum of 9) Formal courses given infrequently to explore a topic or topics in bioethics in depth.

**Special Topics (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 598** Special Topics (1-9 per semester/maximum of 9) Formal courses given infrequently to explore a topic or topics in bioethics in depth.

**Special Topics (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 600** Thesis Research (1-12 per semester/maximum of 99) Thesis Research in Bioethics.

**Thesis Research (1-12 per semester/maximum of 99)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 601** Ph.D. Dissertation Full Time (0) Full-time Ph.D. dissertation preparation.

**Ph.D. Dissertation Full Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Students will teach lower-level undergraduate courses in bioethics, including courses on the undergraduate minor in bioethics and medical humanities.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 603** Foreign Academic Experience (1-9 per semester/maximum of 18) Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.

**Foreign Academic Experience (1-9 per semester/maximum of 18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 610** Thesis Research Off-Campus (1-12 per semester/maximum of 99) Thesis Research, Off Campus.

**Thesis Research Off-Campus (1-12 per semester/maximum of 99)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOET 611** Ph.D. Dissertation Part Time (0) Part-time Ph.D. dissertation preparation.

**Ph.D. Dissertation Part Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Bioinformatics (BIIFM)**

**BIIFM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIIFM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIIFM 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BIIFM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIIFM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Biological Basis-Dis (BBD)**

**BBD 716** Biological Basis of Disease (6) This integrated course includes topics in microbiology, immunology, pathology, pharmacology, and human genetics.

#### **Biological Basis of Disease (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Biological Chem-Hy (BCHEM)**

**BCHEM 505** Biological Chemistry II (2) A continuation of BCHEM 502. Emphasis on interrelations of metabolic pathways, catabolic end products, and regulation.

#### **BCHEM 505 Biological Chemistry II (2)**

Biological Chemistry II is a continuation of Biological Chemistry I. Metabolic pathways for lipids, amino acids, and carbohydrates are discussed with emphasis placed on regulation and integration with material covered in Biological Chemistry I. The objective is to provide students with the knowledge needed to understand the ramifications that change in one pathway may induce in another. This course is required of all graduate students in the biochemistry and molecular biology program. Because it is a required basic course, it is offered in the spring semester each year and it is taken by all first year students in the biochemistry program. Two exams will be given, a mid-term and a final.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 510** Carcinogenesis and Chemoprevention (2) Mechanisms of cancer induction by environmental carcinogens and chemoprevention by natural and synthetic agents.

#### **BCHEM 510 Carcinogenesis and Chemoprevention (2)**

The etiology of most human cancer remains obscure even though a vast body of literature describes risk factors for certain cancers and proposes various hypotheses for cancer etiology on the basis of epidemiological and experimental studies. Tobacco smoking is an established cause of several cancers, with lung cancer remaining the first target on the list. International studies have repeatedly confirmed that people (Chinese, Japanese) migrate from their country of origin to the U.S., adopt the pattern of certain cancers within a few generations (e.g., breast and prostate) of the latter country, which is indicative of the presence of chemical carcinogens in the environment and/or changes in lifestyles. Consequently, the search for carcinogens that exist in the human environment challenges both scientists and regulatory agencies. Chronic exposure to traces of chemical carcinogens in the diet, in polluted air, or in tobacco smoke can be important in the etiology of several human cancers in the presence of host factors that favor the multi-step process of carcinogenesis. Bioassays in laboratory animals can provide important information on the role of environmental agents in the induction of particular types of cancer. Biochemical studies can lead to insights into the nature of interactions of these environmental agents with macromolecules such as DNA that are necessary, but not always sufficient for carcinogenesis.

The search for optimal diets and for naturally occurring agents in routinely consumed foods that may inhibit cancer development, although challenging, constitutes a valuable and plausible approach to finding ways to control and prevent cancer. The prevention of cancer is the longstanding goal for most cancer researchers. There has been enormous gain in our understanding of carcinogenesis and cancer progression; such knowledge has provided new and promising opportunities to prevent cancer, e.g., to treat pre-cancer or inhibit carcinogenesis (a process often involving 20-30 years in human epithelial cancers), rather than waiting to treat cancer. In the early 1980's, the U.S. National Cancer Institute recognized the promise of chemoprevention research. In summary, this course will provide a better understanding of the potential contribution of environmental carcinogens in the development of certain human cancers and will provide important information on cancer chemoprevention intervention strategies.

The course will cover topics that include exposure, metabolic activation, detoxification, and biomonitoring of chemical carcinogens in the human environment, carcinogen-induced DNA damage, mutagenesis and DNA repair, carcinogen-induced cellular and molecular alterations, tumorigenesis and organ specificity in laboratory animals, and factors modulating individual susceptibility to the deleterious effects on chemical carcinogens. Furthermore, this course will provide knowledge on various classes of cancer chemopreventive agents, their efficacy, safety, and mechanisms of action in preclinical studies.

Course Objectives: Upon completion of this course, the students will be able to:

1. Understand the potential risk associated with human exposure to chemical carcinogens detected in the environment.
2. Describe the current assays of biomonitoring of human exposure to chemical carcinogens.
3. Learn the process of metabolic activation and detoxification of chemical carcinogens.
4. Understand the stages of the multi-step carcinogenesis process.
5. Identify factors that govern individual susceptibility to the deleterious effects of chemical carcinogens.
6. Understand the concept of cancer chemoprevention.
7. Identify molecular and cellular targets for chemoprevention intervention at any time during the process of carcinogenesis.

Grading: Grading will be determined as follows:

1. Midterm Exam 30%
  2. Research Paper\* 30%
  3. Class Participation 10%
  4. Final Exam 30%
- Total 100%

\*Guidelines for Research Paper: The topic will be selected following approval of the faculty member in charge. The paper should include the goals (aims) of the research project, literature background, the significance of the research topic, knowledge to be gained, gaps in existing knowledge, and the potential to propose future studies.

**Faculty Member Proposing:** Karam El-Bayoumy

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 521 Biochemistry: Structure/Function/Regulation of Biological Molecules (3)** The fundamentals of biochemistry in evaluating the forces that govern inter- and intra-molecular interactions are studied.

**BCHEM 521 Biochemistry: Structure/Function/Regulation of Biological Molecules (3)**

An overriding theme in biochemistry is that macromolecules, which are polymers of simpler molecules, interact to form structurally large and functionally complex entities that give rise to discrete structures and functions. This course focuses on intermolecular forces between the monomers of macromolecules that govern tertiary structure, as well as interactions between macromolecules that govern higher order structures. The course begins with proteins, covering the structural basis of protein functions and then moves on to simple enzyme kinetics and mechanisms. Next, the students will discover the forces that control the three dimensional structures of nucleic acids. Subsequently, the students will explore simple and complex carbohydrates and topics in glycobiology that include energy storage, framework skeleton, and specific molecular recognition. Lipid biochemistry will be examined next, in topics that include lipid chemistry, complex lipids, membrane biology, and transport systems. Finally, the analysis of higher order structures involving the interactions between protein, nucleic acids, lipids, and carbohydrates will be discussed. The course will describe various analytical, chemical, and biochemical techniques that biochemists use to interrogate biomolecular structure and

interactions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 522 Molecular Genetics: Genes to Genomes (3)** This course focuses on concepts of molecular genetics and genomics, and DNA- protein interactions and their functions within macromolecular complexes.

**BCHEM 522 Molecular Genetics: Genes to Genomes (3)**

This course focuses on the principles and concepts of molecular genetics and genomics and DNA-protein interactions and their functions within macromolecular complexes. Special emphasis is placed on the aspects of eukaryotic genome organization, chromatin and chromosome structural and epigenetic changes, and DNA-protein interactions that regulate expression of genetic information and change the process of inheritance in normal and disease models and affect genome stability. This course contains three major sections. Section I includes principles of recombinant DNA technologies used in the analysis of DNA sequences and genome structure. Section II covers genetic interactions and macromolecular assembly and provides links between the studies of molecular interactions and equilibrium with in vivo and genetic approaches. Section III covers genome stability, epigenetics, and medical applications involving mis-regulation of the molecular mechanisms involved in these processes. This part builds on material presented in the BMS 503 course of the core curriculum and provides students an in-depth understanding of the molecular mechanisms of genome alterations and their biomedical significance.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 581 Enzymology: Structure, Energetics, and Function-A. Structural Biology (1)** Structural biology: NMR spectroscopy and X-ray crystallography.

**BCHEM 581 Enzymology: Structure, Energetics, and Function-A. Structural Biology (1)**

The objectives of this course are to provide students with a solid background to critically interpret X-ray crystallographic and NMR experiments. Topics will be covered in the X-ray crystallography lectures will include crystal growth, diffraction, phasing and refinement to determine the structure. Topics in NMR spectroscopy will include basic principles, multidimensional experiments, and assignments of atoms to resonances, structure determination and dynamics of ligand binding to proteins. The students will learn the basic principles of protein structure determination by NMR and X-ray crystallography.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 582 Enzymology: Structure, Energetics, and Function-B. Practical Enzymology (1)** Practical aspects to study protein-ligand binding and substrate-enzyme reaction.

**BCHEM 582 Enzymology: Structure, Energetics, and Function-B: Practical Enzymology (1)**

The objectives of this course are to provide students with a solid background in practical enzymology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 583 Enzymology: Structure, Energetics, and Function-C. Mechanisms of Enzyme Reactions (1)** Molecular basis for

enzyme specificity and catalysis.

**BCHEM 583 Enzymology: Structure, Energetics, and Function - C. Mechanisms of Enzyme Reactions (1)**

The objectives of this course are to provide students with the wherewithal to interpret and design experiments aimed at elucidating the mechanisms of enzyme catalyzed reactions. Selected mechanisms of enzyme catalyzed reactions will be surveyed using primary literature. The rationale for the chemical, kinetic, molecular biological, spectrophotometric, thermodynamic tools that are used to investigate these reactions will be discussed. Topics that will be discussed include (a) principles of enzyme catalysis, (b) electrostatic catalysis (c) acid/base catalysis, (d) phosphates (e) Schiff base formation. Cofactors that will be discussed include pyridyl pyrophosphate, thiamine, biotin, tetrahydrofolate, NAD, FAD, S-adenosyl methionine, and vitamin K and B12.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 584 Glycobiology A: Carbohydrate Chemistry (1)** Graduate course for students interested in carbohydrates.

**BCHEM 584 Glycobiology A: Carbohydrate Chemistry (1)**

The proposed course is designed to give graduate students interested in studying carbohydrates the basics about their chemistry. Because of their structure and the ability of just two sugars to form a number of different bonds with each other, carbohydrate chemistry is significantly more complex than that of any of the other building blocks found in the body. With the development of new approaches for studying these compounds, the science of glycomics is coming into its own.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 585 Glycobiology B: Glycoconjugates (1)** Graduate course for students interested in carbohydrates.

**BCHEM 585 Glycobiology B: Glycoconjugates (1)**

The proposed course is designed to give graduate students interested in studying glycoconjugates the basics about their structure, functions that they serve, exposure to papers pertinent to the field, and the opportunity to integrate what they learn in class with what they read in assigned papers through class discussion.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 586 Glycobiology C: Glycans in Health and Disease (1)** Graduate course for students interested in carbohydrates.

**BCHEM 586 Glycobiology C: Glycans in Health and Disease (1)**

Students will learn about the possible role(s) of glycans in health and disease and how that knowledge might be used to ameliorate certain diseases. Students will be expected to read papers and to integrate what they have learned in lecture with what they read when papers are discussed in class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BCHEM 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Biology (BIOL)

**BIOL 400 Teaching in Biology (1-3)** This course will train biology teaching assistants to teach in the laboratory/ recitation setting with emphasis on critical thinking skills. Enrollment will be limited to students of at least fifth semester standing that have been accepted as teaching assistants for biology.

### **BIOL 400 Teaching in Biology (1-3)**

This course provides teaching assistants with the fundamentals they will need to be effective in the laboratory and/or recitation classroom. Students will learn the fundamental skills needed to; design lesson plans; facilitate class discussions; write effective quizzes; communicate learning expectations; grade fairly; and in the case of the laboratory setting, maintain a safe learning environment. Students enrolled in this course will also be serving as teaching assistants and consequently faculty who serve as course instructors and/or lab coordinators in the relevant course will provide the instruction. Through regular meetings the course instructors will help teaching assistants adjust to their duties and solve common problems that arise in the laboratory/recitation environment. Emphasis will be placed on how teaching assistants can facilitate active learning and help their students develop sound study skills. Students enrolled in this course will be evaluated on regular attendance, organization in and preparation for their teaching, and clarity in how they communicate with their students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 402W Biological Experimental Design (3)** Discussion of experimental design, analysis and presentation, with a practicum providing for student design, analysis and presentation of biological experiments. Students may not take this course if they have taken BIOBD 350W.

### **BIOL 402W Biological Experimental Design (3)**

This course emphasizes written and oral communication of scientific ideas. Students discuss papers from the literature, preparing written critiques of two. Critiques are reviewed in writing by the instructor and peers and may be revised twice. Peer reviews are graded in writing and may be revised once. Written proposals for biological research are required. Students must build arguments for methodological rationales, justify statistical approaches, and place their proposed research into a larger societal context. Proposals are reviewed by the instructor and three peer reviewers. Peer reviewers must prepare written critiques and present proposals to the class during an "NSF"-style panel review. Prior to the presentation, the instructor provides written and oral feedback to the author and the peer reviewer in a meeting at which strategies for presenting the proposal are discussed. Subsequent to the presentation, peer reviewers write summaries of the discussion and provide explicit guidance to authors. Proposals may be revised twice. Peer reviews and summaries are graded in writing and may be revised once. Thus, each student writes 2 critiques, 1 proposal, 2 peer reviews of critiques, 1 peer review of a proposal, and 1 summary of the panel discussion. Each assignment is graded in writing and is subject to revision. Students also are graded on their proposal presentations and on participation in panel discussions. These activities constitute 75% of the final grade.

Students must demonstrate competence in the use of SAS, a statistics package. Students must choose and apply appropriate statistical techniques to biological data. In addition to the program and its output, students write interpretations of the results. This activity constitutes 25% of the final grade.

Lectures are used to review statistics and "how tos" (e.g., proposal preparation). Case histories are used to address ethics, statistical decision-making, and design. Students are expected to challenge what they learn, and the notion that scientists must acknowledge and guard against bias in their work is emphasized. Intellectual honesty and the ability to give and receive constructive criticism are demanded.

This course is required in two of the six options in biology (ecology and general), and it can be taken by students in the other options. The course is required of students who have not fulfilled the WAC requirement at the 200-level (transfer students).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 404 Cellular Mechanisms in Vertebrate Physiology (3)** This course considers cellular mechanisms governing physiological aspects of vertebrate cell signaling and their adaptation to particular organismal functions.

**Cellular Mechanisms in Vertebrate Physiology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 405 Molecular Evolution (3)** Introduction to concepts and techniques of analysis of molecular sequence data from an evolutionary point of view.

**Molecular Evolution (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1994

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 406 Symbiosis (3)** This course covers a variety of different types of symbiotic relationships between unicellular symbionts and plants, fungi, or animals.

**Symbiosis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 407 Plant Developmental Anatomy (3)** This course will examine the development of basic vascular plant anatomical structures including leaves, stems, roots, and flowers.

**BIOL 407 Plant Developmental Anatomy (3)**

The course will provide students with an understanding of the developmental anatomy of plant organs and tissues. More specifically, the course will focus on the structure and function of plant organs throughout their lifecycle, including embryogenesis, organ initiation, and the structures of leaves, roots, stems, and flowers in vascular plants. When appropriate, the course will discuss genes involved in the formation and function of these organs to provide illustrations of current scientific investigations in the field of plant developmental anatomy. Upon completing the class, students will have gained an appreciation of the structure/function relationships of plant tissues and organs in regards to their development and physiological roles.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 408 Contributions of Women to the Biological Sciences: Past and Present (3)** A study of the contributions that women scientists have made and continue to make in the biological sciences.

**Contributions of Women to the Biological Sciences: Past and Present (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 409** Biology of Aging (3) Mechanisms of the aging process, with special reference to man. Unfavorable progressive changes in molecules, cells, systems, and organisms.

### **Biology of Aging (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 411** Medical Embryology (3) Develops an understanding of human reproductive physiology, embryological processes, their time frames, and the development of major human body systems. The course emphasizes clinical correlations and the medical consequences of developmental abnormalities.

### **Medical Embryology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 412** Ecology of Infectious Diseases (3) This course examines how ecological processes impact upon the epidemiology of infectious diseases.

### **BIOL 412 Ecology of Infectious Diseases (3)**

The course will examine the population dynamics of disease and takes an ecological perspective on how pathogens and parasites flow through host populations to identify possible means of predicting and controlling pathogens.

The approach is one of population dynamics, examining changes in disease patterns in time and space. We construct mathematical models to capture the patterns observed, make predictions and identify the means of reducing disease spread. This is an ecological approach, applying the techniques of population biology to an understanding of Parasitology to develop a different perspective on epidemiology. At the same time, the course brings aspects of evolutionary biology into the course and will examine some of the current issues in disease biology including disease emergence, bioterrorism, agro-terrorism and the role of humans as disease reservoirs for wildlife etc.

Upon completion of this course, students will obtain insight into the dynamics of disease spread. They will understand how to construct models and how to apply generic models to specific disease systems and make predictions about controlling disease. They will grasp some major concepts in Parasitology and population dynamics including the role of the disease basic reproductive number (RO), when diseases show a density dependent patterns of transmission or a frequency dependent pattern, non-linear dynamics and the processes that generate heterogeneities in exposure and susceptibility. The course will provide an excellent course for pre-Med students, biologists and students interested in ecology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 413** Cell Signaling and Regulation (3) Introduction to the themes of cellular signaling and regulation through critical review of primary literature.

### **Cell Signaling and Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 414** Taxonomy of Seed Plants (3) Basic principles and procedures in the practice of angiosperm systematics.

### **Taxonomy of Seed Plants (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 415 Ecotoxicology (3)** Major concepts and controversies in the interdisciplinary field of ecological toxicology; toxicity analysis, remediation, and case studies of environmental pollution.

### **Ecotoxicology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 416 Biology of Cancer (3)** This course intends to illustrate biological basis of cancer development, and discusses aspects on prevention, detection, and treatment of cancer.

### **Biology of Cancer (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 417 Invertebrate Zoology (4)** Function and form of major invertebrate phyla.

### **Invertebrate Zoology (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 419 Ecological and Environmental Problem Solving (3)** Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and environmental problems.

### **BIOL 419 Ecological and Environmental Problem Solving (3)**

The course will provide a general overview of the process involved in studying a variety of ecological and environmental problems. It will provide a toolbox of techniques for understanding ecological and environmental problems, and discuss how they can be used to address questions and generate testable predictions. It will examine connections between individuals and populations and communities as well as between theory and data. The focus will be on theoretical and computer modeling approaches, while maintaining a strong link to data and real systems.

After an introduction to modeling, students will learn to develop and use simple and stochastic optimization models for individual organisms, as well as applying basic game theory to interactions between individuals. Many of the class meetings will be held in computer laboratories where they will be actively engaged in working on applying these models. They will explore a sequence of population demographic models of increasing complexity, ranging from unlimited, unstructured population growth to density-dependent, structured population growth, in non-spatial and spatial contexts, culminating in individual-based models for population dynamics. The students will then apply these models to interacting species, learning about mutualistic, competitive and host-natural enemy interactions. Finally, we will explore theory for communities of species in space and time. Applied problems will be drawn from all areas of conservation, harvesting, pest control and epidemiology. This course will be one of several ecology courses that are available to students in the ecology and general option in the biology program along with the biology minor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BIOL 420 (GEOSC 420) Paleobotany (3)** Classification, morphology, phylogeny, and stratigraphic occurrence of fossil plants; practicum includes field trips and study of paleobotanical techniques and specimens.

**BIOL (GEOSC) 420 Paleobotany (3)**

Land plants provide the oxygen, food, and forest structure that make our lives on land possible. They are sensitive indicators of global change in the past as well as today. This course will examine the history of green plants on the dynamic Earth from their beginnings in the Proterozoic oceans to today, with emphasis on central topics such as the colonization of land, the histories and relationships of major plant groups, the evolution of seeds and flowers, the evolution of plant-animal interactions, extinction and diversification, paleoclimates, and the origins of modern biomes such as rainforests and grasslands.

This course is strongly recommended to graduate students and advanced undergraduates with interests in paleobiology and/or plant biology. Specimen observation and field trips will be important course components. Exams, assignments, and class participation will be the primary bases of evaluation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 421 (VB SC 421) Comparative Anatomy of Vertebrates (4)** The comparative anatomy of representative vertebrate animals discussed from a descriptive and an evolutionary viewpoint.

**BIOL (VB SC) 421 Comparative Anatomy of Vertebrates (4)**

Upon completion of this course, students will understand the fundamentals of vertebrate anatomy and be able to employ comparisons between phylogenetically distinct vertebrate species to illustrate evolutionary adaptations and the relationship between structure and function. Unique adaptations such as those of ruminants and birds will be explored in addition to the more common fish, amphibians and mono-gastric mammals typically used to illustrate these principles. Laboratory activities utilizing specimens representative of higher and lower vertebrate species will emphasize structure identification and functional adaptations. Students will be evaluated by means of laboratory examinations which will focus on structure identification. Attendance in laboratory is mandatory and laboratory exercises to be completed at each laboratory period will be graded. Students that miss laboratory session due to an excused absence should arrange a make up assignment with the instructor. Unannounced quizzes will be presented in either lecture or laboratory sessions. Three lecture examinations and a comprehensive final examination will be given.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 422 Advanced Genetics (3)** Chromosomal mechanism of heredity; cytoplasmic and polygenic inheritance, chemical genetics, genomics, and experimental evolution.

**BIOL 422 Advanced Genetics (3)**

This course will examine the genetics of chromosomes and how changes in gene arrangements shape the structure and function of genes in genomes. This will include an examination of how chromosomes organize genetic information, how chromosomes are transmitted, how the evolutionary process shapes genetic variation in the genome of populations of organisms and between different species.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 424 Seeds of Change: The Uses of Plants (3)** Interdisciplinary approach to the biology, chemistry, history, and culture of the interactions between plants and people.

**Seeds of Change: The Uses of Plants (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 425 (PEM 425) Biology of Fungi (4)** A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to human affairs.

### **BIOL (PPATH) 425 Biology of Fungi (4)**

This course is a hands-on survey of fungal diversity, covering a wide variety of topics in fungal biology: phylogenetics, morphology, ecology, evolution, population biology, fungi as food, fungi as sources of toxins, ethnomycology, fungi as agents of plant and animal disease, fungi as sources of pharmaceuticals, and industrial uses. All fungi will be discussed, from mushrooms and other fleshy fungi to molds to slime molds. The laboratory portion of the course will center mostly around handling and manipulating freshly collected and living fungi, and microscopic analysis of their major features. There will be approximately 4-5 required field trips to local forests during the laboratory period, to observe fungi in their natural habits and collect them for further analysis in the laboratory. Students will come out of the course with a broad base of knowledge about fungi and their diversity and the ability to handle them in the laboratory and observe them using the microscope.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 425 (PEM 425) Biology of Fungi (4)** A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to human affairs.

### **BIOL (PPATH) 425 Biology of Fungi (4)**

This course is a hands-on survey of fungal diversity, covering a wide variety of topics in fungal biology: phylogenetics, morphology, ecology, evolution, population biology, fungi as food, fungi as sources of toxins, ethnomycology, fungi as agents of plant and animal disease, fungi as sources of pharmaceuticals, and industrial uses. All fungi will be discussed, from mushrooms and other fleshy fungi to molds to slime molds. The laboratory portion of the course will center mostly around handling and manipulating freshly collected and living fungi, and microscopic analysis of their major features. There will be approximately 4-5 required field trips to local forests during the laboratory period, to observe fungi in their natural habits and collect them for further analysis in the laboratory. Students will come out of the course with a broad base of knowledge about fungi and their diversity and the ability to handle them in the laboratory and observe them using the microscope.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 426 Developmental Neurobiology (3)** Overview of basic developmental processes as they apply to the central nervous system.

### **BIOL 426 Developmental Neurobiology (3)**

This course will provide a general overview of developmental processes as they apply to the central nervous systems. From initial differentiation of neuronal tissue to the aging of human brain, this course will expose students to many hot topics in the current neuroscience research field, including synaptogenesis, axon guidance, neural stem cells, apoptosis, learning and memory, and Alzheimer's disease. Although one textbook will be assigned as the major reference book, many current research results will be integrated into the lectures so that students can grasp the most recent advancement related to each topic.

The course will be divided into four parts. Part I introduces the induction of neural tissue, the polarity and regionalization of the neural tissue, and the generation and function of neural stem cells. Cutting-edge research on neural stem cells will be discussed. Part II deals with various interactions within neuronal system, including neuron-glia interaction, cell adhesion and migration, axon growth and guidance, and target selection. Part III teaches synapse formation and maturation, neurotrophic factors and their distinct functions, and neuronal cell death. Part IV talks about learning and memory from developmental view, and also the memory disease -Alzheimer's disease. Current research on Alzheimer's disease will be discussed.

The lectures will be given in PowerPoint presentations. Classical models and front line research will be integrated to stimulate students' imaginative thinking. Students will be encouraged to read some current research paper and offer their own view on some particular subject, such as neural stem cells and learning and memory.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 427 Evolution (3)** Selected topics on the evolution of life.

### **Evolution (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 428 Population Genetics (3)** Mathematical formulation of evolution by natural selection, genetic equilibrium under selection, mutation, migration, random drift.

### **Population Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 429 Animal Behavior (3)** Physiological mechanisms, ecological relevance, and adaptive significance of animal behavior.

### **Animal Behavior (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 430 (B M B 430, ENT 430) Developmental Biology (3)** Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

### **Developmental Biology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 431 Reproductive Biology (3)** Reproduction is essential to all life and the course will explore development, physiology, cell biology, genetic and evolutionary aspects of this area.

### **Reproductive Biology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BIOL 432 Developmental Genetics (3)** An advanced course in developmental biology, focusing on the use of genetics techniques to study fundamental questions of animal development.

### **Developmental Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 434 Pathobiology of Emerging Infectious Disease (3)** The course will analyze the pathology, immunology, microbiology, evolutionary biology, and policy of important emerging and reemerging infectious diseases.

### **Pathobiology of Emerging Infectious Disease (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 435 Ecology of Lakes and Streams (3-4)** Physical, chemical, and biological characteristics of freshwater environments, with special emphasis on factors regulating productivity in freshwater ecosystems.

### **Ecology of Lakes and Streams (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 436 Population Ecology and Global Climate Change (3)** Ecological responses of individuals, populations, and communities to environmental variation, with emphasis on climate change.

### **BIOL 436 Population Ecology and Global Climate Change (3)**

In this course, students will be presented with a close look at the factors shaping the characteristics of populations and their dynamics in time and space, with emphasis on the responses of populations to climatic fluctuation and global climate change. The course begins with an introduction to the basic concepts necessary for understanding the responses of individuals, populations, and communities to climate change in the recent past (the past 2 centuries), present, and future. These concepts include: the science of climate change, how temperature trends are estimated, the data used in assessment reports by the Intergovernmental Panel on Climate Change, large-scale climate systems such as the North Atlantic Oscillation and the El Nio Southern Oscillation, the basic characteristics of populations, how population densities are estimated, and the types of population data used in studies of population responses to climate change. In this first section of the course, students are also introduced to natural selection and the concepts of adaptation and vulnerability, which sets the stage for distinguishing between adaptive ecological responses to climate change vs. susceptibilities to climate change.

After presenting these basic concepts, the course then moves on to examine single-species population dynamics. This section of the course teaches students about the different types of population growth, including unlimited growth, density-dependent population dynamics, and density-independent population dynamics. Here, we take a close look at case studies documenting population responses to large-scale climatic fluctuation, and case studies that demonstrate interactions between the opposing influences of density dependence and climate on population dynamics. This section of the course also introduces students to some of the analytical difficulties inherent in quantifying the contribution of climatic fluctuation to local population dynamics. This section finishes with lectures on the phenomenon of spatial synchrony in population dynamics and the implications of global climate change for widespread population decline and extinction risk.

The final section of the course focuses on multi-species dynamics. Lectures in this section introduce students to inter-specific competition through examination of case studies involving desert rodents and ants; then move on to predation, with case studies of wolf predation illustrating the different types of functional and numerical responses, predator-prey cycles, and cascading effects of predators on population dynamics at lower trophic levels including herbivores and plants; and parasite-host dynamics, including discussion of the role of parasites as specialized predators in host population dynamics. This section also includes discBIOL 436 Population Ecology and Global Climate Change (3)

General Education: None  
Diversity: None



Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 437 Histology (4)** Microscopic structure of the tissue of the animal body.

#### **Histology (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 438 Theoretical Population Ecology (3)** Theoretical discussions of demographics, population and metapopulation growth models, life histories, and species interactions such as competition, predation, host-parasitoid relationships.

#### **BIOL 438 Theoretical Population Ecology (3)**

At the present time our program has no theoretical and quantitative upper level ecology course. This course is designed to be a highly-quantitative second ecology course. It emphasizes mathematical and theoretical approaches to ecological questions and reinforces the theory with practical, hands-on field and laboratory exercises in which students are required to erect and test hypothesis using appropriate experimental and statistical techniques. The course builds on concepts from introductory ecology and requires students to use tools acquired in biostatistics and calculus to solve ecological problems. It can act as an introduction to or as an extension of experimental design. Although it is not a writing intensive course, students will be required to use standard technical writing and public speaking skills throughout the course. The course covers topics that are relevant to, but not addressed in, evolution and evolutionary genetics. In addition, it offers an opportunity for mathematics students interested in applications of mathematics to biological problems to apply models covered in mathematical modeling to real situations.

Throughout the semester analytical and theoretical thinking will be emphasized, starting with simple descriptions of population phenomena and ending with development of mathematical models and the critical experiments needed to test those models. The emphasis lies on empirical tests of ecological theory and applications of ecological theory to real-world problems. Students will be evaluated by means of essay exams covering theory, mathematical models, and the design of hypothetical experiments, in-class presentations of the primary ecological literature and applications of ecological theory to current environmental problems, and laboratory reports in which data collected during laboratory exercises will be analyzed and interpreted. Field exercises will be conducted on the campus of Penn State Erie and will take advantage of the rich natural environment on campus including numerous wetlands, streams, forests, and old fields.

This course will be available to all biology majors as elective credit at the 400 level. It also will be a core course requirement for any biology major taking the Ecology Option. It may function as a course for students seeking a minor in biology, particularly for mathematics majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 439 Practical Bioinformatics (3)** Practical aspects of retrieving and analyzing biological information residing in common databases.

#### **BIOL 439 Practical Bioinformatics (3)**

This course focuses on practical aspects of biological databases and analyses of molecular data. Students will learn about vast resources available, how to access them, and retrieve only the desired information. Sequence comparison and alignment methods will be presented. We will discuss practical aspects of such algorithms as dot matrix plots, dynamic programming, BLAST, and FASTA. Different strategies of multiple alignments will be discussed as well. We will cover computational genomics and computational analysis of gene expression. Students will learn how to assemble short sequences into long contigs and how to infer biological information from raw sequence data. They will learn how to analyze protein sequences including secondary structure prediction, protein function prediction (based on motifs and functional domains), and structural modeling. The whole course will be well balanced between theoretical description of computational biology methods and practical aspects of bioinformatics (some sessions will meet in computer classrooms)

Upon completion of this course, students will have sufficient knowledge to retrieve a desired information from biological databases based on both text and sequence data. They will learn what public resources are available in term of databases and a software. They will know how to interpret results in biological context and how to adjust different parameters in the software to get exact desired results.

This course will be one of several courses that are available to students in the genetics and developmental biology and general options in the biology program along with the biology minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 441 Plant Physiology (3)** Classical and current concepts in plant constituents, mineral nutrition, water relations, respiration, photosynthesis, photoperiodism, plant hormones, growth, and development.

### **Plant Physiology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3)** How evolution of animals and plants can be traced to changes in the regulation and/or interactions of genes controlling development.

### **BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3)**

"Evo-devo" is a new, exciting and interdisciplinary field in biology that encompasses knowledge from developmental biology, comparative genomics, gene regulation and evolutionary theory. The key concept in "evo-devo" is that the evolution and diversification of animals and plants can be traced to changes in the regulation and/or interactions of genes controlling development. The first few weeks of the course will bring students up to date on what they need to know about evolution, development and molecular genetics to appreciate the interdisciplinary field of "evo-devo". As this is such a new field, subsequent classes will give students a taste of the excitement of current research through the use of case studies. There will be ten case studies, seven examples from animals and three examples from plants, covering a range of morphological novelties and concepts. Each case study will involve one or more lectures of background information given by the instructor and one discussion class in which students will read, present and discuss reviews and/or primary research articles. Students will be given enough background information in the fields of evolution, development and molecular biology to enable them to understand and discuss primary literature in evo-devo. For many students this will be the first time they have read reviews and articles from the literature and this course will give them the capacity to move beyond textbook knowledge to knowledge of how science really works.

This course will be one of several courses that are available to students in the genetics and development, and general options in the biology program along with the biology minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 444 Field Ecology (3)** This field course will explore the flora and fauna of the mid-Atlantic area.

### **BIOL 444 Field Ecology of the Central Appalachian Highlands (3)**

This course is designed to take advantage of the teaching opportunities presented by the West Virginia highlands. The main advantage of using this area as an outdoor classroom derives from the fact that there are large changes in elevation and soils, and a tremendous variety of community types located in a small geographic area. In this area, students can observe ecological communities ranging from river, bottom forests at 1500 to 2000 feet in elevation to dry ridge slope forests at 3000 feet to the unique acid soil heath barrens community of the Dolly Sods Wilderness at 4000 feet. Since almost all of this area was extensively logged in the past, students will have the opportunity to observe the results of succession, and how the process of succession is affected by variation in topography, soil type and local climate. There are also several types of aquatic communities available for study, including large rivers, small high elevation streams and acidic wetlands. The course will use an integrated natural history approach to study the various ecological communities. This will include discussion of the effects of human activity and the topography and geology of the area in addition to study of terrestrial and aquatic flora and fauna. At terrestrial site, we will, in part, follow the example of the US Forest Service's Forests of the Central Appalachians Projects (<http://www.spies.com/~gus/forests/>) which uses forest walk inventories to document biodiversity. Therefore, the course would have a significant plant identification and taxonomy component. Each community can be studied as a separate unit and then compared to the adjacent communities at different elevations. By the end of the course, students should understand the relationship of geology, topography and soil type to the distribution of plant communities. They should also understand the relationship of plant communities and water chemistry to the distribution of aquatic insect and vertebrate and be able to use aquatic insects as water quality indicators. This course will be one of several field courses that are available to students in the ecology and general option in the biology program along with the biology minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 446 Physiological Ecology (3)** The physiological abilities of plants and animals to adapt to their abiotic environment.

**Physiological Ecology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 448 Ecology of Plant Reproduction (3)** Analysis of the ecology, evolution, and natural history of angiosperm reproduction, including pollination, fruit-set, dispersal, and relevant plant- animal interactions.

**Ecology of Plant Reproduction (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 450W Experimental Field Biology (3-5)** A practical introduction to modern experimental techniques for ecological study of terrestrial, marine, and fresh water habitats.

**Experimental Field Biology (3-5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 459 (BIOTC 459, HORT 459) Plant Tissue Culture and Biotechnology (3)** Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

**Plant Tissue Culture and Biotechnology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 460 (ANTH 460) Human Genetics (3)** The human genome, its variation, origins, and relation to disease and other traits.

**BIOL (ANTH) 460 Human Genetics (3)**

The course considers many examples derived from the study of the genetics of human disease, and includes most general areas of interest, including simple Mendelian disorders, and complex chronic diseases such as cancer and cardiovascular disease, and variable special topics including immunogenetics and the genetics of imprinting or other processes. The course usually also touches briefly on the nature of forensic genetics and the problem of making inferences from individual genotypes. Finally, the course considers the bioethical and societal issues involving contemporary human genetics. The study of disease genetics is important for students preparing for graduate work in medicine and other health professions as well as for graduate studies in molecular and evolutionary genetics and related areas, including biological anthropology and bioethics. This course is relevant to requirements or appropriate electives for life science majors and graduate students (check with your academic advisor). Over the years, it has been proven to be excellent preparation for subsequent graduate and professional work in these areas. The course is offered most years, in the fall semester. Depending on enrollment and other factors, the course may include graded homework or other components, but

evaluation is predominantly based on exams during the semester and a comprehensive final. This course is cross-listed as ANTH 460 and BIOL 460, but there is only one course, at the same time and place, for all students no matter how they register. In some years, a 4-credit Honors version is offered (ANTH 460H/BIOL 460H), that is identical to 460 but with an additional class period each week involving additional written and presentational assignments and term projects, along with the regular 460 exams, that combine to determine the final grade.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 460H (ANTH 460H) Human Genetics (4)** Gene mapping in humans; molecular basis of genetic disease; gnomonic structure; immunogenetics; and genetic evidence for human evolutionary history.

**BIOL (ANTH) 460H Human Genetics (4)**

Students will explore interesting normal or pathological variation to understand first its biological nature, then its epidemiological distribution, genes and genetic mechanisms associated with the trait, phylogenetic origins or comparison, and the nature of relevant genotype-phenotype relationships. Alternatively, students may explore methods for identifying and characterizing gene action or structure, or historical subjects related to human variation and evolution. Ethical and societal aspects of these issues will be considered as well. Time will be taken for faculty or students to read and present current important papers appearing in the literature, relevant to the current course topics. As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course format of Human Genetics 460 which, while presenting material at a sophisticated level, will not have time to explore the more subtle, problematic, or challenging aspects. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when the instructor learns they have registered. The nature of the course will be described including semester-specific themes or focus that will apply (if any). Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. Students will be evaluated on the quality of their project work, including writing ability, presentation ability, and depth of thought. Several written assignments will be given and graded for content and expression quality. Although students will take regular Human Genetics 460 lectures, they may be given separate exams (corresponding to those given in the regular course) that will allow more freedom of expression than multiple-choice exams or homework assignments. Depending on the workload in any semester, there may be a separate written take home synthetic essay final exam. The Honors session each week will be highly interactive rather than passive, and students will be graded on attendance, participation and whether they have done assigned work in advance of the class. Students will be expected to have the stipulated background knowledge of biological anthropology, evolutionary biology, statistics and genetics. This course should count as 4 credits toward additional courses in biological anthropology required for the Anthropology major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 461 Contemporary Issues in Science and Medicine (3)** Current/classical issues relating to health, research, agriculture, environment, and biotechnology. Active exploration of the impact of science on society.

**BIOL 461 Contemporary Issues in Science and Medicine (3)**

The aim of this course is to provide students of the biological and biomedical sciences with a framework to recognize, examine, and resolve conflicts which may affect their professional conduct. Current and classical issues relating to human health, scientific and medical research, agriculture, the environment, and biotechnology will be explored. The history, controversies, and current issues related to each topic will be presented by the instructor through lecture, guest presentations, and multimedia presentations. Each topic will be explored by students through a variety of activities, including role playing, case studies (real and hypothetical), mock trials, small- and large-group discussions, writing exercises, and student research projects presented in oral and poster format. Some activities and discussions will involve the entire class simultaneously, while other activities will be structured for very small groups (2-3 students), small groups (5-6 students), or large groups (10-15 students). This course is especially relevant to any student majoring in Biology, as it allows and encourages them to relate information they have learned in other Biology courses to their own professional conduct. Although the course was specifically designed to cover issues that are relevant to students majoring in each of the Biology concentration areas (Genetics and Developmental Biology, Ecology, Plant Biology, and Vertebrate Physiology), it is also relevant to students in colleges other than Science, who may be enrolled in majors with some biological content or applications. This course is designed to be rigorous and very interactive.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 463** General Ecology (3) Illustrates science of ecology, from individual, population, and community- level perspectives, discusses applications of this science to issues of conservation of biodiversity.

### **General Ecology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 464** Sociobiology (3) The study of the adaptive function of social behavior, the comparative analysis of social organization, and the ecology of sociality.

### **Sociobiology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 467** Molecular Basis of Neurological Diseases (3) Students taking this course will learn about neurological diseases in a biological molecular context.

### **Molecular Basis of Neurological Diseases (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 469** (BB H 469) Neurobiology (3) Comprehensive examination of neuroanatomy and physiology designed to integrate the principles of neurochemistry, neuroendocrinology, and molecular biology.

### **Neurobiology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 470** (BB H 470) Functional and Integrative Neurosciences (3) Neurobiological function in motivated behaviors, motor and sensory functions, learning and memory development, sexual differentiation, and pathology.

### **Functional and Integrative Neurosciences (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 472** Mammalian Physiology (3) Mechanisms concerned with normal animal function, with special emphasis on humans.

### **Mammalian Physiology (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 473** Laboratory in Mammalian Physiology (2) Laboratory experiments demonstrating fundamentals in physiology.

### **Laboratory in Mammalian Physiology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 474** (GEOSC 474) Astrobiology (3) In depth treatment of principles/concepts of biochemical evolution, the origin/evolution of life; evaluation of distribution of life in the universe.

### **BIOL (GEOSC) 474 Astrobiology (3)**

Astrobiology is the study of life in the universe. Astrobiology has become a major focus of scientific research in the United States and a topic often discussed in popular science literature. The recent interest in astrobiology has resulted in the formation of an Astrobiology Institute at Penn State University. This advanced undergraduate course in astrobiology will cover many topics in the field including, biochemical evolution, the origin and evolution of life on Earth, microbial diversity, protein evolution, and the distribution of life in the universe. This course is intended to provide students of the natural sciences with the opportunity to prepare for a research career in the rapidly expanding field of astrobiology. The course will also present astrobiology as a cross-disciplinary framework that ties together the diverse courses the students have already taken. The students will learn new concepts while having, to draw on their previous knowledge of chemistry, biology, and the geosciences. In summary, this course has the following objectives: (1) to develop the student's literacy in astrobiology so that they can critically evaluate claims that they encounter well after the course has ended; (2) to present a scientific question that requires the sum of the student's previous education to solve; (3) to provide a deep background to some of the astrobiological concepts that are often only briefly mentioned in other classes or in the media; (4) to develop research and communication skills required for a young scientist through a class term paper and short oral presentation; and (5) to prepare the students for graduate research in astrobiology by giving them a broad background of the field and by demonstrating many of the outstanding problems yet to be solved.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 479** (AN SC 479) General Endocrinology (3) Endocrine mechanisms regulating the morphogenesis, homeostasis, and functional integration of animals.

### **General Endocrinology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 482** Coastal Biology (3-4) Marine organisms, their interactions with each other, and their relationships with several coastal habitats.

### **Coastal Biology (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 492** Senior Seminar in Biology (1) Discussion of selected topics from recent biological literature; reports on current

research or internship experiences.

### **Senior Seminar in Biology (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 495** Internship in Biology (1-12) Practical off-campus experience in Biology under the supervision of a professional and a faculty member.

### **Internship in Biology (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497A** The Biology of RNA (3) This course will explore the biological functions that RNA plays in diverse organisms, including transcription, translation, virology, and RNA - interference.

### **The Biology of RNA (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BIOL 497A** The Biology of RNA (3) This course will explore the biological functions that RNA plays in diverse organisms, including transcription, translation, virology, and RNA - interference.

**The Biology of RNA (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497A** The Biology of RNA (3) This course will explore the biological functions that RNA plays in diverse organisms, including transcription, translation, virology, and RNA - interference.

**The Biology of RNA (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497C** Comparative Neuroanatomy (3) Structural-functional organization of the central nervous system of primates and other vertebrates. Emphasis is placed on understanding the anatomical structure of the major neural systems and the evolutionary principles that guided their phylogenetic development in different vertebrate lineages.

**Comparative Neuroanatomy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497E** Evolution of the Vertebrates (3) This course covers evolution of vertebrate animals, with emphasis on adaptation and convergence within and among living representatives of each group.

**Evolution of the Vertebrates (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497I** Global Climate Change: A Field Course in Panama (1) Students must complete a field-based trip experience with the Smithsonian Tropical Research Institute in selected biological field stations throughout Panama.

**Global Climate Change: A Field Course in Panama (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 497T** Biology of Eco-Health (0.5-3) This three-week summer session course is taught entirely in Tanzania during the first summer session at Penn State. Students will examine topics related to human health, human-environment interactions, and conservation of natural resources. In addition to lectures and discussions, this exceptional opportunity allows students to participate in guided field studies contributing to long term datasets and research projects in both pastoral and agricultural ecosystems. The course will include guest lectures by local experts in biology, conservation, and health as well as visits to research institutions, national parks and a medical clinic/lab.

**Biology of Eco-Health (0.5-3)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 498** (ENT 498) Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 498A** Biology of Eco-Health (0.5-3) This three-week summer session course is taught entirely in Tanzania during the first summer session at Penn State. Students will examine topics related to human health, human-environment interactions, and conservation of natural resources. In addition to lectures and discussions, this exceptional opportunity allows students to participate in guided field studies contributing to long term datasets and research projects in both pastoral and agricultural ecosystems. The course will include guest lectures by local experts in biology, conservation, and health as well as visits to research institutions, national parks and a medical clinic/lab.

#### **Biology of Eco-Health (0.5-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 499A** (IL) Tropical Field Ecology (3) An intensive introduction to tropical biodiversity to be taught in Belize, Central America.

#### **Tropical Field Ecology (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 505** Statistical Methods in Evolutionary Genetics (3) Statistical methods that are used for analyzing and interpreting genetic data in molecular evolution will be discussed.

#### **Statistical Methods in Evolutionary Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BIOL 514** Topics in Systematics and Evolution (2) Discussion of pertinent current literature in systematic biology and evolution.

**Topics in Systematics and Evolution (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 519** Ecological and Environmental Problem Solving (4) Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and environmental problems.

**BIOL 519 Ecological and Environmental Problem Solving (4)**

The course will provide a general overview of the process involved in studying a variety of ecological and environmental problems. It will provide a toolbox of techniques for understanding ecological and environmental problems, and discuss how they can be used to address questions and generate testable predictions. It will examine connections between individuals and populations and communities as well as between theory and data. The focus will be on theoretical and computer modeling approaches, while maintaining a strong link to data and real systems.

After an introduction to modeling, students will learn to develop and use simple and stochastic optimization models for individual organisms, as well as applying basic game theory to interactions between individuals. Many of the class meetings will be held in computer laboratories where they will be actively engaged in working on applying these models. They will explore a sequence of population demographic models of increasing complexity, ranging from unlimited unstructured population growth to density-dependent, structured population growth, in non-spatial and spatial contexts, culminating an individual-based models for population dynamics. The students will then apply these models to interacting species, learning about mutualistic, competitive and host-natural enemy interactions. Finally, we will explore theory for communities of species in space and time. Applied problems will be drawn from all areas of conservation, harvesting, pest control and epidemiology.

Graduate students will additionally be required to attend a once a week case study, where we will focus on a paper from the recent literature that uses the techniques or theory learned that week in class. Additionally, graduates will develop models of their own, based on their own research, or on some other subject of interest. They will be expected to meet with me twice in a group and individually during office hours throughout the semester, to discuss the development of their projects. They will have to complete a written report on the motivation, model development, and results and implications of their work. This work will take the form of a short manuscript (as if for publication to a representative journal in their field). They will also have to make a verbal presentation to the entire class on their project (15 minutes, as if attending a professional conference). The course will be offered once/year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 546** Ecology of Populations (3) Ecological responses of organisms to environmental variables (food, etc.) that determine population behavior. Demography, competition, predation, and community principles.

**Ecology of Populations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 571** (PHSIO 571) Animal Physiology (3) Mammalian cardiovascular, respiratory, renal, and gastrointestinal systems.

**Animal Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 572** (PHSIO 572) Animal Physiology (3) Mammalian nervous, endocrine, metabolic, and reproductive systems.

### **Animal Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 591** Molecular Evolutionary Biology Seminar (1) Continuing seminars in Molecular Evolutionary Biology consisting of individual lectures by faculty, students, or outside speakers.

### **Molecular Evolutionary Biology Seminar (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 592** Critical Evaluation of Literature in Biology (1) Weekly readings and critiques of recent papers from primary literature are used to teach independent thinking and effective scientific communication.

### **BIOL 592 Critical Evaluation of Literature in Biology (1)**

This course teaches beginning graduate students how to evaluate new findings reported in primary literature in the biological sciences. Each week, a recently published paper is evaluated according to 8 basic criteria as follows:

1. Does the author adequately establish a context for the issues addressed in the paper? Are the issues addressed in the paper important in the field? Why or why not?
2. What is the hypothesis? Is it clearly stated? Is it operational (i.e. "falsifiable")?
3. Are the methods adequate to test the hypothesis? Why or why not? What are the controls? Are they adequate?
4. Are the data clearly presented? Are the results properly analyzed? Are statistical inferences stated appropriately? Do the data meet the assumptions of the statistical tests?
5. What conclusions are drawn from the results? Do the conclusions follow from the data? Have some conclusions been overlooked? Are there reasonable alternative interpretations of the data? Did the authors consider alternative hypotheses?
6. What could be done to improve the paper? Consider written format as well as the overall experimental design. For example, is the title appropriate? Does the abstract accurately summarize the results and conclusions? Does the paper use recent and appropriate references?
7. What is your overall opinion of the size of contribution that the paper makes to the body of knowledge in its field? Is this work creative? Does it provide new insights or a framework to understand previously disparate data? Defend your position.
8. What would be the next set of tests of the hypothesis or the next hypotheses to test? How should these hypotheses be examined experimentally? To what extent do you think this paper will stimulate further studies?

The goal of the course is to provide students with opportunities to sharpen their thinking in regard to what constitutes meaningful scientific experimentation, interpretation of results, and effective presentation of information in text, figures, and tables. Near the end of the course each student prepares a written critique of a paper, and meets individually with the faculty to discuss their critique. The course follows a format very similar to the Ph.D. candidacy exam for Biology, thus providing formal preparation for that exam.

Faculty: James Marden

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 598A** Experiential Teaching in Biology (2) This course will cover issues related to national reform efforts in science education, as well as our current understanding of how people learn, and research based understanding of effective pedagogy. It is intended to prepare graduate students to teach in biology courses.

**Experiential Teaching in Biology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 602** Supervised Experience in College Teaching (1-3) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BIOL 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Biomedical Sci-Hy (BMS)**

**BMS 501** Regulation of Cellular & Systemic Energy Metabolism (3) Teaches biochemical and signal transduction concepts while exploring the control of bioenergetic processes.

**BMS 501 Regulations of Cellular & Systemic Energy Metabolism (3)**

Energy is fundamental to life. The production, storage and utilization of energy by organisms are highly regulated processes that provide excellent examples of the principals that govern the control of cellular metabolism and hormonal signaling. In addition, future biomedical scientists must be prepared to study diseases associated with aberrant energy metabolism, such as diabetes, obesity, and malnutrition. Regulation of Cellular & Systemic Energy Metabolism is one of three thematic courses that comprise the fall semester. The course explores how energy is obtained, stored and utilized by cells, tissues and organisms. The biochemistry of energy metabolism is studied with a focus on mechanisms by which these pathways are controlled in order to maintain health and energy homeostasis. Principles of hormonal signaling and cellular signal transduction pathways are studied in the context of energy metabolism. In addition, knowledge of these subjects is applied to the study of pathologies involving abnormal energy metabolism, including diabetes, obesity and starvation. Course objectives include developing an understanding of metabolic pathways and the mechanisms by which they are regulated; understanding principals of receptor theory, signal transduction and hormonal control of cellular processes; and gaining an understanding and appreciation of diseases that involve abnormal energy metabolism. The

course is taught in approximately four blocks, with review sessions and examinations following each block. Exams are designed to determine mastery of the subject matter and to evaluate the ability to solve problems and logically address research questions. The principles and skills learned through successful completion of the course help prepare students for advanced graduate courses and graduate research careers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 502 Cell and Systems Biology (3)** Explores the cellular and intracellular organization of biology, assembly of cells into tissues, and further integration into biological systems.

### **BMS 502 Cell and Systems Biology (3)**

This course will cover the cellular basis of physiological processes from a systemic perspective. The major emphasis will focus on the cellular, molecular, and biochemical basis of normal and abnormal (pathological) tissue function. A special emphasis will be placed on common themes applicable to all tissue and the integration of molecular, cellular, tissue and organ systems. Introductory lectures will be followed by discussion of the primary literature that complements the lecture material. The course is designed to give students an appreciation of the cell and molecular mechanism underlying physiological processes as well as cell and molecular biology research techniques.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 503 Flow of Cellular Information (3)** Teaches concepts underlying the inheritance, transmission and translation of genetic information.

### **BMS 503 Flow of Cellular Information (3)**

Medicine in the 21st century must incorporate an understanding of the genetic information that underlies all biological processes in every cell, tissue, and organism together with an appreciation of how genetic differences impact complex cellular pathways and individual traits or disorders. Further, with the culmination of the human genome project and high-throughput analysis this information can now be considered in the context of whole genomes and proteomes. This course provides students with a fundamental understanding of the basic processes that convert this genetic DNA information to produce RNA and proteins and the genetic principals that underlie transmission of this information at each cell division and to subsequent generations. This topic is of importance for all biomedical disciplines.

The course explores how DNA is inherited, replicated, transcribed, translated, mutated, repaired, and manipulated, and how this information is utilized by cells, tissues and organisms and in the context of genomes and populations. Central dogma (DNA to protein) is studied with a focus on mechanisms by which these processes are controlled. Other topics include non-coding RNAs and protein degradation. Course objectives include understanding the mechanisms of how these processes occur and how they are regulated; developing an appreciation for the genetic and molecular biology approaches that have allowed insight into these processes.

The flow of cellular information is one of three thematic courses that comprise the fall semester. The course is taught in approximately three blocks, with review sessions and examinations following each block. Exams are designed to determine mastery of the subject matter and to evaluate the ability to solve problems and logically address research questions. The principles and skills learned through successful completion of the course help prepare students for advanced graduate courses and graduate research careers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 504 Art of Scientific Communication I (1)** Introduction to scientific analysis, writing, and oral presentation using primary literature sources.

### **BMS 504 Art of Scientific Communication I (1)**

The overall goal of BMS 504, and the sequential course BMS505 taken in the Spring semester, is to develop the students into scientific communicators who, in written and oral formats, can convey scientific concepts and the experimental

support for these concepts. This includes the development of the knowledge base and communication skills required for effective scientific exchange and engagement. BMS 504 meets 90 minutes, once a week for 11 weeks from the first week of class until the Thanksgiving Recess, and focuses on reading and analyzing articles from the primary literature with brief presentations by students. The intent of this schedule is to support the students in developing the skills necessary to analyze the primary literature, begin to present components of scientific articles in a group setting, and complete these goals in a time frame that does not compete with end-of-semester examinations. The first meeting is a presentation by a course director on Effective Powerpoint Presentations. The following 10 meetings allow two weeks to cover each of five topics. Each topic focuses on a high quality article selected from a portfolio created by the instructors of the Fall first-year Core Curriculum for the Biomedical Sciences (BMS) Graduate Program (BMS 501, 502, and 503). Topics vary from year to year. The first week of each topic examines the components of the chosen article (purpose and significance) and is led by one of the course directors. The second week includes short presentations by students on experimental design and data analysis from the articles and is facilitated by a content expert from one of the Core BMS Courses.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

Concurrent: BMS 501 BMS 502 BMS 503

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 505** Art of Scientific Communication II (1) Advanced topics in scientific analysis, writing, and oral presentation using primary literature sources.

#### **BMS 505 Art of Scientific Communication II (1)**

The overall goal of BMS505 is to further the development of students as scientific communicators that began in BMS 504. This includes enhancement of the knowledge base and communication skills, in written and oral presentations, required for effective scientific exchange and engagement. BMS 505 meets 90 minutes, once a week for 10 weeks from the first week of class until the end of April, and focuses on reading and analyzing articles from primary literature with extended oral and written presentations by students. Topics vary from year to year and focus on research or curricular interests of students enrolled in the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 506A** Biological Basis of Human Health and Disease A (2) Cellular, molecular, genetic, and biochemical basis of organ function pathology.

#### **Biological Basis of Human Health and Disease A (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 506B** Biological Basis of Human Health and Disease B (2) Cellular, molecular, genetic, and biochemical basis of organ function pathology.

#### **Biological Basis of Human Health and Disease B (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 520** Human Integrative Physiology (3) This course explores whole organ physiology emphasizing skeletal muscle and exercise physiology, cardiovascular, renal and urinary, respiratory, gastrointestinal, and endocrine.

#### **BMS 520 Human Integrative Physiology (3)**

Human Integrative Physiology considers the function of the mammalian organism with an emphasis on system physiology.

This course builds upon the strong foundation of cellular processes, molecular interactions, and genetic regulation provided in BMS 501, 502, 503 and allows students to develop an appreciation of the integration of biological function. The course is organized into multiple sections that focus on different organ systems. Initially, the course reviews principles of excitable cells and discuss sensory transduction, the autonomic nervous system, and motor system physiology. Next, students learn the structure and function of skeletal muscle physiology including muscle contraction, force generation, and movement. The course then focuses on the structure and regulation of the cardiovascular, renal, and respiratory systems. Subsequent sections cover gastrointestinal and endocrine systems by building upon the cellular and molecular processes covered in BMS 501, 502, and 503. Each section teaches the basic design of the system, explores the physiological principles of function, and examines how each system contributes to homeostasis and pathophysiological disease. Class material is covered through lectures and primary literature.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 568** Current Topics in Translational Cancer Research (3) The course covers current topics in cancer research, with a focus on translation to the clinic.

### **Current Topics in Translational Cancer Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 571** Graduate Clinical Rotation (1-3) This course allows graduate students at Hershey and University Park to gain experience in the clinical arena.

### **BMS 571 Graduate Clinical Rotation (1-3)**

The Graduate Clinical Rotation is designed to allow graduate students at Hershey and at University Park to gain intensive experience in the clinical arena in the area of their thesis research. The site of the clinical rotation and specific responsibilities of the student are determined by the clinical mentor that is matched with the student. Clinical mentors will indicate their willingness to sponsor a student and will outline the associated opportunities and responsibilities of the specific clinical rotation. The specific rotation will be selected by the student and the thesis mentor to compliment the student's graduate studies.

Opportunities during the clinical rotation: The rotation typically will last 6 – 8 weeks and the student will be in the clinic and/or engaged in clinical activities for about 4h/week. During this rotation, students will have a range of opportunities including: attending Grand Rounds, attending Resident and Department Seminars and lectures, shadowing physicians, attending clinical research meetings, attending relevant case conferences, and, if appropriate, observing surgery. Students also may engage in a practical hands-on analysis of the subject matter (e.g., via an analysis of data, histology, fMRI, etc.) and they will be involved in the discussion of relevant cases and of potential treatment strategies.

Requirements: Course-specific policies and expectations for all students (i.e., for all students from Hershey and from the University Park Campus).

(1) Student Infectious Disease Summary: In January or early February, all students must contact Janice Mesarick (x-5998) in Student Health on the Hershey campus to complete an Infectious Disease Summary. Once complete, this form is to be sent to Ms. Catherine Caruso, MEd.

(2) Insurance Waiver: An insurance Waiver needs to be signed and returned to Catherine Caruso, MEd, Academic Placements Officer. The form can be located at the following site: <http://www.hmc.psu.edu/facultyaffairs/shadowing/>

(3) Confidentiality Agreement: A Confidentiality Agreement needs to be signed and returned to Catherine Caruso, MEd. The form can be located at the following site: <http://hmc.psu.edu/facultyaffairs/shadowing>

All 3 forms must be received by Ms. Catherine Caruso, MEd, Academic Placements Officer, Department of Psychiatry, H073 before the start of the Graduate Clinical Rotation.

(4) Orientation Meeting: All students are required to attend a 2 hour mandatory Orientation Meeting where issues will be discussed related to the course requirements, what to expect in the clinical setting, HIPAA regulations, what is and is not appropriate, how and when to interact with patients, how physicians collect data from patients, terminology, hierarchy, and differences in thinking styles between clinicians and scientists. Students will not be allowed to begin their rotation if they fail to attend this mandatory meeting.

Student Requirements:

(1) The specific opportunities/requirements of the Graduate Clinical Rotation will differ for each student depending upon the nature of the selected Clinical Rotation. The specific opportunities for Clinical Rotations will be listed by the clinician at the following site <http://psu.neurosciencefaculty.info/forum/index.php>. Students will view this site, consult with his or her thesis mentor, and select a rotation that compliments the student's graduate studies. Each activity will include exposure to the related clinical setting, attendance at relevant Grand Rounds, Resident and Departmental Seminars, and



lectures, a practical hands-on analysis of the subject matter (e.g., via an analysis of histology, fMRI, etc.) and consideration of important treatment issues. Students will be required to spend at least 4 hours per week in this setting for at least 6 weeks.

(2) Weekly requirements: In addition to the requirements set forth by the Clinical Mentor, each student will be required to keep a journal describing their clinical activities and experiences. The contents of the journal are considered private and are for the benefit of the student only.

(3) Oral Presentation/Student Evaluation: Students will be evaluated in one 30 min. presentation given to other graduate students in their program regarding the material learned during their Clinical Rotation and its application to translational research. Specifically, students will describe a problem that they have identified in the clinic and their proposal for addressing that problem.

(4) Written Requirement: Students will prepare one NIH-like Background and Significance section and Specific Aims outlining a problem identified in the clinic, the background related to the problem and, in the Specific Aims, the proposed translational solution to address the problem.

(5) Student Evaluation: Students will have the opportunity to evaluate their Clinical Mentor and the specific Clinical Training Activity and students will have the opportunity to evaluate the course.

Clinical Mentor's Responsibilities:

(1) The Clinical Mentor must meet with the student at least once every 2 weeks during the rotation.

(2) The Clinical Mentor must be supportive of the student's inclusion as a trainee on the clinical team and should see to it that the student receives good counsel as to how to seek information in a patient care training environment.

(3) The Clinical Mentor will be required to provide a reading list to the student.

(4) The Clinical Mentor is required to attend and evaluate the student's oral presentation.

(5) The Clinical Mentor must evaluate the student's written Background and Significance and Specific Aims.

(6) The Clinical Mentor should provide an "Exit Interview".

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 581** Molecular and Translational Approaches to Human Disease (3) This course teaches students the scientific process used to understand the molecular bases of diseases and the development of novel therapies.

### **BMS 581 Molecular and Translational Approaches to Human Disease (3)**

The course utilizes clinically relevant diseases as specific examples of applying an integrated approach to elucidate a mechanistic understanding of disease pathophysiology and the development of novel therapies. Over the 15-week period of the course the students study five specific diseases or complications of diseases, each over a 3-week period. The diseases used represent areas of high impact on Western society or ones in which specific principles of mechanistic understanding or therapeutic development are clearly illustrated. The diseases also represent strengths of the research at the Penn State Hershey such as cancer, diabetes, cardiovascular disease, and infection and inflammation. The instructors use primary literature to demonstrate the scientific approach used to test specific hypotheses related to disease mechanism. At the end of the 3-week period, the students use team-based learning to develop experimental approaches to study novel aspects of the disease pathology or therapeutic development.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 590** Colloquium (1 per semester/maximum of 4) A series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1 per semester/maximum of 4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 591** Biomedical Research Ethics (1) Education in research ethics for biomedical scientists. Meets U.S. Public Health standards for education in responsible conduct of research.

### **Biomedical Research Ethics (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 596A** Tutoring Foundations in Biomedical Research (1-3) The objective of Tutoring Foundations in Biomedical Research is to provide a tutoring opportunity in the context of the course Foundations in Biomedical Research. Tutors will facilitate small groups of students in the context of experimentation or problem-based learning and will provide one on one guidance as necessary.

#### **Tutoring Foundations in Biomedical Research (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 597A** Grant Writing and Comprehensive Exam Prep (1) This course focuses on the topics and skills necessary to write an effective, fundable grant. While the focus of this course is to inform students about grant writing skills, the course will also address tailoring a grant for special purposes such as the comprehensive exam. Topics covered include: A) components of a grant, B) the grant review process, C) generation of hypotheses and specific aims, and D) experimental design, interpretation of results and alternative approaches.

#### **Grant Writing and Comprehensive Exam Prep (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 597A** Grant Writing and Comprehensive Exam Prep (1) This course focuses on the topics and skills necessary to write an effective, fundable grant. While the focus of this course is to inform students about grant writing skills, the course will also address tailoring a grant for special purposes such as the comprehensive exam. Topics covered include: A) components of a grant, B) the grant review process, C) generation of hypotheses and specific aims, and D) experimental design, interpretation of results and alternative approaches.

#### **Grant Writing and Comprehensive Exam Prep (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 600** Thesis Research (1-9 per semester/maximum of 36) Laboratory work on thesis project.

#### **Thesis Research (1-9 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 601** Thesis Preparation (0) BMS 601 is available to full-time Ph.D.-degree candidates who have passed the comprehensive examination and met the two-semester residence requirement.

#### **Thesis Preparation (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BMS 611** Thesis Preparation (0) BMS 611 is available to part-time Ph.D.-degree candidates who have passed the comprehensive examination and met the two-semester residence requirement.

#### **Thesis Preparation (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Biorenewable Systems (BRS)**

**BRS 411** Biobased Fiber Science (4) Theoretical and practical aspects of structure-property relationships for biobased

industrial fibers, including fiber biological and chemical constitution and fiber-water relationships.

#### **BRS 411 Biobased Fiber Science (4)**

This course investigates fundamental aspects of biobased industrial fibers (also known as biofibers), and ties their underlying biological and chemical structure to macroscale properties. Bioproducts are defined as products created from biologically derived, renewable industrial feedstocks (wood, cotton, grasses, and bast fibers including jute, hemp, kenaf, etc.). The course begins with a look at the worldwide production of biofibers, and considers implications relating to sustainability. Elements of underlying biological and chemical structure are then investigated, including an introduction to relevant aspects of polymer science. The interaction of biofibers with water is a practical issue that bears great significance; this is the focus of the last third of the course. Students will learn principles of psychrometrics (water-temperature-environment relationships) including measurement of relative humidity and fiber moisture content. Final course subjects include industrial techniques for drying fibers, energy implications of these processes, and troubleshooting of biofiber industry issues relating to moisture.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 422 Energy Analysis in Biorenewable Systems (3)** Energy management, energy conversions, renewable energy alternatives, engineering economic analyses, national and international perspectives on energy resources.

#### **BRS 422 Energy Analysis in Biorenewable Systems (3)**

This course focuses upon first understanding the various forms of energy in common use today and then analyzing the energy equivalents of various forms of energy. Forms of energy to be studied most extensively include electricity, fossil fuels, and renewable energy sources. Principles and applications of engineering economic analyses will be emphasized because these principles are needed to evaluate the feasibility of converting from one energy form to another. Specific application areas of emphasis include buildings, motors, and lights. For each application area, there will be discussion of the alternatives available for using energy in a more efficient and economical manner.

The infrastructure systems needed for providing electricity and natural gas to a specific location will be described as well as typical rate structures for the energy provided. Alternatives to the conventional energy systems will be identified and the course will conclude with discussion of energy strategies throughout the 21st century. Local, national, and international perspectives on energy resources will be infused throughout this course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 423 Deterioration and Protection of Bioproducts (3)** Timber, wood, and bioproduct deterioration from fungi, insects, fire; treatment of bioproducts for in-service protection.

#### **Deterioration and Protection of Bioproducts (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: BRS 411

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 426 Safety and Health in Agriculture and Biorenewable Industries (3)** Managing occupational safety and health in production agriculture, bioproducts and related operations.

#### **BRS 426 Safety and Health in Agricultural and Biorenewable Industries (3)**

BRS 426 explores management aspects of occupational safety and health specifically as it pertains to both the agricultural and biorenewable systems industry sectors. Employers are increasingly demanding students have training in safety and health. Topics to be covered include principles of safety and health, hazard analysis, hazard prevention and control, human behavior and safety, training and education, safety and health regulations, agricultural emergencies and

developing a written safety program.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 428 Electric Power and Instrumentation (3)** Principles and application of electric circuits for power distribution, motors, automatic controls, and instrumentation used in agricultural and biorenewable industries.

### **BRS 428 Electric Power and Instrumentation (3)**

Nearly every facet of our modern society relies on electricity and electronics. Whether engaged in product development, manufacturing, production, testing, or management, graduates of technical programs benefit from a fundamental understanding of electrical/electronic systems. This course prepares students to analyze electrical/electronic systems applicable to agricultural and biorenewable industries. Upon completion of this course, the student will be able to: demonstrate correct use of common electronic measurement tools including multimeters, oscilloscopes and others; demonstrate sound electrical construction techniques including cable preparation, soldering, circuit board construction, and others; demonstrate sound troubleshooting skills for electrical and electronic systems; understand common elements of power distribution systems; understand simple measurement and control circuits represented by schematics or ladder diagrams; understand and apply various sensors to measure temperature, pressure, strain, force, proximity, speed etc.; understand the application of dataloggers, programmable logic controllers, and computer software to collect data and/or control simple processes; understand the function of common circuit components such as resistors, capacitors, inductors, diodes, op-amps, transistors, and transformers in simple circuits; understand basic maintenance and safety requirements for facility electrical systems.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 429W Biorenewable Systems Analysis and Management (3)** Theory of systems thinking; optimization and quantitative techniques for analysis of agricultural production and other biorenewable systems.

### **BRS 429W Biorenewable Systems and Analysis and Management (3)**

BRS 429W is a capstone course for the BioRenewable Systems major. The course covers systems analysis and optimization techniques including an introduction to systems theory, qualitative and quantitative analysis, linear programming, waiting line models, PERT/CPM, minimal spanning tree, calculus methods, simulation modeling for decision making, inventory, and energy audits. All topics are presented in the form of case studies that require the students to solve problems in realistic production and processing scenarios. The course also provides a writing-intensive structure. The course targets BRS students in their last semester because it integrates knowledge and experiences acquired in prior BRS, business, and agricultural science courses.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 437 Bioproduct Marketing and Sales (4)** Business-to-business bioproduct sales and marketing fundamentals and market overview of key forest industry sectors including biorefinery value chain outputs.

### **BRS 437 Bioproduct Marketing and Sales (4)**

This course covers business-to-business (B2B) bioproduct marketing fundamentals and a market overview of key forest industry sectors (solid wood, composite panels, and engineered wood products) including biorefinery value chain outputs (environmental services, energy, fuels, and co-products) and personal selling of bioproducts. Students will apply B2B market principles and concepts toward an understanding of bioproducts industries and markets. Personal selling techniques will be developed and applied to enhance understanding of the industrial sales function within bioproduct firms. Marketing research for decision-makers will be examined.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 490** BioRenewable Systems Colloquium (1) Presentations and discussions of solutions to problems within the biorenewable systems industries.

**BioRenewable Systems Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 500** (A B E 500) Research Methods (3) Foundation course in research philosophies, methodologies, issues, policies; research quality; critical thinking and discourse; professional development; and research ethics.

**Research Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 501** Biobased Polymers (3) The chemistry, structure-property relationships, and industrial applications of biobased polymers from plant and agricultural feedstocks.

**Biobased Polymers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 502** Human Behavior in Management and Technology (1) Explore the relationship between human behavior and professional activities including ethical leadership and decision-making.

**Human Behavior in Management and Technology (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 511** Structural BioComposites (3) Manufacture and practices related to the production of engineered biocomposites processed from lignocellulosic materials.

**Structural BioComposites (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 550** Applied Bioproducts Marketing (3) Bioproduct marketing applications for solid and engineered wood products and biorefinery value chain output including environmental services, energy, fuels, and co-products.

**Applied Bioproducts Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 551** Sustainable Business Strategies (2) Coverage of business strategies that relate to sustainability and environmental issues.

**Sustainable Business Strategies (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 590** Colloquium (1-6 per semester/maximum of 12) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-6 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 594** Research Topics (1-9 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-9 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 595** Internship (1-9 per semester/maximum of 12) Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-9 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 596** Individual Studies (1-9 per semester/maximum of 12) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 597** Special Topics (1-9 per semester/maximum of 15) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 598** Special Topics (1-9 per semester/maximum of 15) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 600** Thesis Research (1-9 per semester/maximum of 36) No description.

**Thesis Research (1-9 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 602** Supervised Experiences in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in undergraduate biorenewable systems courses.

**Supervised Experiences in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 610** Thesis Research Off Campus (1-9 per semester/maximum of 36) No description.

**Thesis Research Off Campus (1-9 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRS 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Business (BUS)

**BUS 500** Negotiation, Communication, Teamwork (2) Experience-based learning approach to developing effective teams and work organizations; emphasis on developing reflective thinking and interpersonal skill sets.

**BUS 500 Negotiation, Communication, Teamwork (2)**

This course provides students with an enhanced understanding of their own behavior, the behavior of others, and the capability to deal more effectively with people and groups in organizations. Primary emphasis is placed upon application of experiential learning theory in developing the ability to perform well as a member of a team, and also in facilitating team effectiveness. As adult learners, students are empowered to become active creators of their own learning, and working with the faculty member responsible for the course, to develop skill sets and competencies in analyzing ethical issues, negotiation and communication skills, and developing leadership responses to these issues.

This course provides the skill sets and competencies underpinning the collaborative learning model used throughout the MBA program. It is intended to be taken by students who have not taken a similar course either as part of their undergraduate programs, or as graduate work. Where required, this course must be among the first 6 credits taken in the MBA program.

A combination of individual and team assignments, consistent with expectations for 500-level courses forms the basis for evaluation. There will be no formal in-class exams. However, in addition to participation in group discussions and projects (40% of the grade), and short summary papers at the completion of each chapter (20% of the grade), four short (minimum five page, typed, double spaced) papers will be required (40% of the grade). These papers will consist of an analysis and summary of the student's experiences in, and possibly, out of class, in attempts to apply theories of behavior being studied at the time. The last paper in the series will be a summary by the student of his/her interpersonal strengths and weakness, and an action plan to improve the areas of weakness.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 501** Statistical Analysis for Business Decisions (3) Application of statistical techniques to the formulation, analysis, interpretation, and solution of business problems.

**Statistical Analysis for Business Decisions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BUS 502** Business Research Applications (3) Critical evaluative techniques of business research.

**BUS 502 Business Research Applications (3)**

The goals of this course are to: 1) expose students to business research and information retrieval, 2) teach students how to critically evaluate pertinent information, 3) improve student ability to work collaboratively, 4) teach students how to use technology to present research findings, and 5) improve writing skills.

Student performance will be evaluated by means of written reports and presentations, primarily team based, and written examinations. Faculty: Janet Greenlee, Stephen Schappe, Gayle Yaverbaum, and Mukund Kulkarni

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 505** Data Analysis for Business Decisions (2) Selection and application of statistical methods, and use of business data bases, to support managerial decision-making; interpretation and presentation.

**BUS 505 Data Analysis for Business Decisions (2)**

Data analysis is the process of drawing meaningful information from a database for business research and to support managerial decision-making. Business managers may be either producers or consumers of data analysis. A producer generates a data analysis from raw quantitative and/or qualitative information. The producer needs the skills to select the appropriate statistical methods, to apply them correctly and to present results in a meaningful way.

The consumer is a manager who must interpret, utilize, and often evaluate data analysis that was created by others. Business managers typically function as producers, especially at earlier stages of their careers or if they work in managerial support functions. Managers function as consumers at other times, especially as senior executives or directors.

MBA students are expected to have become familiar with basic concepts of statistics such as means and standard deviations, the normal distribution, confidence intervals for means, t-tests, and simple regression. This can result from an undergraduate course or through structured self-study. BUS 505 will focus on in-depth application of statistical methods for specific business cases.

The course begins with discussion of the formulation of business research problems that call for analysis of quantitative data. Using business cases, students will identify management problems, formulate research questions, and develop testable hypotheses.

Unlike the short, isolated, data-sparse problems solved in most introductory statistics courses, the business case approach emphasizes the preparation and use of large databases that are common in business settings. Students will learn how to extract data sets from these bases that are appropriate to the specific hypotheses that must be tested. Often, a business case may require the student to apply several hypotheses tests and statistical methods, using the same database.

All of the statistical methods covered in this resource module can be applied using EXCEL or LOTUS spreadsheet software, which are widely available in business firms. Sophisticated dedicated statistical packages, such as SAS and SPSS, can also be used.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 515** Business Ethics and Corporate Governance (2) Social, legal and ethical obligations of key organizational participants; organizational structure and goals; conduct in global and multicultural contexts.

**BUS 515 Business Ethics and Corporate Governance (2)**

The subject matter of corporate governance deals with the nature of the interrelationships among shareholders (owners), boards of directors (representatives of the owners), and managers (agents of the owners). These interrelationships form the basis for the modern corporation. As their agents, managers are supposed to run a company in the interest of its shareholders; the board of directors is expected to monitor the performance of managers and to ensure that they do not stray from their primary obligation to the owners. The subject of corporate governance also encompasses the study of corporations' relationships with its employees, creditors, suppliers, and customers. Finally, as corporations are expected to be good citizens of their communities, corporate governance also extends to the study of corporations' relationships with their communities.

Periodic scandals involving major, publicly held companies have underscored the fundamental importance of these relationships. The larger interests of society and of its citizens require that various stakeholders perform their roles in an ethical manner. This course reviews major theories of ethical and moral development, provides cases and exercises to

heighten students awareness of these areas, and reviews heuristics and decisions-models for ethical conduct. This course thus also addresses the emerging area of ethical corporate governance, specifically exploring the how ethical conduct and the ethical underpinnings of corporate governance function to safeguard the interests of all stakeholders.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 554 Master's Project (3)** Development of an original master's project in the student's professional field of interest and preparation of a paper.

### **Master's Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 555 International Business (3)** Studying theories and practices of international business activities, strategies, structures and operations of multinational companies across nations.

### **BUS 555 International Business (3)**

This course focuses on international business activities like exports, imports, foreign investment and operations of multinational enterprises. It also examines political-legal, socio-cultural, and economic environments of international business. It emphasizes business strategies and functional operations of multinational enterprises.

Faculty: Refik Culpan

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 584 Business in a Global Society (3)** Business sector and society relations; international and cultural issues; corporate values and ethics; relationship to stakeholders; social, political, legal environments.

### **Business in a Global Society (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 588 Strategic Management (2)** Analysis of current theory and practice for the formulation and implementation of organizational strategies in complex dynamic environments; capstone course.

### **BUS 588 Strategic Management (2)**

BUS 588 is the capstone course in the MBA curriculum. It takes a multi-disciplinary approach that requires the student to apply knowledge gained in a variety of functional courses within a framework of strategic management theory and practice in order to understand the strategic decision-making process. The course adopts a systems perspective in which organizational outcomes are viewed as being the result of interaction with a variety of environmental agents and forces. Special emphasis is placed on managing the organization to create competitive advantage in dynamic contexts. Both the formulation and implementation of strategic actions are analyzed. The case study approach is used extensively to aid the learning process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 589** Strategic Venture Planning and Innovation (2) Development and presentation of a venture plan including product development; market research; competitive analysis; financing and capitalization; organizational structure.

### **BUS 589 Strategic Venture Planning and Innovation (2)**

The purpose of BUS 589 is to have the business student apply strategic management theories and practices acquired in BUS 588 to a specific, practical project in order to further the understanding of the process of creating and managing a strategy based on innovation (an entrepreneur strategy). This course is a direct extension of BUS 588 and should be taken immediately following it. The process of innovation is analyzed in detail together with the influences on it. The effects of various contexts on entrepreneurial strategy will be considered. Finally, issues related to the implementation and management of a strategy based on innovation will be discussed.

Students are required to develop a comprehensive new venture plan for an actual business organization to demonstrate knowledge of organizational design from a strategic perspective. Students will have to apply management, marketing, finance, information systems, and accounting knowledge in the new venture proposal. They must also demonstrate their knowledge of the influence of external (environmental) contexts on strategy formulation and implementation through the use of appropriate analytic frameworks. Finally, they must demonstrate a grasp of what constitutes competitive advantage within the strategic context that they have chosen for their project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 595** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Business Admin (B ADM)**

**B ADM 500** Business, Government, and Society (3) Overview and analysis of ethical, legal, political, technological, and societal impacts on business.

### **B ADM 500 The Business Enterprise (3)**

The Business Enterprise course is designed as an interdisciplinary introduction to business and basic business processes using problem-based and collaborative learning approaches. A key objective is to introduce students to basic concepts and models that will enable them to formulate and answer important questions applicable to any business. The course will require students working in interdisciplinary teams of 4-5 to write multi-disciplinary business/operating plan for a new product or service as a final integrative project. Students in the MFGSE graduate program will be required to write a plan for a manufacturing business. Students completing an MBA degree may write a plan for a manufacturing or service business or a non-profit organization. To the extent possible, teams will be comprised of individuals with different academic and industry backgrounds.

Business/operating plans will address all of the functional areas of business introduced throughout the course and require students to integrate them into a coherent plan. The final plans will be presented for critical review to the class, interested faculty, and an appropriate group of business professionals.

The role of the instructor in this course is to facilitate student inquiry by helping students formulate questions that must be answered and by directing students to information resources appropriate to answering their questions. It is anticipated that the instructor will call upon other faculty and members of the business community to provide functional expertise to student teams as needed.

Faculty: John Magenau and Richard Progelhof

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 501** Costs, Competition, and Marketing Performance (6) A project-oriented investigation into the critical principles of accounting, economics, and finance.

### **Costs, Competition, and Marketing Performance (6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 502** Demand, Operations, and Firm Performance (6) A project-oriented investigation into the critical principles of management, marketing, and operations.

### **Demand, Operations, and Firm Performance (6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 503** Integrated Business Analysis (3) Overview of the statistical analyses of a variety of business problems.

### **Integrated Business Analysis (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 510** Cost Management for Decision Making and Control (3) The study and use of accounting information for cost management, product costing, planning and controlling operations, and managerial decision making.

**Cost Management for Decision Making and Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 511** Information Systems Management and Strategy (3) Fundamental uses of IS/T and guiding principles associated with the development and management of IS/T as a strategic organizational asset.

**Information Systems Management and Strategy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 512** Managing Effective Organizations (3) Understanding the critical and changing role of management in contemporary organizations.

**B ADM 512 Managing Effective Organizations (3)**

The objective of this course is to provide MBA students with an understanding of the challenges confronting managers of contemporary organizations and a knowledge of the tools and techniques available to help them confront those challenges in dynamic workplace settings. The course will be structured around the POLC framework, a system that emphasizes the four essential functions of management – Planning, Organizing, Leading, and Controlling – as an ongoing process of interrelated activities.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 513** Quantitative Methods for Business (3) This course is designed to provide a systematic understanding of design, operation, and control of business processes that transform inputs into outputs.

**B ADM 513 Quantitative Methods for Business (3)**

This course is designed to provide a systematic understanding of design, operation and control of business processes that transform inputs into outputs. The course encompasses both manufacturing and services. The focus is managerial decision-making with an emphasis on quantitative methods of analysis. Topics include operations planning and strategy, systems design, inventory management, capacity and materials planning, JIT and lean operations, quality control and management, scheduling, and project management. Quantitative methods include linear programming, decision analysis, inventory models, forecasting, simulation and queuing models.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 514** Strategic Planning and Business Policy (3) Formulation of objectives and the implementation of programs to

promote long- range success of the organization in a changing environment.

**B ADM 514 Strategic Planning and Business Policy (3)**

Drawing from concepts in competitive strategy, organizational economics, financial economics, and industrial organization, this course will describe the skills that managers must command to create economic value through firm strategy. These skills include the ability to apply analytical tools to assess industry structure and competitors' strategies, the ability to assess the optimal scope and boundaries of the firm, and the ability to design administrative structures, systems, and processes that facilitate the development and deployment of corporate resources. Even though the course incorporates various theoretical perspectives, it ultimately is designed to focus on the essential issues and problems of competitive strategy as experienced by managers.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 520 Entrepreneurial Ventures (3)** The contribution of the entrepreneur to the enterprise system, supporting public policies and personal requirements for entrepreneurial success.

**Entrepreneurial Ventures (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 521 Leadership Seminar (3)** Experiential problem-based seminar providing leadership opportunities and practice.

**Leadership Seminar (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 522 Business Solutions (3)** Practicum experience in solving problems in real business situations.

**Business Solutions (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 523 International Business (3)** Survey of the theory and practice of international business.

**International Business (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 525 Innovation and Change Management (3)** Analysis of innovation sources, effects on industry structure and firm resources, and how firms can manage adoption and implementation process.

**Innovation and Change Management (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 526 Leadership and Ethics (3)** A multiperspective review of leadership theory and research with special emphasis given to the ethical dimensions of leadership.

**B ADM 526 Leadership and Ethics (3)**

The objectives of this course are to: a) increase moral awareness of ethical issues in organizations, b) consider the interrelationships between organizations and their stakeholders, c) analyze the ethical impacts of managerial decision-making, d) understand how to manage the ethical performance of people and organizations, e) develop an understanding of the ethical dimensions of leadership theory and research, f) explore the relationship between the concepts of leadership effectiveness and ethical leadership.

Ethical conduct is an important issue for managers in all functional areas of business organizations. Long-term "success" in business depends not only on mastery of the immediate technical environment and competitive domain, but also consideration of and attention to the broader social and ethical environments in which all organizations and institutions are embedded. Leaders have an important role to play in managing the financial and ethical performance of individuals and organizations. Even though leadership is one of the most researched topics in management, most reviews of the leadership literature rarely mention the ethical dimensions of leadership. Understanding what ethical leadership is and why it is important can provide a more comprehensive view of what it means to be an effective leader.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 530 Investment Theory (3)** Advanced literature pertaining to investments; special reference to the theory of random walks, stock valuation models, and portfolio management.

**Investment Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 532 Corporate Finance (3)** Application of modern corporate finance theory to corporate practice.

**Corporate Finance (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 533 Derivatives (3)** Applied theory of derivative instruments in hedging risk and management strategies.

**Derivatives (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 550 Global Marketing (3)** Marketing decision making from a global perspective.

**Global Marketing (3)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 551 Marketing Research (3)** Examination of marketing research today, including research and marketing decisions, sampling and measurement, and collection and analysis of data.

**Marketing Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 552 Service Marketing (3)** The application of marketing concepts to special needs of a service environment.

**Service Marketing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 553 Consumer Behavior (3)** Project-oriented course introducing consumer research techniques to formulate marketing strategies.

**B ADM 553 Consumer Behavior (3)**

The purpose of this course is to acquaint students with the field of consumer behavior and its major concepts, research techniques, and research findings. Students will be exposed to individual and psychological factors, as well as the social and cultural factors that influence consumer behavior. There will be a group project focusing on the development of a new product concept for a specific target market. Throughout the course students will be exposed to how firms utilize consumer behavior research to develop marketing strategies. Consumer behavior is presented as an actionable and strategic discipline. A deliberate attempt will be made throughout the course to tie consumer behavior concepts with "real world" illustrations. Case analysis and experiential exercises will be relied on to help accomplish this objective.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 554 Marketing Strategy (3)** An application of marketing theoretical principles from popular press publications.

**B ADM 554 Marketing Strategy (3)**

This course is an investigation into current popular press publications and their application of marketing theoretical principles to actual business situations. It includes analytical processes and an emphasis on critical thinking skills useful to upper level marketing managers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 562 Financial Statement Analysis (3)** Utilizes concepts in accounting, economics, and business strategy to analyze financial statements of real companies.

**Financial Statement Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 596A** Determinants of Labor Productivity in a Detailed Manufacturing Industry (1-6) Explore labor productivity in a specific detailed manufacturing industry across metro areas in the United States.

**Determinants of Labor Productivity in a Detailed Manufacturing Industry (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 597** Special Topics (1-9) Formal courses given on a topic or special interest subject which may be offered

infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 597A** International Economics (3) Formal courses given on a topic or special interest subject which may be offered infrequently.

### **International Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 597B** Negotiations (3) Formal courses given on a topic or special interest subject which may be offered infrequently.

### **Negotiations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 597C** Business Processes (3) Formal courses given on a topic or special interest subject which may be offered infrequently.

### **Business Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 597D** Project Management (1-6) Formal courses given on a topic or special interest subject which may be offered infrequently.

### **Project Management (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**B ADM 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 894** Capstone Experience (1-3 per semester/maximum of 3) Supervised, professionally-oriented student activities that constitute the culminating experience for the program.

**Capstone Experience (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 895** Internship (1-6) Supervised, professionally-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 896** Individual Studies (1-6) Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 897** Special Topics (1-9) Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 898** Special Topics (1-9) Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B ADM 899 Foreign Studies (1-2 per semester/maxmimum of 3)** Courses with a professional orientation offered in foreign countries by individuals or group instruction.

### **Foreign Studies (1-2 per semester/maxmimum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Business Admin (BUSAD)**

**BUSAD 501 Statistical Analysis for Managerial Decision Making (3)** Use of statistical methods for managerial decision making, with emphasis on problem formulation, data analysis and interpretation, and business applications.

### **Statistical Analysis for Managerial Decision Making (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 511 New Ventures 1 (3)** Introduction to the issues involved in the development of new ventures within existing business organizations or from start-up.

### **BUSAD 511 New Ventures 1 (3)**

This course deals with the process of finding, evaluating and developing new ventures, from both the perspective of the start-up as well as the larger existing organization, which has different opportunities, resources and barriers. Students will develop an appreciation of the many legal, financial, operational, HR, and technical challenges posed by venturing.

Course activities include discussion of readings, case analyses, developing components of business plans, and teamwork. These activities encourage students to develop the critical thinking, communication and managerial skills necessary to further their understanding of corporate venturing.

This course prepares students for future coursework in the New Ventures and Entrepreneurial Studies Option within the MBA program. It is also relevant to students engaged in the general MBA program who are involved in new product development and R&D. This course is followed by New Ventures 2, which provides an in-depth view of the legal and financial issues facing managers of new ventures.

The course is a graduate elective primarily for MBA students and could also be taken by MSIS students. It is intended to be the introductory course in the New Ventures and Entrepreneurial Studies option within the MBA program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 515 Acquiring the Existing Enterprise (3)** The process of acquiring an existing company as an alternative to starting a new venture is explored.

### **BUSAD 515 Acquiring the Existing Enterprise (3)**

The focus of this course is on the methods and strategies required to successfully acquire an existing enterprise as opposed to building one from scratch.

Most prospective entrepreneurs think of a start-up as the path toward becoming an entrepreneur. However, the time required to develop products and services and to build sales to a profitable level is long, and the failure rate for new organizations is high. Existing organizations have the advantage of already having products, customers, suppliers, and employees. Also, financing the purchase of an existing company is easier than financing a start-up. This may be a better path into a new venture for many people. Since it is a different process than a start-up, a separate course is required to

provide adequate coverage of the topic.

Evaluation will be on case study analyses, exams, and a written and oral report on the legal and financial aspects of new venture.

Designed especially for students taking the New Ventures and Entrepreneurial Studies option within the MBA program. This course builds on the work in New Ventures 1, which is required for all New Ventures majors.

This will be an elective course for students taking the New Ventures option in the MBA program. It would also be an elective for students in the general MBA program and the MSIS (Info Science) program who have an entrepreneurial orientation.

**Faculty Members Proposing Course:** Eric W. Stein and Ellen Foster-Curtis

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 519 (LEAD 519) Developing Creative High Performance Organizations (3)** This course focuses on how to create high performing organizations based on models provided by business, science and the arts.

### **BUSAD (LEAD) 519 Developing Creative High Performance Organizations (3)**

#### Overview:

This course focuses on how to create high performing organizations based on models provided by business, science and the arts. We will examine the key assets that these disciplines bring and show how to apply them to business activities. For example, it has been shown that improvisational models from music are highly relevant to new product development.

Course activities will include a discussion of the readings from relevant academic research in the business field. We will discuss the philosophy of aesthetics, analyze cases, and review original works. We will also listen to short lectures by practicing artists, musicians, actors, scientists, and writers. Together, these activities will help students to develop strategies to help their organizations attain higher levels of performance. This course is a graduate elective for MBA students and could also be taken by other students (such as Leadership students) if it meets their degree requirements.

#### The way the course will run:

This course will be run as a graduate seminar designed to maximize the learning of the members of the group including the instructor's. We will learn about each of the topics noted above through a variety of means. Our interaction will include general discussions, lectures, case discussions, exercises, small group meetings, and on-line chats. We will have invited speakers for the class representing the arts, music, science and business.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 522 New Ventures 2 (3)** Examines the financial and legal issues that are critical in the formation, development, and management of new ventures.

### **BUSAD 522 New Ventures 2 (3)**

The focus of the course is on the methods of funding and cash flow management for the new enterprise, as well as the underlying legal issues that impact new ventures.

Evaluation will be on case study analyses, exams, and a written and oral report on the legal and financial aspects of new venture.

All students in the MBA program are required to take an introductory finance course. This course builds on that foundation and introduces the various legal issues that are critical to new venture development. Designed especially for students taking the New Ventures and Entrepreneurial Studies option within the MBA program. This course builds on the work in Entrepreneurship or New Ventures 1, which are required for all New Ventures majors.

This will be an elective course for students taking the New Ventures option in the MBA program. Students in the other options would not usually take this course. However, they could take it as an elective, since it has little overlap with the required courses in the business option. It would also be an elective for students in the MSIS (Info Science) program who have an entrepreneurial orientation.

**Faculty Members Proposing Course:** Eric W. Stein and Ellen Foster-Curtis

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 523 Prices and Markets (3)** A survey of analytical concepts and techniques essential to an understanding of the business environment.

**Prices and Markets (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 525 Quantitative Methods in Finance (3)** Study of quantitative methods used in financial and investment analysis and modeling.

**BUSAD 525 Quantitative Methods in Finance (3)**

BUSAD 525 studies statistical and econometric methods to provide a quantitative foundation in financial and investment analysis. Students will be introduced to the statistical and econometric methods necessary in quantitative financial modeling. Students will acquire practical knowledge, skills and abilities in financial modeling, including sampling, estimation, and hypothesis testing, regression analysis and its application in finance, portfolio analysis methods, and time-series analysis and forecasting. Spreadsheet programs such as the Microsoft Excel program will be used extensively throughout the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 526 Current Issues in Corporate Finance (3)** Finance topics involving strategic financial decisions, including capital structure and cost of capital, financial forecasting, valuation, and corporate control.

**BUSAD 526 Current Issues in Corporate Finance (3)**

BUSAD 526 focuses on current issues in corporate finance involving strategic financial decisions, including capital structure policy and cost of capital, payout policy, financial planning and forecasting, valuation methods including real option, venture capital and IPO, and topics on corporate control. Students will develop an ability to analyze and solve complex financial decision problems by applying financial theories and tools discussed in this course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 527 Fixed Income Securities (3)** Analysis and valuation of fixed income securities and interest rate derivatives.

**BUSAD 527 Fixed Income Securities (3)**

BUSAD 527 focuses on the various fixed income securities including bonds (treasury, corporate, municipal bonds), mortgage-backed securities, asset-backed securities, interest rate derivatives, and credit risks. Valuation and risk management of fixed income securities will be discussed using market data on securities. Fixed income is technically demanding subject and the course will use relatively advanced techniques and concepts. Basic statistics and spreadsheet modeling will be used extensively throughout the course. The students will gain a working knowledge in fixed income securities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 528** Mergers and Acquisitions (3) Survey of drivers of success in M&A and develop knowledge and skills in the design and evaluation of M&A transactions.

### **Mergers and Acquisitions (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 530** Biotechnology and Health Industry Overview (3) Organization, financing, policy, trends, problems and issues in the biotechnology, pharmaceutical, and health industries. Overview of cost, quality, access issues.

### **BUSAD 530. Biotechnology and Health Industry Overview (3)**

BUSAD 530 explores current issues and trends in the biotechnology, pharmaceutical, and health industry. The classic cost, quality, and access paradigm is applied from the perspective of multiple stakeholders. Organization, financing, policy, regulatory, and ethical problems and issues are emphasized. Teaching methods include video and didactic presentations, small group and class discussions, guest lectures by industry executives, and case study analysis. Student evaluation methods will include individual and team projects, presentations, and papers. The course will be offered twice annually by the Penn State Great Valley School of Graduate Professional Studies' MBA program and is a required course in the Penn State Great Valley MBA program option in biotechnology and health industry management.

Faculty member proposing course: Janice L. Dreachslin

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 534** Ethical Dimensions of Management in the Biotechnology and Health Industry (3) Ethical managerial decision-making in biotechnology, pharmaceuticals, and health including ethical implications of technological/scientific advances, medical interventions, and business decisions.

### **BUSAD 534. Ethical Dimensions of Management in the Biotechnology and Health Industry (3)**

BUSAD 534 introduces the students to various ethical decision-making frameworks, which are then applied to critically examine issues within the biotechnology and health industries. Ethical decision-making frameworks include utilitarian principles, rights and justice theories, virtue ethics, feminist ethics, and various medical ethics models. Applications to cases involving genetic testing, stem cell research, euthanasia, organ retrieval and transplantation, and pharmaceutical development are among those to be explored. Teaching methods include faculty lectures, case study analysis, small group and class discussions, and industry guest speaker presentations. Students will be evaluated on the quality of individual and team writing assignments as well as a team oral presentation. The course will be offered twice annually by the Penn State Great Valley School of Graduate Professional Studies' MBA program and is a required course in the Penn State Great Valley MBA program option biotechnology and health industry management.

Faculty member proposing course: Donald Snook

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 537** Management Information Systems (3) Information system theories and methods applied to administrative structures and management decisions in organizations.

### **Management Information Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006



Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 542** Global Intercultural Management (3) This course develops students' global cross-cultural competencies and cultural intelligence to enhance ability to manage global organizations and work interculturally.

### **Global Intercultural Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 545** Negotiation Strategies (3) This course covers strategies and tactics for understanding conflicts, for negotiating effectively, and for dealing successfully with power in organizations.

### **BUSAD 545 Negotiation Strategies (3)**

Although situations involving international incidents, corporate acquisitions, or national collective bargaining contracts demonstrate the dramatic effects of the need for negotiation, it is something that most people do every day. Negotiation is not a process reserved for skilled diplomats, top salespeople, or leaders of labor unions. The structure and processes of negotiation at the interpersonal level are fundamentally the same as at the corporate or international level. For this reason, knowledge about and skill in negotiating is essential to anyone who works with and through other people to accomplish objectives. It is part of the normal "give and take" of any business situation, such as negotiating salaries, arranging deals with vendors, or allocating resources for a project. Unfortunately the ability to simply recognize conflict and the need for bargaining does not insure successful negotiating situations. Negotiation is a complex human activity, involving a dynamic interpersonal process. The skilled negotiator possesses a number of skills including: the intellectual ability to understand the key facts that shape and characterize different negotiation situations; the skills to diagnose problems and select appropriate strategies and approaches to address them; and the understanding of one's own personality and value system, which affect the perception of a situation and the choice of tactics and strategy. Negotiation is a learnable process. In this course students will learn how to recognize and resolve conflict through bargaining, what the bargaining process involves, and how to plan and carry out a successful negotiation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 551** Business, Ethics, and Society (2-3) The course focuses upon the exploration and analysis of the ethical, political, technological, social, legal and regulatory environments of business.

### **BUSAD 551 Business, Ethics, and Society (2-3)**

Students will explore and analyze the challenging issues that lie at the intersection of business, government, and society through a lens of business ethics. Topics covered include the importance of ethics in the business decision process and the types of ethical issues business practitioners face in the business environment; consequentialist and nonconsequentialist ethics principles and their application to business decision-making; the role of personal and organizational values in business decision-making and the impact that organizational culture has on the ethical dimension of decision making. Students will evaluate and analyze the ethical dimension of decision-making; become familiar with the stakeholder concept and utilize it in the business decision-making process; identify the constraints societal values place upon the firm; examine the role government plays in the marketplace; explore the social and ethical dilemmas that arise from the globalization of business; and understand and explain the process through which corporations attempt to influence societal and government institutions.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 555** (LEAD 555) Full Range Leadership Development (3) Development of behavioral skills associated with outstanding leadership of individuals, teams, and organizations through advanced information technology, experimental exercises, and case analysis.

**BUSAD (LEAD) 555 Full Range Leadership Development (3)**

Leadership is one of the world's oldest preoccupations. Since the beginning of civilization, prophets, kings, rulers and managers have struggled to find answers to an important question: Why do most leaders or managers elicit merely competent performance from their followers, while a select few inspire extraordinary achievement? Given increased globalization, diversity, restructuring, e-business and innovation in today's business environment, finding answers to this question is important for maintaining organizational competitiveness.

The purpose of this course is to provide answers to this question by identifying traits and behaviors associated with outstanding leaders, explaining how they get results, and why their leadership often exceeds all expectable limits. This course is designed to introduce students to a) behaviors associated with outstanding leadership, b) social learning and cognition in organizations as a context to promote outstanding leadership, and c) leadership development as a strategic intervention to enhance individual, group, and organizational motivation and performance.

The course will be run as a graduate seminar. We will interact through Web site technology, general group discussions, team projects, lecturettes, case discussions, exercises and videos. Class sessions will focus on issues raised by the readings, cases, and issues relevant to students' organizational experiences. A portion of the class time may be set aside for the coordination of team projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 556 (LEAD 556) Diversity Leadership (3)** Analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

**BUSAD (LEAD) 556 Diversity Leadership (3)**

In this course students will explore the theory and practice of diversity leadership through experiential exercises, video and didactic presentations, small group and class discussions, and the analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 558 Knowledge Management (3)** This course examines the strategic value of knowledge and how organizations can manage their knowledge assets for competitive advantage.

**BUSAD 558 Knowledge Management (3)**

This course is designed to explore the topic of knowledge management (KM), which differs from information management in critical ways. Knowledge pertains to the subset of all information that embodies experience, experimentation, organizational learning, best practices, and techno-scientific knowledge. Knowledge thus differentiates average firms from great ones; e.g., Google vs Alta Vista. KM is now on the short list of strategic objectives for firms large and small. Future managers thus need to better understand the issues and challenges posed by knowledge management.

Students taking the course will learn about KM as a human social process as is evident in Communities of Practice. We will examine the processes of knowledge creation, acquisition, retention and utilization. To understand how knowledge-based systems and practices are implemented in the "real world" (e.g., Merck, Lockheed Martin, Vanguard) we will review various case examples that highlight the unique problems posed by KM to business organizations. Experts from industry will be invited to speak to the class and students are invited to attend the Knowledge Management Group of Philadelphia ([www.kmgphila.org](http://www.kmgphila.org)) meetings that meet once a month.

The course will be run as a graduate seminar designed to maximize the learning of the members of the group including the instructor's. We will learn about each of the topics noted above through a variety of means. Our interaction will include general group discussions, lectures, case discussions, exercises, small group meetings, and on-line chats.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 559 Career Management (3)** Provides students with a conceptual understanding of careers/career design making through an examination/discussion of the literature in career management.

**Career Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 575 High Tech Venture Development (3)** How high tech entrepreneurs and intrapreneurs design, develop, and market new information technology products (e.g., software) and services.

**High Tech Venture Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 576 Ethical Issues in Information Technology (3)** Exploration of ethical issues affected by IT: privacy, free speech, computer crime, intellectual property, IT professionalism, and software product liability.

**Ethical Issues in Information Technology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 577 Management of Information Technology (3)** This course focuses upon the challenges of aligning IT strategy with organizational goals.

**BUSAD 577 Management of Information Technology (3)**

This course identifies the challenges facing managers of information technology resources and addresses the methods of managing them. These resources include hardware, software, networking, data, information, and personnel. The course takes the approach of high-level management of what has become an important strategic resource in almost every organization. Therefore, it focuses on strategies rather than project management of individual efforts. The course focuses on decision making at the level of chief information officers and their immediate underlings. Its premise is that to succeed, an organization must align its IT strategy with the general organizational and business goals.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 578 Managing Business Processes (3)** Develop and evaluate process models, performance metrics, and information flow to facilitate cross-functional business processes for 21st century organizations.

**BUSAD 578 Managing Business Processes (3)**

Twenty-first century executives cross-functional business processes rather than managing their organizations as independent functional silos. Consequently, the ability to design and implement process oriented organizations has considerably evolved over the past decades. More importantly, initiatives related to Service Oriented Architectures (SOA) and Business Process Management (BPM) systems are predicated on the existence of well-designed business processes. However, the task of designing processes has become harder due to the disappearance of boundaries both within and across enterprises. Managing Business Processes provides students with an understanding of the key aspects of business processes such as collaboration, information flow, people, and business rules. The main objective is to provide an overview of various techniques and tools for analyzing, improving, and implementing business processes and information system controls. The course will utilize cases, process modeling methodologies, and simulations to strengthen the students' understanding of business processes and their contribution to business performance.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 581** Venture Strategy, Planning and Development (3) This is the capstone course in the New Ventures option of the MBA program. Students develop a strategic or operational plan for a new venture.

**BUSAD 581 Venture Strategy, Planning and Development (3)**

The purpose of the New Venture option in the MBA program is to prepare students to develop and start their own entrepreneurial ventures or to prepare them to head new ventures in their existing organizations. This course allows them to integrate the material they have learned in the MBA program and the New Venture option, which can lead to the development of a venture.

Evaluation will be on participation in discussion of cases and contributions to fellow classmates. The major weight for evaluation will be on the project. Students with strong papers will be encouraged to apply for funding for their proposals via grants, internal budgets or competitions.

This is the capstone course in the New Ventures option. It will typically be the final course taken, although it is possible that, because of scheduling limitations, one or two courses may be taken after this one, since it will not be offered every semester. It integrates the material from many of the New Venture courses into the final product. It could also be taken as an elective by information science and other students who have taken at least one New Venture course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 582 (LEAD 582)** Social Entrepreneurship and Community Leadership (3) This course will provide an opportunity for students to explore concepts of developing and leading businesses that create social value.

**BUSAD (LEAD) 582BUSAD (LEAD) 582 Social Entrepreneurship and Community Leadership (3)**

This course uses entrepreneurial and leadership skills to craft innovative responses to social needs. Entrepreneurs are particularly good at recognizing opportunities, exploring innovative approaches, mobilizing resources, managing risks, and building viable, sustainable enterprises. Entrepreneurial skills are just as valuable in the social sector as they are in business. Social Entrepreneurship aims at social impact but does not exclude economic wealth creation. Therefore it is not limited to the non-profit sector. Despite a sustained economic boom in this country, numerous social problems remain and some seem to be getting worse. The course will focus on introducing business leadership and entrepreneurship principles to both profit and non-profit organizations whose products and services are designed to create social value.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 583** Future of the Biotechnology and Health Industry: Strategic Implications (3) Strategy in biotechnology, pharmaceutical, and health industries; impact of technological innovation and economic, social, political trends, and events.

**BUSAD 583. Future of the Biotechnology and Health Industry: Strategic Implications (3)**

BUSAD 583 explores and analyzes future trends in the biotechnology, pharmaceutical, and health industries. An analysis of trends in technology, administration and control, advances in research methods, emerging products and services, and preparing for the future will be undertaken. The strategic management impact of these trends will be explored from the perspective of suppliers of goods and services, professional care providers, payors and governmental and regulatory activities. Teaching methods include facilitator led didactic presentations, class discussions/classroom exercises, small group activities centered on case studies, team project/group presentations, and papers. The course will be offered twice annually by the Penn State Great Valley School of Graduate Professional Studies' MBA program and is a required course in the Penn State Great Valley MBA program option in biotechnology and health industry management.

Faculty member proposing course: Donald Snook

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 585** Research in Security Valuation (3) Analysis and valuation of equity investments.

### **BUSAD 585 Research in Security Valuation (3)**

BUSAD 585 focuses on the analysis and valuation of a firm's equity securities in the financial market using a fundamental analysis. Students will learn how to use different valuation techniques for different types of companies (e.g., companies in financial distress/bankruptcy, private companies, start-up companies with no earnings). The course integrates topics discussed in various finance courses to help students to develop their analytical ability to identify strategies that enhance value creation. The philosophical basis for this topical integration is that valuation of a firm's securities requires one to know not only the accounting issues involved in the preparation of financial statements and how to analyze financial statements, but also to understand the impact of monetary policy, the operation and regulation of financial markets on the value of the firm's equity securities. Moreover, because firm value depends on how well the company is managed, a good understanding of its operations in the global markets, its internal control and risk management strategy is also essential. Finally, because valuation is also based on quantitative models, knowledge of quantitative methods is paramount.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 597A** Ethical Issues in the Finance Industry (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Ethical Issues in the Finance Industry (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 802** Cornerstone of Sustainability (3) In-depth exploration of the social, environmental, and organizational sustainability challenges facing business leaders in the 21st Century.

### **BUSAD 802 Cornerstones of Sustainability (3)**

BUSAD 802 provides students with an overview of the social, environmental, and organizational sustainability challenges facing 21st Century business leaders. The course seeks to develop students' critical capacities for reflection and action based upon a systems thinking framework. Topics to be explored include the history of the sustainability movement, an overview of pressing environmental and social issues, and alternative perspectives on the local and global economy. The course addresses local and global issues surrounding sustainable management and reviews the major frameworks of sustainability that provide the scientific foundations and economic principles of how sustainability can help organizational leaders to achieve natural competitive advantage. Students will apply theoretical and practitioner frameworks to real world cases.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 809 Triple Bottom Line Accounting (3)** In-depth exploration of the issues related to implementing measurement, reward and reporting systems for economic, social, and environmental impacts.

**BUSAD 809 Triple Bottom Line Accounting (3)**

BUSAD809 expands the traditional financial and managerial accounting topics to encompass economic, social, and environmental impacts. Students will investigate the strategic linkages between sustainability and the value of the organization, define true costs and become familiar with alternative cost measurement systems, and assess the impact of social risk. Other topics include the design and implementation of management performance evaluation and reward systems that align with social and environmental as well as economic goals, and global reporting standards and best practices.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 824 Finance and Investment for Sustainable Growth (3)** In-depth exploration of the methods of financing available for sustainable growth in developed and emerging markets.

**BUSAD 824 Finance and Investment for Sustainable Growth (3)**

BUSAD 824 provides students an in-depth exploration of the theories and the applications that financial professionals can leverage to simultaneously earn a profit and have a positive impact on society. The specific financial sectors students will examine are: Capital Markets (to address environmental issues), Commercial Banking (to create sustainable economic development), Project Finance (to reduce poverty and create infrastructure development), and Investment Management (to understand and employ socially responsible investing).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 835 Commercialization of Biopharmaceuticals (3)** Review organizational processes, regulatory, and environmental issues in the development and commercialization of biopharmaceuticals in the United States and globally.

**BUSAD 835 Commercialization of Biopharmaceuticals (3)**

This course reviews organizational processes, regulatory, and environmental issues in the development and commercialization of biopharmaceutical products in the United States and globally. Business development strategies and tactics that encourage innovation and enable biopharmaceutical organizations to prosper in changing business environments are emphasized. The regulatory environment globally and nationally is reviewed for its impact on biopharmaceutical discovery and commercialization, including the IND (investigational new drug) and NDA (new drug application) process and quality control/assurance. Organizational dynamics including culture, structure, ethical dimensions of management, and special considerations in global marketing are explored. Marketing and brand management, financial forecasting, and structuring sales and marketing are examined for their impact on successful commercialization of biopharmaceutical products.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSAD 879 Sustainable Products and Service Development (3)** In-depth exploration of the creation and development of sustainable products and services.

**BUSAD 879 Sustainable Products and Service Development (3)**

BUSAD879 provides students with the opportunity to explore the creation and development of sustainable products and services. The course merges theory and practice, investigates the linkages between products and services, examines

historic, current, and potential examples of sustainable products and services, and guides students toward practical tools of inquiry and application that will serve them in their careers. The emphasis in this course is on the process of new product innovation, development and commercialization. The term "product" will be treated in its most general sense in which service may be an important component or the "product" might be entirely a "service". For example, a software product may have no other function than to provide a service. Students will examine how requirements for sustainable development affect the process of product development and will assess how sustainable products contribute to the firm's competitive advantage and to its entrepreneurial opportunities. Students will study various sustainability frameworks in integrating the environment and societal externalities in the traditional product design process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Business Administration (B A)

**B A 411 Analyzing Business and Industry (3)** Prepares students to obtain an enterprise-wide view of business and industry by integrating operational and financial decisions in a team and learning environment.

### **B A 411 Analyzing Business and Industry (3)**

The course provides the students with a methodology for analyzing the business, introduces the students to sources of financial information available from private and public sources and trains the student to prepare and professionally present business analysis reports. The course, which adopts a user perspective, extends the students' basic knowledge of financial reporting and provides them with a broader context for understanding business that includes economic and social forces, the regulatory environment of businesses and their financial reporting, capital market operations and corporate governance. It applies concepts and decision tools that are studied throughout the curriculum such as present value, financial ratio analysis, break-even point analysis and statistical analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 412H Honors Integration and Research (2-3)** The integration of the business core into a detailed financial, strategy and market analysis of actual companies selected by student teams.

### **B A 412H B A 412H Honors Integration and Research (2-3 credits)**

The purpose of this course is to assist students in developing their Schreyer Honors Thesis. It proceeds by exposing students to research conducted within the various business majors; the research conducted by prior honors students; and having student teams conduct research on contemporary businesses and industries. Typical readings include materials related to evaluating an actual company, prior Schreyer Honors theses, contemporary business articles, prior course projects and supporting academic literature. Written company analyses and oral presentations are made by the teams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 420 Preparation for Career Management (1)** This course emphasizes effective career planning by closely examining oneself, the business world, communication styles and strategies.

### **B A 420 Preparation for Career Management (1)**

BA 420 develops students' career preparation and management skills through the close examination of self, the world of work and communication styles and strategies. This course is one of a series in the program which collectively develop the skills and competencies necessary for the business administration student.

The course is designed on the belief that (1) career decision-making is greatly enhanced by considering personal traits such as one's interests, values, goals, and approach to making decisions; and (2) through the exploration of self and world

through out-of-classroom learning experiences. The student becomes empowered to apply prior classroom learning outside of the academic environment. These skills are utilized throughout a person's career

Students who successfully complete the course will be able to:

- Prepare resumes targeted to a range of industries and positions.
- Write effectively to prospective employers.
- Identify personal traits and qualities in the context of career management.
- Demonstrate effective interview techniques.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 421 Project Management (3)** Introduction to Project Management covering all phases of a project including proposal development, planning, execution, and closing.

### **B A 421 Project Management (3)**

BA 421 is designed to provide the fundamental skills necessary for success in the business environment. BA 421 is one of a series of courses that collectively develop the the skills and competencies necessary for business administration students.

BA 421 is designed to provide students with the fundamental understanding of the Project Management Book of Knowledge that defines the standards of the Project Management Institute (PMI) which is the professional credentialing body of the discipline. This introductory course in project management covers all phases of a project, including; proposal development, planning, execution and closing.

The course will also explore the application of the Theory of Constraints to project management, and will use project management software to demonstrate and reinforce class concepts. The software will also be instrumental in the execution of a business project.

By the end of the proposed new course, students should be able to:

- Identify the role of the project manager within organizations and projects.
- Understand the Processes and Procedures needed to Plan and Control a Project.
- Recognize the options available as well as the inherent strengths and weaknesses of different approaches.
- Define the project scope and priorities.
- Create Work Breakdown Structure (WBS) and integrate it with the organization.
- Estimate and interpret project times and costs.
- Construct project networks and find critical paths.
- Understand and Implement Activity Precedence Logic
- Identify, assess and respond to project risks.
- Schedule project resources and evaluate resource constrained projects.
- Differentiate between the options to accelerate project completion.
- Use Microsoft Project Management Software as a skilled tool for Project Management.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 422W Strategic Business Planning (3)** Study of strategic planning and implementation in multi-industry, multi-cultural, and multi-national settings with emphasis on sustaining competitive advantages.

### **B A 422W Strategic Business Planning (3)**

BA 422W is the capstone of the series of business administration courses in the BSB degree. These courses collectively develop the the skills and competencies necessary for the business administration student.

BA 422W is designed for students to examine the discipline of strategic management and to develop an appreciation of the criticality of strategic management in guiding a business entity through a changing and challenging environment. The course requires students to build upon their knowledge of business structure, internal and external environments, and functional design as each relates to strategy development and implementation. Students explore methods and techniques to identify strategies best suited to accomplish an entity's mission and its business objectives.

As a writing intensive (W) course, there is a strong emphasis on development and reinforcement of effective writing skills. Students prepare well reasoned, organized, and constructed bodies of work.



Upon successful completion of the course, students will be able to:

1. Identify environmental threats and opportunities impacting a firm.
2. Identify strengths, weaknesses and competencies of a firm.
3. Effectively apply critical thinking skills to design strategic alternatives and then recommend the best alternative.
4. Critique and evaluate strategic actions taken by firms.
5. Explain the profound effects that a strategic move (either at the corporate level or at the business level) can have on the entire organization.
6. Demonstrate exceptional skills in presenting complex business information and issues.
7. Efficiently research a firm or industry using a variety of sources.
8. Demonstrate proficiency in analyzing business cases and formulating well reasoned recommendations when no "right" answer exists.
9. Demonstrate effective leadership skills in a group environment.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 462 Business Strategy (3)** Interpretation of business concept in the analysis of problems related to the successful management of a company, institution, or organization.

**Business Strategy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 495A Business Internship (3-6 per semester/maximum of 6)** Guided professional practicum in business consisting of 3 or 6 credits of supervised fieldwork in business.

**B A 495A Business Internship (3-6 per semester/maximum of 6)**

B A 495A facilitates the application of students' prior classroom learning in a field setting. This course is one of a series in the business program which collectively develop the skills and competencies necessary for success as a business administration student.

The course is designed to provide students with a firsthand opportunity to experience the challenges and rewards of the business professional. Essentially, an internship bridges the gap between the academic environment and the professional environment. Internships provide an opportunity for students to link theory with practice in a nonacademic setting. Internships provide practical, real-world experiences which cannot be simulated in the classroom.

Upon successful completion of an internship, students will:

- Have a better understanding of employer expectations related to career advancement.
- Have an enhanced strategic view of the industry/business segment in which they worked.
- Have experience integrating and using their knowledge and skills from the classroom.
- Have increased awareness of professional and technical areas of strengths and weakness.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 495B** Undergraduate Research in Business (3-6 per semester/maximum of 6) Guided student research in business, culminating in the presentation of the research project at a professional conference.

**B A 495B Undergraduate Research in Business (3-6 per semester/maximum of 6)**

BA 495B provides students an opportunity to apply prior coursework to address a business problem or research question in far greater depth than a traditional research paper. This course is one of a series in the business program which collectively develop the skills and competencies necessary for success as a business administration student.

The course provides the students with an opportunity to work intensively on a research project of extended duration and depth of analysis with a supervising faculty member. This course introduces the students to conducting business research on a more advanced level. Students will have the opportunity to develop the research question(s), read extensively in the academic literature, gather and analyze data, and thereby extend learning from prior coursework in a research setting.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 495C** Undergraduate Research in Business (3-9) Guided student research in business administration; application of analytical or research techniques to business problems.

**B A 495C. Undergraduate Research in Business (3-9)**

This course is a senior-level project activity that is intended to build upon all of a student's previous coursework in business, links the theoretical with day-to-day practical applications, and represents the single largest event in the Bachelor of Science in Business (BSB) program. This course is where the student will design a research project in which they have a particular interest and under the supervision of a faculty member will carry out data collection and analysis, prepare a comprehensive paper, and give a presentation of their work. Research as defined for this course means original research of actual business situations or phenomena, the findings, or results of which may be of value to others.

As with many of the other courses within the BSB curriculum, this course further reinforces the development of writing and resentation skills, but also builds upon the competencies attained in project management whereby the student rather than the nstructor drives the time schedule and must coordinate their own unique set of resources, including scheduling time as needed ith the supervising instructor.

This is one of the five signature BSB courses (B A 321, B A 322, B A 421, B A 495A, B, or C and B A 422W) and should e taken as close as possible to the end of the course of study. It is recommended that B A 495C be taken concurrently with A 422W, the capstone course for the BSB degree.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 497A** Strategies for Enterprise Sustainability (3) Course will provide students with an understanding of how environmental and sustainability issues are impacting business strategies and ultimately profits. Case studies and real world problems related to sustainability in operations will be analyzed. Course will review sustainability practices utilized by participants throughout the entire supply chain.

### **Strategies for Enterprise Sustainability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 497B** Sustainable Marketing Strategy for Consumers, Firms, and Societies (3) Sustainability is a broad domain concerning the extent to which environmental, economic, and social practices are viable for current and future generations. Consumer awareness of sustainability issues has evolved from an emerging social movement to mainstream values, and marketing strategy plays an important role in a business' ability to respond to these issues in a genuine manner. This course focuses on the role of sustainability in the marketplace and marketing strategies to effectively engage customers and stakeholders around sustainable issues.

### **Sustainable Marketing Strategy for Consumers, Firms, and Societies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 499** (IL) Foreign Study--Business Administration (1-18) Study in selected countries of business institutions, functions, and current business problems.

### **Foreign Study--Business Administration (1-18)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 500** Marketing Management (1-3) An examination of the role of the market place in company management.

### **Marketing Management (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 501** Management (2) Examination and application of concepts of human behavior and organization to managing people in work organizations.

**Management (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 502** Team Process and Performance (1-3) Development of managerial skills and techniques for diagnosing, intervening and leading effective teams.

**B A 502 Competencies for Converging Economies: Teams, Negotiations, and Ethical Leadership (2)**

B A 502 provides students with some basic knowledge about predictable team dynamics and how to constructively deal with issues that arise in the first year MBA teams. The course focuses on observation, diagnosis, and intervention skills for developing effective teams. Topics include diagnosing group dynamics, giving and receiving feedback to teammates, cross-cultural communication and conflict management techniques. The course provides a real-time practicum for diagnosing team issues and addressing team problems and conflicts. Students apply team process concepts and techniques as they work to complete team projects in their other core MBA classes. Students leave the course with an understanding of how to successfully lead a team and how to diagnose and correct dysfunctional team behaviors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 504** Ethical Leadership (2) This course introduces students to their ethical responsibilities as business leaders.

**Ethical Leadership (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 505** Negotiation Theory and Skills (1-3) Development of managerial skills for distributive and integrative negotiations at the two-party and team levels.

**B A 505 Negotiation Theory and Skills (1)**

The ability to effectively negotiate is an essential skill for managers. Negotiations not only occur with customers or clients, but also between bosses and subordinates, among teammates and across departments. Being able to craft a successful deal, especially in difficult circumstances, requires knowledge of yourself, as well as the substantive material that you are negotiating. Effective negotiators know their own limitations as well as their strengths. They also listen well and have good analytical skills. And, they can craft agreements that garner gains for themselves as well as for other if such gains are possible. Successful negotiating is also closely allied with successful teamwork since both processes require listening, persuasion and influence skills and creativity.

This course will introduce students to the difference between traditional (distributive) bargaining and interest-based (or integrative) negotiations. Students will learn the rudiments of interest-based negotiating and practice it in several negotiation simulations. They will learn how to identify their own and others' interests, to create and claim value and to craft constructive agreements for all parties. The course will concentrate on two person and small group negotiations as well as to deal with difficult opponents.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 510** Supply Chain and Operations Management (1-3) Introduction to the organizational processes and methods used to create and deliver goods and services.

**Supply Chain and Operations Management (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 511** Financial Accounting (1-3) Basic concepts and principles (i.e. the jargon) underlying financial accounting practices.

**Financial Accounting (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 512** Quantitative Analysis for Managerial Decision Making (2) Construction and use of quantitative methods in business decision-making.

**Quantitative Analysis for Managerial Decision Making (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 515** Business Statistics for Contemporary Decision Making (2) Conceptual understanding of statistics through both numerical and applied approach.

**B A 515 Business Statistics for Contemporary Decision Making (2)**

A course designed to meet the entry statistical requirements for any course in the Smeal MBA Program, as well as to provide job applicable skills across the entire business portfolio.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 517** Communication Skills for Management (1-3) Development of communication skills required for management; audience awareness, style, individual and group presentations.

**Communication Skills for Management (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 521** Introduction to Managerial Accounting (2) Cost accounting and the design of management accounting systems for planning and controlling operations, and for motivating personnel.

**Introduction to Managerial Accounting (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 523 IT Strategy (2)** An introduction to information technologies critical to business organizations.

**IT Strategy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 528 Business Simulation (1-3)** A team-based course during which students will manage a simulated firm.

**B A 528 Business Simulation (1-3)**

Using the business simulation, teams of 4-5 students will compete against other teams in a particular industry. The team members will have to make all the decisions about how to run the firm, including overall strategy, product design, detailed marketing plans, factory operations, and financing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 531 Introduction to Finance (1-3)** An examination of the techniques available to aid the financial manager in decision making.

**Introduction to Finance (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 532 Global Business Environment (1)** An introduction to worldwide economic trends and economic problems with an emphasis on how businesses cope with global business problems.

**B A 532 Global Business Environment (1)**

Changes in interest rates, swings in the business cycle, new international trade agreements: all are macroeconomic events, and all can dramatically impact your business. Institutional constraints, as well as theory, and history guide present day macroeconomic analysis and policy. Accordingly, the class is a synthesis of institutional, theoretical, and historical perspectives. A wealth of macroeconomic information and data is now available on the web for those who know how to access the interpret it. We will make extensive use of this material.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 533 Economics for Managers (2)** An introduction to the tools of economic decision making and a consideration of firm, industry, and global economic influences on economic decision making.

**Economics for Managers (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 535 Global Perspectives (1)** An overview of the global business environment.

**Global Perspectives (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 536 Global Immersion (1-3)** Exploration of the opportunities and the challenges of doing business in another economic region.

**B A 536 Global Immersion (2)**

Global Immersion is designed around a visit to another economic region. In the past, MBA students have visited such countries as Belgium, Brazil, Chile, China, Czech Republic, France, Ireland, Turkey, and Singapore. In each country, students visit both local and multinational businesses to understand how a business gets established and run in another country; students also meet with industry and government officials to get their perspectives on the economic policies of the country. Each Immersion is coordinated by a faculty leader who plans the visit so as to appeal to a wide range of student interests.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 545 Business, Government and International Economics (2)** Understand how macroeconomic events and policies affect the global economy and business decisions.

**B A 545 Business, Government and International Economics (2)**

Changes in interest rates, swings in the business cycle, new international trade agreements: All are macroeconomic events, and all can dramatically impact business. Accordingly the class is a synthesis of institutional, theoretical and historical perspectives.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 565 Strategic Leadership (1-3)** Presents a senior executive perspective on key opportunities and challenges faced by business leaders.

**B A 565 Strategic Leadership (1-3)**

This course presents a CEO's perspective on the key opportunities and challenges faced by business leaders as they seek to adapt themselves and their organizations to the evolving business environment.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 571 Strategic Management (1-3)** Analysis and application of concepts and techniques aimed at successfully developing and implementing competitive strategy in a complex business environment.

**B A 571 Strategic Management for Converging Economies (3)**

This course introduces students to the field of strategic management and the skills and tools used by general managers

to make strategic decisions. Students learn to use frameworks and perspectives for analyzing industries, competitors, and companies with an overall objective of positioning the firm to attain and sustain competitive advantage. Students learn how to identify the industry and firm-level determinants of profitability and then relate those factors to the development of competitive strategy within the context of responsible business practice. Students also learn how to evaluate strategies to understand how and why companies are successful or not. Finally, students will learn how senior managers use integrative approaches for solving strategic problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 572 Introduction to Business Research (3)** An introduction to issues involved in framing, defending, and evaluating business research programs.

**B A 572 Introduction to Business Research (3)**

This course introduces incoming business doctoral students to the research process. It covers the methodology of framing business research programs, including the problem of generalizing from business data to business theories, problems involved in testing theories, arguments for and against paradigmatically based business research, and issues involved in attempting to construct so-called rational accounts of business research. The course will emphasize similarities and differences across major approaches to business research.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 574 Business Research (1-3)** A project paper, comparable in quality and scope of work to a graduate thesis, on problems of a company.

**Business Research (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 575 Capstone Business Case (4)** A team-based project course that requires students to analyze an actual business problem from a firm or nonprofit organization.

**B A 575 Capstone Business Case (4)**

The Capstone Business Case course is designed to allow second-year MBA students the chance to integrate the knowledge they have gained to date in the program. True business problems are not narrow, functional area problems; rather they require teams of people to come together to jointly solve a problem that extends across many areas. For example, to assess the commercial viability for a new product requires contributions from economics, marketing, supply chain, finance, strategy, and corporate innovation. The more opportunities students have to work on real cross-functional problems, the better prepared they will be to solve them once they are actually on the job. In addition, working on a team and having to present the results gives students the ability to practice communication, teamwork, and leadership skills that are vital to success on the job.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 578 Entrepreneurship (3)** Study of the development or acquisition of a business appropriate to the objectives and resources of the individual entrepreneur.



**Entrepreneurship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 591** Applied Communications (1) Develop oral and written communication strategies to succeed in professional and academic contexts.

**B A 591 Professional Development for Business Academics (1)**

This course is designed to equip doctoral students in business with skills and knowledge that will assist them in successfully completing their doctoral studies and moving on to a successful career as a business academic. These skills fall into three broad categories: 1) communication skills, 2) research skills, and 3) interpersonal skills (which include ethical behavior). The course is designed to cover many crucial skills and career issues that may be overlooked during a doctoral student's normal course of study.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 597A** Six Sigma Statistics (2) Statistics course designed as an introduction to the MBA Six Sigma course.

**Six Sigma Statistics (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 597A** Six Sigma Statistics (2) Statistics course designed as an introduction to the MBA Six Sigma course.

**Six Sigma Statistics (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 597D** Advanced Microeconomic Analysis (3) Topics in advanced microeconomic analysis including competitive analysis, game theory, and mechanism design.

**Advanced Microeconomic Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 597E** Sustainable Business Strategies (2) Course will provide a unique view of business issues that relate to sustainability and corporate social responsibility.

**Sustainable Business Strategies (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 599** (IL) Foreign Study--Business Administration (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Study--Business Administration (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B A 850** Sustainability Driven Innovation (3) This course explores sustainability as a business opportunity for developing innovative products and services. It will focus on consumer needs related to sustainability, willingness to pay for these needs, and the innovative processes necessary to create sustainable solutions.

**Sustainability Driven Innovation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Business Economics (BUSEC)**

**BUSEC 502** Prices, Markets and Competitive Strategy (2) Determination of outputs and prices in markets used by the firm; market structure and the design of competitive strategy.

**BUSEC 502 Prices, Markets and Competitive Strategy (2)**

Business firms depend on markets to purchase goods and services (including human resources) from suppliers to create its saleable product (which may be a good or service). The firm then uses markets to distribute its products to buyers.

Markets involve rivalries of various types. Firms compete with suppliers and other producers for resources. Firms face competitors to sell their output to customers. To that extent, some parallels can be drawn between business strategy and competitive strategy in games such as football or bridge that also involve rivals. Business strategies often apply game theory as developed by mathematicians.

The course begins with basic economic principles of price and output determination in markets. With this foundation, students proceed to examine market structure, which is the nature of competition among firms, ranging from monopoly (one dominant market supplier) to pure competition (many non-dominant suppliers). Only a relatively short amount of the course will be given to monopolies and purely competitive markets. Most of the course will focus on markets in which business firms that have some market power (which is common where there is a small number of inter-dependent sellers) and are rivalrous. The Bertrand and Cournot oligopoly models will be heavily used for studying design of competitive strategy in rivalrous markets.

Firms develop by means of internal growth, horizontal integration, or vertical integration. Horizontal integration involves economics of scope and scale, as when two similar grocery stores combine. Vertical integration concerns mergers and acquisitions along the supply chain, as when an auto tire manufacturer merges with a rubber producer or buys auto tire retail stores. This part of the course will give business students an understanding of how firms and market structures develop. To further this discussion of rivalries students will learn how market structure changes by means of entry and exit of businesses and they will learn the methods used by firms to attain comparative advantage in the market.

The basic theme carried through the course will be development and evaluation of competitive strategies by the firms' managers. The course will be concluded by applying the Five Forces framework for designing competitive strategy (as developed by Michael Porter and others.) This framework is a useful means of integrating the various topics of the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BUSEC 503 Economic Environment of Business (2)** Analysis of the regulatory and global economic environment within which the firm operates and its implications for business strategy.

**BUSEC 503 Economic Environment of Business (2)**

Most courses in the School's M.B.A. program focus on managing the individual firm. However, business firms operate within an economic environment that provides opportunities, constraints, and threats. This course enables the firm's decision-makers to assess this environment and to design strategies that are appropriate for conditions in the firm's global, domestic, or regional spheres of operation.

The path of changes in the economic environment over time is generally described as the business cycle. The course begins with consideration of business cycle indicators, such as growth of real GDP, unemployment rates and inflation. Students employ simple models of the business cycle to explain recessions, inflation, and other environmental conditions. Class discussions will include consideration of appropriate managerial decisions under each of a variety of these conditions.

Financial markets are important in determining economic conditions. Students learn how the interest rate yield curve and other financial market indicators give insight into expectations about credit conditions and economic change. Financial markets also play important roles in determining availability and costs of funds.

Economic policy is the effort of government to change the economic environment. An important part of the course is the study of these policies. Fiscal policies consist of the use of taxation and government spending to shape the environment. Monetary policy is the effort to influence credit conditions and interest rates for the purpose of achieving a specific environmental change.

Domestic economic conditions are increasingly shaped by global conditions. Therefore, a significant part of the course is devoted to analysis of foreign exchange rates, interest rates, and monetary policies of other nations. In addition, students will analyze the impacts of barriers to international trade (primarily quotas and tariffs and foreign exchange controls) and investment.

The course concludes with examination of government regulation and its effect on business. Many regulations are designed to counter-act negative external effects of decisions made by private profit-pursuing firms, especially with regard to pollution of the natural environment. Anti-trust policies, patent and copyright laws. These regulations provide constraints and opportunities for business managers.

Students demonstrate achievement through completion of short cases, class discussions, and an examination.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Business Law (B LAW)

**B LAW 424** (R M 424) Real Estate Law (3) Analyze contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property.

### B LAW 424 B LAW (R M) 424 Real Estate Law (3)

Analysis of contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property. The objectives for this course are: (1) to provide students with an understanding of essential U.S. real estate property law, including the rights private property owners may obtain, how ownership and transfer are handled in view of present and future interests, constitutional issues that impact real estate ownership, and the legal aspects of modern real estate contractual transactions; (2) to teach students the ability to spot the legal issues arising from the above as future business leaders and (3) to introduce students to the legal reasoning process necessary to address and avoid the legal dilemmas presented by such issues. Instructional methods for the course will include detailed lectures and classroom discussion of readings and other materials. Student progress and mastery of the material will be evaluated through periodic examinations.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 425** (R M 425) Business and Environmental Regulation (3) Examines the interplay between environmental regulation and commercial activities, including property interests.

### B LAW (R M) 425 Business and Environmental Regulation (3)

R M/B LAW 425 is an advanced business law course based on foundation knowledge in legal regulation, property rights, and enterprise. The course explores the interplay between environmental laws and property rights and includes topics such as; common law regulation of the environment, government power and private rights, zoning, protecting endangered species, regulating the transportation and storage of hazardous materials, and Federal regulation of water quality. Students will develop their comprehension and analysis of the legal reasoning processes along with the ability to identify legal issues from the perspectives of the government, property owners, and environmental interest groups. The instructional methods will include class discussions of readings and video presentations. To facilitate thorough analysis of the competing interests affecting environmental law, this course will employ the Socratic teaching method and place a special emphasis upon class discussion and interaction.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 441** Business Law II: Agency, Employment and Business Structure (3) An examination of the laws governing agency relationships, employment, and the various structures of commercial enterprises.

### Business Law II: Agency, Employment and Business Structure (3)

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 444** Advanced UCC and Commercial Transactions (3) All articles of the Uniform Commercial Code, banking relationships, debtor- creditor law, and bankruptcy law.

### B LAW 444 Advanced UCC and Commercial Transactions (3)

This course is designed to: (1) provide the student with a systematic study of the laws governing sales transactions, the

instruments for financing those transactions and rights and liabilities of debtors and creditors (the Uniform Commercial Code governs these issues); (2) to explore current trends in the law affecting commercial transactions; (3) to develop further the student's legal reasoning processes; (4) to enhance the student's ability to identify legal issues from the business decision maker's and financial auditor's perspectives. Instructional methods will include lectures, readings, multimedia content, and class discussions. Student progress and mastery of the material will be evaluated through periodic examinations. Some state C.P.A. Boards require completion of this course as a prerequisite to obtaining certification as a public accountant. Completion of the course will be credited toward fulfillment of the requirements for the Legal Environment of Business Minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 445** Advanced Intellectual Property and Competition Law (3) Copyrights, trademarks, patents, and trade secrets followed by related topics in the regulation of competition.

### **B LAW 445 Intellectual Property & Competition Law (3)**

The objectives for this course are to (1) provide students with an understanding of U.S. and international law that supports the creation of beneficial information via intellectual property rights, allows government to regulate information property through antitrust and privacy statutes, and promotes business development by encouraging competitive uses of information; (2) teach students the ability to spot the legal issues arising from the above as future business leaders and (3) introduce students to the legal reasoning process necessary to address and avoid the legal dilemmas presented by such issues. Instructional methods for the course will include detailed lectures and classroom discussion of readings and other materials. The course builds on the introductory business law curriculum by providing an advanced and detailed study of specific areas of law that are highly valuable to modern, technology-driven businesses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 446** Employment Law (3) Examines the legal and regulatory environment of employment relationships. Topics include anti-discrimination; worker health and safety; and labor relations laws.

### **B LAW 446 Employment Law (3)**

The course is designed for business students seeking a solid understanding of labor relations and employment law. It is not a general overview or introduction to law course for those seeking to enter law school. Labor and employment law has developed and changed over the past seven decades, and continues to evolve as the economic model and means of production changes globally. With the passing of the National Labor Relations Act and subsequent amendments thereto, including development in the ability of public employees to engage in concerted activity, the understanding of the modifications in the employer-employee relationships is necessary for successful business executives and front-line managers. While a thorough understanding of the underpinnings of these laws is necessary, this is only a portion of the issues at hand. The ability to apply these laws in current working environments along with interpreting and critiquing these laws will assist in the preparation of future corporate managers.

The course goes into detailed discussion regarding the employment at will doctrine, wrongful discharge, workplace torts, and employee privacy and monitoring. With this foundation, the course then covers civil rights and discrimination based on race, color, religion, gender, sexual orientation, family obligation, disability, and national origin are covered using Supreme Court cases that have tested the validity and soundness of our federal legislation. The closing part of the course focuses on organized labor through the process of unionizing and union membership, negotiations and economic pressure used to obtain concessions in collective agreements. Additionally, fair labor laws and occupational health and safety requirements to diminish workplace accidents and improve productivity is discussed.

For each of the topics presented, detailed analysis of prominent cases will be discussed with the expectation that students can apply these case decisions to current employer/employee situations. Exposure to differing opinions, reversed rulings, and detailed legal processes will provide students with a broad understanding of the complex nature of legal proceedings and how these processes impact labor and employment relations in the United States. Content synthesis and critical analysis are the learning goals of the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 471** (CRIMJ 471) Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3) Civil law issues within a justice agency and between criminal justice agencies and members of the public.

**Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 473** (CRIMJ 473) Criminal Procedure and Evidence in the Business Community (3) Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.

**Criminal Procedure and Evidence in the Business Community (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 497A** Entertainment Law (3) Provide students with an understanding of fundamental issues in entertainment law that arise in a business context.

**Entertainment Law (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 525** Business Law for Innovation and Competition (2) Nature of intellectual property rights, as well as process for obtaining and enforcing them.

**B LAW 525 Business Law for Innovation & Competition (2)**

Primary areas of focus include intellectual property ("IP") law (patents, trademarks, copyrights and trade secrets) and antitrust law, as well as basic principles of U.S. law and the legal rules for related industry practices such as licensing. Students will also learn the legal rules designed to encourage competition (and punish anticompetitive behavior). Finally, the course will help students to better appreciate when professional legal counsel is necessary, and how to manage those interactions more cost effectively. Although the course will impart advanced legal concepts, prior coursework in business law is not required.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**B LAW 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LAW 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Business Logistics (B LOG)**

**B LOG 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LOG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LOG 597** Special Topics (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Special Topics (1-9)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**B LOG 599** (IL) Foreign Study--Business Logistics (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

### **Foreign Study--Business Logistics (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Cardiology-Hy (CAR)**

**CAR 722** Cardiology (4.5) These areas will be studied: Symptoms and Signs; Systemic Arterial Hyper- tension; Atherosclerosis; Heart Failure; Congenital Heart Disease; Infectious, Inflammatory, and Immunologic Disease; Connective Tissue Disorders; Electrical Abnormalities; and Lipid Disorders.

### **Cardiology (4.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Cell & Molec Biol-Hy (CMBIO)**

**CMBIO 506** Biological Basis of Human Health and Disease (2) Biological basis of human health and disease by cellular, molecular, genetic, and biochemical basis of organ function pathology.

### **CMBIO 506 Biological Basis of Human Health and Disease (2)**

This course will cover the biologic basis of human health and disease. Designed to be translational in nature and to parallel the pathology of organ systems presented in the second year medical school curriculum. Topics will include coverage of human disease as it affects organ systems. The major emphasis will focus on the cellular, molecular, genetic, and biochemical basis of human diseases. Introductory lectures will be followed by discussion of the primary literature that complements the lecture material. Designed to give students an appreciation of diseases affecting the major organ systems, and how these illnesses have been analyzed using the tools of genetics, biochemistry, and cell and molecular biology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 590** Colloquium (1-3) Continuing seminars which consist of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CMBIO 594** Research topics (1-18) Supervised student activities on research projects identified on an individual or group basis.

**Research topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBIO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Cellular/Mollec Bas (CMBMP)

**CMBMP 711** Cellular and Molecular Basis of Medical Practice (7) This integrated course includes topics in biochemistry, physiology, pharmacology, and molecular genetics.

**Cellular and Molecular Basis of Medical Practice (7)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMBMP 712** Cellular and Molecular Basis of Medical Practice (7) Continuation of CMBMP 711.

**Cellular and Molecular Basis of Medical Practice (7)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Ceramic Science (CERSC)

**CERSC 590** Colloquium (1-3) Current developments in ceramic science and related fields. Required of all graduate students in ceramic science.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CERSC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CERSC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CERSC 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CERSC 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Chemical Engineering (CH E)**

**CH E 410** Mass Transfer Operations (3) Introduction to principles and applications of mass transfer, with focus on the design of equilibrium stage and continuous contacting separation processes.

### **CH E 410 Mass Transfer Operations (3)**

The objective of this course is to present the principles of mass transfer and their application to separation and purification processes. The course integrates fluid dynamics and thermodynamics and proceeds to develop rate expressions for mass transfer in multiphase, multicomponent systems. Starting with Fick's law and macroscopic balances the course moves to the design of large scale separation processes such as equilibrium stage separations (distillation, extraction) and continuous separation (absorption towers, scrubbers) for the separation and purification of chemical compounds. The course also introduces the use using modern software tools such as HySys, used in the actual design of such processes and also in the capstone design course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 410** Mass Transfer Operations (3) Introduction to principles and applications of mass transfer, with focus on the design of equilibrium stage and continuous contacting separation processes.

### **CH E 410 Mass Transfer Operations (3)**

The objective of this course is to present the principles of mass transfer and their application to separation and purification processes. The course integrates fluid dynamics and thermodynamics and proceeds to develop rate expressions for mass transfer in multiphase, multicomponent systems. Starting with Fick's law and macroscopic balances the course moves to the design of large scale separation processes such as equilibrium stage separations (distillation, extraction) and continuous separation (absorption towers, scrubbers) for the separation and purification of chemical compounds. The course also introduces the use using modern software tools such as HySys, used in the actual design of such processes and also in the capstone design course.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 423 Chemical Energy Technology (3)** This course provides an overview of current and prospective chemical energy storage and conversion technologies.

### **Chemical Energy Technology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 430 Chemical Reaction Engineering (3)** Chemical reaction rates and equilibria, reactors, reactor design; emphasis on industrial chemical processes.

### **CH E 430 Chemical Reaction Engineering (3)**

This course teaches the principles of reaction engineering and reactor design. It is one of the core subjects in the chemical engineering curriculum and it is normally scheduled in the senior year. Students learn how to apply stoichiometry in combination with a rate law to design a chemical reactor that produces the desired conversion of reactants. The design of various types of chemical reactors is discussed at length, including continuous stirred-tank (CSTR), plug-flow (PFR), continuous-operation and batch-operation reactors. Additional topics include heterogeneous reactors, catalytic systems and fluidized beds, the design and optimization of reactor networks, and safety. The course integrates fluid mechanics and heat transfer to the design and analysis of isothermal and non-isothermal reactors. It leads to the capstone design course in which chemical reactors are integrated into a chemical plant.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 430 Chemical Reaction Engineering (3)** Chemical reaction rates and equilibria, reactors, reactor design; emphasis on industrial chemical processes.

### **CH E 430 Chemical Reaction Engineering (3)**

This course teaches the principles of reaction engineering and reactor design. It is one of the core subjects in the chemical engineering curriculum and it is normally scheduled in the senior year. Students learn how to apply stoichiometry in combination with a rate law to design a chemical reactor that produces the desired conversion of reactants. The design of various types of chemical reactors is discussed at length, including continuous stirred-tank (CSTR), plug-flow (PFR), continuous-operation and batch-operation reactors. Additional topics include heterogeneous reactors, catalytic systems and fluidized beds, the design and optimization of reactor networks, and safety. The course integrates fluid mechanics and heat transfer to the design and analysis of isothermal and non-isothermal reactors. It leads to the capstone design course in which chemical reactors are integrated into a chemical plant.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 432 (F SC 432) Petroleum Processing (3)** A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

### **Petroleum Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 438** Bioprocess Engineering (3) Introduction to the biotechnology field including consideration of upstream and downstream processing of biochemicals.

### **Bioprocess Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 442** (MATSE 448) Polymer Processing Technology (3) Basic principles of polymer melt processing are reviewed and subsequently applied to the most important industrial processing operations.

### **CH E 442 (MATSE 448) Polymer Processing Technology (3)**

CH E 442 involves both lectures and laboratory experiments illustrating the interrelations between structure, processing conditions, and physical properties of industrial polymer products. Students apply engineering fundamentals and principles of polymer melt rheology to analyze industrial processing operations. Unlike typical polymer processing courses offered at most U.S. universities, CH E 442 covers detailed analyses of individual processing operations, rather than dwelling on underlying polymer science fundamentals that are covered elsewhere in our curriculum. Students learn to optimize processing variables, given a particular set of materials and conditions, establishing how processing conditions impact the physical properties of finished polymer products. We explore the physics governing processing operations including extrusion, mixing, calendaring, blow molding, thermoforming fiber spinning compression molding, injection molding, and nanolithography.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 446** Transport Phenomena (3) Fundamental treatment of mass, heat, and momentum transfer; emphasis on transport properties and mathematical models of chemical engineering transport processes.

### **CH E 446 Transport Phenomena (3)**

This is an intermediate course in transport phenomena intended to expand on the materials introduced in the required undergraduate courses on momentum, heat and mass transfer. It introduces the student to the rigorous formulation of transport problems using the conservation principles and flux expressions, and identifies the similarities and differences among the transport processes for momentum, heat, and mass. The main focus of the course is on microscopic treatment of transport problems, with particular emphasis on proper use of dimensional analysis and scaling arguments. Transport phenomena is a rather mathematical subject and the student is assumed to be familiar with ordinary and partial differential equations, elementary vector analysis, and elementary numerical techniques. This course is intended to prepare the student for a graduate-level course in transport phenomena.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 446H** Transport Phenomena (3) Fundamental treatment of mass, heat, and momentum transfer; emphasis on transport properties and mathematical models of chemical engineering transport processes.

### **Transport Phenomena (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 448** Advanced Mass Transfer Operations (3) Diffusion and mass transfer as applied to stagewise and continuous contact operations, including equipment design.

**Advanced Mass Transfer Operations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 449** Bioseparations (3) Analysis and design of separation processes for the purification of biological molecules.

**CH E 449 Bioseparations (3)**

This course introduces students to the principles and applications of separation processes used for the purification of biological molecules, including fine chemicals, pharmaceuticals, and therapeutic proteins. By the end of the course students will be able to perform preliminary design calculations and scale-up of specific separation systems including centrifugation, filtration, chromatography, and membrane processes. Students will also be able to develop outlines of overall separation schemes appropriate for the purification of different biological products. This course is required for the Bioprocessing and Biomolecular Engineering Option in Chemical Engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 450** Process Dynamics and Control (3) Analysis of time-dependent variables in chemical process plants; reactor design and control; computer applications.

**CH E 450 Process Dynamics and Control (3)**

The course is an introduction to chemical process dynamics and control and is offered as a technical elective. The first part of the course is devoted to the dynamical behavior of systems and the mathematical tools (differential equations, Laplace transforms) used in their analysis. The second part of the course covers the design and operation of various types of controllers, including proportional, integral and differential and their combinations. The theoretical principles are demonstrated with applications to chemical engineering processes such as storage tanks, chemical reactors and separation processes.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 452** Chemical Process Safety (3) This course provides an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant accidents.

**CH E 452 Chemical Process Safety (3)**

The course will provide an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant accidents, their causes, and steps to eliminate them, with emphasis on inherently safe designs. Chemical Plant accidents deal most often with Flammability and Toxicity issues and these are dealt with in great detail. The role of Human Error in accidents is also examined. Actual case studies (including Bhopal, BP Texas City, Piper Alpha) will be examined to show the relevance in today's workplace. The course requires active student participation via discussions of system designs, their weakness and improvements. Guest lecturers will also be invited to supplement the material. This is offered as a senior elective in Chemical Engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**CH E 470** Design of Chemical Plants (3) Lectures and practicum on methods and calculations, including economic evaluations for the design of chemical plants; formal technical report required.

**CH E 470 Design of Chemical Plants (3)**

The chemical engineering capstone design course introduces the principles of process design and economic evaluation utilizing various industry computer tools, with special emphasis on process simulators. The student will develop critical design logic to evaluate a process, starting with block flow diagrams and simple material balances utilizing practical heuristics and then build the process flowsheet through computer simulation, flowsheet optimization, and detailed equipment design.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 480M** Chemical Engineering Laboratory (Honors) (3) Data interpretation and analysis from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

**CH E 480M Chemical Engineering Laboratory (Honors) (3)**

CH E 480M is the laboratory course in chemical engineering. The objectives of CH E 480M is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior-senior-level classes. This course does not introduce new material but focuses instead on planning, execution and interpretation of experiments. The special aspect of the honors section is that students will be given an open-ended experimental research project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 480M** Chemical Engineering Laboratory (Honors) (3) Data interpretation and analysis from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

**CH E 480M Chemical Engineering Laboratory (Honors) (3)**

CH E 480M is the laboratory course in chemical engineering. The objectives of CH E 480M is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior-senior-level classes. This course does not introduce new material but focuses instead on planning, execution and interpretation of experiments. The special aspect of the honors section is that students will be given an open-ended experimental research project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 480W** Chemical Engineering Laboratory (3) Data interpretation and correlation from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

**CH E 480W Chemical Engineering Laboratory (3)**

This is the laboratory course in Chemical Engineering. Its objective is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior- and senior-level classes. CH E 480W does not introduce new material but focuses instead on planning, execution and interpretation of experiments.

The course is team-based and includes laboratory sessions as well as lectures. Evaluation is based on the written and oral reports given based on experiments performed. These reports undergo several drafts, in which at different times students or faculty evaluate the report, suggesting corrections. Course evaluation may also include a "pre-exam" to assure that the

students understand technical material coming into the course. Peers assess each others' performance (contributing to the grade), as does the faculty.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 480W** Chemical Engineering Laboratory (3) Data interpretation and correlation from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports.

### **CH E 480W Chemical Engineering Laboratory (3)**

This is the laboratory course in Chemical Engineering. Its objective is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior- and senior-level classes. CH E 480W does not introduce new material but focuses instead on planning, execution and interpretation of experiments.

The course is team-based and includes laboratory sessions as well as lectures. Evaluation is based on the written and oral reports given based on experiments performed. These reports undergo several drafts, in which at different times students or faculty evaluate the report, suggesting corrections. Course evaluation may also include a "pre-exam" to assure that the students understand technical material coming into the course. Peers assess each others' performance (contributing to the grade), as does the faculty.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 494** Research Projects in Chemical Engineering (1-6) An original problem, including a search of the literature, experimental investigation, and preparation in formal thesis form.

### **Research Projects in Chemical Engineering (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 494H** Research Projects in Chemical Engineering (Honors) (1-6) An original problem, including a search of the literature, experimental investigation, and preparation in formal thesis form.

### **CH E 494H Research Projects in Chemical Engineering (1-6)**

Undergraduate research projects for honors students leading to the generation of a thesis for the Schreyer Honors College. The content of this course typically falls within the research interests of the chemical engineering faculty. The work can be computational, theoretical or experimental in nature and culminates with the writing of an honors thesis. Students should select a thesis advisor prior to enrolling in this course and file an honors thesis proposal report form with the Schreyer honors College. A student outside of chemical engineering can take the course if they are working towards an honors thesis in chemical engineering. A student in chemical engineering can take this course with a co-advisor outside of chemical engineering; however, the CH E Faculty member is responsible for assigning the grade.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 497A** Polymers (3) Introduction to synthesis, structure, characterization and processing of polymers. Single molecule properties, polymer solutions, glasses, crystals and blends.

**Polymers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 497B** Bioremediation and Green Chemistry (3) Application of engineering and biological principles toward remediation of hazardous wastes. Degradation and synthesis of chemicals using genetically engineered microorganisms.

**Bioremediation and Green Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 497B** Bioremediation and Green Chemistry (3) Application of engineering and biological principles toward remediation of hazardous wastes. Degradation and synthesis of chemicals using genetically engineered microorganisms.

**Bioremediation and Green Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 501** (BIOE 501) Bioengineering Transport Phenomena (3) Application of the equations of mass, energy, and

momentum conservation to physiological phenomena and to the design of artificial organs.

### **Bioengineering Transport Phenomena (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 503 (BIOE 503) Fluid Mechanics of Bioengineering Systems (3)** Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

### **Fluid Mechanics of Bioengineering Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 503 (BIOE 503) Fluid Mechanics of Bioengineering Systems (3)** Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

### **Fluid Mechanics of Bioengineering Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 510 (MATSE 510) Surface Characterization of Materials (3)** Physical and chemical principles of characterization techniques widely used in materials science, chemistry and engineering.

### **Surface Characterization of Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 524 Chemical Engineering, Application of Thermodynamics (3)** Elements of thermochemistry and thermodynamics of greatest importance in chemical engineering.

### **Chemical Engineering, Application of Thermodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 528 Colloidal Forces and Thermodynamics (3)** Unified treatment of formation, growth and stability of colloids based on principles of intermolecular and colloidal forces and thermodynamics.

### **Colloidal Forces and Thermodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 535** Chemical Reaction Engineering (3) Optimal design of batch and continuous chemical reactors and reactor batteries; effect of mixing on reactor operation.

### **Chemical Reaction Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 536** Heterogeneous Catalysis (3) Thermodynamics and kinetics of adsorption and reactions on solid surfaces, heat and mass transfer effects, theory and correlations in catalysis.

### **Heterogeneous Catalysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 544** General Transport Phenomena (3) Formulation and solution of transport problems involving momentum, heat, and mass transfer, with chemical engineering applications.

### **General Transport Phenomena (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 545** Transport Phenomena I (3) Momentum transport, laminar and turbulent flow, boundary layer analysis, non-Newtonian flow, mechanical energy balance, chemical engineering applications.

### **Transport Phenomena I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1982

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 546** Transport Phenomena II (3) Heat and mass transfer, steady and unsteady state, coupling, molecular diffusion, moving boundaries, transfer coefficients, chemical engineering applications.

### **Transport Phenomena II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1982

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 576** (C E 576) Environmental Transport Processes (3) Fundamentals of chemical transport in engineered environments, such as biofilm reactors, and natural systems including aquifers and rivers.

### **CH E(C E) 576 Environmental Transport Processes (3)**

This course covers the fundamentals of mass transport of chemicals between air, water, soil, and biota. Material is divided into three subject areas: mass transfer theory, transport processes related to engineered reactors, and transport in the

natural environment. The focus of the course is on chemical calculations particular to dilute systems, with emphasis on quantifying chemical transport rates and distributions in natural and engineered environments. Special topics of interest to environmental engineers include biofilm models, bioreactors, chemical partitioning in thin fluid film bioreactors, and fate of anthropogenic chemicals from spills and discharges into the environment (rivers, lakes, and groundwaters). The course is open to all graduate students interested in the fate and transport of chemicals in the environment, and it is required for all students pursuing a graduate degree in environmental engineering.

Course grades are based on three exams and graded homework assignments. This course is taught every fall semester at the University Park campus.

Faculty: Bruce Logan

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 597A** Numerical Methods in Chemical Engineering (3) Application of numerical analysis and computational methods to the solution of differential equations of relevance to chemical engineering.

### **Numerical Methods in Chemical Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 597B** Research Topics in Chemical Engineering (1) Lecture and discussion by visiting faculty and engineers on the most recent topics in Chemical Engineering.

**Research Topics in Chemical Engineering (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 597B** Research Topics in Chemical Engineering (1) Lecture and discussion by visiting faculty and engineers on the most recent topics in Chemical Engineering.

**Research Topics in Chemical Engineering (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Opportunity for supervised and graded teaching experience for graduate students in chemical engineering.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CH E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Chemistry (CHEM)

**CHEM 400** Chemical Literature (1) Instruction in use of the library and of the literature of chemistry.

**CHEM 400 Chemical Literature (1)**

CHEM 400 covers an orientation to use the library; sources of organic and inorganic synthesis information; use of relevant indexing and abstracting services; spectral data sources; patent literature; sources related to general chemical information, and properties data. Additional topics may be included as time permits.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 402** Chemistry in the Environment (3) Chemistry of the atmosphere, natural waters, and the land surface with particular focus on human influence on processes occurring therein.

**CHEM 402 Chemistry in the Environment (3)**

Fundamental and descriptive aspects of the sources, reactions, transport, and effects of chemical species, both natural and synthetic, in water, air, soil, and living systems, and the influence of human activities on these processes. The goal of the course is to gain an understanding of the theory and application of the fundamental processes that determine the distribution and transport of inorganic and organic substances in the environment; the techniques for determining important physicochemical properties that influence environmental fate; and the major sources of important classes of environmental chemicals. Rapid increases in technological sophistication have led to startling innovations in our everyday lives almost unthinkable a century ago. However, at the same time, advances in science and engineering have complicated how we live and react to the new technologies and, at times, force consideration of complex issues before our need for reflection. Approaching problems from different directions and perspectives is fundamental to our understanding of Earth processes. New and continued emphasis in global warming, loss of biodiversity, ozone layer depletion, acid mine drainage, sustainable development and energy use are only a few of the major environmental threats which require an intelligent and informed response. As such, the course provides a balanced discussion of the hard science and social sciences aspects of environmental issues.

General Education: None



Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 406** (NUC E 405) Nuclear and Radiochemistry (3) Theory of radioactive decay processes, nuclear properties and structure, nuclear reactions, interactions of radiation with matter, biological effects of radiation.

### **CHEM 406 Nuclear and Radiochemistry (3)**

CHEM 406 provides a basic introduction to many of the important physical phenomena in nuclear and radiochemistry and the theories that describe them. The exposition of both experimental phenomena and theory complements the content of other upper-level courses in physical chemistry such as CHEM 450 and 452.

Specifically, the types of radioactive decay are described, and, using this information, the equations that relate the growth and decay, i. e., the kinetics, of radioactive nuclei are derived. In parallel, a variety of types of nuclear reactions, such as neutron capture are introduced and used to develop the equations that governing the kinetics of nuclear reactions, including the concept of cross section. To describe the nature of nuclear matter, the relationships between energy, binding energy, and mass, are developed and augmented with the introduction of related quantities including the nuclear magnetic-dipole moment, total angular momentum of the nucleus, and Fermi-Dirac and Bose-Einstein statistics. A basic introduction to quantum mechanics, including several problems of increasing complexity, namely, the one-dimensional particle-in-a-box, the three-dimensional particle-in-a-cubic-box, and the particle-in-a-spherical box is then provided. The latter problem forms the basis for developing the single-particle shell-model of the nucleus, which is compared to the single-particle shell-model of the atom, namely, the hydrogen-atom problem. The barrier-penetration theory of alpha-decay, Fermi's phase-space theory of beta-decay, and the selection rules for gamma-ray decay are then presented. Final topics include the interactions of radiation with matter and the biological effects of radiation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 408** Computational Chemistry (3) Introduction to numerical and nonnumerical computer uses in physical science.

### **CHEM 408 Computational Chemistry (3)**

CHEM 408 introduces some of the many ways in which computers are used in modern chemical research. The main emphasis is on "molecular modeling" including such topics as electronic structure calculation, molecular mechanics, molecular dynamics and Monte Carlo simulation methods. In lesser detail, chemical informatics will also be considered, time permitting. Discussion of the theoretical underpinnings of these various methods and their range of applicability will be combined with exercises illustrating the use of several current chemical software packages and with assignments based on critical reading of illustrative literature papers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 410** Inorganic Chemistry (3) Conceptual and descriptive aspects of nontransition elements, covering structural, thermodynamic, and kinetic features.

### **CHEM 410 Inorganic Chemistry (3)**

CHEM 410 covers structure and bonding in inorganic chemistry, including the chemistry of main group elements and selected topics in transition metal chemistry. Theories and models of chemical bonding (valence bond theory, crystal field theory, and molecular orbital theory) are applied to inorganic molecules, coordination compounds, and solids. The course also covers the following topics: periodic trends in the chemistry of the d- and p-block elements, structural solid state chemistry, magnetism of transition metal complexes and inorganic solids, ionic and covalent bonding in solids, electronic properties of metals, alloys, superconductors, and semiconductors, synthesis of inorganic materials, and properties of nanoscale inorganic solids.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 412** Transition Metal Chemistry (3) Structure and bonding of compounds containing transition metals.

### **CHEM 412 Transition Metal Chemistry (3)**

CHEM 412 covers the chemistry of the transition metals, and in particular the d-block elements. Major areas of emphasis include coordination chemistry, organometallics, and the role(s) of transition metals in biology. The course covers the following topics: molecular symmetry with applications to bonding and vibrational spectroscopy, coordination chemistry, structural and optical isomers, crystal and ligand field theories, electronic structure and electronic transitions, spectroscopic methods for probing transition metal complexes, kinetics and thermodynamics of ligand substitution reactions, oxidation-reduction reactions, organometallic complexes and their basic reaction types, homogeneous and heterogeneous organometallic catalysts and their reaction cycles, the interactions of metal ions with biological molecules, the function of transition metal ions in metalloproteins, and medically-important transition metal complexes.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 413** Chemistry of the Elements (4) Theoretical and descriptive chemistry of the elements; laboratory synthesis and measurements in inorganic, coordination, and transition metal chemistry.

### **Chemistry of the Elements (4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 423W** Chemical Spectroscopy (4) Modern methods and instruments of spectroscopy and their applications to problems of chemical structure and analysis.

### **CHEM 423W Chemical Spectroscopy (4)**

The course reviews modern methods and instruments of spectroscopy and their applications to problems of chemical structure and analysis. Topics include electronics, optics, and atomic and molecular spectroscopy (UV-VIS, Fluorescence, FTIR, Raman, liquid- and solid-state NMR). The course thoroughly integrates lecture and laboratory activities. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. Students work in small groups (2-3 students) to complete each assignment. Students are required to write research papers during the semester. The reports are linked to the core course topics and the fifth is associated with the semester-long research project. All reports require students to search for and read the relevant published literature.

The course is designed to be rigorous and comprehensive in scope. The writing component for this course includes: maintaining a proper laboratory notebook; reports; and an oral poster presentation. All writing elements are reviewed and graded by the instructor and teaching assistants.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 425** Chromatography and Electrochemistry (3) Gas, liquid, and other forms of chromatography; important techniques of electrochemistry.

### **CHEM 425 Chromatography and Electrochemistry (3)**

The course topics include gas, liquid, and other forms of chromatography, mass spectroscopy, and important techniques of electrochemistry. The course material is designed to increase student understanding of both the analytical instruments used in the laboratory and the principles underlying the measurements. Evaluation of student performance is based on the level to which a student understands how an instrument operates and how particular components determine overall performance and specifications; limitations to measurements as a function instrument design; criteria by which one

selects an appropriate instrument to obtain the desired measurements; and criteria by which one selects appropriate components to build an instrument for specific uses.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 427W (FRNSC 427W) Forensic Chemistry (4)** Analytical and instrumental methods used in the forensic sciences with special emphasis on the analysis and characterization of trace evidence.

#### **CHEM (FRNSC) 427W Forensic Chemistry (4)**

The purpose of this course is to provide students with a rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of trace evidence. The course thoroughly integrates lecture and laboratory activities to explore the history, controversies and current issues related to each topic. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. Students work in small groups (2-3 students) to complete each assignment. Students are required to write five research papers during the semester. Four of the reports are linked to the core course topics and the fifth is associated with the semester-long research project. All reports require students to search for and read the relevant published literature.

The course is relevant to any student majoring in Forensic Sciences or who has an interest in obtaining employment in a crime lab. The course is required for accreditation through the American Association of Forensic Sciences and is recommended by the National Institute of Justice in their published recommendations for undergraduate curricula in the forensic sciences. The proposed course and the course in Forensic Anthropology/Biology comprise the core 400-level science courses required in the Forensic Sciences major.

The course is designed to be rigorous and comprehensive in scope. Grades will be based on in-class lecture examinations (20%), problem sets (10%), laboratory notebooks (15%), laboratory write-ups (30%), and a term project (written and oral presentations; 25%). The writing component for this course includes: maintaining a proper laboratory notebook; five approximately 10-page reports; and an oral poster presentation. All writing elements are reviewed and graded by the instructor and teaching assistants. Students are allowed to correct, or rewrite, and resubmit notebook entries for three separate submissions (notebooks are graded a total of eight times throughout the semester) and the written reports excluding the final project report. Students are required to submit a preliminary poster for a ) non-graded) review prior to the oral presentation. The writing component of the course accounts for 55% of the total course grade.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 430 Structural Analysis of Organic Compounds (3)** Spectroscopic methods as tools in gross and detailed structural analysis and interpretation within the framework of modern theory.

#### **CHEM 430 Structural Analysis of Organic Compounds (3)**

This course is designed to introduce students to the spectroscopic techniques that are used to elucidate the structures of organic molecules of various molecular weights. Some theoretical background will be provided and is necessary, but the emphasis is on solving problems. The course starts with fundamental concepts and techniques learned in sophomore organic chemistry and builds toward state-of-the-art methods used by modern organic and bioorganic chemists. Topics to be covered include: UV spectroscopy, 1D- 1H and 13C NMR, spin-spin (scalar) coupling and chemical shifts, IR spectroscopy, simple and advanced mass spectroscopic techniques, stereochemistry, advanced NMR topics including advanced 1D and 2D NMR and correlation spectroscopies. Some consideration will also be given to the challenges associated with structure determination in biomolecules.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:  
Concurrent: CHEM 213

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 431W Organic and Inorganic Preparations (4)** Preparation, purification, and characterization of both organic and inorganic compounds by modern methods.

**CHEM 431W Organic and Inorganic Preparations (3)**

CHEM 431W is a one-semester, writing-intensive advanced laboratory course that focuses on the preparation, isolation, purification, and characterization of organic, organometallic, and inorganic compounds. Students are expected to use the techniques learned in the introductory organic chemistry laboratory and will learn more advanced techniques such as the use of air-free and anhydrous reaction conditions, glove bags, vacuum manifolds, vacuum distillations, flash chromatography, solvent stills, and gas-tight syringes. Molecular modeling techniques are also introduced. Students are given hands-on access to instrumentation for the characterization of synthetic products or organic unknowns using standard analysis methods such as IR, NMR, UV/V is spectroscopy, mass spectrometry, polarimetry, HPLC, GC and GC-MS. Students are expected to search the chemical literature using databases and online journals and to write formal lab reports in ACS style. The lab assignments include syntheses, separating an unknown mixture, and a team project, which includes a written proposal, synthetic work, a final report, and a poster presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 432 Organic Reaction Mechanisms (3)** The study, evaluation, and discussion of the mechanisms of selected organic reactions.

**Organic Reaction Mechanisms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 440 Instrumental Analysis (3)** General instrumental theory and methods used in common atomic and molecular analyses.

**CHEM 440 Instrumental Analysis (3)**

This course presents analytical methods used by the chemistry community in a way that extends and compliments the treatment in CHEM 221. Preliminary discussions will entail sample preparation for organic and inorganic samples, quantitative measurements, sensitivity and limit of detection. Techniques addressed will cover the areas of separation, qualitative and quantitative optical spectroscopic techniques, mass spectrometry, electroanalytical techniques and surface analysis. In separation techniques, methods presented will be capillary electrophoresis, gas, liquid, and ion chromatography. In optical spectroscopy, methods presented will be infrared, Raman, nuclear magnetic resonance, ultraviolet and visible molecular absorption, chemiluminescence, inductively coupled plasma emission, atomic fluorescence, atomic absorption and emission spectrometry. Mass spectrometry methods presented will include time of flight, magnetic sector and electric sector mass spectrometry as well as interfacing with gas chromatography, liquid chromatography and capillary electrophoresis. Electroanalytical methods include amperometric, voltammetric and potentiometric techniques. Surface analysis methods discussed will be atomic force microscopy, scanning tunneling microscopy, Auger electron spectroscopy, X-ray photoelectron spectroscopy and secondary ion mass spectrometry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 441 Elemental Analysis and Instrumental Design Laboratory (1)** An introduction to the use of modern instruments for problems in chemical structure and analysis.

**CHEM 441 Elemental Analysis and Instrument Design Laboratory (1)**

CHEM 441 is one of three laboratory courses (CHEM 441, CHEM 443, and CHEM 445) which accompany the lecture course in instrumental analysis, CHEM 440. The topics for CHEM 441 are: 1) optics, flame atomic emission spectrometry & microwave induced plasma emission spectrometry, 2) electronics and data acquisition/signal analysis, and 3) basic ultraviolet-visible instrument design. Every student will have ample opportunity to become proficient in the operation of the instruments being studied. They will spend about half of the time learning the fundamentals of each instrument and will then carry out a specific experiment using each one.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 443** Electrochemistry and Chromatography Laboratory (1) An introduction to the use of modern instruments for problems in chemical structure and analysis.

#### **CHEM 443 Electrochemistry and Chromatography Laboratory (1)**

CHEM 443 is one of three laboratory courses (CHEM 441, CHEM 443, and CHEM 445) which accompany the lecture course in instrumental analysis, CHEM 440. The topics for CHEM 443 are: 1) ion sensitive electrodes and cyclic voltametry, 2) gas and high performance chromatography, and 3) gas chromatography-mass spectrometry. Every student will have ample opportunity to become proficient in the operation of the instruments being studied. They will spend about half of the time learning the fundamentals of each instrument and will then carry out a specific determination for each one.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 445** Atomic and Molecular Spectroscopy Laboratory (1) An introduction to the use of modern instruments for problems in chemical structure and analysis.

#### **CHEM 445 Atomic and Molecular Spectroscopy Laboratory (1)**

CHEM 445 is one of three laboratory courses (CHEM 441, CHEM 443, and CHEM 445) which accompany the lecture course in instrumental analysis, CHEM 440. The topics for CHEM 445 are: 1) flame atomic absorption spectrometry and fluorimetry, 2) infrared and ultraviolet-visible spectroscopy, and 3) nuclear magnetic resonance spectrometry. Every student will have ample opportunity to become proficient in the operation of the instruments being studied. They will spend about half of the time learning the fundamentals of each instrument and will then carry out a specific determination for each one.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 446** X-Ray Crystallography (3) Theoretical and practical aspects of structure determination using x-ray diffraction, from crystal growth to structure solution.

#### **CHEM 446 X-Ray Crystallography (3)**

CHEM 446 introduces the student to the basic principles of molecular structure determination through the diffraction of X-rays by single crystals. The emphasis is on small organic, coordination and organometallic compounds. However the principles can provide the basis for extensions into disciplines ranging across geology, materials, molecular biology, and nanoscience. The course is organized in the same way that an actual crystal structure determination might proceed, with theoretical considerations introduced as needed. Techniques of crystal growth and selection are summarized. X-ray sources and instrumentation are described briefly. Unit cells, Miller planes, unit cell geometry and Bragg's law give rationale to the diffraction experiment. Space group symmetry is connected with data collection and the contents of the unit cell. Practical considerations of data collection and instrumentation are covered next. The theoretical description of structure factors and Fourier synthesis leads to consideration of solutions to the phase problem. The remainder of the course illustrates the process of structure solution using real data and software readily available to the students. All the details of publication of a crystal structure; the CIF, ORTEP figures and the format of the experimental section of most journals is described using actual student selected publications. Related structural techniques such as protein crystallography and molecular modeling may be reviewed time permitting.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 448 Surface Chemistry (3)** Surface chemistry, emphasizing the physical and chemical aspects of surfaces important for applications in colloids, catalysis, microelectronics and biocompatibility.

**CHEM 448 Surface Chemistry (3)**

CHEM 448 introduces the student to the basic principles of the chemical behavior of surfaces with an emphasis on the fundamental aspects, including surface structure, bonding, thermochemistry and dynamical behavior. The course is intended to provide the basis for extensions into disciplines ranging across geology, materials, environmental engineering, biology, agriculture, physics and nanoscience. Fundamental concepts and relationships of the chemical behavior of organic and inorganic substances that the student has already learned in previous courses will be assembled, correlated and directed towards understanding the behavior of the surfaces and interfaces of liquids and solids. Starting from the basic principles the student will be guided to evolve a fundamental understanding and predictive ability for important man made and natural applications and phenomena of practical interest, including colloids, surface coatings, lubrication, heterogeneous catalysis, weather, geology, chemical sensing, microelectronics and biocompatibility.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 450 Physical Chemistry - Thermodynamics (3)** Introduction to physical chemistry with primary emphasis on chemical thermodynamics and its molecular interpretation. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.)

**CHEM 450 Physical Chemistry - Thermodynamics (3)**

CHEM 450 is a physical chemistry course that introduces students to chemical properties of matter and the fundamentals of chemical thermodynamics. The theoretical foundations of thermodynamic principles are covered and illustrated with a wide variety of examples from the sciences, engineering and technology fields. The course covers the following topics: gas laws, equations of state, the First Law of Thermodynamics, work and heat, internal energy, enthalpy changes, heat capacity, the Second Law of Thermodynamics, entropy and entropy changes, the Third Law of Thermodynamics, Helmholtz and Gibbs energies, phase stability and phase boundaries, phase diagrams, phase equilibrium, surface tension, capillary action, partial molar quantities, thermodynamics of mixing, chemical potential, solvent and solute activities, colligative properties, the phase rule, thermodynamics of two-component systems, chemical equilibrium, spontaneity of chemical reactions, the response of equilibria to experimental conditions, and equilibrium electrochemistry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 452 Physical Chemistry - Quantum Chemistry (3)** Introduction to physical chemistry with primary emphasis on molecular structure, spectroscopy, and chemical kinetics. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.)

**CHEM 452 Physical Chemistry - Quantum Chemistry (3)**

CHEM 452 is an introductory physical chemistry course that covers quantum chemistry, atomic and molecular spectroscopy, and chemical kinetics. If time permits, other possible topics include statistical thermodynamics, nuclear magnetic resonance, electron spin resonance, structures of solids, X-ray scattering, and processes at surfaces.

Quantum chemistry includes: development of wave mechanics, Schrodinger's equation, particle in a box, in a ring, on a spherical surface, free particle, barrier penetration, harmonic oscillator, postulates, hydrogen atom, helium atom, electron spin, atomic and molecular structure and symmetry. Spectroscopy includes: atomic spectra, microwave, infrared, and visible spectra of molecules. Chemical kinetics includes: rate laws, mechanisms, chain reactions, polymerization reactions, catalysis, molecular reaction dynamics (collision theory and activated complex theory), and nature of potential energy surfaces for reactions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 457** Experimental Physical Chemistry (1-2 per semester/maximum of 2) Laboratory experiments designed to illustrate the principles of physical chemistry and teach techniques of error analysis and the presentation of quantitative data. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.)

CHEM 457

**CHEM 457 Experimental Physical Chemistry (2)**

CHEM 457 is a laboratory course designed to illustrate some of the principles of physical chemistry presented in CHEM 450 and 452 and to teach proper treatment and presentation of quantitative data. In this course, students will learn how to write quantitative laboratory reports complete with analysis of the uncertainties of the measurements they make. They will also learn how these uncertainties are propagated through each calculation that make use of the initial measurements. In doing so, students should become more aware of the importance of experimental design, proper use of instrumentation, and careful data collection.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 459W** Advanced Experimental Physical Chemistry (4) Laboratory experiments and projects for students interested in advanced study in physical chemistry.

**CHEM 459W Advanced Experimental Physical Chemistry (4)**

CHEM 459W Advanced Experimental Physical Chemistry is a project-based course designed as a follow-up to CHEM 457. CHEM 459W provides students with further experience in laboratory techniques used for quantitative experimentation and with the processing and interpretation of quantitative data. Experiments and short research projects are designed to complement the theoretical knowledge acquired in lecture courses so as to enhance students' competence in problem solving in a research environment. Particular attention will be devoted to written communication of experimental results in an effective and concise manner according to American Chemical Society journal standards.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 460** Advanced Thermodynamics (3) Chemical thermodynamics, with applications to pure phases, solutions, and chemical reactions.

**CHEM 460 Advanced Thermodynamics (3)**

CHEM 460 is a one semester course that teaches students the fundamental principles of classical thermodynamics. Depending on the instructor and the time available, introductory elements of statistical mechanics and its relationship to classical thermodynamics may be covered. The course generally starts with the laws or postulates of thermodynamics and develops the thermodynamic machinery useful for applications from these laws or postulates. The emphasis is generally on developing a deep and thorough understanding of the fundamental principles of thermodynamics, rather than any particular set of applications. Students who take this course are well prepared to apply thermodynamics to a very broad range of applications. Topical areas that are typically covered include the conditions of equilibrium, entropy, reversible processes and maximum work, Legendre transforms and the thermodynamic potentials,  $F$ ,  $G$ , and  $H$ , stability of thermodynamic systems, and the fundamentals of chemical and phase equilibria.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 462** Advanced Quantum Chemistry (3) Introduction to quantum chemistry, with emphasis on atomic and molecular structure.

**CHEM 462 Advanced Quantum Chemistry (3)**

CHEM 462 is an introduction to quantum mechanics and its applications to the study of chemical bonding and molecular

structure. The course covers the following topics: fundamental principles and theorems of quantum mechanics; mathematical concepts such as operators and eigenvalue equations; the Schrödinger equation; analytical solutions for models such as particle in a box, particle in a rectangular well, and harmonic oscillator; angular momentum; analytical solution for the hydrogen atom; approximate methods such as the variation method and perturbation theory; electron spin; Hartree-Fock theory and applications to diatomic molecules. Applications of quantum mechanics to modern research are also discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 464** Chemical Kinetics and Dynamics (3) Introduction to chemical kinetics and molecular dynamics.

### **CHEM 464 Chemical Kinetics and Dynamics (3)**

CHEM 464 is a one-semester course that introduces students to chemical kinetics and molecular dynamics, the branch of chemistry concerned with the rates of chemical reactions and the microscopic details of how reactions occur. The course covers old and new experimental, theoretical, and computational methods for kinetics and dynamics. Example systems are chosen from a variety of application including gas-phase reactions, reactions in solution, atmospheric chemistry, and reactions in biological systems. Topics covered are: basic concepts, phenomenological treatments, mechanisms, chain reactions, potential energy surfaces, collision theory, transition state theory, analysis, reactions of surfaces, photochemistry, molecular beams, Monte Carlo methods, molecular dynamics, energy requirements for reaction, and energy disposition.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 466** Molecular Thermodynamics (3) Introduction to physical chemistry with a primary emphasis on the statistical and molecular interpretation of thermodynamics.

### **CHEM 466 Molecular Thermodynamics (3)**

CHEM 466 is a physical chemistry course that emphasizes the statistical and molecular interpretation of thermodynamics. This focus enables the student to consider macroscopic properties based on the constituent molecular properties. After a very brief introduction to classical thermodynamics, the statistics of large systems is introduced, used to develop the Boltzmann distribution of energies and then combined with the quantum mechanical structure of energy levels to form a basis to predict and understand atomic and molecular properties such as heat capacity and chemical reaction equilibrium. Solution thermodynamics, interfacial phenomena and colligative properties are discussed in terms of lattice models. The course then turns to a molecular view of transport and chemical reaction rates. Molecular transport is described in terms of random molecular motion and intermolecular forces that tie together to give macroscopic behavior such as ionic conductivity and mass diffusion. Reaction rates are formulated in terms of the distributions of energies and statistical probabilities of the combined reactants in a transition state. Cooperativity in phase transitions is discussed, followed by adsorption and catalysis. Examples with proteins and other biomolecules, as well as polymers and various solutions, appear throughout the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 472** General Biochemistry I (3) Basic structure and function of cellular components; principles of enzyme kinetics and regulation.

### **CHEM 472 General Biochemistry I (3)**

CHEM 472 will serve as an introductory course in biochemistry. The course will begin with a review a number of chemical concepts applicable to biochemistry including molecular interactions, acid-base reactions, buffers, titrations and basic thermodynamic and kinetic concepts. The focus will then shift to a discussion of the structures of the biomolecules that make up living matter including carbohydrates, lipids, membranes, proteins, and enzymes, emphasizing the relationship between chemical structure and biological function.



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 474 Organic Synthesis (3)** Theory and methodology of organic synthesis applied to complex organic molecules.

### **CHEM 474 Organic Synthesis (3)**

CHEM 474 will present the theory and methodology of organic synthesis. The course will initially focus on the methodology necessary to synthesize complex organic molecules. This will include an in-depth look at functional group transformations, carbon-carbon bond forming reactions, ring-forming reactions, aromatic chemistry and heterocyclic chemistry. We will then discuss the use of retrosynthetic analysis and the "disconnection approach" to logically guide total synthesis. Finally, a number of literature syntheses will be used to examine the strategies involved in formulating a total synthesis emphasizing the compatibility of functional groups, sequence of reactions, use of protecting groups and the impact of stereochemistry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 476 Biological Chemistry (3)** Fundamentals of Biochemistry for Chemists. Students cannot receive credit for both CHEM 476 and B M B 401.

### **CHEM 476 Biological Chemistry (3)**

Approximately a quarter of the course will be devoted to a description of the structure and chemical properties of biomolecules. Another quarter will focus on physical processes such as reaction kinetics and binding equilibria. The third part will present some of the chemical logic in enzymatic reactions, drawing from advanced organic and inorganic chemistry concepts. The last part will address energetic aspects of metabolism. Throughout, the approach will be to introduce the analytical tools that have led to major advances in biochemistry as well as the physical and chemical principles underlying each topic. For example, in the presentation of the structure of DNA, the techniques of X-ray diffraction, sedimentation, and optical spectroscopy, will be reviewed. In the discussion of enzyme kinetics, fluorescence and stopped-flow equipment will be described, etc. The course will follow a textbook designed for chemistry students. It will also include reading assignments of several types: historical papers, current scientific literature (breakthrough reported in the journals SCIENCE and NATURE), and current biological science and society topics, as presented in Science Times section of the New York Times. Review sessions with three-dimensional graphic presentation of structures will be organized (these have been successful at demonstrating the complexity and beauty of biomolecules). The course also includes assignments that require of the students that they use databases such as those of the National Center for Biotechnology Information.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:  
Concurrent: CHEM 452

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 494 Chemical Research (1-10 per semester/maximum of 20)** Experimental investigation of an original research problem. Preparation of a formal thesis is optional. (Credit not allowed for graduate students in Biochemistry, Chemistry or Chemical Engineering.)

### **Chemical Research (1-10 per semester/maximum of 20)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 494H Chemical Research (1-10 per semester/maximum of 20)** Experimental investigation of an original research

problem. Preparation of a formal thesis is optional. (Credit not allowed for graduate students in Biochemistry, Chemistry or Chemical Engineering.)

**Chemical Research (1-10 per semester/maximum of 20)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1982

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 500** Seminar in Chemistry (1-2 per semester) No description.

**CHEM 500 Seminar in Chemistry (1)**

CHEM 500 is a course in which 1st and 2nd year Chemistry graduate students write about and present a seminar on current chemical research. During their first year of graduate study students are asked to write 6 or more brief reports summarizing and critiquing designated seminars in one of the department's five regular seminar series. These reports are graded for both their scientific content and writing quality. During their second year of graduate study students are asked to write a more lengthy report and give an oral presentation on a topic of current interest in chemistry, but one not closely related to research being done at Penn State. The written and oral portions of this exercise are also graded.

Faculty: Andrew Ewing and Mark Maroncelli

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 516 Inorganic Chemistry (3)** Overview of systematic inorganic chemistry including main group, transition metal, lanthanide, and actinide chemistry.

**CHEM 516 Inorganic Chemistry (3)**

The purpose of this course is to provide a graduate level foundation in the field of inorganic chemistry and its relationship to other areas of science and technology. The emphasis will be on atomic and molecular structure, synthesis methods, and structure-property relationships in a way that will prepare students for studies in more specialized areas such as environmental chemistry, catalysis, materials science, and the biological fields. Opportunities will be provided to integrate the learning experience with the organization of information through writing assignments and class discussions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 517 Organometallic Chemistry (3)** Organometallic compounds and their use in catalysis and organic synthesis.

**CHEM 517 Organometallic Chemistry (3)**

CHEM 517 provides a graduate-level foundation to a broad range of topics in organotransition metal chemistry with a particular emphasis on catalytic applications in polymer chemistry and organic synthesis. The course assumes a B.S.-level understanding of inorganic and organic chemistry. Topics to be covered include the following: basic principles of bonding and structure, elementary reaction mechanisms, and catalytic applications including olefin insertion reactions, cycloisomerization reactions, carbenoid chemistry including olefin metathesis, carbonylations, reactivity of metal allyl complexes, cross coupling and related C-C bond formations, oxidations, reductions and alkylations. Upon successful completion of this course, students can expect to: 1) understand basic concepts in bonding and molecular structure of organometallic compounds, 2) be able to connect electronic and molecular structure with chemical reactivity, 3) describe organometallic reactivity in a mechanistically rigorous fashion, 4) be familiar with common catalytic paradigms that rely on organometallic catalysts, 5) be equipped to critically evaluate the modern primary literature in this field.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 518 Symmetry and Spectroscopy in Inorganic Chemistry (3 per semester)** Group theoretical methods and spectroscopies of importance in modern inorganic chemistry.

**CHEM 518 Symmetry and Spectroscopy in Inorganic Chemistry (3 per semester)**

CHEM 518 provides a graduate-level foundation in molecular group theory and its use in understanding the molecular orbital structure of organic and inorganic molecules. EPR, NMR, rotational, vibrational, and electronic spectra of molecules are considered with an eye towards using symmetry to simplify analysis. Other spectroscopies of interest to the modern inorganic chemist, such as XPS, PES, and x-ray crystallography are also discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 519 Materials Chemistry (3)** An overview of the role played by chemistry in the field of materials science.

**Materials Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 524** Electroanalytical Chemistry (3) Electrochemical principles, techniques, and analytical applications.

**CHEM 524 Electroanalytical Chemistry (3)**

CHEM 524 covers the fundamental background and applications of electroanalytical methods. Potentiometric methods are discussed in the context of the basic principles of electrochemical equilibrium. Amperometric methods - chronoamperometry, chronocoulometry, stripping voltammetry, cyclic voltammetry, pulse and hydrodynamic techniques - are also discussed in the context of mathematical models for mass transport and electrode kinetics. Applications including spectroelectrochemistry, photoelectrochemistry, ultramicroelectrodes, corrosion, and scanning electrochemical microscopy are covered. The course involves solving differential equations relevant to electrochemical problems by analytical methods as well as by means of digital simulations, so prior knowledge of a programming language is recommended.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 525** (BMMB 525) Analytical Separations (3) Fundamentals and application of modern chromatographic separations.

**Analytical Separations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 526** Spectroscopic Analysis (3) An overview of modern instrumental techniques including FTIR, optical spectroscopy, mass spectrometry, and electron spectroscopies.

**Spectroscopic Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 535** Physical Organic Chemistry (3) Reactive intermediates, reaction kinetics and thermodynamics, solvent effects, conformational analysis, reaction mechanisms, noncovalent interactions in synthesis, and stereochemistry.

**Physical Organic Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 536** Medicinal Chemistry (3) Topics from classical bioorganic chemistry, modern chemical biology, and organic chemistry related to drug design and drug action.

**Medicinal Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 537** Organic Synthesis (3) Organic synthesis including both classical and modern synthetic methodology as well as applications to construction of complex molecules.

### **Organic Synthesis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 538** (BMMB 538) Spectroscopic Methods in Bioinorganic Chemistry (3) Foundations in spectroscopic methods employed for the determination of the geometric and electronic structure of transition metal clusters in nature.

### **Spectroscopic Methods in Bioinorganic Chemistry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 539** (BMMB 539) Biochemical Reaction Mechanisms (3) Mechanisms of the most important biochemical reactions, with emphasis on enzyme catalysis.

### **Biochemical Reaction Mechanisms (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 540** Biophysical Chemistry (3) Structure of biomacromolecules, physical techniques for the study of structure and function, thermodynamic and kinetic studies of biomacromolecules in solution.

### **Biophysical Chemistry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 543** (MATSE 543) Polymer Chemistry (3) This graduate course discusses the new advances in polymer chemistry that leads to new polymeric materials with interesting structures and properties.

### **CHEM (MATSE) 543 Polymer Chemistry (3)**

This course provides advance level of polymer chemistry and materials taught in MATSE 441 - Polymeric Materials. Students are able to know the versatility that is inherent in polymer chemistry and the new research results and activities, especially controlling polymerization, polymer structures, designing polymers with desirable properties, etc. Students shall also understand the major economic and environmental concerns and solutions in producing commercial-scale polymers.

This polymer chemistry course provides important links between chemistry and polymeric materials. The course will focus on recent advances in polymer chemistry that affords new polymer materials with controlled polymer structures, compositions, and properties, as well as economic and "green" processes.

This course is designed for graduate students having basic knowledge in organic, inorganic, and organometallic principles. For Chemistry major, this course offers students with the knowledge to apply chemical principles and methods to design and prepare the desirable polymers (no prerequisite for Chemistry graduate students). For Material Science and other majors, this course provides advance level of polymer chemistry and materials taught in MATSE 441 (a prerequisite

course).

In addition, each student will be required to review (presentation and term-paper) a contemporary subject relative to polymer chemistry, which will help student self-education, and presentation and writing skills. Students will be evaluated by quizzes and examinations, a term-paper and presentation, and class participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 544** Chemical Thermodynamics (3) Development of thermodynamic theory, with special reference to common physical changes and chemical reactions.

### **Chemical Thermodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 545** Statistical Thermodynamics (3) Basic principles of statistical mechanics with application to the calculation of thermodynamic properties of gases and condensed phases.

### **Statistical Thermodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 560** Topics in Physical Chemistry (2-6) No description.

### **Topics in Physical Chemistry (2-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 563** Chemical Dynamics (3) Molecular dynamics of chemical reaction, energy transfer, and scattering. Reaction rate theory and experiment.

### **Chemical Dynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 565** Quantum Chemistry I (3) A foundation in the principles of quantum mechanics and their applications to chemistry.

### **Quantum Chemistry I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 566** Quantum Chemistry II (3) Additional techniques in quantum mechanics, with applications to problems in molecular structure and light-matter interactions.

### **Quantum Chemistry II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 567** Molecular Spectroscopy (3) Principles and applications of classical and modern spectroscopic methods.

### **Molecular Spectroscopy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 572** (BMMB 572) Nucleic Acids Chemistry (3) Biophysical and biochemical approaches for studying structure-function relationships in nucleic acids.

### **CHEM 572 Nucleic Acids Chemistry (3)**

The goal of this course is to provide a foundation in biophysical approaches for studying the quantitative and structure-function relationships in nucleic acids systems, including DNA, RNA, and their interactions with proteins, salt, and water. Lectures include basic physical chemistry and statistical mechanics principles along with current literature in the biochemical sciences. At the end of the course, you should be able to meaningfully dissect molecular biological papers at the level of the physical chemistry of these processes. Current topics are introduced through reading and presenting papers from the literature.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 573** (BMMB 573) NMR Spectroscopy for Synthetic and Biological Chemistry (3) Nuclear magnetic resonance approaches for characterizing the structure and dynamics of synthetic compounds, natural products, and biological macromolecules.

### **NMR Spectroscopy for Synthetic and Biological Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 589** Studies in Chemistry (1-9) Theoretical research, experimental research, or a critical survey of the literature in an area of chemistry.

### **Studies in Chemistry (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 597B** Bioinorganic Chemistry (3) Introduction to spectroscopic methods employed for the determination of the geometric and electronic structures of transition metals and clusters in nature.

**Bioinorganic Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of chemistry undergraduate laboratory and recitation classes with senior faculty instruction supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHEM 611** Ph.D. Dissertation Part-Time (0) No description.



**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Chinese (CHNS)**

**CHNS 401 (IL) Level Three Chinese A (4)** Emphasis on oral proficiency through discussions of aspects of contemporary Chinese culture.

**CHNS 401 Advanced Conversation (4) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course aims to enhance students' abilities in speaking, listening, reading, and writing. The objectives in this course are; 1)to review, reinforce, and expand the basic grammar, 2)to expand knowledge of characters, vocabulary and idioms, 3) to be able to speak not only in single sentences, but in dialogues to perform basic communicative functions,4) to be able to read and understand simple essays and stories, 5) to be able to write short compositions.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Second or Beyond 12th Level Foreign Language  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 402 (IL) Level Three Chinese B (4)** Readings in representative works of traditional and modern literature; practice in composition; study of aspects of Chinese culture.

**Level Three Chinese B (4)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language and Other Cultures  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 403W Level Four Chinese A (4)** Continuation of CHNS 402. Aims to improve students' proficiency in all four language skills, with a special emphasis on writing.

**CHNS 403W Level Four Chinese A (4)**

This is a four credit course designed for those who have completed Level Three Chinese B or the equivalent. The course aims to further develop students' proficiency in all four language skills, with a special emphasis on writing. Students will study several topics on current social issues in modern Chinese society, such as education and housing issue, woman's status, through a selected textbook, news reading, and by interviewing native speaker of Chinese from different regions. Via all the debatable topics, students will be guided to explore and practice various writing styles, such as description, narration, argumentation, and expository writing throughout the semester. Comparison of rhetorical strategies between Chinese and English writing will also be introduced to help students think and write more like a native when using the target language. The majority of reading and writing assignments will be done outside of class, with some guidance from the instructor. Class time will be used mainly for discussions of content, feedback on writing. All class activities will be conducted in Chinese.

Writing exercises include short response papers on topics, summarizes of the readings, and short essays. Through the writing exercises, students will reflect more deeply on certain topics, synthesize information from course materials, provoke critical thinking and express their opinions and support ideas by referring to and citing from source texts. This will help students be prepared for a longer thesis in the next course in the sequence.

This course will help students further advance their writing skills by continuously building their vocabulary, understanding the target culture, and its social issues through various sources of structured and authentic materials. Students will also write a resume and formal letter that help them start building their career in Chinese.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 404** Level Four Chinese B (4) Continuation of CHNS 403W. Aims to improve students' proficiency in all four language skills through content-based language learning.

#### **CHNS 404 Level Four Chinese B (4)**

This is a four credit course designed for those who have completed Level Four Chinese A or the equivalent. The course aims to further develop students' proficiency in all four language skills. Students will study several topics on current social issues in contemporary Chinese society. For example, economic spurt in China, environmental protection, values conflict between traditional Chinese culture and Western culture, etc. Students will learn those topics via a textbook, interviewing native speakers of Chinese from different regions, and variety of media, such as newspaper, TV news, and movie. The majority of reading and writing assignments will be done outside of class, with some guidance from the instructor. Students will be guided to use appropriate resources such as dictionaries, reference books, online dictionaries and other online resource to facilitate their learning. Class time will be used mainly for discussion of content, feedback on writing, and presentations by students. All class activities will be conducted in Chinese.

Students will be mainly evaluated by writing exercises and presentations. Writing exercises include short response papers on topics, summarizes of the readings, short essays and a final thesis. Through the writing exercises, students will reflect more deeply on certain topics, synthesize information from course materials, provoke critical thinking and express their opinions and support ideas by referring to and citing from source texts. Presentations include debates, individual and group presentation, which will help students advance their communication and presentational skills. E-portfolio will sample the work students have done in the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 410** (IL) Chinese Through Film (3) This course is designed for students who finish Level Two Chinese or higher and aims to help them develop Chinese proficiency through movies.

#### **CHNS 410 Chinese Through Film (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course aims to provoke students' critical thinking on China-related issues and improve their Chinese language proficiency by encouraging them to reenact and remake selected scenes from the movies, investigate and discuss the social issues as shown from the movies. This is a three credit course designed to go beyond the day-to-day topics to further develop students' understanding of the social issues in contemporary China and thus enhance their Chinese language proficiency. Through watching movies in Chinese, students will listen to authentic Chinese and expose to broader aspects of Chinese people's lives and Chinese society. In addition, they will have opportunities to conduct culture comparisons between China and the U.S., East and West, which will enable them to make in-depth analysis when examining a complex social, political or economic issue in China. The follow-up class activities include both speaking and writing assignments. Depending on the topics, speaking assignments may include: reenactment or recreation of a selected scene from the movies, class or group discussions, debates and presentations. Writing assignments may include: writing a new story or different ending for the movies, and reflection essays.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 411** (IL) Chinese Written Characters (3) This course aims to establish a solid foundation of students' Chinese orthography and prepare students for continuing study in subsequent Chinese courses.

#### **CHNS 411 Chinese Written Characters (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course aims to equip students' knowledge and skills of Chinese orthography through both cognitive and meta-cognitive approach of learning, where it is expected to lay a solid foundation for students' continuing study of subsequent Chinese language courses. Students will learn and apply radical and component-building approach to synthesize their already-acquired characters, and further learn approximately 500 additional characters. Characters selected for study in this course are based upon the references of HSK (Hanyu Shuiping Kaoshi) Level V and TOP-Huayu (Test of Proficiency- Huayu) Intermediate level. Building upon these characters, students will further expand their vocabulary volume through character association strategy and extensive reading. Cooperative learning approach will be largely incorporated to promote in-class active learning, such as developing and sharing character learning strategies through keeping learning journal, group reading, discussing cultural connotations of selected amount of characters, etc. Students will also learn the origin, history and evolution of Chinese characters through textbook reading and multimedia materials learning, such as DVD and You Tube video clips that help visualize the evolution process of selected characters for demonstration.

Instructional Objectives (what the student is expected to learn; what skills s/he will develop):

1. Understand the origin, history and evolution of Chinese characters
2. Develop and apply strategies on learning Chinese characters
3. Familiarize with available resources that assist Chinese characters learning and memorizing
4. Strengthen and synthesize students' existing knowledge of Chinese orthography
5. Learn approximately 500 new characters
6. Expand vocabulary volume derived from the acquired characters
7. Expand reading experience by reading semi-authentic and authentic articles that are constituted of the acquired characters
8. Strengthen listening and speaking skills of the target language through intensive in-class discussions and lectures

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 421 (IL) China Beyond China (3)** Study of modern and contemporary Chinese culture in its diversity and its intercultural contexts.

**CHNS 421 China Beyond China (3)  
(IL)**

In order to begin to understand Chinese culture, we cannot treat it as a monolithic, unified whole. This course will give an introduction to modern and contemporary Chinese culture (focusing on the 20th and 21st centuries) by paying special attention to China's inner diversity, as well as the continuous shaping of Chinese culture in contact, dialogue, and tension with other cultures. Through the study of literary texts, films, and other cultural material—as well as a small number of theoretical essays—this course will focus on:

- 1) Chinese culture in its variety by focusing on Chinese cultural spheres beyond the People's Republic (Taiwan, Hong Kong), the Chinese diaspora, as well as other ethnicities and cultures within Mainland China
- 2) The ways in which Chinese modernity was impacted by intercultural impulses, as well as the recent self-representation of China in the context of globalization.

Course Objectives include:

1. Understand modern and contemporary China in its cultural diversity, as well as shaped by intercultural and global processes.
2. Critically analyze processes of cultural contact and the representations of cultural differences.
3. Think critically about globalization with its impact on such categories as the local and the national.
4. Question your assumptions about the world, re-examine your own points of view, and understand cultures and value systems that may differ from (or be shared with) your own.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 422 (IL) Gender and Sexuality in China (3)** Study of gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China.

**CHNS 422 Gender and Sexuality in China (3)**

**(IL)**

This course explores gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China (from the end of the 19th century up to today), paying attention also to developments in Chinese cultural spheres beyond the People's Republic, such as Taiwan, Hong Kong, and the Chinese diaspora. This course will use the representation of gender, sex, and sexuality as a lens through which modern and contemporary Chinese culture can be understood in its historical, social, and aesthetic changes. For this purpose, the syllabus adopts a largely diachronic structure, with different foci for each week. The analysis of representations of gender and sexuality throughout the class will focus on literary and filmic texts, as well as art, rather than on theoretical work on gender and sexuality (in China or in general).

Course Objectives include:

1. Critically assess the complex construction of gender roles and sexuality in modern and contemporary Chinese literature and film
2. Reflect critically on different ways of understanding and representing gender difference.
3. Critically assess the connections between gender and sexuality and changing political, historical, and cultural contexts.
4. Question your assumptions about gender and sexualities in the context of cultural difference, understand cultures and value systems that may be different from (or be shared with) your own.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 423 (IL) The Warrior, the Courtesan and the Ghost in Classical Chinese Novels (3)** This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost.

**CHNS 423 The Warrior, the Courtesan and the Ghost in Classical Chinese Novels (3)  
(IL)**

A narrowly defined notion of modern literature is a relatively recent phenomenon that dates back only to the early twentieth century in the Chinese context. There is, however, a long tradition of the vernacular novel that remains influential till today, in spite of its marginalization by the Western-influenced Chinese Enlightenment project. This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost. The warrior is commonly found in historical romances, tales about errant knights and assassins, and martial arts fiction. Although the typical setting for the courtesan is in novels about prostitution (Xia Xie Xiaoshuo), this course will relate this figure to other female types in various domestic space, thereby tracing the genealogical connections between the domestic fiction and the courtesan fiction. The ghost can be found in Accounts of the Strange (Zhi Guai) and Tales of the Miraculous (Chuan Qi). This course will relate this figure in these narrative genres with other types of the supernatural being, such as Gods and Demons. Most readings will be drawn from the Ming-Qing period (14th -20th c) but modern and contemporary literature as well as visual or media culture that consciously continue or rewrite these narrative traditions will be considered as well. All readings and class discussions will be in English. Knowledge of Chinese or Chinese literature is not assumed or required.

From year to year the content we cover might change, but this course will always explore:

- 1) Major classical Chinese narrative traditions that are radically different from the Western-influenced narrative modes of the twentieth century.
- 2) Pre-modern practices of literary reading and criticism and pre-modern notions of literacy, literature, and modes of circulation.

Course Objectives include:

1. Critically analyze major texts and genres of the classical Chinese novel.
2. Understand pre-modern practices of story-telling, literary circulation, reading, and criticism.
3. Think critically about pre-modern societies and their connections with the contemporary world.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 424 (HIST 482) Confucius and the Great Books of Early China (3)** This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China.

**Confucius and the Great Books of Early China (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 426 (IL)** The Chinese Rhetorical Tradition (3 per semester/maximum of 6) Study of the rhetorical works in ancient China as well as multiple facets of modern Chinese rhetoric.

**CHNS 426 The Chinese Rhetorical Tradition (3 per semester/maximum of 6) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course surveys the Chinese rhetorical tradition dating back two and a half millennia. Rhetoric is defined here as the study and practice of artful means of communication, including poetic, expository, and argumentative modes. The class will first delve into the works of competing intellectual schools in pre-imperial China (pre-221 BCE), which set a corner stone for thoughts and practice of communication in the imperial period (221 BCE - 1918). These schools, including the Daoist, the Confucian, and the Legalist, developed their rhetorical notions through engaging with the political, intellectual, and ethnic Other. From here the class will examine the multiple facets of modern Chinese rhetoric, which has undergone a continual contact and conflation with other rhetorical traditions in the global contact zone. The class will focus on topics such as feminist discourse, Chinese-American rhetoric, and the teaching of writing, which bear direct implications on our contemporary social life.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2011  
Prerequisite:  
Concurrent: ENGL 471

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 452 (IL)** Contemporary China: Culture and Trends (3 per semester/maximum of 6) Survey of aspects of the contemporary Chinese-speaking world. Includes readings from Chinese newspapers, magazines, and fiction. Topics may vary each semester.

**CHNS 452 Contemporary China: Culture and Trends (3) (IL)**

**BA - This course meets the Bachelor of Arts degree requirements.**

**This course surveys Chinese cultural production in the contemporary period**, with an emphasis on literature. Taught in Chinese; readings and assignments in Chinese.

The course will examine the diverse forms of cultural expression (literature, film, new media, theater, television) throughout the Chinese-speaking world. Students will learn about major cultural trends in such locations as mainland China, Taiwan, Hong Kong, and the worldwide Chinese diaspora. Readings will represent several genres, such as poetry, folktale, short story, novel, prose fiction, and drama. Through this course students can develop a historical and cultural perspective in order to understand the contexts and value systems that have inspired literary works in the contemporary period. Students will investigate such topics as the relation between social institutions and the individual, the traditional patriarchal system, the changing roles of women, westernization, and postmodern consumer culture, among others.

Class work will include lectures or presentations by the instructor and student participation through means such as guided discussions, group discussions, and students' presentations. This participatory approach is intended to deepen students' appreciation of the texts, to help them understand value systems that may differ from, or else be shared with, those predominant in modern Western cultures, and to assist students in developing analytical and expressive abilities.

Chinese 452 is designed to be suitable for students (Chinese majors) who have completed Chinese 401. The course is designed to count as international cultures, and as a B.A. "Other Cultures" course.

This course will be taught in the active-learning mode, featuring a variety of instructional components such as lecture, discussion, oral presentations, web-based activities, etc., to provide students abundant opportunity for expressing their opinions. The course will include writing, speaking, self-expression; information gathering, synthesis, and analysis; and international/intercultural components.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 453 (IL)** Chinese Film (3 per semester/maximum of 6) Selected films and directors representing various aspects of

Chinese culture and cinema. Topics may vary each semester. Taught in Chinese.

**CHNS 453 Chinese Film (3)**  
**(IL)**

**BA - This course meets the Bachelor of Arts degree requirements.**

This course surveys Chinese film from the early twentieth century to the present time, with an emphasis on film and national history. Taught in Chinese; readings and assignments in Chinese.

The course will examine the diverse forms of film language in the works of filmmakers from mainland China, Taiwan, and Hong Kong. Readings will include interviews, reviews, film criticism, and other relevant texts (such as a short story that inspired a film).

Through this course students can develop a historical and cultural perspective in order to understand the contexts and value systems that have inspired Chinese-language films. Students will investigate such topics as the relation between social institutions and the individual, the traditional patriarchal system, the changing roles of women, westernization, and postmodern consumer culture, among others.

Class work will include lectures or presentations by the instructor and student participation through means such as guided discussions, group discussions, and students' presentations. This participatory approach is intended to deepen students' appreciation of the texts, to help them understand value systems that may differ from, or else be shared with, those predominant in modern Western cultures, and to assist students in developing analytical and expressive abilities.

Chinese 453 is designed to be suitable for students (Chinese majors) who have completed Chinese 401.

This course will be taught in the active-learning mode, featuring a variety of instructional components such as lecture, discussion, oral presentations, web-based activities, etc., to provide students abundant opportunity for expressing their opinions. The course will include writing, speaking, self-expression; information gathering, synthesis, and analysis; and international/intercultural components.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 454 (IL)** Introduction to Classical Chinese (3 per semester/maximum of 6) Basic patterns and structures of Classical Chinese to the first millennium B.C. to the 19th century.

**CHNS 454 Introduction to Classical Chinese (3)**  
**(IL)**

**BA - This course meets the Bachelor of Arts degree requirements.**

This course introduces students to the basic patterns and structures of Classical Chinese. Classical Chinese is a language shaped in the latter half of the first millennium B.C. that still persists as a living medium of expression today. Knowledge of Classical Chinese is important to help students read and understand sophisticated modern Chinese texts, which make frequent use of Classical allusions and constructs. In this course, students will learn basic grammar, syntax, and commonly-used vocabulary. The cultural and literary implications of classical Chinese will be discussed throughout the course in order to provide the students not only with the linguistic knowledge of classical Chinese, but the rich historical backgrounds implied in this particular style of Chinese.

The main goal of the course is for students to acquire skills in reading Classical Chinese and expand their knowledge and understanding of ancient Chinese culture, society and history in relation to modern and contemporary Chinese culture, such as Confucianism and family values. With this knowledge and training, not only will students be more comfortable reading the Chinese Classics, they will also thereby increase their proficiency in modern Chinese and their knowledge of Chinese culture.

This course will fulfill the Intercultural Cultures and B.A. "Other Cultures" and foreign language requirements.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Foreign Language  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 455 (IL)** Masterpieces of Traditional Chinese Literature (3) Survey of traditional Chinese literature, including poetry, historical narratives, philosophical texts, and drama and novel.

**CHNS 455 Masterpieces of Traditional Chinese Literature (3)**  
**(IL)**

**BA - This course meets the Bachelor of Arts degree requirements.**

CHNS 455 Masterpieces of Traditional Chinese Literature presents an overview of China's literary tradition, focusing, in particular, on literary techniques used in a variety of text types such as poetry, essays, fiction and drama.

This course aims to develop students' advanced knowledge of the features of traditional Chinese literature and its intellectual, cultural, and social background. Through close reading of selected major works, students will become familiar with the features of various genres.

For example, students will study prose writings, the major poetic forms and some of the important poets from the Tang period, and aspects of literati culture through close reading of texts from the late imperial period.

At the end of this course, a student will have read and discussed sample writings from philosophical and poetic traditions and well as sample writings on the cultural and scholastic activities of the literati. Students should also be able to deal with classical texts on a reasonable level, to identify problematic passages and to be able to clarify them with the help of secondary reference material. Students should also be able to appreciate some of the civilizing aspects of Chinese culture as well as literary and poetic devices such as tonal patterns, rhyme schemes, structure and writing techniques, and discussion of the poets and their work, and have an understanding of the main genres in classical Chinese literature and philosophy.

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Foreign Language

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 496A** Chinese Through Film (3) This is a three credit course designed for students who have completed Level Two Chinese. The course aims to develop students' proficiency in all four languages skills through movies and help them transition to Level Three Chinese.

**Chinese Through Film (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 496B** Chinese Written Characters (3) This is a three credit course designed for those who have completed Level Two Chinese or the equivalent. This course aims to equip students' knowledge and skills of Chinese orthography.

### **Chinese Written Characters (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None



Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CHNS 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Civil Engineering (C E)**

**C E 410W Sustainable Residential Subdivision Design (3)** Residential subdivision process; site selection; conservation and neo-traditional design; utility design and layout; best management practices for erosion and stormwater.

### **C E 410W Sustainable Residential Subdivision Design (3)**

The course is designed for seniors and graduate students in Architectural and Civil Engineering interested in learning the principles of sustainable residential design and development. The course is typically offered one semester each year. The objective of this course is to provide the students with a working example of the residential land development process from a regional perspective.

The course provides an overview of zoning legislation and regulations followed by an analysis of market trends and information sources. Conservation and neo-traditional design techniques emphasize sustainable development principles for maximizing profits while complying with open space zoning. Access design principles focus on traffic calming strategies and development of a well-defined transportation hierarchy. Students are introduced to key components in utility design including the basic principles of water and wastewater transport. Best management practices for erosion control and stormwater management are reviewed and included as part of the residential design process. Finally the students are asked to use realistic data to estimate costs and profit margins for development.

To work effectively in residential design, students must be proficient in applying the principles of mathematics, economics and engineering software (CAD or similar) included in accredited programs of engineering. Students will be exposed to engineering/design calculations associated with each of the phases of residential land development. Technical Release 55, the stormwater management design manual, and the BMP Handbook for erosion control and stormwater management supplement the text. The CAD lab will be utilized for approximately 25% of the class.

At the completion of the class, students will present a written project narrative and an oral presentation describing a full-scale residential development designed by the project team. This project is open ended and includes at a minimum a market analysis, engineering calculations, a cost estimate, and a full set of engineering drawings which include, soils, contours, open spaces, lot boundaries, roads, utilities and stormwater control systems details. Five preliminary mini-reports will be written and submitted over the course of the semester. These reports will be evaluated by the instructor for both content and professional writing, and returned to students. Students will be encouraged to consult with the instructor for additional feedback. The reports will be revised and incorporated into the final report. In addition to the team development project, students will receive a mid-term and final exam.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 421W Transportation Design (3)** Design of streets and highway facilities; emphasis on geometric elements, intersections and interchanges, roadway drainage, and pavement design.

### **C E 421W Transportation Design (3)**

This course provides advanced study in highway engineering and is designed for civil engineering students who are interested in Transportation Engineering careers. It includes topics such as functional classification, highway cross-sections, horizontal and vertical alignment and sight distance. Other topics are pavement design, drainage intersection and interchange design and highway signs. The students will also have a CAD lab where they design a complete highway system. The semester project provides hands-on highway design experience and includes the planning and operational aspects of a new highway design. This course serves as a capstone design course with writing projects. Students are expected to do in-class presentations of their projects.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 422 Transportation Planning (3)** Transportation systems planning, programming, and management; modeling and simulation, data collection, analysis, and forecasting.

**C E 422 Transportation Planning (3)**

In this course, students acquire basic knowledge on the history and recent developments in transportation planning problems and quantitative methods. They will develop an understanding of transportation planning, transportation modeling, transportation system simulation, data collection techniques, and gain laboratory experience with each. Students will use mathematical/statistical models and GIS software to analyze, simulate, and forecast the demand for transport services. They will gain familiarity with the software used in transportation planning practice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 423 Traffic Operations (3)** The highway capacity manual, concepts and analyses, freeway operations, signalized and unsignalized intersections, signal coordination, traffic impact studies.

**Traffic Operations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 432 Construction Project Management (3)** Fundamentals of project management, construction scheduling using the CPM technique, construction project preplanning, and control of quality, safety, and costs.

**C E 432 Construction Project Management (3)**

This course introduces students to the basic practical aspects of the construction process and the quantitative methods used to manage projects within budget, deadline, and prescribed quality. Students will understand the construction market and the inter-relationships among the various players involved. Focus in this course is on integrating the various facets of construction cost estimating, planning, scheduling, control, and overall project management.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 435 Foundation Engineering (3)** Bearing capacity, settlement, and structural design of shallow foundations; lateral earth pressure; retaining and sheet-pile walls; introduction to deep foundations

**C E 435 Foundation Engineering (3)**

C E 435 provides students with a working knowledge of the state-of-practice of foundation engineering, covering bearing capacity, settlement, and structural design of shallow foundations; lateral earth pressure; design of retaining and sheet-pile walls; and an introduction to deep foundations. The course is an elective for students in the civil engineering major and serves as an essential prerequisite for continued study in the areas of construction and structural engineering. The course is delivered in lecture format, and concentrates on practice-oriented design problems in foundation engineering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 436 Construction Engineering Materials (3)** Design, production, application, specification, and quality control of construction materials unique to civil engineering.

**C E 436 Construction Engineering Materials (3)**

C E 436 provides students with a working knowledge of the safe design, production and application of quality construction materials unique to civil engineering. The course builds upon the understanding of civil engineering materials gained in the introductory course. C E 436 focuses on the materials design and quality control of aggregates, steel, portland cement concrete, and asphalt concrete.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 437 Engineering Materials for Sustainability (3)** Environmental impact of materials; life-cycle assessment; material selection to optimize performance; design, evaluation, and production of green construction materials.

**Engineering Materials for Sustainability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 438W Construction Engineering Capstone Design (3)** Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling; design details: excavations, foundations, retaining walls, formwork, pavements.

**C E 438W Construction Engineering Capstone Design (3)**

This course is intended to establish the foundation for organizational and procedural understanding in construction engineering. The student will gain the knowledge necessary to apply engineering principles in analyzing economical approaches to construction problems. This course will cover construction methods, equipments, and cost estimation of the construction materials, excavation, foundation, and other phases of civil engineering construction projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 439W Geotechnical and Materials Engineering Design Capstone (3)** Subsurface site evaluation; integrated design of retaining walls, foundations, pavements, and materials for airports, highways, dams, or other facilities.

**Geotechnical and Materials Engineering Design Capstone (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 441 Structural Design of Foundations (3)** Design of concentrically and eccentrically loaded square, rectangular, and combined footings; analysis and design of mat foundations; retaining walls; piles caps; flexible retaining design, and caissons.

**C E 441 Structural Design of Foundations (3)**

This course prepares the structural engineering student to analyze, proportion, size reinforcing, and select steel sections for structural foundations designs based on the state of practice presented in ACI 318, AISC, and available industry

literature. Structural foundation analysis techniques for many foundation types are presented with extensive use of EXCEL in the design process. Analysis and design of foundation systems are developed for concrete shear walls, concentrically loaded square and rectangular footings, eccentrically loaded square and rectangular footings, and combined footings. Use of approximate and finite element analysis methods for analyzing mat foundations and grid foundations are presented. Working knowledge of retaining wall, pile cap, and flexible earth retaining structure design methods are also developed. This course is an elective for students in the civil engineering major and serves as an essential prerequisite for continued study in structural engineering and advancement to the structures capstone course. This course is delivered in lecture format and concentrates on practice-oriented structural foundation analysis and design problems.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:  
 Concurrent: C E 342

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 445 Advanced Structural Analysis (3)** Analysis of trusses and frame stiffness matrix method of analysis. Analysis of indeterminate beams, trusses, and frames using classical methods.

### **C E 445 Advanced Structural Analysis (3)**

The course is an advanced analysis which includes an analysis of structures using classical and matrix methods. Topics covered include the analysis of statically determinate and indeterminate beams; trusses and frames. An introduction to the stiffness method and a software package for structural analysis will also be covered.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 447 Structural Analysis by Matrix Methods (3)** Analysis of truss and frame structures using flexibility and stiffness methods of matrix analysis. Computer applications.

### **Structural Analysis by Matrix Methods (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 448W Advanced Structural Design (3)** Wind, snow, seismic, bridge loads; building design using steel, concrete, and prestressed concrete; advanced steel connections; capstone project; computer applications.

### **C E 448W Advanced Structural Design (3)**

The objectives of the course are to develop an understanding of advanced structural engineering design issues in a capstone context that will merge knowledge gained in prerequisite structural design and analysis courses. Building on concepts introduced in introductory steel building, concrete building, and foundation design, students will gain proficiency in structural conceptualization, environmental and induced load determination, modeling and analysis, detailed design of steel and concrete structures, and graphical communication.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 449 Advanced Structural Design (3)** Special systems, frames and bracing in steel, wood and reinforced or precast concrete. Introduction to composite construction.

### **C E 449 Advanced Structural Design (3)**

This course provides students with an understanding of advanced structural design processes, the mechanics of special

systems (such as prestressed concrete) as well as the ability to design and proportion structural connections and bracing members including reinforced concrete and steel. The course will also introduce the LRDF approach and composite construction in which the design of specific components is integrated into the design of the structure as a whole.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 454 Safety (3)** This course will focus on safety issues as they relate to OSHA.

### **Safety (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 456 Planning and Scheduling (3)** Theory and practice used in planning and scheduling projects; defining task and resources, creating logic diagrams, and monitoring the projects.

### **C E 456 Planning & Scheduling (3)**

"Planning and Scheduling" encompasses construction tenets and fundamentals including organizing, staffing, directing, and controlling representing concepts and principles integral to career applications in project and design management. Students who successfully complete this course will be able to:

- 1) understand and use planning, scheduling, and control techniques for managing construction projects
- 2) understand scheduling techniques and computer applications in critical path methods, PERT, and resource scheduling
- 3) understand construction financing and schedule / cost relations
- 4) understand the principles of project tracking, progress measurements, trend analysis, and forecasting

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 458 Construction Management II (3)** Procedures in construction organization including procurement, ethics, field supervision, legal and managerial problems, personnel, cost accounting, and construction business practices.

### **C E 458 Construction Management II (3)**

This course presents policies, procedures, and applications in construction management and organization including procurement, ethics, field supervision, legal and managerial problems, personnel, cost accounting, and construction business practices. The course encompasses construction tenets and fundamentals including planning, organizing, staffing, directing, and controlling. Students who successfully complete this course will be able to:

- 1) understand organizational issues concerning development of a project delivery system
- 2) comprehend the roles and responsibility of the Resident Project Representative and members of the construction team and the respective utility of the resident inspection office responsibilities
- 3) know the various documentation construction records/reports normally
- 4) recognize the salient features of specifications and drawings and the fundamentals for using them in contract administration
- 5) become familiar with the prevailing construction laws, policies, and procedures dealing with labor and safety
- 6) understand the utility of meetings during construction and the principles and techniques of negotiation
- 7) apply risk management through contractual allocation of rush and liability
- 8) become well versed in planning/orchestrating during reconstruction operations
- 9) apply management principles of directing and controlling construction operations and resources including CPM scheduling, inspections, tests, and contractor submittals
- 10) understand the concept of value engineering in construction operations
- 11) understand the critical control issues involved with measurement and payments, controlling construction materials and workmanship, and changes and extra work

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 461** Water-resource Engineering (3) Qualitative and quantitative description of the hydrologic cycle, flood and drought frequency analysis, climate and land use change impacts, risk analysis and uncertainty, water resource management at regional, national and global scale.

### **Water-resource Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 462** Open Channel Hydraulics (3) Free surface flow in rivers, canals, steep chutes, stilling basins, and transitions.

### **C E 462 Open Channel Hydraulics (3)**

This is an advanced senior level course dealing with steady gradually varied flow. The laws of conservation of mass, energy and momentum are applied to gradually varied steady flow problems in rectangular and non-rectangular channels. Basic definitions and equations governing flow are developed for uniform and nonuniform flow conditions. The students will use their knowledge of fluid mechanics, calculus, numerical analysis and computer science to solve practical open channel flow problems.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 465W** Water Resources Capstone Course (3) Hydraulic design of river structures and open channels including supercritical and spatially varied flow; hydrologic/hydraulic computer modeling; design project.

### **C E 465W Water Resources Capstone Course (3)**

This course is designed to provide seniors in the water resources area with a major design project. In addition, the course has a writing component, which satisfies the University's writing across the curriculum requirement.

Projects cover hydrologic and hydraulic design. Hydrologic analysis is performed to size the hydraulic structure systems that convey the design flows. The students utilize Geographic Information Systems data bases, utilize several state of the art computer models, and are required to write several computer programs.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 472W** Environmental Engineering Capstone Design (3) Principles and design of unit operations for water; domestic and industrial wastewater treatment; equipment selection and application.

### **C E 472W Environmental Engineering Capstone Design (3)**

This course will integrate engineering science and design skills through application to an open-ended environmental problem dealing with one or more of the following: industrial sustainability and pollution prevention; water transmission and treatment; wastewater collection and treatment; solid waste collection, treatment, and disposal; remedial investigation and feasibility studies for a hazardous waste site.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 475** Water Quality Chemistry (4) Chemistry applicable to the understanding and analysis of water quality, pollution, and treatment.

**C E 475 C E 475 Water Quality Chemistry (4)**

C E 475 Water Quality Chemistry is a senior/graduate-level course focused on both theoretical aspects of water chemistry and applied aspects of engineering practice. The course will cover a wide range of fundamental chemical principles that will be investigated further in the laboratory exercises and through an independent research project. The course covers reaction stoichiometry and reaction type with specific examples of processes typically encountered in water, wastewater and hazardous waste treatment situations. The course distinguishes between kinetic and equilibrium reactions and presents mathematical formulations for both types of reactions. The course reviews thermodynamics and electrochemistry and relates them to equilibrium constants and the spontaneity of reactions. The course covers redox reactions especially with respect to the corrosion of civil infrastructure, the generation of acid rock drainage, and biological wastewater treatment processes. The course covers acid/base reactions especially with respect to disinfection of drinking water and pH adjustments commonly used to enhance air stripping of pollutants. The course introduces the use of computer models for determining chemical speciation of acid/base constituents. The course covers alkalinity and the carbonate system especially with respect to the issues of acid rain, acidification of the Earth's oceans, and limestone buffering of surface waters in Pennsylvania. Computer models are used to calculate chemical speciation in carbonate-containing systems. The course covers pH-dependent solubility of common minerals – primarily carbonates, hydroxides and aluminosilicates. The course covers engineering applications related to metal solubility including water softening, coagulation for turbidity removal in water treatment plants, heavy metal generation from acid rock drainage, and heavy metal removal in hazardous waste treatment. The course covers complexation reactions especially with respect to effects on metal solubility and toxicity. Computer models are used to calculate chemical speciation in multi-complexant systems. The course covers analytical chemistry especially with respect to the most common parameters measured in water and wastewater treatment systems, and with respect to the principles of measurement (i.e. gravimetric, spectrometric, volumetric, potentiometric analyses). The course involves a research project on a local water quality problem of concern. In the past, this project has focused on the proposed "Beneficial Reuse" of wastewater in Centre County, and on the impact of acid rock drainage from the construction of I-99 on Buffalo Run in Centre County.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 476** Solid and Hazardous Wastes (3) Characteristics and treatment of solid wastes and hazardous wastes.

**C E 476 Solid and Hazardous Wastes (3)**

Solid waste management continues to be a major area of concern for the Environmental Engineering profession. Based on the principle of the conservation of mass, we know that all of our wastes must be deposited in either the air, water or land environments. With improvements in air and water pollution control technologies, resulting in solid residuals, an increasing waste load is being placed on the land. Environmental impacts are being addressed as a future need.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 479** Environmental Microbiology for Engineers (3) Intro microbiology for engineers; microbe structure, function, and diversity; environmental ecosystems; diagnostic labs.

**C E 479 Environmental Microbiology for Engineers (3)**

C E 479 Environmental Microbiology for Engineers is a senior/graduate-level course comprised of three main sections: (1) the fundamentals of microbial structure, function, nutrition, and growth for students with no prior formal instruction in microbiology; (2) microbial diversity and ecology; and (3) the application of these fundamental microbial principles to environmental systems. In the fundamentals section, the course covers microbial nomenclature, macromolecules, cell biology, energetics, growth, and genetic regulation. This is illustrated with calculations of thermodynamic constraints in microbially catalyzed reactions, the calculation of efficiencies based on energy conservation from common pathways, and the connection of these efficiencies to microbial growth in a chemostat. Building on these fundamental concepts of metabolic potential and conserving energy and acquiring reducing equivalents from redox reactions, the second section covers the reactions and energetics of the primary microbial functional diversity such as phototrophy, lithotrophy, autotrophy, anaerobic respirations, and fermentations. It also introduces modern molecular biology techniques for studying microbial systems, and pulls the concepts of functional diversity together by illustration with the major nutrient cycles, including discussions of environments in which each reaction might be encountered. Finally, the last section applies these ecological principles to several specific engineered environments of interest. Homework assignments throughout the semester involve questions about the methods, findings, or applications of recent articles that highlight the recently covered material, giving the students experience in the critical evaluation of primary literature and

demonstrating the relevance of the material to environmental microbiology research and application. Complementing the progression of the lectures are eight instructional laboratories that provide hands-on application of diagnostic microbiological techniques to the characterization of environmental enrichment cultures and pure cultures. For example, a microscopy lab immediately follows the lecture material on cell biology, an enrichment experiment follows the material on nutrition, an enumeration experiment follows the section on microbial growth, etc. The final seven weeks of the laboratory period are devoted to group projects, in which students apply the techniques they have learned as appropriate to answer specific short-term research hypotheses. The final period is devoted to group presentations of their projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 488C** Capstone Project - Construction (4) This course consists of a project either selected by the students with approval or assigned by the instructor.

#### **C E 488C Capstone Project - Construction (4)**

This course integrates the structural design and construction skills through an application to a project focusing in the construction management area. The course serves as the capstone of the senior student's education courses.

The course C E 488C identifies the student selection of a construction capstone project.

The student works on a team during the course project process. The team will be evaluated on different assignments during the project as well as the final product. The team will submit a final written report as well as make an oral presentation. The SDCET advisory board is invited to participate in the oral presentations.

The 4 credit hour course is separated into two parts which are taken in two consecutive semesters. The first course offering is for 1 credit to provide the students an overview of the course and an introduction to the project. The course is then repeated for 3 credits the following semester for the project. This is to allow the necessary time for students to complete the project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 488D** Capstone Project - Structural Design (4) This course consists of a structural design project either selected by the students with approval or assigned by the instructor.

#### **C E 488D Capstone Project - Structural Design (4)**

This course integrates the structural design and construction skills through an application to a project focusing in the construction management area. The course serves as the capstone of the senior student's education courses. The course C E 488D identifies the student selection of a structural design capstone project.

The student works on a team during the course project process. The team will be evaluated on different assignments during the project as well as the final product. The team will submit a final written report as well as make an oral presentation. The SDCET advisory board is invited to participate in the oral presentations.

The 4 credit hour course is separated into two parts which are taken in two consecutive semesters. The first course offering is for 1 credit to provide the students an overview of the course and an introduction to the project. The course is then repeated for 3 credits the following semester for the project. This is to allow the necessary time for students to complete the project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 494** Senior Thesis (1-9) Students must have approval of a thesis adviser before scheduling this course.

#### **Senior Thesis (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 494H** Honors Senior Thesis (1-6) Investigation of an original project in the area of Civil Engineering.

**C E 494H Honors Senior Thesis (1-6)**

Investigation of an original project in the area of Civil Engineering. The thesis topic must be approved by the honors advisor and thesis advisor and submitted as a thesis proposal to the Schreyer Honors College prior to scheduling the course. Students may register for a total of 6.0 credits over their last two semesters.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 496A** Ground Characterization for Geothermal Applications (3) Basic principles of ground-sourced heat exchange systems will be discussed. Site-specific variables affecting the performance of different geothermal applications (both shallow and deep) will be explored and their effects will be characterized.

**Ground Characterization for Geothermal Applications (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 497A** Construction Engineering (3) Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling; design details; excavations, foundations, retaining walls, formwork, pavements.

**Construction Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 497A** Construction Engineering (3) Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling; design details; excavations, foundations, retaining walls, formwork, pavements.

**Construction Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 497B** Bridge Analysis and Design I (3) Fundamentals and practical applications pertaining to bridge superstructures will be covered. Emphasis will be on Load and Resistance Design methodology. The two primary bridge types, prestressed concrete and steel, will be discussed exclusively.

**Bridge Analysis and Design I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: C E 341 C E 342

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 497C** Residential Construction Design Project (1) NAHB competition involving site design, construction scheduling and budgeting, cash flow projections, market and risk analysis, green building, project management. Travel involved. Contact instructor.

**Residential Construction Design Project (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 497D** Engineering Materials for Sustainability (3) Quantitative evaluation of the environmental impact of materials and products; life-cycle assessment; material selection to optimize structural performance; design, evaluation, and production of green construction materials.

**Engineering Materials for Sustainability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 511** Engineering Soil Characteristics (3) Applications of physico-chemical principles in soil engineering; soil composition; factors influencing engineering soil properties.

**Engineering Soil Characteristics (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 512** Soil Mechanics II (2-5) Evaluation of strength parameters and compressibility of soils; elastic analysis of stress and strain; techniques of forecasting foundation settlement; slope stability analysis.

### **Soil Mechanics II (2-5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 513** Advanced Foundation Engineering (3) Practical applications of soil mechanics principles to geotechnical engineering problems; dewatering techniques; design of deep foundations and retaining structures.

### **Advanced Foundation Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 521** Transportation Networks and Systems Analysis (3) Techniques of transportation network, user, stochastic user, and variable demand equilibrium; transportation activity system; computer simulation techniques and forecasting methods.

### **Transportation Networks and Systems Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 522** Traffic Simulation and Control (3) Simulation theory, traffic modeling using GPSS, traffic signal optimization using TEXAS, EVIPAS, PASSERII, TRANSYT-7F, TRAF-NETSIM, FRESIM and CORFLO.

### **Traffic Simulation and Control (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 523** Analysis of Transportation Demand (3) Theories of travel behavior, least squares and maximum likelihood, estimation methods, continuous dependent variable models, utility maximization, discrete econometric techniques.

### **Analysis of Transportation Demand (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 524** Advanced Problems in Civil Engineering Materials (2-6) Study in the literature and by laboratory investigation of selected topics on field-controlled civil engineering materials.

### **Advanced Problems in Civil Engineering Materials (2-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 525** Traffic Flow Theory (3) Microscopic and macroscopic traffic flow characteristics; traffic stream models; shockwaves and queuing for traffic operations.

### **Traffic Flow Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 526** Highway and Street Design (3) Technical analysis of the design elements of roadways, alinement, cross-section features, and intersection and interchange design considerations.

### **Highway and Street Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 527** Roadside Design and Management (3) Roadside safety and design, safety management, pavement management, lighting, signs, signals, and markings, clear zone, guiderail, impact attenuators.

### **Roadside Design and Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 528** Transportation Safety Analysis (3) Issues and methods in transportation safety analysis; factors contributing to crashes; crash causation; modeling accident occurrence; identifying sites for treatment.

### **C E 528 Transportation Safety Analysis (3)**

This course introduces students to issues and methods in transportation safety analysis; factors contributing to crashes; methods of analysis for determining crash causation; modeling accident occurrence; identifying crash sites for treatment. Students will be evaluated using periodic homework assignments, a mid-term exam, and a class project. Students are expected to learn fundamental aspects of highway accident occurrence and modeling. They will be introduced to modeling techniques and methods used to assess causality in crashes. The course is offered annually in the fall semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 531** Legal Aspects of Engineering and Construction (3) Basic legal doctrines, contractual relationships between parties, analysis of construction contract clauses, contract performance, and professional practice problems.

### **Legal Aspects of Engineering and Construction (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 533 Construction Productivity Analysis and Performance Evaluation (3)** Construction productivity concepts and models; productivity measurement, control, and forecasting; analysis of factors affecting productivity; methods improvement techniques.

### **Construction Productivity Analysis and Performance Evaluation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 539 Approximate Methods of Structural Analysis (3)** Structural analysis through the application of initial-value methods, Newmark's method, Fourier series, finite difference techniques, and work and energy procedures.

### **Approximate Methods of Structural Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 540 Statically Indeterminate Structures (3)** Analysis of statically indeterminate straight/curved beams, grids, 2D/3D frames, arches, cables, and shells using classical and modern techniques.

### **C E 540 Statically Indeterminate Structures (3)**

This course introduces students to various methods for analyzing statically indeterminate structural systems, including: straight and curved beams, grids, 2D and 3D frames, arches, cables, and shells. Both classical hand calculation approaches and more modern computer based approaches that utilize force and displacement based methods are discussed. Additional analysis topics, such as plastic analysis and the examination of beams on elastic foundations are presented. The procedures are introduced to the students so that their ability to analyze statically indeterminate structural systems is enhanced. In addition, practical applications for the methods that are discussed are presented.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 541 Structural Analysis (3)** Theory of various finite elements as applied to civil engineering structures. Term paper required.

### **Structural Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 542 (A E 542) Building Enclosure Science and Design (3)** The building enclosure: nature, importance, loadings; building science: control of heat, moisture, air, hygrothermal analysis; design: walls, windows, roofs, joints.

### **C E (A E) 542 Building Enclosure Science and Design (3)**

The building enclosure, or envelope, is the environmental separator in any building and is, like the superstructure and the service systems, one of the major physical components of the building. The primary objective of this course is to develop an understanding of the nature, importance, functions, and performance of the building envelope in general. The necessary building science--concerning primarily heat, moisture, and air--is covered, and hygrothermal analysis procedures are developed. A generalized categorization system for enclosure elements, i.e., walls (both above- and

below-grade), roofs, and other enclosure sub-assemblies, is proposed. General design strategies are developed. The design of specific wall systems (both above- and below-grade), roof systems, base floors, windows, and their joints is then addressed in some detail. The integration of structures (composite action, restraints, etc.), service systems (especially energy consumption), and finish (exterior and interior) is considered in sonic detail. Evaluation is based on an equal combination of assignments (6) and examinations (2). This course complements courses in architecture, civil engineering, architectural engineering, and mechanical engineering

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 543 Prestressed Concrete Behavior and Design (3)** Design and behavior of prestressed concrete structures: materials and systems losses, flexure, shear, bond, deflections, partial prestressing, continuous beams.

#### **Prestressed Concrete Behavior and Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 544 Design of Reinforced Concrete Structures (3)** Advanced topics in design of reinforced concrete structures. Torsion and shear; beam moment-curvature; two-way slab systems; slender columns; strut- and-tie methodology.

#### **C E 544 Design of Reinforced Concrete Structures (3)**

This course explores advanced topics in the design of reinforced concrete structures in conformance with standardized building codes. Topics covered include load combinations, principles of structural modeling, torsion and shear in reinforced concrete members, two-way slab systems, moment-curvature of beams, slender columns, and strut-and-tie models. Students enrolled in this course should have prior knowledge of the design of reinforced concrete beams, one-way slabs, and short columns. Due to the course content, students must be familiar with the American Concrete Institute (ACI) Building Code Requirements for Reinforced Concrete.

This course will generally be offered each fall, with an anticipated enrollment of 10. Grades will be based on two examinations, assignments, and a comprehensive final examination.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 545 Metal Structure Behavior and Design (3)** Design philosophies and basis; seismic loading; fatigue; bending, column, plate, and beam-column stability; tapered members; torsion; connections; bracing; frame stability.

#### **C E 545 Metal Structure Behavior and Design (3)**

This course presents advanced topics in elastic and inelastic structural metal member behavior and the theoretical basis of modern design codes and procedures. Philosophies of design, fatigue, bending stability and tapered members, torsion, stability of plates, stability of columns, stability of beam-columns and bi-axial bending, connections, and frame stability are covered in depth in addition to other topics relating to advanced behavior and design of metal structures. Students interested in this course must be familiar with the American Institute of Steel Construction (AISC) *Manual of Steel Construction*.

This course will generally be offered each fall, with an anticipated enrollment of 12. Grades will be based on homework assignments, a semester project, two examinations, and a comprehensive final examination.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 546 Reinforced Concrete Slabs (3)** Behavior, analysis, and design of floor systems; elastic, ACI Code method, yield line

theory; two-way, flat slab, flat plate.

### **Reinforced Concrete Slabs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 548 Structural Design for Dynamic Loads (3)** Dynamic behavior of structural systems of one and more degrees of freedom; earthquake, blast-resistant analysis, and design of structures.

### **Structural Design for Dynamic Loads (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 549 Bridge Engineering I (3)** Engineering of modern steel and concrete bridge structures; loading; analysis; design.

### **Bridge Engineering I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 550 Engineering Construction Management (3)** Management fundamentals for construction contracting; organization, project planning, scheduling and control, bonding and insurance, labor legislation and regulation, cost and control.

### **Engineering Construction Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 551 Random Processes in Hydrologic Systems (3)** Hydrologic systems analysis, simulation; design using probability, time series and dynamical systems; formulating models, parameter estimation, environmental impact, resource assessment.

### **Random Processes in Hydrologic Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 552 Coastal and Nearshore Processes (3)** Hydrodynamics of the near-shore environment, including waves, currents, and storm surges. Coastal response, sediment transport, engineering structures.

### **C E 552 Coastal and Nearshore Processes (3)**

Coastal and Nearshore Processes is concerned with the hydrodynamic processes that transport mass, momentum, and energy in the nearshore environment. These processes include tides, waves, currents, and storm surges.

Following study of the characteristics of these processes, emphasis is placed on the qualitative and quantitative study of the physical response of the coastline to these forcing mechanisms. Both cross-shore and long-shore sediment transport are considered, as are simple models for long-term coastline evolution. Finally, some attention is given to engineering structures placed in the coastal environment and the accompanying modifications to wave and current climates.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 555** Groundwater Hydrology: Analysis and Modeling (3) Introduction to groundwater resource analysis, model formulation, simulation, and design of water resource systems using symbolic and numerical methods.

**Groundwater Hydrology: Analysis and Modeling (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 561** Surface Hydrology (3) Quantification of the processes that govern the movement and storage of water near the land-surface including precipitation, evapotranspiration, and runoff.

**C E 561 Surface Hydrology (3)**

Water is an important factor in numerous engineering and scientific problems. It can be both a hazard and a resource. Knowledge of the movements and storage of water in the terrestrial, oceanic, and atmospheric environments is fundamental in many such applications. This course provides a graduate level introduction to surface hydrology, which focuses on the quantification of water pathways near the land-surface. It presents basic properties of the terrestrial, oceanic, and atmospheric environments and develops water and energy budget equations for different settings and scales. The course also provides detailed quantitative descriptions of the main processes responsible for the movement of water in the environment including precipitation, evapotranspiration, snowmelt, infiltration, surface runoff, groundwater recharge, subsurface runoff, and streamflow.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 563** Systems Optimization Using Evolutionary Algorithms (3) Comprehensive introduction to genetic and evolutionary computation: genetic algorithms, evolutionary strategies, multi-objective optimization, parallelization approaches, and fitness approximation.

**C E 563 Systems Optimization Using Evolutionary Algorithms (3)**

A comprehensive introduction to the field of genetic and evolutionary computation. The course emphasizes state-of-the-art methods for designing and implementing evolutionary algorithms for computationally intensive engineering and science problems. Course concepts are demonstrated using case studies drawn from the disciplines of the students enrolled. The course is offered every spring semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 564** Sediment Transport in Alluvial Streams (3) River flow, river channel formation, the physical characteristics of rivers, responses of rivers to natural and human-made changes.

**C E 564 Sediment Transport in Alluvial Streams (3)**

A comprehensive presentation of river processes and engineering must be built upon the foundations of fluvial geomorphology, hydraulics of river flow, and sediment transport. The course is organized into the following five principal parts:

Part I. Fluvial Geomorphology  
 Part II. Foundations of Fluvial Process



Part III. Regime Rivers and Processes  
 Part IV. Mathematical Modeling of River Channel Changes  
 Part V. River Engineering

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 566** Uncertainty and Reliability in Civil Engineering (3) Introduction to probabilistic modeling, simulation, uncertainty analysis, and reliability estimates applied to civil engineering.

### **C E 566 Uncertainty and Reliability in Civil Engineering (3)**

The objective of this course is to develop understanding of the uncertainty in Civil Engineering analyses, design, and construction and to introduce reliability-based methods of analysis. The course covers review of probability and statistics, uncertainty analysis, probabilistic models of load and resistance, and the application of reliability analysis to problems in Civil Engineering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 567** River Engineering (3) Introduction to river mechanics and fluvial geomorphology applied to problems of sediment transport and channel morphology.

### **C E 567 River Engineering (3)**

River Engineering will introduce students to the concepts of flow and sediment transport in canals and alluvial rivers. This course covers: river morphology and hydraulic geometry; hydraulics of flow in river channels; measurement of velocity; rating curves; properties of sediment; scour-related problems; stream stability and classification; sediment movement in rivers; channel design; software for erodible channels; stream bank, bridge pier, and bridge abutment protection; environmental considerations; and stream restoration. During the semester, the students will visit local streams for the purpose of making various observations and measurements.

Faculty: Peggy A. Johnson  
 General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 570** Environmental Aquatic Chemistry (3) Speciation, reactivity, and distribution of contaminants in water, with emphasis in inorganic chemicals.

### **Environmental Aquatic Chemistry (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 571** Physical-Chemical Treatment Processes (3) The theory of physical-chemical processes used in the treatment of potable water and municipal and industrial wastewaters.

### **Physical-Chemical Treatment Processes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 572 Biological Treatment Processes (3)** The theory and application of biological processes to treat organic wastes, including wastewater, solid residuals, and toxic priority pollutants.

### **Biological Treatment Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 573 Environmental Organic Chemistry (3)** Theory, measurement, and estimation of the characteristics and environmental transformations of hazardous materials.

### **Environmental Organic Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 574 Laboratory Analyses in Water Quality Control (3)** Experiments illustrating current chemical and biochemical methods of water and waste treatment and analytical methods used in research and control.

### **Laboratory Analyses in Water Quality Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 575 Industrial Waste Management (3)** Surveys and analysis, pollution prevention, regulatory requirements, treatment and disposal of liquid, gaseous and solid residues.

### **Industrial Waste Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 576 (CH E 576) Environmental Transport Processes (3)** Fundamentals of chemical transport in engineered environments, such as biofilm reactors, and natural systems including aquifers and rivers.

### **C E 576 Environmental Transport Processes (3)**

Environmental Transport Processes covers the fundamental of mass transport of chemicals between air, water, soil, and biota. Material is divided into three subject areas: mass transfer theory, transport processes related to engineered reactors, and transport in the natural environment. The focus of the course is on chemical calculations particular to dilute systems, with emphasis on quantifying chemical transport rates and distributions in natural and engineered environments. Special topics of interest to environmental engineers include biofilm models, bioreactors, chemical partitioning in thin fluid film bioreactors, and fate of anthropogenic chemicals from spills and discharges into the environment (i.e., rivers, lakes, and groundwaters).

Faculty: Bruce E. Logan

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**C E 577** Treatment Plant Design (1-6) Design of works for the treatment of water and wastewater for municipalities and industries.

### **Treatment Plant Design (1-6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 578** Groundwater Remediation (3) Application of fundamental physical/chemical/biological processes in natural and engineered systems for remediation of contaminated soil and groundwater.

### **Groundwater Remediation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 579** Environmental Pollution Microbiology (3) Fundamentals of microorganisms in water and wastewater treatment; indicators of pollution; activities of microorganisms in polluted waters, including biogeochemical cycles.

### **Environmental Pollution Microbiology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 580** Hydrodynamic Mixing Processes (3) Physical mixing processes in rivers, estuaries, lakes, and oceans. Analytic methods and computational modeling.

### **C E 580 Surface Water Quality Models (3)**

Hydrodynamic Mixing Processes is concerned with the transport and dispersal of tracers in natural water and air environments. It straddles the boundary between traditional civil engineering fluid mechanics (concerned with water quantity) and environmental engineering (concerned with water quality). Emphasis is placed on understanding the physical hydrodynamic processes responsible for tracer dispersal and application to practical problems through use of freely-available numerical models.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 581** Pavement Management and Rehabilitation (3) Techniques of network and project level pavement management, field evaluation methods and equipment, maintenance and rehabilitation strategies, overlay design procedures.

### **Pavement Management and Rehabilitation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 582** Pavement Design and Analysis (3) Viscoelastic analysis; non-linear analysis; fatigue and permanent deformation; back-calculation of layer moduli; mechanistic-empirical design methods.

**Pavement Design and Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 583** Bituminous Materials and Mixtures (3) Composition, physical behavior, production, and performance of bituminous materials and mixtures.

**Bituminous Materials and Mixtures (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 584** Concrete Materials and Properties (3) Study of concrete properties and associated variables, prediction models, testing, preventative measures, pozzolans, admixtures.

**Concrete Materials and Properties (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 591** Environmental Engineering Seminar (1) Seminar topics selected by faculty and students based on research interests on topics related to environmental engineering and science.

**C E 591 Environmental Engineering Seminar (1)**

This is a seminar course offered primarily for graduate students in Environmental Engineering, although other graduate students with interests in environmental research take this course. Graduate students may receive only 1 credit of this seminar towards a degree in Environmental Engineering, however, they are encouraged to register and attend every semester during their graduate career. This course is offered for 1 credit for both fall and spring semesters. Students making presentations receive letter grades, while others receive a satisfactory/unsatisfactory grade.

Seminar topics are selected by faculty and students based on research interests on topics related to environmental engineering and science. Most of the talks will be by environmental engineering graduate students. However, during the semester there will typically be three outside speakers that will be invited to give talks. Students in this class are expected to meet with these outside speakers in the laboratory to discuss their own research projects.

Students in this class give short presentations on their research topics. Each presentation should be about 20 minutes in length, allowing for 10 minutes of questions concerning the technical content of the presentation. The rest of the class is used for general discussion. Students are encouraged to give a seminar even though they have not completed all of their research (i.e. prior to their defense). Feedback from faculty and other students in this informal setting can be used to help improve research ideas and stimulate new ideas and research directions during the course of their research work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 592** Environmental Engineering & Science Topics (1) Current topics in environmental engineering and science.

**C E 592 Environmental Engineering & Science Topics (1)**

This is a literature review course for graduate students interested in topics related to environmental engineering. The subject of this seminar changes each semester. Examples of topics include: membrane bioreactors; biological hydrogen production; metal reduction by soil bacteria; anaerobic respiratory pathways used by bacteria for pollutant degradation.

This class is highly participation-oriented. Each week we review a single paper selected by the instructor or by a student in the class. The first two papers are selected by the instructor. Thereafter, students choose the paper. The paper must be selected one week in advance, and sufficient copies will either be brought to class or a pdf file will be provided by email to all participants one week prior to the class. The student choosing the paper will be expected to lead the discussion by: prompting others to provide a summary of the paper or of key items; suggesting areas that require closer inspection; stimulating a critical evaluation of the paper. No background is needed on this topic other than general environmental engineering courses typical of an M.S. program in Environmental Engineering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 597A** Geotechnical and Materials Engineering Seminar (1) Graduate student seminar with topical discussions on Geotechnical and Materials Engineering.

**Geotechnical and Materials Engineering Seminar (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 597A** Geotechnical and Materials Engineering Seminar (1) Graduate student seminar with topical discussions on Geotechnical and Materials Engineering.

**Geotechnical and Materials Engineering Seminar (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 597B** Public Transportation Systems (3) Planning and analysis of various public transportation systems, including: point to point, corridors, networks; fixed route vs. demand responsive systems; vehicle operations and fleet management.

**Public Transportation Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 597B** Public Transportation Systems (3) Planning and analysis of various public transportation systems, including: point to point, corridors, networks; fixed route vs. demand responsive systems; vehicle operations and fleet management.

**Public Transportation Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 603** Foreign Academic Experience (1-9 per semester/maximum of 18) Foreign study and/or research constituting progress towards the degree at a foreign university.

**Foreign Academic Experience (1-9 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Classics and Ancient Mediterranean Studies (CAMS)

**CAMS 400W** Comparative Study of the Ancient Mediterranean World (3) Comparative study of ancient Mediterranean civilizations.

**CAMS 400W Comparative Study of the Ancient Mediterranean World (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

CAMS 400W provides students in the Classics and Ancient Mediterranean Studies (CAMS) Major, and other undergraduate and graduate students in allied fields, a capstone overview of research methodologies as they are applied to contemporary issues in ancient Mediterranean studies. The course is interdisciplinary in nature, and stresses the interactions among the ancient cultures of the Mediterranean region. The specific course content varies depending on the current research interests of the department faculty and the work undertaken by participating students. The course is organized as a seminar with participation by department faculty, and, when appropriate, visiting speakers. The topics concern issues of chronological, geographic, and cultural breadth. Students are expected to give an oral presentation of their research on a relevant topic during the last three weeks of the semester.

This course requires a sequence of written assignments that constitute drafts in the process of writing an extended research paper. These consist of a statement of the problem, an annotated bibliography, a preliminary draft, and a final paper revised in light of the instructor's comments on the assignments. This paper and an oral presentation in class based upon it will constitute about half of the final grade. A quiz and essay final examination will constitute the remainder of the grade.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 405 (IL) Law & Economy in the Ancient Near East (3)** This course is an overview of the legal and economic texts and institutions in the Ancient Near East.

**CAMS 405 Law & Economy in the Ancient Near East (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will introduce the students to the legal and economic institutions of the Ancient Near East, as well as to the many theoretical issues raised by their study, such as: the matter of land tenure; the role played by the temple and the palace in the economic structure; the nature of law within political theology and kingship; and the legal and economic status of specific social groups (women, the elderly, slaves, children).

Since most of the topics to be examined are widely debated, the course will provide the students with a broad overview of scholarly theories and intellectual schools. In order to accomplish such an objective, the readings for the class will include both introductory works (taken, for instance, from Sasson, *Civilizations of the Ancient Near East*) and more advanced and specific articles and works (e.g., R. Westbrook, *A History of Ancient Near Eastern Law*). Students will be asked to prepare these readings, which will be available in the library or in electronic format, so they will be ready to take part in class discussions.

The source book for the basic legal texts will be M.T. Roth's edition of law collections. Moreover, students will be expected to give a presentation based on some of the optional readings listed on the syllabus. Thus, every class will consist of lecture on the topic and a critical and open discussion of the assigned readings. Every lecture will take into account the assigned readings and will be accomplished by some handouts.

Students will be evaluated on the basis of class participation (including a class presentation), as well as on writing assignments. The writing assignments will include take-home examinations.

This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the several history and culture courses in CAMS that provide detailed overviews of major civilizations of the Mediterranean and Near Eastern regions.

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Humanities

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 410 Classical Epic (3)** Homer, Hellenistic Epic, and Vergil; influences on later epic.

**Classical Epic (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 411W Classical Drama (3)** Masterpieces of Greek tragedy (Aeschylus, Sophocles, Euripides) and comedy (Aristophanes, Menander); their influence on Roman writers.

**CAMS 411W Classical Drama (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The aim of this course is to read, interpret, discuss, and write about the best known and most influential examples of classical drama (in English translation). Students will become conversant with the formal and thematic aspects of Greek tragedy and comedy. (The course could also include a module devoted to Roman adaptations of Greek drama.) The Greek playwrights to be read are Aeschylus, Sophocles, Euripides, and Menander. (Roman playwrights would include Plautus, Terence and Seneca.) The objectives of this course include learning how to read, analyze, and interpret tragedy and comedy within a literary, cultural, and historical framework that is fundamentally different from our own. At the same time as students come to grips with the cultural differences of Greek drama, they will be invited to ponder why these texts are still relevant to modern readers and audiences. The second objective of this course is to give students a forum in which they may reenact the critical debates and dramatic conflicts that characterize the ancient Greek theater. Class time will be devoted to structured discussion on set topics. Toward the end of the semester students will give 15-minute presentations on different aspects of classical drama that illuminate the texts read in class: for example, the design of Greek theaters and ancient theatrical production, the religious and civic functions of tragedy, gender roles, tragic and comic heroism, myth, rhetoric, philosophy, and the legacy of Greek tragedy and comedy in the modern world. The third objective of the course is to focus on developing critical writing skills and communicating clearly with readers. Students will write six papers of varying length (three papers in two drafts) and two essay exams (mid-term and final). The process of writing will provide a vehicle for close-reading and critical interpretation of classical drama. Students will also learn in classroom discussion and in feedback from the instructor and other students that critical writing entails drafting ideas and



revising them. Finally, participants will learn how to write properly documented and well-argued research papers.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 420** Introductory Targumic Aramaic (3) Fundamentals of Aramaic grammar, syntax, and vocabulary.

### **CAMS 420 Introductory Targumic Aramaic (3)**

The aim of CAMS 420 is to introduce students to the fundamentals of Targumic Aramaic as quickly and thoroughly as possible. Targumic Aramaic, is the dialect used by Jews in the last few centuries BCE in their translations of the Bible into Aramaic. Targumic Aramaic texts remain vital within Judaism and Biblical study. This course focuses primarily on the morphology and syntax of Aramaic. Drills on each point of grammar, as well as translation of sentences from Aramaic to English and English to Aramaic, and brief passages taken from the native texts are the basis of the student's homework throughout the semester. By the end of the semester, the students will be prepared to read short, unmodified passages of actual Aramaic. The course will focus primarily on reading and writing, though students will read aloud in class regularly in order to ensure correct pronunciation and understanding. CAMS will prepare students to work with Aramaic in related courses in CAMS, in particular those dealing with other Aramaic dialects, the Bible, and other related ancient languages. The course goals, in addition to providing the students a basic understanding of the history of the Aramaic literary tradition. The primary focus will be on mastering paradigms and syntax, but the students will also be introduced to real Targumic Aramaic texts, which are of great importance to understanding the history of Biblical textual transmission.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 440W** Studies in Classical and Ancient Mediterranean Archaeology (3-6) Selected topics in the literary sources and material evidence for classical and ancient Mediterranean society.

### **CAMS 440W Studies in Classical Archaeology (3-6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

CAMS 440W is a writing-across-the-curriculum upper level archaeology course on various topics in the broad field of ancient Mediterranean archaeology. The course will vary depending on the specific topic, which could be a study of authors such as Herodotus and/or Pausanias in relation to the archaeological record; epigraphy; numismatics; food production and consumption (e.g., diet, subsistence requirements, public dining, symposia, Roman dining, furnishings) from the literary and archaeological record; various classes of ancient Mediterranean ceramics; or the archaeological study of a specific urban site, such as Troy, Babylon, Egyptian Thebes, the Athenian Agora, or Pompeii with an emphasis upon economic and social organization.

In most semesters the topic will emphasize interdisciplinary themes, such as comparative state formation, or Egyptian-Greek-Persian relations, or the cultural development of a particular society, such as the Etruscan, that was strongly influenced by interaction with other Mediterranean cultures.

Students will learn of major publications in the field of study, and how to conduct searches of the previous archaeological literature and the related literary record. As one requirement, students will complete a research paper on a topic related to the particular theme of the course that semester. The sequence of writing assignments is designed to allow students to develop a project, to search for related publications, to develop a proposal, and to revise drafts of the final paper.

The course is also intended to provide students with a practical background in Classical and ancient Mediterranean archaeology that will help prepare them for fieldwork at ancient Mediterranean sites, for the interpretation of archaeological publications, and, as relevant, for utilizing the literary and/or epigraphic record for interpreting archaeological evidence.

Those considering enrolling in this course may obtain information about the specific topic by asking the faculty member listed as teaching the course or the Undergraduate Officer in the Department of Classics and Ancient Mediterranean Studies.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CAMS 442 (IL) (KINES 442) Sport in Ancient Greece and Rome (3)** An examination of the continuity of sport in Greek and Roman societies.

**CAMS (KINES) 442 Sport in Ancient Greece and Rome (3)  
(IL)**

This course examines the continuity of sport in ancient Greek and Roman societies. It investigates the role of athletic festivals in both cultures as well as the value placed on physical activity as part of the educational process.

The objectives of the course are to enable students to gain an appreciation for the continuous involvement of the ancient Greeks in the areas of competitive athletics and gymnastics[Kinesiology] as an important part of their value system. Moreover, the course will provide a comparison of Greek and Roman attitudes of athletics and gymnastics.

Typical topics include athletics during the Minoan /Mycenaean Bronze Age, Athenian and Spartan philosophies regarding education, the importance of spectator sports in Roman society and their link to politics.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 470 (IL) Languages and Cultures of the Ancient Near East (3)** This course is an overview of the languages and cultures that populated the Ancient Near East.

**CAMS 470 Languages and Cultures of the Ancient Near East (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course aims to provide students with a wide overview of the languages spoken in the Ancient Near East. The goal is to go beyond the merely linguistic sketches of the main grammatical features of these languages. In fact, the focus will be placed on historical, literary, social, anthropological, and ethnic matters: language contact settings; relations between language and ethnicity; sociolinguistic aspects of language evolution, language variation, bilingualism, and diglossia; relations between historical and social patterns and the literary, bureaucratic, and popular uses of language; etc.

In order to address this ample variety of issues, the students will be introduced first to the essential set of facts needed to comprehend the sociolinguistic history of each region, i.e., basic overviews of the languages in question, their linguistic affiliation, the main periods of their history as evolving linguistic realities, and their different writing systems. These overviews will immediately open the door to the discussion of a tapestry of topics concerning the realities behind these languages, especially their speakers and their ethnic, historical, and political identity. This inquiry into the facets of language as an inherently human reality will lead to a miscellaneous constellation of problems, such as, for instance, the construction of a national identity through the use, revival, or vindication of a concrete language or dialect.

Students will be required to do a number of readings before each class. These readings will include basic historical sketches of the languages and linguistic traditions with which the course will deal. Moreover, students will be expected to give a presentation based on some of the optional readings listed on the syllabus. Thus, every class will consist of a lecture on the topic and a critical and open discussion of the assigned readings. Every lecture will take into account the assigned readings and will be accompanied by some handouts.

Students will be evaluated on the basis of class participation (including a class presentation), as well as on writing assignments. The writing assignments will include take-home examinations.

This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the several history and culture courses in CAMS that provide overviews of major civilizations of the Mediterranean and Near Eastern regions.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 471 Sumerian (3)** Introduction to the Sumerian language and the cuneiform writing system.

**CAMS 471 Sumerian (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Sumerian was the language originally spoken in the south of Ancient Mesopotamia (modern Iraq) during the third millennium b.c.e. After it died out as a spoken language, Sumerian became the essential cultural vehicle for a wide variety

of literary, scholarly, and religious genres, and it was preserved in writing until the practical disappearance of the Mesopotamian civilization by the second century of our era.

This course aims to familiarize students with the basics of Sumerian grammar and enable them to read royal inscriptions from the Early Dynastic and Ur III periods (3rd millennium b.c.e.) as well as provide them with a preliminary introduction to some literary and non-literary texts. Students will be introduced to a variety of genres: royal inscriptions, administrative documents, letters, incantations, and literary texts.

Because of the specific nature of the writing system and the fact that most Sumerian texts are available only in copies, students will also be introduced to the cuneiform script, its basic structure, and a basic repertoire of signs.

Students will be required to do all the assigned exercises in advance, and participate in class. Special emphasis will be put on class participation: every student will be asked to read and translate in class. Furthermore, occasional quizzes are by no means a remote possibility. In addition, there will be a mid-term and a final examination.

This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the courses in CAMS that provide an introduction to an essential language of the Mediterranean and Near Eastern regions.

General Education: None

Diversity: None

Bachelor of Arts: Other Cultures and Humanities

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 472 Akkadian (3)** Introduction to the Akkadian language (Babylonian & Assyrian) and the cuneiform writing system.

### **CAMS 472 Akkadian (3)**

(BA) This course meets the Bachelor of Arts degree requirements.

Akkadian is the cover term for the East Semitic dialects spoken and written in Mesopotamia (modern Iraq) from the mid-third millennium b.c.e. to about the first century c.e. These dialects (Babylonian and Assyria) are all quite similar. As is customary, the course will focus on Old Babylonian, as this is the "classical" variety of the language, and served as the basis for the dialect of the vast majority of later Akkadian texts (Standard Babylonian). This course aims to familiarize students with the basics of Akkadian grammar and enable them to read a wide variety of genres: legal texts, letters, omens, royal inscriptions, and literary compositions.

Because of the specific nature of the writing system and the fact that many texts are available only in copies, students will also be introduced to the cuneiform script, its basic structure, and a basic repertoire of signs. Every meeting will follow a similar structure: the first part will be devoted to the exercises corresponding to the lesson in the textbook that was explained the previous day; and the second part will be an explanation of the next lesson, the exercises of which will have to be prepared for the next meeting.

Students will be required to do all the assigned exercises in advance, and participate in class. Special emphasis will be put on class participation: every student will be asked to read and translate in class. Furthermore, occasional quizzes are by no means a remote possibility. In addition, there will be a mid-term and a final examination.

This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the courses in CAMS that provide an introduction to an essential language of the Mediterranean and Near Eastern regions.

General Education: None

Diversity: None

Bachelor of Arts: Other Cultures and Humanities

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 480 (J ST 480) Greeks and Persians (3)** Development and achievements of the Achaemenid kingdom; relationships between Persians and Greeks.

### **Greeks and Persians (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 481 (IL) Introduction to Middle Egyptian & Hieroglyphics (3)** An introduction to the language and script of Ancient

Egypt, familiarizing the student with grammar, syntax and lexicon.

### **CAMS 481 Introduction to Middle Egyptian & Hieroglyphics (3)**

This course is offered as a basic introduction to that stage in the evolution of the Egyptian language known as "Middle Egyptian" (used as a vernacular c. 2300-1700BC, and as a "literary" dialect c. 2200-1350BC). First encountered in caption texts and snippets of conversation of the workers and peasants in late Old Kingdom mastaba depictions, Middle Egyptian originally was the vernacular of the "street" during the outgoing Old Kingdom. In the upheaval that swept away the monarchy and elite of the Old Kingdom the language which characterized the Pharaonic court (Old Egyptian) was swept away as well. In the subsequent First Intermediate Period, the language that everyone speaks is a lower class register. Middle Egyptian was given a fillip shortly after the turn of the millennium when the new regime of the 12th Dynasty (c. 1991-1786 BC) established a writing school and adopted this dialect as the accepted literary medium. The scribes of this institution produced a number of literary pieces, hymns and poetry which although created in writing, were intended for oral dissemination *parlando*. They rapidly became classics and were copied and learned by heart for centuries into the future. Middle Egyptian was used in every walk of life from monumental inscriptions, religious, and mortuary texts to letters, business documents and accounts, and the output from Dyn. 12 through 18 was prodigious. Even beyond the 14th Century BC learned scribes would continue to make the attempt at composing in Middle Egyptian, even though the language was no longer spoken, and as a quasi-ecclesiastical speech it continued down to Greco-Roman times. By that time its restriction to temple texts gave the false impression that both language and script had always had the purpose of conveying religious concepts, hence the Greek misnomer 'hieroglyphs', i.e. holy script.

General Education: None

Diversity: IL

Bachelor of Arts: Other Cultures and Foreign Language

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 490 Ancient Mediterranean Languages (3-6)** Variable topic study of an ancient language of the Mediterranean basin and related areas, other than Greek, Latin, or Hebrew.

### **CAMS 490 Ancient Mediterranean Languages (3-6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

CAMS 490 is a variable topic course in ancient languages, other than Greek, Latin, and Hebrew, that are offered by the Department of Classics and Ancient Mediterranean Studies. The course expands the range of ancient languages of areas in the Mediterranean region which students may study at Penn State. The course permits students of Latin, Greek, or Hebrew to learn the basics of other ancient Mediterranean languages, thereby extending their understanding of the structural similarities and differences of the region's writing systems. The languages taught at present include Egyptian and Sanskrit. Other languages, such as Akkadian, Hittite, Ugaritic, or Aramaic may be offered in future years. The course consists of three major components: The course begins with an overview of the language of study with respect to the language systems of the ancient Mediterranean world in a historical context. Next students learn the essential features of the language of study including its forms, grammar, and lexicon. In the second part of the semester, students read selected texts of various genres as appropriate, including literary and historical texts and inscriptions. The known features of the oral language will also be discussed. The course complements advanced courses such as LATIN 450W, The History of the Latin Language, and other advanced language offerings in Greek, Latin, and Hebrew. It also complements offerings in historical-comparative and Indo-European linguistics such as LING 102(GH).

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 492 Intermediate Field Methods (3-6)** On-site experience in archaeological fieldwork in the ancient Mediterranean region.

### **CAMS 492 Intermediate Field Methods (3-6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Students will have the opportunity to participate in a practicum in archaeological fieldwork at Mediterranean sites under the direction of an experienced research archaeologist. Activities will include surveying recognition and recording of stratigraphy and standing remains, recovery of artifacts and ecofacts, and on site conservation. Students will keep a journal and be graded on it as well as on their development of skills in excavation and interpretation. This course may be used to fulfill a requirement for the Classics and Ancient Mediterranean Studies option of the CAMS major and as a 400-level course for the CAMS Minor. The course will be available when CAMS faculty conduct archaeological fieldwork or students participate in projects approved by CAMS archaeology faculty. Estimated enrollment will vary depending on project, funding, etc.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 493** Intermediate Field Analysis (3-6) On-site experience in archaeological analysis in the ancient Mediterranean region.

**CAMS 493 Intermediate Field Analysis (3-6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Students will have the opportunity to participate in archaeological fieldwork at Mediterranean sites under the direction of an experienced research archaeologist. Activities will include analysis of materials recovered in archaeological projects including maintaining an objects database, artifact sorting and reparation, recognition of pottery types, recording finds, proper handling and storing of finds, and understanding the role of artifacts in archaeological interpretation. Students will keep a journal and be graded on it as well as on their development of skills in recording and interpreting archaeological data.

This course may be used to fulfill a requirement for the Classics and Ancient Mediterranean Studies option of the CAMS major and as a 400-level course for the CAMS Minor. The course will be available when CAMS faculty conduct archaeological fieldwork or students participate in projects approved by CAMS archaeology faculty.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 497A** (J ST 497A) Paul the Apostle (3) Intensive study, in historical, literary, and religious contexts, of the life and writings of one of the founders of Christianity. Considerable attention will be focused on the impact of Paul and his writings on the evolution of early Christianity.

**Paul the Apostle (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 497A** (J ST 497A) Paul the Apostle (3) Intensive study, in historical, literary, and religious contexts, of the life and writings of one of the founders of Christianity. Considerable attention will be focused on the impact of Paul and his writings on the evolution of early Christianity.

**Paul the Apostle (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 497H** Environmental Thought in the Ancient Mediterranean World (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Environmental Thought in the Ancient Mediterranean World (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 497H** Environmental Thought in the Ancient Mediterranean World (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Environmental Thought in the Ancient Mediterranean World (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 501** Comparative Greek and Latin Grammar (3) The evolution of the phonological, morphological, syntactic and lexical structures of Greek and Latin from Proto-Indo-European.

**Comparative Greek and Latin Grammar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 503** Seminar on Ancient Mediterranean Languages (3 per semester, maximum of 6) An in-depth examination of the ancient languages of the Mediterranean basin, including Indo-European and non-Indo-European languages.

**Seminar on Ancient Mediterranean Languages (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 504** Topography of Ancient Rome (3) Lectures and readings on physical development of the ancient city of Rome from earliest habitation to time of later empire.

**CAMS 504 Topography of Ancient Rome (3)**

This is a course in the topography of the ancient city of Rome. That is, this course is concerned with the study of the physical reality of the ancient city of Rome: how it was perceived in antiquity; how we identify its elements today. The chronological scope is from the foundations of the city in ca. 800 BCE through late antiquity/the early medieval period (ca. 650 CE). Major topics of discussion and study include how the city expanded over time, the distinctions between public and private urban space, the nature of identifiable neighborhoods, the relationship between political governments and monumental architecture, the evolution of public and private urban religious structures, the physical infrastructure of the city (for example: roads, water, sewer), housing, and population.

The objective of this course is the acquisition of a scholarly understanding of the ancient city of Rome's physical identity: its foundation, development, and expansion, with particular attention to the identification of physical structures for which there is evidence either archaeological or literary or both.

This seminar complements graduate programs of study in Ancient, History, Art History, Anthropology, and is integral to the graduate curriculum in Classics and Ancient Mediterranean Studies.

Evaluation of student seminar work is based on (1) active participation in seminar discussions; (2) oral presentation of research reports; (3) a major research paper. This seminar has a limited enrollment of 8 and is offered once a year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 520** Advanced Sumerian (3) Advanced study of Sumerian grammar and cuneiform writing through the reading of Sumerian literary texts.

**Advanced Sumerian (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 521** Advanced Akkadian (3) Advanced study of Akkadian grammar and the cuneiform script through the reading of texts in various dialects.

**Advanced Akkadian (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 522** Comparative Semitics (3) Overview of the Semitic language family and introduction to its comparative linguistic study.

**Comparative Semitics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 592** Proseminar (3) Introduction to the history, research methods, historiography of modern scholarship on ancient Mediterranean studies.

**CAMS 592 Proseminar (3)**

The specific aim of this proseminar is to provide a foundation for scholarly work in the disciplines included within Classics and Ancient Mediterranean Studies. This proseminar will therefore introduce the student to the scope and nature of the ancient evidence (literary, documentary, material [archaeological], the history and historiography of modern study of that evidence and the ways in which research methodologies and techniques have evolved. In addition, the proseminar will introduce students to the nature of contemporary academic presentation and publishing, thereby to assist them in preparing research papers for scholarly dissemination.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 593** Research Seminar (3-6) Significant research experience in the fields represented by CAMS; guided supervision in the preparation of a scholarly article.

**CAMS 593 Research Seminar (3-6)**

The specific aim of this seminar is to provide a research experience in one of the disciplines included within Classics and Ancient Mediterranean Studies. This seminar will therefore introduce the student to the scope and nature of the ancient evidence (literary, documentary, material [archaeological], the history and historiography of modern study of that evidence and the ways in which research methodologies and techniques have evolved in a specific discipline of CAMS. In addition, the seminar will require students to present their own research topic in the form of a seminar presentation and a written paper suitable for submission for publication in a refereed journal.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**CAMS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAMS 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Clinical Lrng Compet (CLC)**

**CLC 712** Clinical Learning Competencies I (3) This course will begin to develop the medical students' basic clinical reasoning methods, self-learning concepts and the development of clinical competencies.

**Clinical Learning Competencies I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:  
Concurrent: Cellular and Molecular Basis of Medical Practice Biological Basis of Disease

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLC 721** Clinical Learning and Competencies II (8) This course will continue the development of medical students' basic clinical reasoning methods, self-learning concepts and development of clinical competencies that were provided in CLC 721.

**Clinical Learning and Competencies II (8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:  
 Concurrent: HEM 721 CAR 722 PLM 726 REN 728 GI 729

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLC 722** Clinical Learning and Competencies III (5) This course will continue the development of medical students' basic clinical reasoning methods, self-learning concepts and development of clinical competencies that were provided in CLC 721.

**Clinical Learning and Competencies III (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:  
 Concurrent: NBS 725 MSC 727 DERM 720 REP 730 END 731 FCM 723 Behavioral Influences on Health

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Co-Curricular Activ (COCUR)**

**COCUR 900** Moot Court Board (1 per semester/maximum of 6) See Handbook for Description.

**Moot Court Board (1 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 901A** Member Arbitration L Rev (1 per semester/maximum of 6) See handbook for description.

**Member Arbitration L Rev (1 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 901E** Member Environmental Law Review (1 per semester/maximum of 6) See handbook for description.

**Member Environmental Law Review (1 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 901I** Member Journal of Law and International Affairs (1 per semester/maximum of 6) See handbook for description.

**Member Journal of Law and International Affairs (1 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 901P** Member Penn State Law Review (1 per semester/ maximum of 6) See handbook for description.

**Member Penn State Law Review (1 per semester/ maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 902A** Editor Arbitration Law Review (2 per semester/maximum of 6) See handbook for description.

**Editor Arbitration Law Review (2 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 902E** Editor Environmental Law Review (2 per semester/maximum of 8) See handbook for description.

**Editor Environmental Law Review (2 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 902I** Editor Journal of Law and International Affairs (2 per semester/maximum of 4) See handbook for description.

**Editor Journal of Law and International Affairs (2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 902P** Editor Penn State Law Review (2 per semester/maximum of 8) See handbook for description.

**Editor Penn State Law Review (2 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995A** Penn State Law Review (2) See Handbook for description.

**Penn State Law Review (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995B** Penn State International Law Review (2) See Handbook for description.

**Penn State International Law Review (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995C** Penn State Environmental Law Review (2) See Handbook for description.

**Penn State Environmental Law Review (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995D** Appellate Moot Court Board (2) See Handbook for description.

**Appellate Moot Court Board (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995E** Trial Advocacy Board (1 per semester/maximum of 6) See Handbook for description.

**Trial Advocacy Board (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995F** Law Journal Editing (2) See Handbook for description.

**Law Journal Editing (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 995G** Law Journal Membership (1 per semester/maximum of 99) See Handbook for description.

**Law Journal Membership (1 per semester/maximum of 99)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 997** Special Topics (1-2 per semester/maximum of 2) Special topics.

**Special Topics (1-2 per semester/maximum of 2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COCUR 997A** Willem C. Vis International Commercial Arbitration Moot Court Team (1) Willem C. Vis International Commercial Arbitration Moot Court Team.

### **Willem C. Vis International Commercial Arbitration Moot Court Team (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **College Student Affs (CSA)**

**CSA 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 501** Introduction to Student Affairs (3) An introduction to student affairs in higher education with consideration of various functional areas of the profession.

### **Introduction to Student Affairs (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 502** Organization and Administration in Student Affairs (3) Formulation of policies as guides to the student personnel service programs; integration of program elements; research; current problems and trends.

### **Organization and Administration in Student Affairs (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 503** Student Development in College Environments (3) This course covers the knowledge and methods of human development theories and their applications in college settings.

### **Student Development in College Environments (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 504** Research and Assessment in Student Affairs (3) This course provides the basic knowledge and skills necessary to plan, design, implement, and evaluation assessment programs in student affairs.

**Research and Assessment in Student Affairs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 505** Capstone Seminar (2) This seminar provides advanced students an opportunity to apply concepts from previous course work to current issues facing student affairs.

**CSA 505 Capstone Seminar (2)**

The purpose of this seminar is to provide advanced students with an opportunity to use concepts and theories learned in previously completed coursework, and to understand and analyze current issues facing higher education and student affairs professionals. In addition, this course is designed to assist students in making the transition from graduate student to entry-level professional.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 506** Campus Environments (3) Examination of theoretical concepts and empirical findings that describe the college environment and explain its impact on students and staff.

**Campus Environments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 507** Social Justice Issues in Higher Education (3) Exploration of diverse student population, their different experiences, and the value university communities place on these differences.

**CSA 507 Social Justice Issues in Higher Education (3)**

Higher education reflects the societal context in which it exists but also has the responsibility to critically examine and change that context. An important role for higher education is to work to achieve equity for all its constituents and in society as a whole by raising awareness, increasing knowledge, and encouraging action related to social justice. This class presumes some knowledge of the concept of social justice and a willingness to explore your own positionality with regard to social justice. A basic understanding of the ideas of privilege and oppression and the role that each of us plays within the power dynamics of American society is necessary to gain new awareness and learning in the short amount of time we have to explore these issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 594** Research Topics (1-9) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-9)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 595** Internship (1-9) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSA 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Communication (COMMU)**

**COMMU 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMU 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Communication Arts and Sciences (CAS)

**CAS 402** Speech and Human Behavior (3) General semantics, thought, and human behavior; not offered at University Park campus.

### Speech and Human Behavior (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 403** Interpersonal Communication Theory and Research (3) Examining behavior within interpersonal encounters, with emphasis on both theoretical/applied explanations for how and why people act during such interactions.

### Interpersonal Communication Theory and Research (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 404** Conflict Resolution and Negotiation (3) Theories and strategies important for conceptualizing, developing, and managing conflict negotiation, mediation, and third-party intervention.

### Conflict Resolution and Negotiation (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 405** Family Communication Theory and Research (3) Explores the nature and functions of communication in family life; emphasis on meaning, patterns, and styles of family communication.

### Family Communication Theory and Research (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 406H** Honors Course in Communication Arts and Sciences (3) Individual study and seminar in selected areas or issues of speech communication.

### Honors Course in Communication Arts and Sciences (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 410W** Mother-Daughter Communication (3) Explores the mother-daughter relationship with an emphasis on understanding mother-daughter communication.

### CAS 410W Mother-Daughter Communication (3)

The mother-daughter relationship has been explored in literature, film, and in the social sciences. This course will



examine the mother-daughter relationship through social, psychological, developmental, and relational communication lenses. The course challenges students to explore the socially constructed nature of the mother-daughter relationship in film and literature and investigate the many ways this unique relationship is understood through the social sciences. In addition to examining the social construction of the mother-daughter relationship across time, contemporary social science theories will be discussed and students will be challenged to assess how these theories do or not help to explain their own personal maternal relationships. This course satisfies the university writing intensive requirement, which means that over 80% of the final grade is based assessment of writing. Evaluation will include a series of multiple choice and short essay quizzes, a mid-term paper, and a final application paper. This mother-daughter communication course is an upper division course that contributes toward students' personal development and complements students' interests in pursuing counseling, pastoral, health, gerontology, social services and other career ambitions involving a need to understand family relationships. CAS 410 may be used to fulfill Major or Minor requirements for upper division credits. This course relies heavily on whole-class and small group discussion.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 411 Rhetorical Criticism (3)** Principles of rhetorical criticism examined through analysis of selected texts and critics.

### **Rhetorical Criticism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 415 Rhetoric of Film and Television (3)** Rhetorical analysis of the artistic forms and cultural structures of film and television; intensive study of selected examples.

### **Rhetoric of Film and Television (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 420 Rhetorical Theory (3)** Ancient, medieval, Renaissance, Enlightenment, and contemporary theories of rhetoric.

### **Rhetorical Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 421 Communication and Aging (3)** Concentrates on the pivotal role that communication plays in the social process of aging.

### **CAS 421 Communication and Aging (3)**

Communication and Aging is a course that concentrates on the pivotal role that communication plays in the social process of aging. An understanding of the communicative behavior of older adults can result in significant improvements in our ability not only to describe the essential components of a quality life, but to actively intervene in the various factors that help each of us adapt to the many physiological, psychological, social and economic challenges of the aging process. Topics covered in this course include: the theories of social aging; attitudes and ageism; mass media use and portrayals; work, leisure, and retirement; family relationships such as siblings, grandparent-grandchild, parent-child; friendships; health and aging; death and dying; and successful aging. This course places communication and our interactive behavior at the heart of the aging process and helps us combine the growing bodies of literature in physical, psychological and social aging as we attempt to grasp the process of life long development.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 422 (US) (AF AM 422) Contemporary African American Communication (3)** A focused study on the continuities between African and African American culture and communication.

**CAS (AAA S) 422 Contemporary African American Communication (3) (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

At least once a year, this multidisciplinary course is designed to serve both Speech Communication and African and African American Studies. It is concerned with the relationship between a people's culture and world view and their systems of rhetoric/communication. It also provides a focus on the continuities between African and African American culture and communication. Specifically, it offers an approach to ascertaining the salient features of African and African American communication for community development. Special emphasis is given to the development and rhetoric of the Civil Rights Movement. The course utilizes videos, guest lectures, tapes of speeches, etc. to clarify objectives and stimulate classroom discussion. Students will be evaluated on two exams, one oral report, a final paper and class participation. Even though students need 400-level courses for their major and minor, this course is not required for Speech Communication majors. However, it does meet the Intercultural and International Competency requirement because it focuses on the communication of African Americans and how that communication has affected all Americans. The course will accommodate ten students in Speech Communication and ten students in African and African American Studies to ensure active discussion of issues.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 426W Communication Ethics (3)** Ethical issues in public and private communication; role of communication in expressing and realizing individual and social values.

**Communication Ethics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 438 Rhetoric of Documentary (3)** Rhetorical analysis of the documentary in film, television, and other media; historical and critical analysis of functions and form.

**Rhetoric of Documentary (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 450W Group Communication Theory and Research (3)** Selected theories of problem solving through group discussion emphasizing participation and leadership.

**CAS 450W Group Communication Theory and Research (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

CAS 450W: Group Communication Theory and Research is a writing-intensive course in which students study a broad range of theories and perspectives concerning the role of communication in decision-making and problem-solving groups through a variety of writings by leading scholars in the area of Group Communication. The objectives of CAS 450W are: (1) to expose students to various facets of group life and theories that account for their performance; (2) to provide a summary knowledge of representative findings from research on group interaction; (3) to develop critical skill in the assessment of theoretical arguments and the adequacy of the evidence on which they are based; and (4) to enhance

students' capacities for addressing, both orally and in writing, substantive issues posed by the subject matter. Theoretical material is examined with a view toward determining how to improve the performance of decision-making and problem-solving groups. Hence, the course has a strong concern with the identification of communication practices on which students can draw in making choices concerning how to participate in such groups. The course incorporates a discussion, rather than lecture, format. Attendance is required. Students will receive a set of questions in advance of each reading assignment that will provide a basis for discussion in the class sessions. The questions for the first five reading assignments will also serve as topics for a series of five short position papers that fulfill the writing intensive component of the course. In addition to the position papers, students are required to complete a midterm and final examination, both of the open-book, essay variety, and a course paper exploring a significant communication issue raised in the course. Among the topics covered in the course are the impact of member characteristics on interaction, the social dynamics of groups, the management of conflict, argument and decisional outcomes, leadership, and principles of meeting management. Students completing the course will have not only a better understanding of why decision-making and problem-solving groups both succeed and fail, but also a much improved basis for contributing effectively to them. CAS 450W satisfies requirements in the Communication Arts and Sciences Major and Minor, the Liberal Arts Business Minor, and the Dispute Management and Resolution Minor. It may also be used as an elective and is complementary to courses dealing with groups and group process in Psychology, Sociology, and Management.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 452** Organizational Communication Theory and Research (3) Explores the nature and functions of communication in organizations; emphasis on concepts, tools, and skills for effective management of communication.

### **Organizational Communication Theory and Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 452W** Organizational Communication Theory and Research (3) Explores the nature and functions of communication in organizations; emphasis on writing and exploring concepts, tools, and skills for effective management of communication.

### **CAS 452W Organization Communication Theory and Research (3)**

This course is designed to further introduce you to the field of Organizational Communication. Emphasis is placed on macro-organizational variables that can systematically affect micro-communication behaviors: in other words, how could something like the hierarchy of the organization influence who you talk with as an organizational employee. The purpose of the course is to provide you with a basic understanding of communication-relevant behaviors and activities in organizations. This includes things like leadership, teamwork, conflict management, and diversity. Additionally, we will examine various theories of and approaches to studying communication within organizations. My hope is that when you've successfully completed the course you've mastered these objectives:

- Develop a vocabulary and understanding of organizational communication concepts.
- Become familiar with the historical, current, and future issues and problems facing organizations.
- Apply theoretical perspectives and concepts to organizational situations and settings.
- Identify and understand the relationships between macro (e.g. structure and hierarchy) and micro (e.g. social support and stress) organizational communication variables.
- Experience locating, reading, synthesizing, and evaluating scholarly research appropriate for organizational communication phenomena.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 453** Health Communication Theory and Research (3) Principles of communication about health across the lifespan and within health-care contexts.

### **CAS 453 Health Communication Theory and Research (3)**

This is an upper division course designed to provide students with a comprehensive introduction to multiple discourses about health and health care. CAS 453 emphasizes the communication about health and health care that reaches us

everyday through many and varied professional, personal, and mediated forms. Interactions with health care providers were once limited primarily to physicians and nurses. Today, careers in health care are among the most rapidly expanding job areas, and a bewildering array of technicians and technical and professional titles greets the client of formal health care. Awareness and understanding of how to assess these various roles increases the ability of students to interact competently with care providers. Family, friends, and the cultural groups that nurture our youth and sustain our adulthood interact with us about health on a regular basis as well. Awareness and understanding of the impact that interactions with these primary social network members has on interactions with health care providers increases the likelihood that both provider and client will be better understood and better served.

Every message about health and health care carries an ethical dimension in its content. The course will increase a students' critical thinking and informed decision-making skills associated with others efforts to influence them regarding their own health practices. It also frames discussion about the ethics of and ethical decision-making associated with health communication. Students will examine communication about health in many situations and contexts to illustrate how it reflects efforts to assign labels to illness and disease, and sometimes the environmental and political contributors to the situation. Students will assess whether communication about health and health care places the responsibility on individuals, institutions, society, or some combination for the particular health condition or situation. Finally, students will evaluate how communication is used to invoke personal, professional, and societal norms of conduct associated with standards of conduct that should promote health and well-being.

The course is linked to the courses in interpersonal communication, organizational communication, health communication, and small group communication, as discourse about health crosses societal, cultural, and personal contexts. CAS 453 is one of the upper division courses that may be used to fulfill Major or Minor students' requirements for upper division credits.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 455 (US) (WMNST 455) Gender Roles in Communication (3)** Explores the literature on gender research in the discipline of human communication.

**CAS (WMNST) 455 Gender Roles in Communication (3)  
(US)**

This 400-level course is a theory and application course which also satisfies an intercultural requirement. CAS/WMNST 455 strives to ensure that students understand female and male differences and similarities in communication patterns, perceptions of the opposite sex, and expectations and stereotypes regarding the opposite sex. Many researchers find that gender communication is "cross cultural," i.e., that women and men come from two different cultures, and therefore misunderstanding of each others' intent and expectations may frequently occur. This course examines how distinctions in meaning and interpersonal dynamics may create these two differing cultures, and promotes understanding and possibilities for adaptation. It also investigates when and if changing communication styles is desirable, and in which settings. A goal of the course is to help students to solve puzzles toward understanding those we work with and relate to, as well as to apply their knowledge to their own lives and contexts. The course content and format reflects these goals. CAS/WMNST 455 begins with theoretical information, later applying it to situations of interest to most -- relationships, language use differences (verbal and nonverbal), media messages, and workplace issues. Lecture incorporates considerable discussion and exploration of gender issues, and most topics are followed by activities, which illustrate how theories work in real life. This course is useful for any students seeking an intercultural course. It is recommended to Communications Arts and Sciences and Women's Studies majors and minors due to emphasis on communication theory and gender issues. Business, counseling, psychology, sociology, education and any social science majors may fulfill a US requirement through 455.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 460H Introduction to Honors Thesis (3)** This course will guide students through steps that result in Honors Thesis Proposal.

**Introduction to Honors Thesis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 470** Nonverbal Communication (3) Examining ways nonverbal messages, such as gestures, posture, vocal intonation, and facial expressions, affect us on a daily basis.

### **Nonverbal Communication (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 471** (US;IL) Intercultural Communication Theory and Research (3) Intercultural and cross-cultural communication research theory and practice as applied within and across national boundaries.

### **CAS 471 Intercultural Communication Theory and Research (3) (US;IL)**

This course is designed to introduce theoretical approaches to cross-cultural communication from a variety of disciplines, e.g., speech communication, anthropology, linguistics, sociology, sociolinguistics, psychology, and has a double aim of combining theory with practical application and empirical observation. We will be utilizing a number of readings, films, and such mass media elements as films, magazines, newspapers, and television programs and commercials, as well as actual interviews with people from other cultures. Classes will be conducted through lecture sessions, class discussions, and small group activities. Specific: To examine characteristics of communication, language, and culture; to consider which aspects of language, communication, and culture may be universal, culture-specific or individual characteristics of speakers; to examine cultural values and their relationships to communication involving members of the same cultural group and members of groups outside of that culture; to raise awareness of both similarities and differences within and between cultural groups; to analyze how effective communication is achieved and to identify potential sources of miscommunication and/or misunderstanding; to raise awareness of our own cultural norms, preferences, and expectations; to increase acceptance, understanding, and appreciation of similarities and dissimilarities among people. Students will be evaluated on two midterm exams (undergrads) or two extended analytic journals (grads) 25%, observation journals (6 total) 15%, thought journals (4 total) 15%, article presentation and critique 15%, final paper and oral report 25%, and participation 5% The content and focus of this course is related to any field which has the potential of dealing with persons of other cultures, including but not limited to biobehavioral health, business and marketing, and education. This course is inherently related to Speech Communication Majors and Minors, but is also valuable from a cross-disciplinary perspective since we deal squarely with issues of humanity, tolerance, values, and communication.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 475** Studies in Public Address (3) History and criticism of public discourse; intensive analysis of selected public addresses and social movements.

### **Studies in Public Address (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Social and Behavioral Sciences  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 478** Contemporary American Political Rhetoric (3) Analysis of selected speeches, debates, and persuasive campaigns and movements in recent American political history.

### **Contemporary American Political Rhetoric (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 480** Group Performance of Literature (3) Applying storytelling skills and performance theory to the group presentation of literature; criticism of literature through group presentations.

**Group Performance of Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 483** Communication and Information Technology II (3) Theory and application of interactive internet-based communication and information management; for students who want a Liberal Arts approach.

**Communication and Information Technology II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 494** Research Topics (1-12) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 494H** Research Topics (1-12) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 499 (IL) Foreign Studies (1-9)** Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-9)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 500 Historical Public Address (3 per semester, maximum of 9)** Special topics in American public address, 1765-1900; emphasis on rhetoric of revolution, reform, and reaction.

**CAS 500 Historical Public Address (3 per semester/maximum of 9)**

This is a graduate seminar focusing on special topics in the history of American public address, 1765-1900. It is designed to strengthen students' knowledge of the historical foundations of the American rhetorical tradition. Special attention is paid to key texts, debates, and movements shaping the origins and development of American nationhood. Emphasis is placed on the language of revolution, reform, and reaction. Special topics through which this course is to be taught may include: The Rhetoric of the American Revolution, Rhetoric of Abolitionism and Civil Rights, The Rhetoric of the Women's Suffrage Movement, Great Debates in American History, and Rhetoric and the American Presidency, 1789-1900. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 503 Rhetorical Criticism (3 per semester/maximum of 6)** An advanced seminar in the history, theory, methods, and practice of rhetorical criticism.

**CAS 503 Rhetorical Criticism (3 per semester/maximum of 6)**

An advanced seminar in the history, theory, methods, and practice of rhetorical criticism. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 504 Contemporary Public Address (3 per semester, maximum of 9)** Special topics in recent history of American public address, including speeches, debates, persuasive campaigns, and social movements in America 1900-present.

**CAS 504 Contemporary Public Address (3 per semester/maximum of 9)**

This course is a graduate seminar focusing on special topics in the history of American public address since 1900. Through intensive study of great speeches and other rhetorical texts, important national debates and controversies, and significant persuasive campaigns and social movements, it cultivates specialized understanding of the distinctively American tradition of public advocacy and deliberation and illuminates how that tradition has evolved in response to political and social developments and new communication technologies. Special topics reflecting the research interests of current faculty who might be expected to teach the course include: "The Rhetoric of the Progressive Era," "The Rhetoric of the New Deal," "The Manifesto in Contemporary Social Movements," "The Rhetoric of Contemporary Political Campaigns," and "The Rhetorical Presidency." Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 505 Historical Development of Rhetorical Theory (3 per semester/maximum of 9)** Study of one or more periods of rhetorical theory from Greek antiquity to 1900.

**Historical Development of Rhetorical Theory (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 506 Contemporary Rhetorical Theory (3 per semester/maximum of 6)** A study of rhetorical theory from 1930 to the present, focusing on semantic, political, sociological, symbolic, and philosophical perspectives.

**Contemporary Rhetorical Theory (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 507 Issues in Rhetorical Theory (3 per semester, maximum of 6)** Theoretical, analytical, philosophical, and critical problems in human communication, with application of humanistic and social scientific research framework.

**CAS 507 Issues in Rhetorical Theory (3 per semester/maximum of 6)**

The seminar is available to members of the faculty who wish to explore specialized problems of a theoretical, analytical, philosophical, or critical nature in human communication research. Its content varies by instructor. Such subject areas of language and meaning, epistemology, ethics and moral philosophy, metaphysics and ontology, the functions of myth, cognition, child development, and brain function may be considered for the contributions they make to our understanding of rhetorical behavior. Special topics reflecting the research interests of current faculty who might be expected to teach the course include: "Rhetoric, Myth, and Cosmology," "Rhetoric and Ethics," "The Rhetorical Construction of Social Identity," and "Rhetoric and Public Deliberation." Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 515 Rhetoric and Media (3 per semester, maximum of 9)** Seminar in the application of rhetorical theory and criticism to television, film, and other media.

**CAS 515 Rhetoric and Media (3 per semester/maximum of 9)**



Seminar in the application of rhetorical theory and criticism to television, film, and other media. In a recent offering of the seminar, we studied the films of Alfred Hitchcock from the point of view of *The Rhetoric of the Thriller: The Films of Alfred Hitchcock as Art, Entertainment, and Social Text*. This course offered an intensive examination of the art of Alfred Hitchcock, one of the great film artists of the twentieth century. Each week, the class screened one or more of Hitchcock's classic films. The class then met in small discussion sections for intensive analysis of the films and a series of related readings. Our discussions and readings explored Hitchcock as one of Hollywood's most successful popular entertainers, the "master of suspense"; as one of the great artists of the medium; as a critic of American culture; and as a persona whose reputation is a construction of his own efforts, and the product of reviewers and academic critics. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 530 Political Communication and Media (3)** Study of rhetorical and communicative dimensions of contemporary political communication with particular attention to electronic media.

### **CAS 530: Political Communication and Media (3)**

This seminar explores the rhetoric of electronically mediated political discourse, including broadcast speeches, news coverage of politics and political campaigns, campaign debates, political advertising, talk radio, and political websites. Addressing key problems and issues in democratic theory and practical politics, the seminar explores questions frequently raised by both scholars and political pundits: How has the character of political discourse changed in the age of electronic media? How have new communicative technologies affected political discourse? Is it possible to have an engaged, informed, and responsible electorate in the age of 30-second Aspot@ ads and journalistic A-sound bites?@ What might be done to improve the quality of political discourse and to enhance public deliberation? How might new media technologies be used to combat political alienation and promote civic engagement? The specific focus of the seminar varies by semester. Recent seminars have focused on the rhetoric of presidential campaigns, conceptions of A-the public@ and A-public opinion@ in the age of mass media and polling, and the political significance of such non-traditional media as motion pictures and websites. Whatever the topic, the focus remains on the impact of mass media on the quality and character of political discourse in America. Students in the seminar will join in a larger scholarly conversation about the impact of new media technologies on democratic politics. Students in CAS 530 will read scholarly works on mass media and politics from a variety of disciplines, as well as more popular writings that have developed influential critiques of contemporary political communication or have advocated reforms in the laws and regulations governing mass media. Given the subject matter, the seminar is necessarily interdisciplinary in approach, and students will be encouraged to take interdisciplinary approaches to their own research and writing for the seminar.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 550 Social Influence (3 per semester/maximum of 6)** Theory and devices of persuasion; analysis of persuasive discourse.

### **CAS 550 Social Influence (3 per semester/maximum of 6)**

This is a graduate-level seminar designed to provide students with social scientific theoretical principles for explanation, prediction, and practice in social influence contexts and situations. CAS 550 emphasizes the positive and negative outcomes likely to be associated with specific messages designed to influence others in social and societal settings. It emphasizes the importance of audience analysis and goal selection in guiding message design, and source and channel selection to communicate in ways that are intended to form, change, or reinforce and maintain others' beliefs, attitudes, values, and behaviors. It affords significant opportunities to address the gaps between theory and measurement in social scientific research pursuits. These attempts may employ a highly active cognitive approach or a more passive strategy. Both approaches are examined in this course.

The course content and setting reflects the above aims. The course begins by defining social influence, provides an overview of its history, and introduces the major theories associated with social influence formation, change, and reinforcement objectives. The course devotes significant time to the evaluation of existing social influence attempts, including review of the channel(s) and source(s) used to deliver particular messages. Students will also practice known strategies for designing influence messages. These activities will take place within the framework of knowledge generated by research findings associated with the influence theories examined in the class.

Evaluation will include participation in class, exams that include application in the form of a social influence case study, and a research proposal associated with the application of social influence theories to message design and evaluation.

The course complements graduate students' interests in pursuing academic, business, health, management, public relations, advertising, sales, and other career ambitions where communication is associated with the desire to influence others. The course will increase students' critical thinking and informed decision-making skills associated with others'

efforts to influence them. It also frames discussion about the ethics of and ethical decision-making associated with persuasion.

CAS 550 will be offered every other year with 15 seats per offering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 553 (PHP 553) Disaster Communication (3)** This seminar provides students with a comprehensive understanding of the multifaceted nature of disaster communication across phases of a disaster.

### **Disaster Communication (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 554 Small Group Communication (3 per semester/maximum of 6)** Communication variables in small groups. Experimental research and innovations in communication in vocational, therapeutic, and educational groups.

### **CAS 554 Small Group Communication (3 per semester/maximum of 6)**

Group communication is a specialized area of study that has ties to the related areas of interpersonal and organizational communication. These ties reflect the fact that groups typically are part of some larger organizational structure and that it is the interaction among the members of groups that drive their performance. The major objectives of the course, which is presently offered once every two academic years, are to provide students with (1) an in-depth examination of what social scientific research has revealed about the functions communication among the members of groups in various interpersonal and organizational contexts and (2) the opportunity to engage in an even deeper examination of a specific issue relating to a specific function of communication in one of the types of groups included, that is, decision-making and problem-solving groups, familial groups, educational groups, work groups, and support groups, by means of an original research project. The first three weeks of the course acquaint students with the general domain of group communication as a specialized area of study, as well as the dominant theoretical and methodological approaches in evidence. In the fourth and fifth weeks, students come to understand how communication in groups functions generally to socialize the members and thereby shape their respective cultures, as well as influence the ways in which they characteristically fulfill the purposes for which they have been created. During the remaining ten weeks of the course, the accent is on particular types of group contexts and the unique ways in which communication is manifested in each. Finally, each student identifies and executes an original research project, the results of which he or she shares with other members of the class in the form of a scholarly paper which, if warranted, he or she subsequently modifies for presentation at a professional conference and possibly publication. Determination of overall mastery of the course content derives from a student's performance on a comprehensive final examination held during the regularly scheduled final examination period. The grade for the research project and the final examination combined provide basis for the recorded grade for the course. The course requires no special facilities other than a classroom. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 555 Interpersonal Communication (3 per semester/maximum of 6)** Investigation of the communicative management of ongoing relationships; examination of how communication both creates and responds to exigencies of friendship.

### **CAS 555 Interpersonal Communication (3 per semester/maximum of 6)**

This course is intended for graduate students who want an in-depth understanding of interpersonal communication across contexts. It is a graduate-level course, so the reading is heavy, the expectations for the level of discussion are high, and the instructor will assume that students have a serious interest in studying research and theory focused on understanding communication processes. Structurally, the course begins with a review of definitional and philosophical issues underlying research and theory in interpersonal communication, then covers the major frameworks and theories that make up knowledge in the area. In addition, some of the primary issues debated in the literature will be discussed. Evaluation methods will include presentations and research paper(s), but may also include exams and participation. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 556 Relational Communication (3)** Examines theories and research focused on understanding communication in intimate (or potentially intimate) relationships.

### **CAS 556 Relational Communication (3)**

This course is intended for students who want an in-depth understanding of interpersonal communication in intimate and potentially intimate relationships. It is a graduate-level course, so the expectations for the level of discussion are high and the instructor will assume that students have a serious interest in studying research and theory focused on understanding communication processes in relational contexts. The focus will be on cognitive and social theories of relational encounters, including friendships, romantic relationships, and family relationships. Structurally, the course begins with a review of different philosophical issues underlying research and theory in the field of relational communication. Then, students will shift their attention to the major social scientific perspectives on human relationships. Next, major theories would be discussed and the course would be completed with a more focused discussion of central issues related to relational communication. Evaluation methods will include, research paper(s) and presentations, but may also include exams, short papers, journals, quizzes, and creative activities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 557 Health Communication (3)** Provides experience in making decisions about planning, implementing, and evaluating communication in community-based health campaigns to achieve health promotion/education.

### **CAS 557 Health Communication (3)**

This is a graduate seminar designed to provide students with a comprehensive overview of health communication in community-based health campaigns. Health messages are a pervasive feature of contemporary American life. The study of health communication for community-based campaigns overviews strategies for informing, motivating, and selling ideas and behaviors based on health and health care. Students will select a target community and topic to use as a focal point for applying course readings. Students will prepare an evaluation plan for assessing policymakers' involvement in your health topic. This should include projection of the need for policymakers' involvement, using as many archival materials as possible to conduct a formative evaluation of the need and a plan to obtain the additional information needed to identify the gaps between current and projected levels of involvement. Students will also assess previous efforts to involve lay and expert communities in health promotion efforts associated with their topic, and summarize findings, preparing an organizational membership roster for both Expert Advisory Board and Community Steering Committee, and providing a mission statement to be used in recruitment. Provide a draft of a commitment contract to be signed by board and committee members. Students will also examine previous efforts to involve educational institutions, and lay and expert providers in promotion efforts, summarizing findings and developing a vision of how these audiences should be and could be involved. Previous efforts to involve businesses, retailers, and family in promotion efforts will also be assessed, with development of a vision of how these audiences should be and could be involved included.

The health communication seminar complements students' interests in pursuing academic, political, counseling, pastoral, business, health, management, public relations, advertising, sales, and other career ambitions where community-based campaigns comprise an important focus.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 558 Family Communication (3)** Examines theories and research focused on understanding communication in family contexts.

### **CAS 558 Family Communication (3)**

This course is intended for students who want an in-depth understanding of communication in family relationships. It is a graduate-level course, so the expectations for the level of discussion are high and the instructor will assume that students have a serious interest in studying research and theory focused on understanding communication processes in family contexts. The focus will be on communication theories of family relationships, including parent-child relationships across the life span, sibling relationships, and marital relationships. Students are encouraged to apply this knowledge to

their own lives. Students should leave the course with a much more thorough understanding of factors that affect communication within family interaction. Structurally, the course begins with a review of different philosophical issues underlying research and theory in the field of family communication. Then, students will shift their attention to the foundational issues/principles underlying communication in family contexts. Once the course successfully increases student awareness of these foundational principles, the course moves to a focus on interactions within family settings. As part of this move, the course will address communication in parent-child, intergenerational, marital, and sibling relationships, and will include general topics such as affection and intimacy, conflict, power and control, and strengthening and repairing relationships. Throughout, the course will discuss communication processes within the larger cultural, interpersonal, and communication contexts in which family relationships are situated. Evaluation methods will primarily include exams, paper(s), research projects, and critical thinking reaction papers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 559 Lifespan Communication (3)** How various communication processes such as language skills, interpersonal relationship definition and management, social support change cross the lifespan.

### **CAS 559 Lifespan Communication (3)**

Lifespan Communication is a graduate seminar that emphasizes how communication processes (e.g., language skills, interpersonal conflict management, socialization and support, etc.) are developed, maintained and changed across the lifespan. The seminar concentrates upon numerous communicative processes from infancy through childhood, adolescence into middle age, and beyond middle age into later life. Numerous theoretical perspectives that incorporate lifespan principles will guide this seminar. The most recent research that investigates communication across the lifespan will be read and critiqued. This course is grounded in the assumption that multiple disciplines have investigated and continue to investigate human interaction at all points in the lifespan. Therefore, sociological, psychological and anthropological research will complement the research in the discipline of communication that will be discussed in the seminar.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 560 Communication Theory (3)** This course introduces graduate students to the philosophical underpinnings of communication research and develops skills in theory construction.

### **CAS 560 Communication Theory (3)**

The first Department of Communication was established in the 1950s, and most departments of communication are less than 30 years old. This course is intended for graduate students who want an in-depth understanding of the philosophical issues underlying research and theory in human communication. It is a graduate-level course that emphasizes theory development in the area of human communication behavior. The readings covered are extensive, contributing to an expectation for abstract and integrative thought and discussion. Students should have a serious interest in studying theory construction and related philosophical underpinnings. Structurally, the course begins with a review of definitional issues underlying research and theory in human communication, moves to a focused discussion of various epistemological and ontological positions in the social sciences and humanities, then shifts to issues of theory construction and development. In addition, some of the primary issues debated in the related literatures will be discussed. Evaluation methods will include presentations and paper(s), but may also include exams and participation. As a result, students will examine where knowledge about communication comes from while defining social science, metatheory, theory, and levels of theorizing; acquire familiarity with the breadth, scope, and range of communication theory as a domain of study; comprehend major issues confronting researchers and theoreticians in communication; and acquire a vocabulary suitable for understanding the discussion that takes place in the field's journals and at communication conferences. The course is planned as a foundational course for all graduate students entering the graduate program with interests in non-rhetorical methods of inquiry, and it is strongly recommended for all students entering the graduate program with interests in non-rhetorical methods of inquiry. This course will be offered once a year with 15 seats per offering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 561 Quantitative Research Methods (3)** Introduces graduate students to principles, issues, and design considerations underlying social scientific methodology; material is applied to communication research.

**CAS 561 Quantitative Research Methods (3)**

This course is intended for graduate students who want an understanding of the quantitative methodology and research design. It is a graduate-level course, so the reading is heavy, the expectations for the level of discussion are high, and the instructor will assume that students have a serious interest in becoming critical consumers of quantitative research methods. Structurally, the course begins with a review of definitional issues, moves to a thorough discussion of sampling, reliability, and validity in research designs, then shifts to an understanding of quasi-experimental and experimental designs. In addition, some of the primary issues debated in the literature on quantitative methodologies will be discussed. Evaluation methods will include presentations and paper(s), but may also include exams and participation. The course is planned as a foundational course for all graduate students entering the graduate program with interests in non-rhetorical methods of inquiry, and it is strongly recommended for all students entering the graduate program with interests in non-rhetorical methods of inquiry. This course will be offered once a year with 15 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 562 Qualitative Research Methods (3)** Qualitative approaches to investigating human experience using tools such as interviewing and observation.

**CAS 562 Qualitative Research Methods (3)**

This course provides students with an understanding of both qualitative research methods and the theoretical frameworks that inform qualitative inquiry. Additionally, this course focuses on tools for data collection such as individual and group interviewing and observing and recording interaction. This course provides practical experience for students in collecting and analyzing qualitative data with and without the use of technology and examines particular difficulties in the interpretation and reporting of qualitative findings. Qualitative Research Methods course disciplinary boundaries and is useful to any graduate student who will be investigating human interaction.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 581 (APLNG 581) Discourse Analysis (3)** Overview of theories and approaches to the analysis of spoken and/or written discourse.

**CAS (APLNG) 581 Discourse Analysis (3)**

This course is designed to provide an overview of the various theories of and approaches to the analysis of spoken and written discourse, e.g., speech act theory, conversation analysis, pragmatics, contextual analysis, functional/cognitive grammar, grammar and interaction. These and other approaches are intended to serve as analytic tools and frameworks for students to ultimately design and carry out their own research projects within the course of the semester. Research projects may focus on any aspect of language use, such as language and grammar, language and interaction, language and culture, language socialization, language and cognition; projects may center on some phenomenon of English or may involve other languages, as long as the student is capable of conducting an in-depth analysis of the particular phenomenon under investigation in that language.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**CAS 590 Colloquium (1-3)**

The CAS Colloquium provides a forum for the presentation of graduate student and faculty research, as well as for discussion of professional issues, such as preparing a curriculum vitae or teaching portfolio, publishing scholarly work, applying for grants, and interviewing for academic positions. All first-year graduate students register for the colloquium,

and graduate students at all stages of their career are strongly encouraged to attend.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 594** Research Topics (1-12) Supervised student activities on research projects identified on an individual or small group basis.

#### **Research Topics (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 595** Internship (1-9) Supervised off-campus, nongroup instruction.

#### **Internship (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 597A** Interpersonal Communication and Well-Being (3) Interpersonal communication, especially communication with close relationship partners, has significant implications for personal well-being. Interpersonal communication partners can be a considerable source of stress through interactions that may involve conflict, hurtful comments, or verbally aggressive messages. Interpersonal communication partners can also attenuate stress through interactions that accomplish problem solving and convey affiliation and support. Within this broad framework, this course examines social scientific research linking interpersonal communication to well-being.

#### **Interpersonal Communication and Well-Being (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 597B** Interpersonal Communication and Well-Being (3) Interpersonal communication, especially communication with close relationship partners, has significant implications for personal well-being. Interpersonal communication partners can be a considerable source of stress through interactions that may involve conflict, hurtful comments, or verbally aggressive messages. Interpersonal communication partners can also attenuate stress through interactions that accomplish problem solving and convey affiliation and support. Within this broad framework, this course examines social scientific research linking interpersonal communication to well-being.

**Interpersonal Communication and Well-Being (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Students enrolled will, under supervision, teach SPCOM 100--introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CAS 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Communication Disorders (CMDIS)**

**CMDIS 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMDIS 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Communication Sciences and Disorders (CSD)**

**CSD 433** Aural Rehabilitation (3) Methods for improving receptive skills of persons with hearing impairments; clinical observation and practice.

#### **CSD 433 Aural Rehabilitation (3)**

CSD 433, Aural Rehabilitation (AURAL REHAB), is a 3-credit course typically offered during Fall semester. The course is prerequisited by CSD 230, required for Communications Sciences and Disorders majors, and should be taken during the second, third or fourth year. Through lecture, reading, and active learning experiences, students will gain a basic understanding of the principles of aural rehabilitation for hearing impaired (HI) and deaf infants, children, and adults. Specifically, students will gain an understanding of: 1) hearing loss and hearing handicap in relation to speech understanding and communication, 2) the principles of amplification systems and assistive listening and alerting devices, 3) assessment of communication and communication strategies, 4) auditory training, 5) speech reading, 6) aural rehabilitation for adults, and 7) aural rehabilitation for infants/children. In addition, students will also acquire knowledge concerning the roles and work-sites of professionals working with HI and deaf individuals, and the impact of hearing loss and deafness on the individual, family, and society.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**CSD 442** Introduction to Disorders of Articulation and Phonology (3) Etiology, diagnosis, and treatment of articulation disorders.

**CSD 442 Introduction to Disorders of Articulation and Phonology (3)**

CSD 442, Introduction to Disorders of Articulation and Phonology (DIS OF ARTIC/PHON), is a 3-credit course typically offered every spring semester. This course is required for Communications Sciences and Disorders majors, prerequisites by CSD 146, 300, and 311, and should be taken during the third or fourth year. The intent of this course is to provide students with a basic understanding of the etiology, diagnosis, and treatment of children having articulatory and phonological disorders. The course is designed to facilitate critical thinking through problem solving. The educational objectives are that students will acquire an understanding of: 1) the theoretical and practical bases of language and dialectal variations, 2) normal and abnormal articulatory and phonological acquisition, 3) factors related to phonological disorders, 4) assessment procedures and analysis and interpretation of assessment results, and 5) remediation concepts, principles, and methodologies. Students meet the educational objectives by attending and participating in class discussions, completing assigned readings, multiple choice examinations, and three written projects or papers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 444** Introduction to Organic Disorders of Speech and Language (3) Etiology, diagnosis, and principles of treatment of stuttering, and of speech- language disorders having organic bases.

**CSD 444 Introduction to Organic Disorders of Speech and Language (3)**

CSD 444, Introduction to Organic Disorders of Speech and Language (ORGANIC SP/LAN DIS), is a 3-credit course typically offered fall semester. The course is required for Communications Sciences and Disorders majors, prerequisites by CSD 146 and 331, and should be taken during the third or fourth year. The intent of this course is to provide students with a basic understanding of stuttering, related fluency disorders, and other organic disorders. The course is designed to facilitate critical thinking through problem solving with emphasis on the etiology and treatment of organic speech disorders. The educational objectives are that students will acquire an understanding of: 1) stuttering and related fluency disorders with emphasis on causation theories and assessment techniques, and 2) other organic disorders causing speech disorders with emphasis on stroke and closed-head trauma. Students meet the educational objectives by attending and participating in class discussions, completing assigned readings in the text, handout packet, and on the Internet, and completing four tests.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 451** An Introduction to Augmentative and Alternative Communication (3) Examination of assessment and intervention issues in augmentative and alternative communication techniques with persons with severe communication disorders.

**CSD 451 An Introduction to Augmentative and Alternative Communication (3)**

CSD 451, An Introduction to Augmentative and Alternative Communication (INTRO TO AAC), is a 3-credit course typically offered fall semester. The course is required for Communications Sciences and Disorders majors, prerequisites by CSD 146 and 300, and should be taken during the third or fourth year. The intent of this course is to examine assessment and intervention issues in augmentative and alternative communication (AAC) techniques for persons having severe communication disorders. Students will be expected to spend outside of class time becoming familiar with common AAC devices located in the department's AAC laboratory. The educational objectives are that students will acquire an understanding of: 1) persons with severe communication disorders who may require AAC, 2) terminology and principles of AAC applications, 3) types and evaluation of existing AAC systems and emerging technology, 4) assessment issues for children and adults concerning the use of AAC devices, 5) intervention, learning, and therapy issues for children and adults who use AAC, 6) research in AAC, and 7) theoretical issues. Although the course will focus on non-electronic AAC applications, students will be expected to spend time in or outside of class becoming familiar with common electronic AAC devices located in the department's AAC laboratory. Students meet the educational objectives by attending class, participating in class discussions, group projects, constructing an AAC system, completing assigned readings, and examinations.

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 459W** Principles of Clinical Management in Communication Disorders (3) Survey of principles and practices for diagnosing, interviewing, counseling, treating, reporting, and programming in Communication Disorders.

**CSD 459W Principles of Clinical Management in Communication Disorders (3)**

CSD 459W, Principles of Clinical Management in Communication Disorders (PRIN CLIN MGMT), is a 3-credit writing-intensive course offered each semester. The course is required for Communications Sciences and Disorders majors, prerequisites by CSD 146, and should be taken during the third or fourth year. The intent of this course is to closely review the principles and practices for assessing and treating people across the life span who have a communication disorder as well as reviewing, interviewing, counseling, and report writing skills. Overall, this "how-to" course is designed to provide students with practical solutions and methods when serving persons with communication disorders. The educational objectives are that students will acquire an understanding of: 1) report writing with emphasis on different styles and the need for clear documentation and explanations, 2) assessment with emphasis on interviewing skills, preparation and test administration, interpretation of the results, and oral and written presentation, 3) therapy practices with emphasis on task analysis, behavioral objectives, and implementation, 4) documentation with emphasis on lesson plans, mid and final reports, documentation specific to school versus medical settings, and billing, and 5) client and family counseling and group sessions. Students meet the educational objectives by attending and participating in class discussions, quizzes, writing assignments, and class projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 462 (US;IL)** Clinical Bases of Language Disorders (3) Description of pathological language and cognitive development, and principles of assessment and remediation among individuals with communication disorders.

**CSD 462 Clinical Bases of Language Disorders (3)  
 (US;IL)**

CSD 462, Clinical Bases of Language Disorders (LANG DISORDERS), is a 3-credit course typically offered Spring semester. The course is required for Communications Sciences and Disorders majors, prerequisites by CSD 300, and should be taken during the third or fourth year. The course is designed to be an overview of language disorders with emphasis given to child language disorders. Specifically, the course provides information with a wide range of language disorders that affect individuals having different disabilities such as autism, hearing impairment, mental retardation, cerebral palsy, specific language impairment, learning disabilities, and traumatic brain injury. Through lecture, active learning experiences, and out-of-class assignments, students will learn to differentiate communication characteristics and associated problems for specific populations and become familiar with basic assessment and intervention principles. In addition, students will gain information of associated educational and medical problems common to individuals with language disorders.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 494H** Senior Honors Thesis (1-6) Independent study related to a student's interests directed by a faculty supervisor and culminating in the production of a thesis.

**Senior Honors Thesis (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 495A** Speech Therapy Practicum (1-6) Demonstration and practice in examination, diagnosis, and treatment of speech problems.

**CSD 495A Speech Therapy Practicum (1-6)**

CSD 495A, Speech Therapy Practicum (SPCH THPY PRACT), is a variable credit (1-6 credit) course offered every semester. The course is not required for Communications Sciences and Disorders majors. Fourth year Communications Sciences and Disorders students having a GPA of 3.0 can apply to take this course by contacting the Penn State Speech and Hearing Clinic, Coordinator of Clinical Services; however, Communications Sciences and Disorders graduate students are given priority. Typically, undergraduate students enroll in this course for 1-2 credits. Students enrolled in this course are student clinicians and provide assessment and treatment to clients of the Penn State Speech and Hearing Clinic. Students are highly supervised by Communications Sciences and Disorders clinical faculty and may be paired with Communications Sciences and Disorders graduate students. Students must adhere to all of the policies and procedures stated in the Penn State Speech and Hearing Clinical Policy Manual. Students are evaluated using outcome-based competency measures that includes oral and written reports skills.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 495B** Audiology Practicum (1-5) Demonstration and practice in examination, diagnosis, and treatment of hearing impairment problems.

**CSD 495B Hearing Impairment Practicum (1-5)**

CSD 495B, Audiology Practicum (AUDIOLOGY PRACT), is a variable credit (1-5 credit) course offered every semester. The course is not required for Communications Sciences and Disorders majors. Fourth year Communications Sciences and Disorders students having a GPA of 3.0 and an interest in Audiology can apply to take this course by contacting the Penn State Speech and Hearing Clinic, Coordinator of Audiological Services; however, Communications Sciences and Disorders graduate students are given priority. Typically, under-graduate students enroll in this course for 1-2 credits. Students enrolled in this course are student clinicians and provide hearing assessment and treatment to clients of the Penn State Speech and Hearing Clinic. Students are highly supervised by Communications Sciences and Disorders clinical faculty and may be paired with Communications Sciences and Disorders graduate students. Students must adhere to all of the policies and procedures stated in the Penn State Audiology Clinic Policy Manual. Students are evaluated using outcome-based competency measures that includes oral and written reports skills.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 500** Research Methods in Communication Sciences and Disorders (3) Methodology necessary for understanding and conducting research in communication disorders.

**Research Methods in Communication Sciences and Disorders (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 520** Physiologic and Acoustic Issues in Speech Science (3) Seminar in the physiologic and acoustic aspect of normal and disordered speech production.

**CSD 520 Physiologic and Acoustic Issues in Speech Science (3)**

CSD 520, Physiologic and Acoustic Issues in Speech Science (PHSIO-ACS SPCH SCI), is a 3-credit course offered every Fall semester. The course is required of all CSD graduate students working towards a masters degree in Communication Sciences and Disorders. The educational objectives of the course are to provide information on acoustical and some physiological aspects of normal speech production, along with some applications to disordered speech production, particularly neurogenic speech disorders, stuttering, and voice disorders. The goal of the course is to provide the graduate student with experience using the most common methods of speech analysis in the research laboratory and the clinic. Because of the frequent use of audio recording equipment in the field, the emphasis is on acoustical analyses for measurement of vowel and consonant properties. Considerable emphasis is placed on coarticulation. Assessment is based on student projects including vocal fundamental frequency analysis, electroglottographic analysis, acoustic analysis of articulation, analysis of vowels of typical speakers as well as vowels of speakers who stutter, and acoustical analysis of consonants.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 540** Phonological Disabilities (3) Speech-sound production disorders in children and adults; methods of examination, diagnosis, and treatment.

**CSD 540 Phonological Disabilities (3)**

CSD 540, Phonological Disability (PHONOL DISABILITY), is a 3-credit graduate course typically offered every spring semester. The course is required of all graduate students pursuing a masters degree in Communication Sciences and Disorders. The course has two prerequisites, CDS 442, Introduction to Disorders of Articulation and Phonology and CSD 495A, special topics in phonetics. The objectives of the course are to develop an attitude of critical thinking in the areas of phonological disorders. Class discussions, tests, and projects promote synthesis of ideas. In addition, the course integrates research and practice and a portion of class meetings is spent relating research findings to clinical practice in the treatment of phonological disorders. Original articles focusing on treatment of phonological disorders are required reading. Class sessions and independent and group projects emphasize the assessment and analysis of speech produced by children with disordered phonological systems and assist students to utilize clinically efficient speech sample collection and transcription procedures that optimize the reliability, validity, and potential informativeness of obtained data. Activities involving treatment planning are utilized to assist graduate clinicians in designing efficacious treatment, predicting outcomes, and determining effectiveness of intervention. Student performance is evaluated through tests, take-home projects, critique writing, and inclass projects and quizzes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 541** The Voice and Its Disorders (3) Physical, physiological, and psychological bases of voice production; causes, nature, and symptoms of its disorders; current clinical methods in voice improvement.

**CSD 541 The Voice and Its Disorders (3)**

This course presents information on vocal function for speech and the disorders that are common to the human vocal folds. During the first section of the course, the physical, physiological, and psychological bases of voice production are discussed along with the causes, nature, and symptoms of voice disorders. Voice disorders are difficult to understand without adequate demonstrations; therefore, the class uses videotapes and voice samples to help foster understanding of the course material. The first portion of the course also includes a review of the anatomy and physiology of the voice and vocal acoustics and extensive coverage of various laryngeal pathologies. Second, voice evaluation and diagnosis are

examined including VisiPitch training, electroglottography, endoscopy and stroboscopy. Third, specific clinical management techniques are examined including treatment for vocal abuse and laryngeal muscle tension reduction. Alaryngeal voice disorders are examined including pre- and post-operative counseling and tracheosophageal speech and voice prosthetics. Finally, neurological disorders of the voice and resonance disorders are examined.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 542 Stuttering (3)** Modern theories of causes of disorders of rhythm; methods of examination, diagnosis, and treatment.

### **CSD 542 Stuttering (3)**

Fluency disorders are difficult to understand without adequate demonstrations. Therefore, this class makes use of numerous videotapes to foster understanding and assist with explanation of difficult concepts. Topics covered include facts about stuttering and its core behaviors, the etiology of stuttering, the development of stuttering. Furthermore, students learn to evaluate stuttering behaviors and to work as part of an interdisciplinary team. Students will learn to evaluate and treat preschool children, school-age children and adults who stutter. In addition, other types of fluency disorders are introduced. Course activities include exams, a stuttering assessment project, team observation of videotapes of individuals with fluency disorders, and modeling stuttering behaviors in order to fully understand the disorder.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 545 Neuromotor Disorders of Speech (3)** Etiology and symptomatology of dysarthric and apraxic speech: diagnosis, treatment, and the team rehabilitative program approach to these disorders.

### **CSD 545 Neuromotor Disorders of Speech (3)**

In this course, students gain basic knowledge of neurological bases for speech-motor control. Students learn to identify and describe diseases/conditions that result in acquired and developmental motor speech disorders. Students learn to identify and describe the dysarthrias in clinical populations across the age span. Emphasis is placed on the development and implementation of appropriate intervention plans to remediate and/or compensate for motor speech disorders. Students complete three examinations during class and write a paper that synthesizes current research on a topic in motor speech disorders.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 546 Language Disorders in Adults (3)** Nature, etiology, diagnosis, and management of language disorders in adults.

### **CSD 546 Language Disorders in Adults (3)**

This course provides information about the disorders of language that result from impairments to the central nervous system. Basic neurology, the aging process, and the nature and cause of aphasia-producing conditions are covered along with issues related to the assessment and management of adults with aphasia. Stroke-related aphasia in adults is the emphasis of this course, but it also briefly covers other common language and cognitive neuropathologies of traumatic brain injury, Alzheimer's Disease, and right-hemisphere brain damage.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CSD 547** Language Disorders in Children (3) Nature, etiologies, diagnosis, and management of language disorders in children.

**CSD 547 Language Disorders in Children (3)**

This course provides students with a strong foundation in the nature of language disorders, the current issues in and theories of language disorders, assessment and intervention and key language assessment and intervention approaches. Major topics include assessment and intervention of infants, toddlers, preschoolers, school-age children, adolescents, children from diverse cultures, and children with special needs such as autism, cerebral palsy, and mental retardation. As a result of the foundation laid in this course, students will be able to critically evaluate and apply the current literature and forthcoming research to their clinical practice. The class includes a combination of lecture, class discussions, and small group activities. In addition, students complete various assignments in and out of the classroom that are designed to assist them in relating theory and research to clinical practice.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 548** Dysphagia (3) Understanding the process of the swallowing mechanism and the management and treatment of swallowing disorders.

**CSD 548 Dysphagia (3)**

This course is designed to provide graduate students with basic knowledge of the swallowing process/mechanism. A brief overview of normal swallowing from birth to the aging adult will be presented. The course will focus on assessment, management, and treatment of individuals who present with a swallowing disorder. Students will become familiar with both non-instrumental assessments of swallowing, and will interpret videofluoroscopic swallowing studies (VFSS)> Students will also develop treatment plans for case study patients with dysphagia, Multicultural issues related to swallowing will be discussed.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 549** Speech-Language Pathologists in the Schools (3) Topics concerning service delivery in the school setting; legislation related to service delivery, special education enrollment, collaboration, caseload management, special populations.

**CSD 549 Speech-Language Pathologists in the Schools (3)**

This course covers multiple aspects related to becoming a competent speech-language pathologist in the public school system. Topics include: legislation related to school-based service delivery; the hierarchy of special education enrollment; considerations for special populations; caseload management and logistical aspects of work in the public school system., Case examples, class discussion, and group activities will be used to illustrate various aspects of this work setting.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 550** Seminar in Communication Sciences and Disorders (1-6) Advanced study of special problems and new developments in communication sciences and disorders.

**CSD 550 Seminar in Communication Disorders (1-6)**

This seminar is designed to address special topics of interest to doctoral students in the Communication Sciences and Disorders. Topics covered vary from semester to semester and include the art and science of grant writing; various research approaches such as qualitative research methods or single-subject experimental research methods, etc.; issues related to teaching at the university level, speech perception, neuroscience, cognitive science, and cochlear implants.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 551** Assessment and Intervention in Augmentative and Alternative Communication (3) Research results in augmentative and alternative communication (AAC); implications for assessment, prescription of AAC systems, and intervention planning in AAC.

### **CSD 551 Assessment and Intervention in Augmentative and Alternative Communication (3)**

In this course students examine current applications of augmentative and alternative communication (AAC) including unaided and aided AAC systems. Students critically evaluate the strengths and limitations of these systems, identify the skills required to use these systems, and describe individuals who may benefit from AAC. Many topics of importance to AAC are studied including key legislation related to people with disabilities, consumer-responsive services and strategies to effectively implement services that are consumer-responsive. Clinical management is emphasized and students determine appropriate AAC assessment goals, procedures, and tools to identify the communication needs of individuals who require AAC, assess their skills and determine opportunity barriers. Students customize AAC systems to meet the needs of individuals who require AAC, determine partner strategies to enhance communicative interaction with individuals who use AAC and use empirically-validated instructional procedures to teach these strategies to partners. Students evaluate the efficacy of AAC interventions and determine consumer satisfaction. To accomplish these goals, students complete laboratory assignments and written case assignments in AAC assessment, vocabulary selection, and intervention planning and implementation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 595A** Speech/Language Intervention (1-3) Instruction in and application of therapy procedures, including a weekly class and direct therapeutic intervention with individuals across the lifespan.

### **CSD 595A Speech Therapy Practicum (1-6)**

This course introduces first year graduate students to clinical practice. Topics covered include task analysis, clinical teaching, and activities to enhance teaching and learning. Students also learn appropriate methods of data collection and writing clinical objectives and intervention plans. Students learn to screen for suspected communication disorders and become familiar with clinic policies and procedures.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 595C** Speech/Language Therapy Externship (7-15) Full-time clinical experience in speech/language intervention and assessment procedures at an off-campus site.

### **CSD 595C Speech Therapy Internship (7-15)**

This course is a full-time externship experience in the assessment and treatment of communication disorders and is completed at an off-campus site. Students may complete the externship in a variety of clinical and/or educational settings including hospitals, rehabilitation centers, and public schools.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 595E** Audiology Practicum (1-5) No description.

**CSD 595E Audiology Practicum (1-5)**

This course provides speech-language pathology graduate students with a detailed and pragmatic understanding of hearing testing, normal and abnormal auditory systems, and common practices used to evaluate hearing ability. Students will gain experience in pure-tone audiometry, tympanometry, speech audiometry, central auditory processing disorders, and otoacoustic emissions. Students participate in hearing aid fittings, programming and repairs. Students learn to interpret the results of audiological evaluations and make appropriate recommendations based on results of audiological evaluations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 595G Speech/Language Diagnostics Practicum (1-2)** Instruction in and application of assessment procedures, including pre- and post-evaluation meetings and direct assessment with individuals across the lifespan.

**CSD 595G Speech Diagnostics Practicum (1-3)**

In this practicum course, advanced speech-language pathology graduate students gain experience in interviewing clients, parents and spouses. They learn to counsel clients and their families regarding communication disorders. With supervision, students complete diagnostic evaluations for a broad range of communication disorders and synthesize data. Report writing is also emphasized.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 595I Speech Pathology Mini-Placement (1-6)** Part-time clinical experience in speech/language intervention and assessment procedures at an off-campus site.

**C S D 595I Speech Therapy Third Site (1-2)**

Graduate students in Communication Sciences and Disorders participate in an active learning clinical practica with working professionals to enhance their academic and clinical competencies and skills. Students will accrue these required hours (minimum of 50 hours) by completing this mini-placement in an off-campus clinical and/or educational setting including hospitals, rehabilitation centers, nursing homes, early intervention programs, and public schools including pre-school programs. This experience will be completed part-time during the Spring or Fall semester or fulltime during Summer I or Summer II semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 595J Audiology Third Site (1-2)** Internship course.

**Audiology Third Site (1-2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 597A** Dysarthrias and Apraxia of Speech and Other Motor Speech Disorders (2) Introduce students to dysarthrias and apraxia of speech and other motor speech disorders. Focus on the etiologies and nature of the dysarthrias and apraxia.

**Dysarthrias and Apraxia of Speech and Other Motor Speech Disorders (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 597B** Academic and Clinical Aspects of Motor Speech Disorders (1) Integrate academic/clinical aspects of motor speech disorders. Supplement to Neuromotor Disorders to discuss advantages/disadvantages of acoustic/ perceptual measures.

**Academic and Clinical Aspects of Motor Speech Disorders (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 597C** Issues and Phonological Assessment and Intervention (2) This seminar will introduce students to the principles of phonological processing. Students will learn to assess clients with disordered phonological processes. Intervention strategies using evidence based practices will be reviewed.

**Issues and Phonological Assessment and Intervention (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 597D** AAC Research and Clinical Issues (1-5) This seminar will focus on augmentative and alternative (AAC) research and clinical issues for speech-language pathologists.

**AAC Research and Clinical Issues (1-5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 597E** Craniofacial Anomalies-Cleft Lip and Cleft Palate (1) This seminar will introduce students to the etiology,

assessment and treatment of craniofacial anomalies. Special focus on treatment of resonance disorders associated with cleft lip and cleft palate.

**Craniofacial Anomalies-Cleft Lip and Cleft Palate (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSD 603** Foreign Academic Experience (1-12 per semester/maximum of 12) For students who are enrolled in a foreign university, or foreign study and/or research and constituting progress towards the degree.

**Foreign Academic Experience (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Communications (COMM)**

**COMM 401** Mass Media in History (3) Relationship of news media to social, economic, and political developments in the Western world.

**Mass Media in History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 402 International Reporting (3)** International Reporting is an advanced level course in the College of Communications designed to give student journalists experience in reporting the news in a foreign country.

### **COMM 402 International Reporting (3)**

International Reporting is an advanced level course in the College of Communications designed to give student journalists experience in reporting the news in a foreign country. The course is offered in the spring semester only. The key component is a 10-day reporting trip over the spring break to a foreign country. In its first three semesters, the class has gone to Mexico City and Shanghai, and Cape Town, South Africa. The course has been approved as an embedded program by the Office of Global Programs. Admission to the course is highly selective and open only to junior and senior journalism majors. Students must apply for admission and present examples of their work as well as recommendations by a member of the journalism faculty.

The aim of this course is to help young journalists acquire the skills they will need to compete in an industry where increasingly the threads of even the most local stories either come from, or lead, overseas. This is not a course aimed at training students to become foreign correspondents. Rather, we hope to prepare students to function in a foreign environment, and to recognize, overcome and ultimately benefit from the linguistic, cultural, economic and legal challenges that working in another country will entail.

The course has three segments. In the first half of the semester we study the history, culture, politics and economics of the country to which we are traveling. We also develop and refine our ideas for the stories we will report when we get there. We will also learn about foreign reporting and how it differs from the reporting we have been used to doing here. The second part of the course consists of supervised travel to our target country. Here, we report the stories we have selected, file blogs and video posts to ComMedia, and also meet with local journalists, officials and students of the host country. Depending on the country in which we are working, students also have the opportunity to collaborate, when appropriate, with students from local universities. The final half of the semester is devoted to supervised individual work aimed at turning our reporting into stories suitable for publication or broadcast.

Although students are required to acquire a general working knowledge of the country to which we are traveling, and will be tested on it, in the end they will be evaluated almost entirely on their work product. This results-oriented approach has been chosen because it most closely replicates the environment of a professional newsroom.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 403 Law of Mass Communications (3)** Nature and theories of law; the Supreme Court and press freedom; legal problems of the mass media.

### **COMM 403 Law of Mass Communications (3)**

This discussion-intensive seminar provides an in-depth analysis of contemporary First Amendment issues ranging from the protection of violent media content and sexually explicit speech to defamation and invasion of privacy. Students explore the legal standards, public policies and theories that protect - and restrict - the Constitutional rights of free speech and free press. The primary area of study in this course is the law of mass communications and, in particular, legal issues facing the entertainment and news media. Using a law school casebook, written by a Harvard Law School professor, we will cover legal issues related to topics such as sex and violence in the media, defamation, privacy, and copyright.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 403H Law of Mass Communications (3)** Nature and theories of law; the Supreme Court and press freedom; legal problems of the mass media.

### **COMM 403H Law of Mass Communications (3)**

This discussion-intensive seminar provides an in-depth analysis of contemporary First Amendment issues ranging from the protection of violent media content and sexually explicit speech to defamation and invasion of privacy. Students explore the legal standards, public policies and theories that protect - and restrict - the Constitutional rights of free speech and free press. The primary area of study in this course is the law of mass communications and, in particular, legal issues facing the entertainment and news media. Using a law school casebook, written by a Harvard Law School professor, we will cover legal issues related to topics such as sex and violence in the media, defamation, privacy, and copyright.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 405** Political Economy of Communications (3) Structure and functions of American and other mass communications systems and their relationship to political and economic systems.

**COMM 405 Political Economy of Communications (3)**

COMM 405 takes a critical look at the structure and performance of the U.S. mass media within the U.S. and global political economy. The normative purpose of the course is to evaluate whether the media system is performing in such a way as to support and promote a democratic society. We will look at theoretical approaches to the study of political economy; the origins and development of capitalism and the mass media; the structure of contemporary capitalism; the ownership and control of mass communications; the origins of advertising and its effects on the U.S. economy and the mass media; the economic structure and organization of the recorded music and filmed-entertainment industries; and the political economy of democratic communications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 405H** Political Economy of Communications (3) Structure and functions of American and other mass communications systems and their relationship to political and economic systems.

**COMM 405H Political Economy of Communications (3)**

COMM 405H takes a critical look at the structure and performance of the U.S. mass media within the U.S. and global political economy. The normative purpose of the course is to evaluate whether the media system is performing in such a way as to support and promote a democratic society. We will look at theoretical approaches to the study of political economy; the origins and development of capitalism and the mass media; the structure of contemporary capitalism; the ownership and control of mass communications; the origins of advertising and its effects on the U.S. economy and the mass media; the economic structure and organization of the recorded music and filmed-entertainment industries; and the political economy of democratic communications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 406** Electronic News Gathering and Editing (3) Intermediate level skills in creating and editing television news packages.

**COMM 406 Electronic News Gathering and Editing (3)**

This course is designed to provide a substantial background in video production techniques coupled with electronic newsgathering and the use of video equipment. Although students enrolled in this course would be expected to have a basic understanding of video production from previous courses, more advanced editing techniques, along with sustained practice in interviewing, taping, organizing and writing various types of news and feature packages, should provide an excellent preparation for subsequent internships or employment. This is a "hands-on" course and will provide extensive opportunities for practical application of material covered in class. Students will be evaluated on the quality of their productions. This course serves as a supporting course in the Communication and Media Studies major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 407A** Media and Government (3) This course examines the relationship between politics, governance, and news media, and provides a foundation for understanding media's role in public policy.

**COMM 407A Media and Government (3)**

The course is designed to broaden, inform, and empower thinking about media influence on the ways people think about issues and how that influences public policy choices. The course will also analyze the various ways in which elected officials seek to craft messages and manipulate media to encourage support for policy agendas and initiatives. Through the process of examining the relationship between these powerful forces, students will gain critical thinking skills that will better prepare them to consume and create media and to function as citizens in American democracy.

This course will examine the symbiotic relationship between politics, governance, and media, particularly news media, and will provide a foundation of classic media theory combined with new thinking on media's role in public policy formation and its impact on the larger society. The course will emphasize the importance of political narratives, how they are constructed and communicated and also how they influence elections and public policy choices. Primary sources will provide diverse perspectives on the many questions that will emerge from readings and discussions.

This course is only offered as part of the Washington, D.C. Program.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 407B Perspectives on American Journalism (3)** The course examines a number of current issues and topics surrounding journalism including: ethics, state of the industry, and news vs. entertainment.

**COMM 407B Perspectives on American Journalism (3)**

Journalism is a unique occupation. News editors, reporters, producers, anchors, and other media professionals have a special responsibility to the public – the responsibility to provide their readers and audience members with the information they need in order to make choices about how to vote, what issues to get involved with, how to live their daily lives. While journalists – unlike members of other professions – have very few laws that exist specifically to govern their work, their duty to the public carries with it a number of important ethical burdens and responsibilities to the public and to society as a whole.

The course examines a number of current issues and topics surrounding journalism. While there will be new themes and topics for each week's class, nearly all of the topics are interrelated, and each class will build on what has gone before. Among the topics that will be covered are the current state of the news industry, the ethical guidelines that journalists are supposed to follow, the blurring of lines between news and entertainment, and the news media's role in making people famous or infamous. The issues that we examine in this course will be most directly related to the practice of journalism, although we may touch on other aspects of communications (e.g. advertising or public relations) from time to time. Our goal will be to examine news coverage with a critical eye – to think about the reasoning and decision-making that shape the final products that we read or view. The class meetings themselves will center on discussion of the readings and presentation of real-world examples drawing from current news stories and issues involving the news industry.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 407C Media and World Politics (3)** COMM 407C helps to make sense of the impact of media, public opinion and non-state actors shaping foreign policy.

**Media and World Politics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 408 (S T S 408) Cultural Foundations of Communications (3)** Examination of oral, scribal, print, industrial, and electronic cultures; analysis of impact of technology on communications and social structure.

**COMM (S T S) 408 Cultural Foundations of Communications (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

COMM (S T S) 408 traces the development of communications technologies and their impact on culture over the last 500 years. Students will examine how different tools for communicating changed the way people organized and made sense of their worlds. The course begins by looking at oral cultures and moves on to the scribal, print, industrial, electronic and post-industrial or postmodern cultures, studying the media developments that marked each of these eras. With each period and its corresponding technology students will examine how and why the new media altered not only the *form* of communication (the type of speech, form of writing and/or speed of information transfer), but also how such changes altered the *content* of knowledge (how people made sense of their lives and communities). Readings are drawn from a range of disciplinary perspectives on the issues, from history, sociology and anthropology, to philosophy, communication studies and cultural theory.

The historical and theoretical knowledge provided by the course will give students a solid foundation for coming to terms with media trends in present-day society and for thinking through their possible epistemological, political and cultural impacts.

The course is a communications elective for the Journalism and Telecommunications majors and the Media Studies minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 409** News Media Ethics (3) Ethical problems in the practice of journalism; principal public criticisms of news media; case study approach.

### **COMM 409 News Media Ethics (3)**

Ethics is about doing the right thing - which, in the news business, is rarely as easy as it sounds. Is it ever OK for reporters and photographers to intrude on grieving families? Is it ever OK to lie to get information? Are the sex lives of politicians and celebrities our business? COMM 409 will give students a fuller understanding of how journalists do their jobs and how they should make ethically sound decisions. This class is more about learning to ask the right questions than learning the right answers. We'll rely on recent news coverage to get us in the habit of working through the moral dilemmas that reporters routinely confront.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 409H** News Media Ethics (3) Ethical problems in the practice of journalism; principal public criticisms of news media; case study approach.

### **COMM 409H News Media Ethics (3)**

Ethics is about doing the right thing - which, in the news business, is rarely as easy as it sounds. Is it ever OK for reporters and photographers to intrude on grieving families? Is it ever OK to lie to get information? Are the sex lives of politicians and celebrities our business? COMM 409H will give students a fuller understanding of how journalists do their jobs and how they should make ethically sound decisions. This class is more about learning to ask the right questions than learning the right answers. We'll rely on recent news coverage to get us in the habit of working through the moral dilemmas that reporters routinely confront.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 410** (IL) International Mass Communications (3) The role of international media in communication among and between nations and peoples.

### **COMM 410 International Mass Communications (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course examines the role of international mass media in communications and debates about global questions and/or

crises between and among nations and peoples. These roles will be examined using such theories as imperialism, hegemony, information society, modernization, globalization, capitalism, cultural industries, propaganda, and others. Among other issues the course will examine the way in which media report, portray, represent, misrepresent, and construct knowledge about global questions and crises that may border on social injustices, health, the politics of armament, disarmament, and recognition of statuses of states. The course may also explore other issues of international importance not limited to those involving economic questions such as balance of trade, global debt, and financial crises. In addition, this course provides avenue for the appraisal of mediated debates between nations at such platforms as the United Nations (UN), the World Health Organization (WHO), and the World Trade Organization (WTO) among other international and bilateral organizations that serve as platforms for consideration of issues of global importance. Students are led to understand ways in which states relate and communicate with each other in the environment of supranational governance. Students are exposed to these issues through readings in pertinent theories, ICT-enhanced conversations, and critical examinations of applicable concepts, exposure to contemporary issues via media messages; including those presented via newspapers, newsmagazines, broadcast documentaries, films, and other media products that will aid students' ability to better appreciate issues of historical and contemporary relevance to the global community.

General Education: None

Diversity: IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 410 (IL) International Mass Communications (3)** The role of international media in communication among and between nations and peoples.

**COMM 410 International Mass Communications (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course examines the role of international mass media in communications and debates about global questions and/or crises between and among nations and peoples. These roles will be examined using such theories as imperialism, hegemony, information society, modernization, globalization, capitalism, cultural industries, propaganda, and others. Among other issues the course will examine the way in which media report, portray, represent, misrepresent, and construct knowledge about global questions and crises that may border on social injustices, health, the politics of armament, disarmament, and recognition of statuses of states. The course may also explore other issues of international importance not limited to those involving economic questions such as balance of trade, global debt, and financial crises. In addition, this course provides avenue for the appraisal of mediated debates between nations at such platforms as the United Nations (UN), the World Health Organization (WHO), and the World Trade Organization (WTO) among other international and bilateral organizations that serve as platforms for consideration of issues of global importance. Students are led to understand ways in which states relate and communicate with each other in the environment of supranational governance. Students are exposed to these issues through readings in pertinent theories, ICT-enhanced conversations, and critical examinations of applicable concepts, exposure to contemporary issues via media messages; including those presented via newspapers, newsmagazines, broadcast documentaries, films, and other media products that will aid students' ability to better appreciate issues of historical and contemporary relevance to the global community.

General Education: None

Diversity: IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 411 Cultural Aspects of the Mass Media (3)** The mass media as creators and critics of mass culture in American life; relationships between the media and mass culture.

**COMM 411 Cultural Aspects of the Mass Media (3)**

This course examines the mass media as creators and critics of mass culture in American life and the relationship between the media and the mass culture.

What are the mass media? What is culture? What are the relationships between mass media and culture? How do mass media help construct the way we live our lives? Do the mass media reflect or condition social reality? How does one study or engage the mass media? Why would you want to anyway? This course is designed to answer some of these questions by promoting a critical understanding of the mass media from historical, social, philosophical, cultural, and economic perspectives. Ultimately, the course will equip students to address these opening questions on their own terms, without

simply allowing the mass media to provide their own pictures of how they should be understood. One of the goals of this course is to denaturalize the way people view the mass media-as simply a given, or as pure unmediated reality. Media culture has been and continues to be made. Course materials and lectures will provide several ways of thinking about and studying the conditions of media making and interpretation.

Students are encouraged to think as broadly and creatively as possible: to this end, the course will make use of research across a wide range of academic fields such as sociology, history, ethnography, cultural studies, literature, politics, gender studies, economics, art, and philosophy. The course is a communications elective for the Journalism and Telecommunications majors and the Media Studies minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 411H Cultural Aspects of the Mass Media (3)** The mass media as creators and critics of mass culture in American life; relationships between the media and mass culture.

### **COMM 411H Cultural Aspects of the Mass Media (3)**

COMM 411H takes a cultural studies approach to media and more generally culture and politics. The class is predicated upon three assumptions about media. First, media must be examined in context. Second, media play a significant role in the construction of our lived reality. Third, these constructions and all attempts to study them are political and implicated in relations of power. As such, this course treats media as part of cultural and political processes that are not separable, but instead co-constitutive. In other words, these three assumptions have some immeasurable effect on each other and impact our understanding of their relationships.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 412 Sports, Media and Society (3)** Sport and media relationship in American culture.

### **COMM 412 Sports, Media and Society (3)**

This course is designed to help students more critically view the role of sport media in American culture. The influence of/relationship between sport media and issues such as race, gender, sexuality (homophobia), nationalism, capitalism/consumerism, violence and civic life will be examined. Issues in relation to journalism ethics and the production of sport media also will be examined.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 413 The Mass Media and the Public (3)** Nature of mass communications, relationships between mass media and public, media influences on opinion; social pressures on the media.

### **The Mass Media and the Public (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 413W The Mass Media and the Public (3)** Social-level and political theories of the relationships between media and public; media influences on public opinion; social pressure on the media; political communications.

### **COMM 413W The Mass Media and the Public (3)**



This course is designed to explore the complex and dynamic relationships among the media, public, and government. These relationships are examined through the lenses of sociological and political theories regarding the nature and process of mass communication. The central questions answered in the course are: "How do the media influence the public, its opinions, and social and political behavior?" and "How does the public - through social pressures, and political constraints - influence media performance and content?" Special attention is paid to modes of inquiry in communication research, social functions and control of the media, social construction of reality, political communication, and public opinion. The goals of the course are to introduce students majoring in professional areas of communications to theoretical frameworks that help explain media practices, advance the understanding of the communications research literature for Media Studies majors, and develop skills of all students to be informed and critical consumers of the media. The course is required of Media Studies majors and is a communications elective for the Journalism and Telecommunications majors, the Corporate Communications and Journalism options in Communications, and the Media Studies minor.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 414 Media Management (3)** Theoretical bases and practical approaches for management and administration of communications projects, organizations, and resources.

### **COMM 414 Media Management (3)**

Students examine various management styles and how they are applied in various media industries. Special issues in media management such as intellectual rights and work-for-hire contracts are covered. General business management topics are also covered, such as human resource management, sales, motivation, working with unions, managing talent and other assets, and maximizing profits within the framework of very basic business principles. In addition, this course includes topics useful for small media business startups and freelance media content producers. Usually this course utilizes a case/book study approach relying heavily on in-class discussion.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 415 Advanced Photography for Communications (3)** Advanced applications in documentary photography emphasizing the narrative qualities of imagery, and utilizing digital technologies.

### **COMM 415 Advanced Photography (3)**

An advanced undergraduate examination of documentary photography with the goal for each student to produce a portfolio of pictures suitable for exhibition or to show prospective employers. Each week students complete photographic assignments designed to simulate commercial photography work and to give experience with a variety of photographic techniques and subjects. Assignments include topics such as portraiture, documentary photo story production, studio lighting, fill-flash lighting, and sports photography. Classroom exercises include demonstrations of various techniques as well as critique sessions to discuss student assignments and other photography work.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 417 Ethics and Regulation in Advertising and Public Relations (3)** Ethical issues in practice of advertising and public relations; legal and regulatory issues; case studies.

### **COMM 417 Ethics and Regulation in Advertising and Public Relations (3)**

The purpose of this course is to help students gain an understanding of the complex legal and ethical issues they may face in advertising and public relations practice. Through an examination of historic and contemporary issues and cases, students will develop a professional framework for evaluating ethical dilemmas. Perspectives of advertisers, public relations practitioners, agencies, government, media, clients and advocacy groups will be examined, with a focus on social responsibility in professional practice.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 418 Media Effects: Theory and Research (3)** Investigation of social and psychological effects of media messages and technologies via theories and empirical evidence pertaining to processes of effects.

**COMM 418 Media Effects (3)**

This is an upper-level undergraduate course on the social and psychological effects of media messages and technologies, which moves beyond a simple introduction of media theories. Drawing on social and behavioral research in communication, psychology and related disciplines, it will attempt an advanced understanding of media effects via theories and empirical evidence pertaining to the processes of effects. Emphasis will be placed on rigorous examination of theory testing and theory development. The class will assume a general familiarity of basic communication theories pertaining to the relationship between media and public (COMM 118) and a working knowledge of quantitative research methods (COMM 304W).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 419 (US;IL) World Media Systems (3)** Comparative study of modern mass systems and the evolution and structure of specific countries' systems.

**COMM 419 World Media Systems (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is a comparative study of modern mass media systems with focus on the ways in which two or more countries' media have evolved and are structured by the political, economic, social, and cultural environments within which they exist. Students will be exposed to the theories and practices of media systems – as explained in such normative expositions as the four theories of the press and other contemporary iterations. One objective of the course is for students to gain a better appreciation of the structure and location of the media system in the United States vis-à-vis greater awareness of media systems in other political contexts where media cultures may vary from the U.S. matrix. Across the board of sampled countries' media systems, students will be exposed to the ways in which each country's media have developed, are shaped, and are continually shaped by factors that include history, political cultures, evolving legal regimes, media regulations, finances, media economics, new technologies, institutional arrangements, citizens' access to information, or lack thereof.

Another objective of this course is to equip students with a toolbox and framework with which they can replicate comparative media systems analyses in other countries and regions of interest as they contemplate study abroad and/or long-term career (employment, graduate studies) engagements. To achieve foregoing objectives students will be exposed to readings in theories of media systems and to academic articles using comparative methodologies to examine structural evolution of media in tandem with countries transformations over time. Students will analyze historical or contemporary media systems' developments through careful comparisons and applying critical thinking skills. In the process, students develop analytical skills useful in contending with academic and professional environments.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 419 (US;IL) World Media Systems (3)** Comparative study of modern mass systems and the evolution and structure of specific countries' systems.

**COMM 419 World Media Systems (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is a comparative study of modern mass media systems with focus on the ways in which two or more countries' media have evolved and are structured by the political, economic, social, and cultural environments within which they exist. Students will be exposed to the theories and practices of media systems – as explained in such normative

expositions as the four theories of the press and other contemporary iterations. One objective of the course is for students to gain a better appreciation of the structure and location of the media system in the United States vis-à-vis greater awareness of media systems in other political contexts where media cultures may vary from the U.S. matrix. Across the board of sampled countries' media systems, students will be exposed to the ways in which each country's media have developed, are shaped, and are continually shaped by factors that include history, political cultures, evolving legal regimes, media regulations, finances, media economics, new technologies, institutional arrangements, citizens' access to information, or lack thereof.

Another objective of this course is to equip students with a toolbox and framework with which they can replicate comparative media systems analyses in other countries and regions of interest as they contemplate study abroad and/or long-term career (employment, graduate studies) engagements. To achieve foregoing objectives students will be exposed to readings in theories of media systems and to academic articles using comparative methodologies to examine structural evolution of media in tandem with countries transformations over time. Students will analyze historical or contemporary media systems' developments through careful comparisons and applying critical thinking skills. In the process, students develop analytical skills useful in contending with academic and professional environments.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 419H** (US;IL) World Media Systems (3) Comparative study of modern media systems of mass communications in selected foreign countries.

**COMM 419H World Media Systems (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Students in this course will have the opportunity to discover the variety of media systems in the world today and, more importantly, how they got that way and what functions they perform for their respective societies. Students will evaluate each media system's history and analyze the functions of the mass media in the respective contexts. They will examine the historical, social, economic and cultural forces that influence the adoption of a national media system. They will compare perspectives on the problems and issues in freedom of expression within national media systems and evaluate the organization, regulation and economics of those systems. Finally, students will analyze the national development of media systems and the impact of the mass media in the modernization of peasants.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 420** Research Methods in Advertising and Public Relations (3) Primary and secondary research methods used in the development of solutions to advertising and public relations problems.

**COMM 420 Research Methods in Advertising and Public Relations (3)**

This course is designed to provide an introduction to the logic and methods of social science research and its applications in the professional practice of advertising and public relations. Students will be introduced to methods of primary research used in the advertising and public relations fields such as survey, focus group, content analysis, and experimental design. Students will also become more familiar with basic and advanced statistical techniques and statistical software used in the field. Understanding how research is conducted and the strengths and limitations of research findings is a critical first step in developing the ability to apply research findings to communication problems in advertising and public relations.

In addition to helping students understand how to conduct research, this course is also designed to help them become critical consumers of the research conducted by others. Advertising and public relations problems often require the identification, understanding, synthesis, and application of data collected by others in developing problem solutions. Understanding secondary sources of data commonly used in the field, such as Simmons, Nielsen, Arbitron and SRDS, is an essential component of professional expertise.

Problem-solving in advertising and public relations requires decision-making in a turbulent and dynamic marketing environment. To help students learn how to relate research tools and outcomes to the advertising and public relations problems at hand, this course will examine the role of research in decision-making at the critical steps in the problem-solution process. As part of developing understanding of this decision-making process, students will also become more aware of the ethical issues associated with research in advertising and public relations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 421W Advertising Creative Strategies (3)** Planning, designing, writing advertisements; introduction to graphics and production techniques and processes; layout and copywriting practice and critiques.

**COMM 421W Advertising Communications Problems (3)**

This course is designed to provide students with an overview of the intellectual and practical skills involved with the development of advertising creative work. Students are introduced to research and thinking strategies that lead to creative ideas and are provided with computer software and other training that facilitates the execution of advertising based on their ideas. The course requires students to complete several creative projects, in distinct product categories (e.g., packaged goods, durable goods, public services, consumer services), over the course of the semester. Before developing advertising, students will be expected to research the product, service or idea that constitutes the creative project. They will gain an understanding of the kinds of information most valuable to creative professionals in the development of ideas, and be provided with an overview of research strategies leading to the discovery of such information. After completing the required research, students will produce briefs that summarize findings and serve as a platform for further work on their creative projects. Given the course's designation as writing intensive, these documents will be evaluated both for their content and the degree of accuracy demonstrated in grammar, spelling, punctuation and word choice. Since the evaluation of creative ideas is inherently subjective, these written research documents are usually weighted more heavily in the calculation of final course grades. Students will use their own research as the platform for generating creative ideas to advertise their product, service or idea. Instruction on creative thinking techniques will be provided as tools for this activity. As ideas are developed, students are encouraged to share their work with their peers and the instructor for feedback. In "workshop" fashion, these in-class critiques of creative work serve to refine and improve ideas. Over the course of the semester, students work toward finalizing creative solutions. By semester's end, each student will be expected to submit a final portfolio of work that demonstrates proficiency in the subject matter covered by the course. Traditionally, the final portfolio includes creative briefs and ads developed from them.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 422 Advertising Media Planning (3)** Analysis, selection, and scheduling of advertising media; examination of algorithms, technologies, and software used in media planning.

**COMM 422 Advertising Media Planning (3)**

This course is designed to provide an introduction to the concepts and techniques of media planning. The course will cover traditional and online media options. The student will learn to use software models to facilitate media decisions. Secondary sources of research used in the media planning process will be discussed. The design, construction, implementation and evaluation of effective media plans that meet specific advertising objectives will be detailed. Ethical media planning processes will be reviewed. The goal of the course is to develop critical thinking skills that will improve decision making in a dynamic and turbulent media environment.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 424 Advertising Campaigns (3)** Advertising campaign problems from the viewpoint of the national advertiser and advertising agency; production of a complete advertising campaign.

**COMM 424 Advertising Campaigns (3)**

This comprehensive capstone course is designed to provide an opportunity to showcase your creativity and knowledge about advertising communications. Strategic integrated marketing communications concepts are emphasized. The campaign proposal developed in this course will showcase the full weight of your knowledge and skill in the area of advertising communications. Students will need a background in creative design and practices, media planning principles and practices, and research methods used to delineate appropriate target groups and evaluate campaign effectiveness. A strong focus will be on understanding the audience and developing message strategies that have a high potential to influence attention and marketing behaviors. During the course you will create a complete advertising/marketing

communications campaign proposal that reflects a set of communication goals derived from a set of measurable objectives all designed to meet the needs of your client.

A situation analysis will be developed to provide a detailed assessment of the product or service environment. This includes analysis of the product class, lifecycle, generic and brand level competition, and target group identification. The goal is to gain relevant information that can be used to make justifiable strategic decisions related to the advertising campaign. Strategic goals and objectives will be developed that allow the direction and efficacy of the campaign to be measured. Tactics must reflect the strategies developed in the campaign. Campaigns include diagnostic and performance benchmarks used to evaluate the progress of a set of predetermined measurable objectives. The goal is to provide timely feedback that allows the agency and client to evaluate the effectiveness of the campaign. This is especially important as client -agency relations continue to adapt a series of formal measures of campaign effectiveness.

The class is designed to develop critical thinking skills. For example, each strategic decision presented in a campaign must have a fully explicated rationale that is based on quantitative and qualitative criteria. Research tools will be presented in class that allow and support the development of measurable objectives. The campaign proposal must include a series of benchmarks designed to evaluate the progress of the campaign at key time points. The campaign will have a complete media plan that includes selected media, cost efficiencies, and media schedule. Students will be expected to be familiar with media principles and media planning software.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 425** Advanced Advertising Campaigns (3) An academic option for student AAF members who will develop an integrated advertising campaign to be presented in District competition.

### **COMM 425 Advanced Advertising Campaigns (3)**

The class is structured along the lines of a real-world advertising agency and the manner in which they might pitch a new account. Students work through the research and situational analysis to develop an integrated communication plan, campaign budget, and message strategies for a client.

The client is provided by the National Student Advertising Competition. This group provides undergraduate advertising students with a realistic problem that is solved through team effort, knowledge and creativity.

Students might have the opportunity to pitch their plan to the NSAC client.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 426** International and Intercultural Strategic Communication (3) Advertising and public relations in the international and intercultural arenas; multicultural strategic communications strategies.

### **COMM 426 International and Intercultural Strategic Communication (3)**

COMM 426 will provide students with a framework for applying their existing public relations and advertising tools in the global arena. Working internationally and/or interculturally challenges the advertising, public relations or marketing executive to think outside his or her own "cultural box." Some of the challenges include finding research about consumers, competitors and the marketplace outside of North America and Western Europe, understanding local cultures and customs, understanding the importance of ethnicity, and building an integrated core of professional communications that work with a common purpose, even if they come from different backgrounds - or are on different continents.

The emphasis will be on developing a methodology for researching international and intercultural strategic communications problems, and then discussing possible communications-based solutions. To that end, case studies from both the international advertising and international public relations disciplines will play an important role in the course. Additionally, students will be exposed to a number of frameworks for analyzing culture, coming from the areas of anthropology (Schwartz' 10 Value Domains), social psychology (Bond's essay on impression management in multicultural organizations) and international business (Hofstede's Dimensions of National Culture).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 427 Client/Agency Relations (3)** Building and maintaining client/agency relationships in advertising, public relations and direct response agency business functions.

### **COMM 427 Client/Agency Relations (3)**

Client/Agency relations provides students with an understanding of advertising, public relations and direct response agency business functions, and the important role of building and maintaining client/agency relationships. It covers the phases of pre-relationship (identifying, prospecting, pitching and winning accounts), developing relationships with clients and maintaining and enhancing these relationships over time. Client/agency relationships are built on the development of viable partnerships with clients, establishing strategies to support and maintain the vitality of client business success, and the on-going delivery of fresh creative ideas from all agency disciplines.

Today's agency has become a resource for all integrated marketing communication (MARCOM) needs. This includes, but is not limited to, advertising, promotion, public relations, direct response marketing, event marketing, customer-relationship marketing, interactive internet communication and branding ideas. This course covers the integration of these disciplines on behalf of an agency's clients.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 428A Principles of Strategic Communications (3)** Principles of Strategic Communications provides an overview of the various media and communications methods that comprise modern integrated marketing campaigns.

### **COMM 428A Principles of Strategic Communications (3)**

Principles of Strategic Communications will introduce students to strategic communications in the context of integrated marketing communication (IMC). It will overview the industry by providing a foundation for understanding what IMC is and how it developed to its current state, what it tries to accomplish, how it works, and how it can affect society. It lays the groundwork for other courses in the strategic communications sequence. The fundamentals of consumer psychology will be introduced, along with theories of persuasion. In addition to traditional advertising, the course will review other critical functional areas of IMC such as public relations, sales promotion and direct marketing. The role of the internet and emerging new media technologies will also be covered. The advantages and disadvantages for different media will be summarized, and the basics of media planning will be introduced. Course content is present in the context of strategy and planning, with the goal of illustrating how various elements in the promotional mix work together to achieve campaign objectives. The importance of effective measurement and accountability at each point of campaign development and execution will be explained. Finally, the ethical and regulatory environment for IMC will be explored.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

Concurrent: COMM 260W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 428B Strategic Communications Law (3)** Analysis of laws and regulations affecting online advertising and strategic communications.

### **COMM 428B Strategic Communications Law (3)**

Strategic communications law focuses on the key legal issues affecting strategic communications, advertising and marketing in an online environment. Major topics include First Amendment protection for commercial speech; advertising regulation including spam and the use of trademarks and copyrights; privacy regulation including the collection of user data and use of endorsements, and procedural issues such as jurisdiction and analysis of various regulatory authorities. Additional topics will include domain names, marketing to minors and current developments in advertising and Internet law.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 428C Strategic Communications in a Global Environment (3)** Strategic Communications in a Global Environment will provide students with a framework for applying public relations and advertising tools across media platforms and across cultures.

**COMM 428C Strategic Communications in a Global Environment (3)**

Strategic Communications in a Global Environment will provide students with a framework for applying public relations and advertising tools across media platforms and across cultures. While cross-cultural communication has always been a challenge for strategic communicators, introducing online elements to campaigns exposes strategic communications professionals to a host of new challenges, including a wide range of ethical and legal dilemmas emanating from new to abilities to collect sensitive data from audiences, often without their knowledge. Students will be exposed to a number of frameworks for segmenting publics in this new environment, both geographically and psychographically, and will learn the skills to work with colleagues across borders and cultures to create effective, ethical strategic communications campaigns.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 428D Research & Analytics (3)** This course covers online research methods for strategic communication, including web analytics, online surveys, online interviews, and content analysis.

**COMM 428D Research & Analytics (3)**

Increasingly, organizations are using the web as a vehicle for communicating with key audiences such as customers, shareholders, volunteers, donors, community members, and government entities. In this class students will be exposed to theories and practices in the areas of online research and analytics with a focus on understanding how customers perceive the organization, assessing the engagement with target audiences online, measuring the value of relationships that organizations initiate and build online, and tracking how web site visitors experience an organization's site. The course will expose students to tools for tracking and measuring online communication, and it will help students understand how to prioritize audiences and communication to maximize the effectiveness of measurement. Research methods taught in this class include web analytics, online surveys, online interviews, content analysis, and online focus groups. Gauging the impact of online communication helps organizations engage in more efficient and effective communication practices. Practitioners in strategic communication need to understand how to measure and evaluate the effectiveness of their communication in this medium. This course will prepare students to conduct online research in practice.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 428E Social Media Strategies (3)** This course covers social media theory, tools and best practices to prepare students for current and future use of social media.

**COMM 428E Social Media Strategies (3)**

Social media – including social networking, podcasting, bookmarking, blogging, microblogging, location-based, wikis, and other collaborative content creation platforms – are changing the field of public relations. While many public relations professionals claim to be social media “experts,” those who can demonstrate true expertise are rare and much sought after. This course narrows the focus from the broad field of social media to cover the specific tools and best practices needed to conquer current and future use of social media in public relations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 430 Mass Media and Politics (3)** Study of mass media as institutions and the effects of the mass media on politics, public policy, and citizens.

**COMM 430 Mass Media and Politics (3)**

In Mass Media and Politics, we address issues and relations of the political realm, the media institutions, and the public sphere. Particular attention is dedicated to the influence of and coverage by both the domestic and international news media. In addition, we also examine topics such as bias in the media, women and politics, political campaigns, and advertising, ideology and hegemony, and cultural representations in the media. Of importance are notions of how and why mass media influences the national political debate, as well as what mass media exports in terms of culture and what this means to the political reality of other nations. The discussion of these issues is often couched in terms of technologies, especially emerging and traditional mass media technology systems such as convergence technologies, the World Wide Web, television, radio, and newspapers. Prerequisite: COMMS 251.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 433** Film History for Filmmakers II: The Development of the Cinema from 1960 to the Present (3) History of the art, industry, economics, culture, and technology of cinema from 1960 to the present.

**COMM 433 Film History for Filmmakers II: The Development of the Cinema from 1960 to the Present (3)**

Film History for Filmmakers II presents the history of the medium of cinema from 1960 to the present. The course explores the artistic, technical, economic development of the cinema, and the cultural contexts in which this development occurred. The course covers narrative, experimental, and documentary cinema and trains students in the techniques of close formal analysis of the cinema. The course builds upon formal, thematic, and cultural analysis of the cinema introduced in Film History I. This course is integral to the existing curriculum. It provides Film-Video students with a detailed description of trends in their art form. It provides students with a more intensive study in the history of an influential medium in the development of the concept of mass media and communications. The course will be taught each Spring semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 436** Advanced Audio Production (3) Advanced concepts and techniques of audio production in analog and digital formats with hands-on experience in recording, mixing and editing.

**COMM 436 Advanced Audio Production (3)**

This course builds on the concepts and techniques of audio production in both analog and digital formats introduced in COMM 374 and includes in-depth examination of sound theory and hands-on practice in advanced projects involving recording, mixing and editing in analog and digital formats. This course provides an understanding of technical and aesthetic aspects of advanced audio production, and provides students the opportunity to demonstrate advanced skills in recording, editing and mixing. Students gain an understanding of professional studio and field practices and develop advanced studio and field projects suitable for a portfolio.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 437** Advanced Documentary Production (3 per semester/maximum of 6) Advanced exploration of documentary production techniques and aesthetics through the completion of a short video project.

**COMM 437 Advanced Documentary Production (3 per semester/maximum of 6)**

This course is designed to enable students to produce portfolio-quality work while bringing together ideas, processes, practices, and theories in the service of documentary production. Students will explore the history, conventions and theory of the documentary film form, while developing and producing a film or video work for screening at the end of the semester. Working in small crews with others from the class and using sophisticated production equipment, students will write and produce short digital video projects. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions as well as on providing the support, guidance, and critique necessary for a successful production. Particular emphasis is given to the traditions of social criticism, the creative treatment of actuality, the individual and collective points of view.



The history of documentary form is illustrated by comparing the work of the American "Direct Cinema" style embodied in the work of Drew Associates to the French "Cinema Verite" style developed by Jean Rouch. The evolution of these styles into what we now just refer to as "Verite" filmmaking is put into practice through a series of exercises that incorporate a variety of points of view.

Analysis of the above works, as well as examples from Barbara Kopple, Errol Morris, and Frederick Wiseman, provide students with a springboard to develop their own style, vision, and personal creative voice. An examination of Bill Nichols taxonomy of non-fiction film classification further contextualizes aesthetic and theoretical issues for students. A series of lectures, discussions, readings, and screenings move students through the personal and collaborative process of documentary production.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 438 Advanced Narrative Production (3 per semester/maximum of 6)** Advanced exploration of narrative production techniques and aesthetics through the completion of a short film or video project.

**COMM 438 Advanced Narrative Production (3 per semester/maximum of 6)**

This course is designed to enable students to produce portfolio-quality short projects that bring together ideas, processes, practices, and theories in the service of narrative production. Over the course of the semester, students will pursue an entire project from conception to completion through intensive pre-production, production, and post-production stages. Working in small crews composed of fellow classmates and using sophisticated production equipment, students will write and produce short digital video projects. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions, as well as providing the support, guidance, and critiques necessary for a successful production. There will be an emphasis on the thorough execution and evaluation of the steps taken toward completion of their project.

As a workshop, specific topics pertaining to the three stages of production will be reviewed as necessary. Students will be expected to hand in a pre-production packet (budget, schedule, script breakdown and lined script) before proceeding to the production phase.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 439 Advanced Alternative Production (3 per semester/maximum of 6)** Advanced exploration in experimental and animation forms through the production of a film or video project.

**COMM 439 Advanced Alternative Production (3 per semester/maximum of 6)**

Advanced Alternative Production is a senior level course focusing on the development and expression of the individual filmmaker. The emphasis of the course is on exploring the history, conventions and modes that surround the experimental and animation film forms and using this knowledge in creating work that challenges conventions of mainstream media. The course involves viewing works of classic and contemporary alternative media, discussing its contribution or value in communications, and using these examples as models for exploration.

Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions, as well as on providing the support, guidance, and critique necessary for a successful production. There will be an emphasis on the thorough execution and evaluation of the steps taken toward completion of their project.

This course assumes a working knowledge of intermediate film and video production and post-production techniques. Additional production and post-production techniques may be introduced based on the students' interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 440** Advanced Cinematography and Lighting Techniques (3) Advanced exploration in camera, lighting, audio, and color-grading techniques, emphasizing technical skills as well as aesthetics.

**COMM 440 COMM 440 Advanced Cinematography and Lighting Techniques (3)**

This course is a comprehensive approach to techniques, equipment and procedures of film and video production with an emphasis on both practical skills and aesthetics. The course is divided into four sections that will employ a combination of lectures and workshops in camera, lighting, audio and color grading. The course will focus on understanding the theory and procedures underlying dynamic composition, visual and psychological perspective, practical and emotive lighting and sound, color, and the conveyance of meaning through color and continuity. In addition, students will learn accepted procedures in care and use of film and video cameras, sound recording equipment, lighting and grip gear, as well as proper organization, media storage and maintenance techniques specific to post-production. Students will work individually and collaboratively to produce projects for critique and evaluation.

The emphasis of the course is on the artistic and technical aspects that allow an idea to be cinematically realized on celluloid and/or a suitable digital format. The course involves viewing the work of outstanding, established cinematographers and videographers in great detail, and assessing their contributions to film aesthetics and history through the detailed, direct analysis of film excerpts and sequences from landmark films and video work, and the discussion of assigned reading materials on both film and video technique. Students then work in specific film and video production positions to reproduce precisely scenes from the films analyzed. By doing so, students will develop an understanding of the technology and artistic vision used in film and video production so that they may be better prepared to successfully create challenging and thought-provoking projects. In addition, this course also allows for an exploration and comparison of the ever-changing technology used in film and video production. Through this direct use of multiple visual and audio formats, students will discover the creative advantages and disadvantages of various media used to fulfill their artistic vision.

COMM 440 is a support course for the senior level production courses. Student cinematographers in COMM 448 (Adv. Production for Groups) are strongly encouraged to take this course concurrently. It can also be taken as an elective technique course in conjunction with any of the one-semester mode specific advanced production courses (COMM 437, COMM 438, or COMM 439).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 441** Advanced Graphic Design for Communications (3) Theory and practice designing graphic visual communication in commercial, non-commercial, and fine art formats for print and on-line media.

**COMM 441 Advanced Graphic Design (3)**

An advanced examination of graphic design. Students develop proficiencies in the art, craft, formats, and vocabulary of commercial graphic design by creating original work in a series of hands-on projects. During the semester, students learn to research, organize, and interpret verbal and visual information and to solve increasingly complex communication problems. They will further refine their creative problem solving and collaborative production skills. By semester end, students will have begun to develop their own styles and are able to verbally articulate it to others. Assignments generally include topics such as interactive media design, animation, advertising design, and infographic design.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 443** Producing Workshop (3) This course will immerse students in the language and practice of producing film and video projects.

**COMM 443 Producing Workshop (3)**

Through a combination of lecture, readings, screenings, and practical exercises, students will learn the fundamental producing skills needed to begin to understand creative producing in an increasingly complex global marketplace. Producing students will learn how to bring stories all the way from development through post-production and beyond. Students will be afforded an opportunity to develop their creative voices, all the while developing their communication and problem-solving skills. The course will follow a standard production timeline starting with pre-production topics such as the basics of pitching, script development, and financing. The second portion of the class will focus on production issues particularly as they apply to independent film production. This will include line producing and production management, including scheduling/budgeting, script breakdowns, assembling talent and crew, location scouting, and running a set. Finally post-production and distribution topics will be addressed including discussions of trends from major trade publications that impact the industry.

Throughout the semester students will complete practical exercises that will help build their skills at translating a script into a realized project with a minimum budget and maximum production value.

COMM 443 is a support course for the senior level capstone production courses. Student producers in COMM 448 (Adv. Production for Groups) are strongly encouraged to take this course concurrently. It can also be taken as an elective technique course in conjunction with any of the one-semester mode specific advanced production courses (COMM 437, COMM 438, or COMM 439). The prerequisites are in place to ensure students have the necessary production background taught in the intermediate-level courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 444 Advanced Post-Production Techniques (3)** This course offers intensive practical experience in editing, motion graphics and sound mixing techniques, emphasizing both technical skills and aesthetics.

**COMM 444 Advanced Post-Production Techniques (3)**

Through a combination of lectures, readings, screenings, and practical exercises, students will learn advanced post-production techniques needed to produce high quality finished film and video pieces. The course includes modules on the theory and aesthetics of editing, motion graphics, visual effects, 2D animation, audio signal processing and audio mixing. The course will enable students to develop creative skills for translating ideas into short films and to serve as post-production support for senior level productions. Specific design strategies and approaches will be discussed. Students will also be required to demonstrate competence in a variety of digital graphics programs. Throughout the semester students will work individually and collaboratively on practical exercises for critique and evaluation, developing technical, analytical and critical skills.

The course is divided into three sections. In the first section students will focus on the procedures for successful post-production supervision and workflow management, including an exploration of accepted professional practices of editing departments. Students will explore advanced methods of picture editing in all modes and will edit and critique a professionally produced scene. In the second section of the course, students will work on graphics, animation and special effects procedures generally accepted as part of film-video post-production processes. The focus will be on techniques that translate to a variety of software and work environments; including manipulation of picture and text, light and color effects, compositing of multiple images and manipulation thereof. The third section of the course will focus on the practice of preparing elements for a professional audio mix and use of advanced digital audio workstations. This section will feature a discussion of the theory and practice of how tracks are organized, advanced psychoacoustics and signal processing, preparing a multi-track project for mix, and completion of a mixed sound design project.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 445 Directing Workshop (3)** An advanced aesthetic and skill production course in directing for the screen.

**COMM 445 Directing Workshop (3)**

This course is an advanced aesthetic and skill production course in directing for the screen. The class is designed to introduce more advanced directing concepts and techniques as well as to more deeply explore the collaborative processes of working with a creative team on effectively integrating the aesthetics of cinematography, production design and acting performance in film narrative.

The first section of the course will focus on understanding the actor's preparation and process with the goal of developing the appropriate and effective communications skills to coach performance. Students will thoroughly explore scenes for interpretation of subtext and motive, and will learn accepted practices of script preparation. Casting and audition styles will be investigated and demonstrated, as will various types of rehearsal techniques. At the end of this section students will workshop a scene in a small group, blocking it and executing it to illustrate concepts of character relationships, stage and camera craft to produce a short scene for discussion and critique.

The second section of the course will be an advanced aesthetic exploration of the visual vocabulary, including cinematic, psychological and fine art concepts that contribute to the planning and design of screen direction. Students will then analyze the technical means to execute this aesthetic vision through production design, lighting and composition. In practice the students will then translate this analysis into a working scene plan and will produce a short scene for discussion and critique. Students will also be introduced to professional practices such as location and studio set protocols and on-set safety procedures.

The third section of the course will explore narrative conventions and their relationship to screen genres in the interest of understanding the film language shared between filmmaker and audience. At the end of the section students will produce a short classic scene with an alternative interpretation for discussion and critique.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 446** Writing for the Screen II (3) An advanced course in screenwriting that further develops elements of storytelling technique.

### **Writing for the Screen II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 448** Advanced Group Production I (3) A two semester advanced production course emphasizing intensive collaborative film-video production from script through post-production.

### **COMM 448 Advanced Cinematography and Sound Workshop (3)**

This course is designed to enable students to produce portfolio-quality work in any production mode (alternative, documentary, narrative) and to bring together ideas, processes, practices, and theories in the service of this production. Over the course of the semester, students will engage in intensive pre-production and production of an approved film or video project. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by collaborative productions as well as providing the support, guidance, and critique necessary for a successful production. There will be an emphasis on the thorough execution of every step of pre-production, principal photography, and preparation for post-production in spring semester. Students will fill a single production role (such as producer, director, cinematographer, sound designer, editor) throughout the two semesters and are strongly encouraged to take concurrently the supporting technique course for that production role.

Students will be assigned individual exercises specific to their production role in addition to the collaborative work of the project's production.

Production groups will be formed the first week of class. The first part of the semester is devoted to the development of the projects and pre-production. Roughly half way through the semester, the projects will begin production, with shooting and editing to be completed the following semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 449** Advanced Group Production II (3) Continuation of advanced production course emphasizing intensive collaborative film-video production from script through post-production.

### **COMM 449 Advanced Film and Video Projects (3)**

This course is the second half of a two-semester production course designed to enable students to produce portfolio-quality work in any production mode and to bring together ideas, processes, practices, and theories in the service of this production. Students from the fall semester will complete production and engage in intensive post-production in order to have a high-quality finished project to submit to film festivals by the end of the semester. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions as well as providing the support, guidance, and critique necessary for a successfully completed project. Students will continue in the same production role (producer, director, cinematographer, sound designer, editor) from the fall semester, learning new skills for their role in the post-production phase.

Students will be assigned individual exercises specific to their production role in addition to the collaborative work of the project's production. It is expected that all production group members will continue into the spring as well.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 451** (AM ST 451) Topics in American Film (3 per semester, maximum of 6) Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

**Topics in American Film (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 451** (AM ST 451) Topics in American Film (3 per semester, maximum of 6) Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

**Topics in American Film (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 452** Topics in International Cinema (3 per semester, maximum of 6) Critical and historical studies of topics in non-American film. Analysis of theory, direction, cinematography, editing, and screenwriting.

**Topics in International Cinema (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 453** (IL) (CMLIT 453) Narrative Theory: Film and Literature (3) Comparative study of the aesthetics and techniques of film and literature; close analyses of masters of each art form.

**Narrative Theory: Film and Literature (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 454** Documentary in Film and Television (3 per semester, maximum of 6) Study of representative films from various documentary movements, examining form, technique, trends, and audience objectives.

**Documentary in Film and Television (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 455** Advanced Film Theory and Criticism (3 per semester, maximum of 6) Close examination of classic and contemporary film theory and critical perspectives.

**Advanced Film Theory and Criticism (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1989

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 456 Media Criticism and Theory (3)** Critical and theoretical approaches to the analysis of media and communication.

**COMM 456 Media Criticism and Theory (3)**

To what extent does media (television, movies, print, radio, Internet, etc.) shape our awareness of not only the world around us but also ourselves as thinking human beings? Is it all a matter of perception and relative exposure to these media? How do we approach everyday interfaces with the immense number of media messages in both public and private spaces? Where do our opinions of the validity of both the informational and the aesthetic standards of media messages come from? In this class we attempt to come to terms with the rise and apparent predominance of media as a dominant cultural institution.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 457 Media Audiences and Contexts (3)** Survey of the ways media attempt to influence audience reception and how audiences hold sway over media content.

**COMM 457 Media Audiences and Contexts (3)**

The course begins with an examination of how the mass audience is conceived as a statistical entity by analyzing quantitative methods such as the Nielsen ratings. Much of the course is then spent interrogating how this statistical information is used and by whom. If the audience is created as a commodity and is sold to advertisers, what ethical guidelines are in place? How do audience profiles influence the programs we see and consume? As media become more and more fragmented, how does the problem of audience as a commodity get resolved? Students utilize a case-study approach to explore a variety of audience problems and present their findings in papers, demonstrations, and exhibitions.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 458 Media Law and Ethics (3)** The study and practice of key issues in media law and ethics, including libel law, conflict of interest, truth in advertising.

**COMM 458 Media Law and Ethics (3)**

An examination of the role of the mass media in American society in regard to the rights, responsibilities, and duties of practicing media professionals. The semester is almost evenly divided between law and ethics topics. Students examine current laws in mass media with the goal of preparing them to be lawful and responsible members of the profession. Law topics include defamation, privacy, intellectual property and protection of anonymous sources. Students also get an introduction to ethical theories and their practical applications in media industries. Topics include journalistic responsibilities, objectivity, conflicts of interest, invasion of privacy, and the ethics of persuasion and entertainment.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 459 Cultural Effects of Interactive and Online Media (3)** Study of the global social impact and rhetorical limitations of converging media, emphasizing cross-cultural media influences.

**COMM 459 Cultural Effects of Interactive and Online Media (3)**

An examination of the various effects of digital media on society and culture. The nature of digital media affects content and production, the way people use media, and social interaction. Topics include convergence, the information society, the global village, and the various changes in the ways media producers do their work. Various aspects of changes including philosophical, economical, and political are examined with the goal of helping students understand how to prepare for future changes in media industries.

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 460W** Reporting Methods (3) Techniques in reporting news and trends at the local, regional, and county levels. Emphasis on both deadline and interpretive reporting.

### **Reporting Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 461** Magazine Writing (3 per semester/maximum of 6) Students will learn about idea conception, writing, and editing of magazine stories.

### **COMM 461 Magazine Writing (3 per semester/maximum of 6)**

Students will learn about idea conception, writing, and editing of magazine stories. They will walk through the idea process, including how to pitch their ideas to editors. They will learn about research and reporting for stories, and then begin the process of organizing and writing their material. They will write stories and then work with editors to rewrite and improve the story for publication.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 462** Feature Writing (3) Reporting and writing the human interest article for newspapers and magazines.

### **COMM 462 Feature Writing (3)**

COMM 462 teaches the fundamentals of reporting and writing feature stories for newspapers and magazines. Students learn reporting and writing techniques for various types of feature stories. The course emphasizes the development of sound journalistic judgment and proper ethical standards. Students write various types of features stories.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 463** Newspaper Design (3) This course will cover newspaper design. Students will learn to solve design problems, edit photos, and work with industry software.

### **COMM 463 Newspaper Design (3)**

This upper-division course will cover contemporary design theory, grid systems, typography, color and photography as they pertain to newspapers. Students will develop skills necessary to solve design problems associated with the editing process. Students will also learn to use photo editing and page layout software.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 464W** Editorial, Opinion and Commentary Writing (3) Introduces techniques of editorial, opinion and commentary writing.

**COMM 464W Editorial, Opinion and Commentary Writing (3)**

COMM 464W teaches the fundamentals of writing editorial, opinion and commentary articles. Students learn the techniques of gathering information and writing various types of opinion articles. The course emphasizes the development of sound journalistic judgment and proper ethical standards. Students write various types of opinion articles.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 465 Television Reporting (3)** Television news reporting and production.

**COMM 465 Television Reporting (3)**

COMM 465 provides an introduction to television news reporting and production. Students learn the techniques of reporting and writing news for television. They also learn the audio and video techniques required to produce television news stories. The course emphasizes the development of sound news judgment and proper ethical standards. Students complete actual news assignments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 466 Public Affairs Broadcasting (3)** Producing radio and television magazine programs featuring individually-produced mini-documentaries and public affairs interviews.

**COMM 466 Public Affairs Broadcasting (3)**

This is an advanced field production and reporting course focusing on the exploration of public affairs issues on the local, state, and national level. Students will learn how to research a topic, conduct effective television interviews in the field, and produce in-depth reports with advanced production techniques and compelling visual storytelling. In some cases, the entire class will do team coverage of one topic by focusing on one community or one public affairs issue of importance to a mass audience. The last assignments will be produced on-location in a city, town, or region within reasonable driving distance of Penn State.

Trips will be made to a particular coverage area in preparation for a final show. At least one will be a field-production trip to shoot stories related to the umbrella topic in that region. Another trip will be an on-location show that will introduce the various team topics. The show will be post-produced and aired on campus cable and on ComMedia if it has solid editorial and production values. The travel will not include overnight stays.

Student teams will produce a series of high quality, longer-length public affairs pieces for submission to the ComMedia website, on campus cable, or other outlets. Most field reports will be longer-length pieces (3 to 4 minutes) depending on topic and visuals.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 467 News Editing and Evaluation (3)** Concepts and procedures involved in processing news for various news media, but with emphasis on print media editing.

**COMM 467 News Editing and Evaluation (3)**

The goal of the course is to qualify the student to be a proficient newspaper copy editor. These skills can be easily transferred to editing assignments on a Web site, in magazines and other publications, in broadcasting, and in public relations. Even if the student does not intend to become a copy editor, the course should help him or her do a better job of writing. The course emphasizes editing for accuracy, clarity, precision in language, and fairness of content. Students will learn about evaluating the relative importance of news and writing headlines, captions and other display elements. The course familiarizes the student with editing photographs and graphics and designing a newspaper page.

Skill in editing is particularly important to the student majoring in print journalism. It is useful to anyone who regularly



works with words. The student is evaluated through written work (editing copy, writing headlines and captions) and through quizzes, examinations, or other methods the instructor chooses to assess a familiarity with the theory and principles of the course.

Because students need an opportunity to practice their skills under supervision, the course must be taught in a laboratory setting in which each student has access to a computer connected to the Internet.

COMM 260W is a prerequisite. COMM 467 builds on the student's understanding of reporting and news writing techniques by teaching rigor in the use of language.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 468** Graphic Applications in Print Communications (3) Issues, concepts, and practice identified with contemporary design strategies for print journalism, advertising, and public relations.

### **Graphic Applications in Print Communications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 469** Photography for the Mass Media (3) Development of an informed and critical approach to photocommunication; individual and team projects, seminars, and critiques.

### **Photography for the Mass Media (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 470A** Convergent Media News Service: Newspaper Production (3) Practicum emphasizing newsgathering and reporting for newspaper and for additional media formats.

### **Convergent Media News Service: Newspaper Production (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 470B** Convergent Media News Service: TV (3) Practicum emphasizing television news package production for periodic campus news program and for additional media formats.

### **Convergent Media News Service: TV (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 470C** Convergent Media News Service: Radio and Online Publications (3) Practicum emphasizing streaming radio news package production or production of news pieces for online publications and for additional media formats.

### **COMM 470C Convergent Media News Service: Radio and Online Publications (3)**

The digital revolution and cross media ownership has challenged all areas of communications, especially the electronic and print news media. Most media outlets now have an online presence along with their traditional operations. Increasingly news outlets are producing news packages for more than one media outlet, which can include online production of breaking news reports presented with text, images, movies and/or sound bites. Currently students preparing for news careers must have traditional news skills across media along with multimedia computer-based skills to develop versatility in reporting and production. This practicum in streaming radio and online news provides opportunities to produce pieces for streaming radio and online publications and also to reformat these pieces for other media outlets such as the newspaper or television. It will also give students the opportunity to produce news pieces suitable for a cross-media portfolio.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 471 Public Relations Media and Methods (3)** Analyzing media and audiences for public relations purposes; planning, designing, and writing public relations communications; press relations and publicity methods.

### **COMM 471 Public Relations Media and Methods (3)**

COMM 471 introduces students to the methods used in public relations to generate news media coverage for organizations and individuals. The public relations practitioner must understand the goals of the client organization and its publics to establish effective and ethical communication between them. This course focuses on writing and is designed to assist students in developing and improving professional writing skills for public relations practice, in many forms and for a wide variety of media. Students will learn the importance of different writing approaches required for specific publics and news media organizations. In this course students learn to: (1) locate, read, and evaluate research materials; (2) develop clear, concise program objectives based on the organizations' or clients' goals and the results of their research; (3) determine materials that need to be developed and written to achieve the program objectives; (4) develop newsworthy story ideas; (5) write clear, concise copy that is accurate and logically organized; (6) write in a variety of formats commonly used in public relations practice, including: pitch letters, news releases, position papers, backgrounders, public service announcements; and (7) design media kits.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 472 Public Relations Event Planning (3)** Effective planning, organization, implementation and evaluation of events planning.

### **COMM 472 Public Relations Events Planning (3)**

This course links the public relations theories and practices with skills and techniques required for effective events planning. Students will build on their understanding of public relations introduced in COMM 370 by working on projects that are designed to help them to develop skills in conceptualizing public relations events, designing events, selecting sites, analyzing audiences, budgeting, and promoting/marketing. Students will gain experience in event conceptualization and implementation through in-class exercises and discussions, and public events projects. These assignments will provide students the opportunity to develop portfolio materials.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 473 Public Relations Campaigns (3)** Case studies and problems in publicity and public relations in industry, government, and institutions.

### **COMM 473 Public Relations Problems (3)**

This capstone course in the public relations major is designed to provide the student with the opportunity to develop a comprehensive public relations/marketing communications campaign plan based on the four-step process of public relations programming. Those steps include formative research, objectives, programming, and evaluative research. Initially, students will critically analyze award-winning public relations problems, cases, and programs that will provide a foundation for understanding the public relations planning process. Students will be introduced to public relations and

communications theories that provide the foundation for excellence in program development. The public relations campaign plan will be developed from the analysis of primary and secondary research sources. The campaign plan will begin with a situation analysis that includes the client's historical, financial, and competitive position in the marketplace. Previous public relations, advertising, and marketing communications programs will be reviewed and evaluated. Additional secondary research will include a content analysis of the client's news media coverage as well as an analysis of the psychographic and demographic profiles of previously targeted publics. Account teams will design and conduct surveys and focus groups as part of the formative research required in setting the program objectives, strategies, and tactics. The public relations plan will require the development of a media plan, media objectives, production timetable, and budget for implementing the program objectives, strategies, and tactics. Students will apply their critical thinking skills and creative abilities to design and produce communication executions that will communicate the program message to the targeted publics. Those creative abilities include a working knowledge of writing, desktop publishing, photography, and graphic communication. The final phase of the public relations/marketing communications plan will include the design of evaluative research to measure the effectiveness of the program objectives. Those research methods will include content analysis, survey research, and focus groups. Students will work in account teams where each team will be responsible for developing a public relations counseling firm, where team members will produce a firm manual outlining the firm's mission statement, organizational policies, organizational chart, records of all meetings with clients, records of all firm meetings, time sheets for each firm member, a weekly summary of firm activities, project budget reports, bi-weekly evaluations of firm members, and a client presentation plan. The final public relations plan will be presented to the client for evaluation and critique. The final goal of the course is to provide students with the technical and managerial knowledge and experience required for effective public relations program design and implementation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 474** Depth Reporting (3) Exploration of strategies for developing indepth newspaper or magazine articles, with an emphasis on gathering information and long-form writing.

### **COMM 474 Depth Reporting (3)**

This is an upper-level undergraduate course designed to prepare students for writing in-depth newspaper or magazine articles, which extends beyond the basics of writing and reporting techniques emphasized in courses such as News Writing and Reporting, Reporting Methods, and the Feature Article. Depth stories are comprehensive accounts that go well beyond a basic news story or feature. An emphasis on longer, more comprehensive stories that require extensive research and interviews gives students an opportunity to be more than technicians following a rigid set of journalistic guidelines or principles. Depth stories require journalists to spend days, weeks or months exploring and investigating a topic and writing a lengthy story that must be cemented with effective transitions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 475** Issues for Newsroom Managers (3) Newspaper and television management, the state of the industry and topics that prospective employees should know about.

### **COMM 475 Issues for Newsroom Managers (3)**

This is an upper level course for students with an interest in newspaper or/and television management. Issues that managers deal with and management approaches will be covered, emphasizing practical experiences. The basic text may be a packet based on professional experiences of instructor. There will be two papers of roughly 1,500 words. There will be one oral presentation, accompanied by a short summary outlining the main points. The class will consider major issues affecting the industry - the economy, the effort to attract younger audiences and how the look of a product forms the basis of what the audience thinks about the brand and whether it appeals to them. The class will consider how the Internet can be an asset to TV stations and newspapers, if used effectively. Students will evaluate some TV and newspaper Internet sites. The role of advertising and community relations for newspapers and television stations will be discussed. Newspaper opinion pages and public (or interactive journalism) will be covered. The importance of a good local report, and evaluating how effective local coverage is, will focus on state newspapers and television stations. The role of The Associated Press and other news agencies and their approach to coverage and how they relate to local media will be covered. Leadership, management and decision-making will be part of the course. The traits of effective leaders and managers will be discussed. There will be some in-class exercises on managing and ethics. Strategy focusing on the start-up of USA TODAY will illustrate how local newspaper can make strategic gains by following the same checklist. There will be occasional video on the topics covered.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 476 Sports Writing (3)** Techniques in sports reporting and writing for newspapers and magazines.

### **COMM 476 Sports Writing (3)**

This is an upper-level course designed to prepare students to write sports stories for newspapers and magazines. These specialized stories - including contest coverage, analysis, columns, enterprisers, profiles, and sidebars - require skills that go beyond those taught in classes such as News Writing and Reporting Methods.

As the popularity of high-school, college, and professional sports has exploded, the sports section has become one of the most widely read section of many newspapers, and myriad magazines are published that cover a variety of sports. But increasingly knowledgeable sports readers demand more from publications than simple game stories and columns. Modern sports writing requires sportswriters to not only attend games and interview coaches, but also to use statistics, profile sports figures, and explore trends in sports. Through a variety of story assignments, the course will provide students with the experience that will prepare them for the demands of being modern sportswriters. And it will ground them in the ethical principles that all journalists must follow.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 477 Sports Broadcasting (3)** Techniques of sports broadcasting for radio and television.

### **COMM 477 Sports Broadcasting (3)**

This is an upper-level course designed to prepare students to broadcast sports events and news. These specialized broadcasts - including play-by-play, studio sportscasts, field reporting, and features - requires myriad skills that go beyond those taught in classes such as Broadcast Journalism I (Radio News Reporting) and Broadcast Journalism II (Television News Reporting).

As the popularity of high-school, college, and professional sports has exploded, sports shows have become some of the most popular on radio and television. Myriad networks and shows are devoted to sports coverage exclusively. But increasingly knowledgeable sports viewers demand more from sports broadcasters than game coverage and opinion pieces. Modern sports broadcasting requires journalists to not only attend games and interview coaches, but also to use statistics, profile sports figures, and explore trends in sports. Through a variety of story assignments, the course will give students the experience that will prepare them for the demands of being modern sports broadcasters. And it will ground them in the ethical principles that all journalists must follow.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 478 Sports Information (3)** Techniques of effective media relations used in a sports information office.

### **COMM 478 Sports Information (3)**

This is an upper-level course designed to prepare students for a specialized form of modern media relations, sports information. Sports information professionals combine skills of both journalists and public relations specialists, so the advanced techniques go beyond those taught in introductory classes such as News Writing and Public Relations Methods.

As the popularity of high-school, college, and professional sports has exploded, sports information professionals have increasing demands put on them. More and more journalists, working for a variety of publications and broadcasts, cover sports today. Moreover, the growing complexities of modern sports - from the impact of drugs to the enormous salaries of many athletes - means that sports information professionals have to provide more than simple information on athletes, coaches and sporting contest. Through a variety of assignments, the course will provide students with the experience that will prepare them for the demands of being sports information professionals. And it will ground them in the ethical principles that all media relations specialists must follow.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 479 Telecommunication Economics (3)** Economic, regulatory/business issues in the design/operation of large-scale telecommunication networks such as telephone, cable, wireless, and computer networks.

**COMM 479 Telecommunication Networks (3)**

The objective of the course is to help students understand the economic, regulatory, and business aspects of the physical infrastructures underlying modern telecommunications. We will discuss the large-scale technological systems such as telephone, cable, wireless and computer networks over which media and telecommunications services are delivered today. We will not be discussing the content offered over telecommunications networks as much as the infrastructures themselves: the conduits over which information is delivered to the home and the workplace.

With technological convergence and regulatory changes, telephone, cable and wireless networks have acquired the capability to provide services earlier reserved exclusively for one or the other network. For example, we can now access telephone services over wireless networks or over the Internet. Similarly, Web content is available with the traditional telephone modem, as well as over cable, wireless and even satellite networks. In the not too distant future, it may become more meaningful to talk in terms of consumer network to a broadband conduit for all types of content, rather than to particular services such as cable television or long-distance telephony.

It thus becomes necessary for those who wish to participate in the telecommunications industry of the future to have a clear understanding of the way large-scale telecommunications infrastructures are put together and operated. Existing courses in the telecommunications curriculum provide instruction in the technology and content aspects of the media and telecommunications industries. The proposed course will complement these existing courses by focusing on the economic, regulatory and business aspects of large-scale networks, in a historical and policy context.

What are the mechanisms by which large-scale telecommunications systems such as telephone, cable, wireless and computer networks are deployed over time? What are the costs involved in the initial deployment and expansion, and how do they influence policy? How do planners evaluate and choose between alternative technologies of delivering services? What are the economic justifications for and against government regulation of networked technologies? How do companies charge for services provided over networked systems? What problems do we face as more and more services--such as real-time gaming and interactive television--are added to telecommunications networks, and what are some of the current proposals to solve these problems? These are some of the questions that will be discussed in class.

Students taking this course will be expected to have no more familiarity with telecommunication infrastructure issues and basic economic terms and concepts than will be acquired in COMM 180, and ECON 002 or ECON 014. All additional concepts will be introduced at a sufficiently introductory level.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 480 Television News (6)** Produce a weekly television newscast.

**COMM 480 Television News (6)**

COMM 480-Television News will help prepare students for a career in television newscast content, presentation and production with a strong multimedia component. Students will gain experience in all aspects of producing a newscast. The class will meet Mondays and Fridays, but they will be expected to produce content on a daily basis, whenever and wherever stories in Centre County happen. After a few weeks of training, we will produce the Centre County Report each week with elements BOTH ONAIR and ONLINE. This is NOT a newscast focusing only on Penn State activities. Students must be prepared to produce a newscast that informs the larger audience of Central Pennsylvania.

COMM 480 needs the best students to produce the Centre County Report. Students will primarily serve as the news-editorial side of the newscast (anchors, reporters, sports, producers and some in-field photojournalists and studio camera operation) or as the technical team (director, technical director, audio, graphics, studio camera operator AND field production/photojournalists).

By the end of this course, students will have the skill set to:

1. Pursue a career in television news
2. Write solid television news scripts
3. Enhance your storytelling ability
4. Enhance your ability to produce and technically support a newscast
5. Understand the importance of multimedia
6. Produce an effective resume tape

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 481 Advanced Multimedia Production (3)** Advanced work in multimedia production using web authoring, video editing, audio editing, image editing and animation software.

### **COMM 481 Advanced Multimedia Production (3)**

This course builds on the foundations of multimedia production developed in COMM 270 giving students the opportunities to create multimedia website projects. Students will apply advanced multimedia concepts and techniques to website production and demonstrate versatility in multimedia software. Working individually and in teams, students will develop projects for clients using multimedia software, including web authoring, video editing, audio editing, image editing and animation software. These projects will be uploaded to the World Wide Web, and will serve as portfolio materials for the students. This course emphasizes skills development in multimedia and visual media in support of program objective to help students develop cross-media skills and versatility in media.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 482 Advanced Communication Workshop (4)** Conceptualization, planning, and execution of a visual product on a selected topic utilizing an intensive group project-oriented laboratory approach.

### **Advanced Communication Workshop (4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 483 Wireless Communications Industry (3)** A broad examination of the wireless phone industry including its development, current structure and future.

### **COMM 483 Wireless Communications Industry (3)**

Since the 1990s, the wireless industry has transformed "how" people communicate. The ability to offer mobile communication services to consumers allowed the telecommunications industry to rapidly expand and create new products and services. Throughout this period of rapid growth, new players emerged from relative obscurity while incumbent telecommunication providers weighed the benefits & drawbacks of deploying this new technology.

Although wireless devices have become pervasive throughout the United States, few people appreciate the technology and partnerships that are required to offer wireless services for millions of customers. This course will address a variety of wireless topics to allow students to develop a greater understanding and appreciation of the wireless industry. In terms of course design, there are three distinct elements: (1) The early days of the wireless and the key figures and events that shaped an industry, (2) A current state view of the tier 1 carriers, device manufacturers and product offerings, (3) The emerging trends in the wireless industry and the potential impact on consumer products and services.

By the end of this course, the objective is for students to view the wireless industry quite differently. Students will understand the relationship between wireless spectrum, carrier, device manufacturer and products. The industry landscape will be clearer to students and they will be well positioned to pursue a career in wireless.

In this course, students will learn to:

Demonstrate an understanding of the key watershed events and entrepreneurs that initially shaped the wireless industry

Think critically, creatively and independently

Demonstrate an understanding of the current wireless industry landscape

Apply tools and technologies appropriate for the communications professions in which they will work

Appreciate the evolution of the wireless industry and be positioned to contribute to the development of the next generation of wireless products & services.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 484** Emerging Telecommunications Technologies (3) Overview of technology of electronic media and related societal issues.

**COMM 484 Emerging Telecommunications Technologies (3)**

COMM 484 will introduce the technologies in telecommunications and information processing, with an eye toward giving students the necessary perspective on how these technologies work and how markets develop. The course investigates old, new and prospective technologies primarily through an interactive classroom analysis of incumbent or emerging companies bringing products and services to market. Students will conduct their analysis by examining materials not customarily used by undergraduates including stock prospectuses, company annual reports and Internet searches. The class will consider recent strategic alliances, mergers and acquisitions (whether consummated or not) in the context of whether and how technologies drove the deal.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 484H** Emerging Telecommunications Technologies (3) Overview of technology of electronic media and related societal issues.

**COMM 484H Emerging Telecommunications Technologies (3)**

COMM 484H will introduce the technologies in telecommunications and information processing, with an eye toward giving students the necessary perspective on how these technologies work and how markets develop. The course investigates old, new and prospective technologies primarily through an interactive classroom analysis of incumbent or emerging companies bringing products and services to market. Students will conduct their analysis by examining materials not customarily used by undergraduates including stock prospectuses, company annual reports and Internet searches. The class will consider recent strategic alliances, mergers and acquisitions (whether consummated or not) in the context of whether and how technologies drove the deal.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 485** Analysis of Broadcast-Cable Policy (3) Analysis of current policy issues in Broadcast/Cable. Standards and methods for evaluating telecomm policy processes and outcomes.

**Analysis of Broadcast-Cable Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 486** Telecommunications Ethics (3) Drawing on normative theory and political philosophy, this course explores problems in ethics and social responsibility in telecommunications.

**COMM 486 Telecommunications Ethics (3)**

In this course the instructor and students work together to consider and analyze ethical issues in contemporary telecommunications practice. Using the tools of ethical and political philosophy, students will discuss current cases in often long-standing problem areas such as truth, privacy and content control. The intention is that all involved will develop a greater sensitivity to the ethical dilemmas confronting telecommunication professionals and a greater ability to evaluate media performance. The course also strives to help students gain a deeper insight into their own ethical principles and become more keenly aware of the foundations and professional implications of those principles.

In the first few weeks of the semester, students will review the major ethical theories and theorists. They will discuss the nature and types of normative analysis, including the major systems of ethical thought, the process of ethical reasoning and the meta-ethical problems of definition and justification. They will also explore the foundations of political philosophy as they relate to the role of telecommunications industries in democratic society. Related topics will include

the nature and history of professional norms and values, the development of ethical codes within specific industries and existing organizational processes for the applications of those standards (the clearance process).

In the remainder of the semester, students will discuss case studies involving various ethical dilemmas in professional practice across all segments of the relevant industries including, broadcasting, cable, telephony and the Internet. Special attention will be given to contemporary problems in areas such as social networking and Internet search companies. Topics will include: content control in entertainment and advertising, including issues involving race, gender and age; freedom of expression; privacy; intellectual property; international and cross-cultural issues; truth and anonymity; system access and power; questions of civic engagement; image ethics in a digital age; and broader philosophical questions about the inherent social nature of telecommunications technology.

There are, of course, no 'correct' answers in these cases; stress is placed on the process of analysis. Students will be evaluated on their ability to articulate their assumptions and formulate coherent ethical rationales based on those assumptions.

Comm 180 is a prerequisite for his course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 487** Advanced Telecommunications Management and Leadership (3) Strategic management, leadership and ethics issues including marketing, financing, entrepreneurship, and innovation.

### **COMM 487 Advanced Telecommunications Management and Leadership (3)**

This senior-level capstone course discusses a range of strategic management, leadership and ethics issues in telecommunications and media firms. Learning objectives include creative problem-solving, critical thinking and writing, basic financial literacy and management considerations in ethics, globalization, diversity and free speech. Specific areas of emphasis include marketing, programming, customer service, technology adoption, finance and strategic planning. Broadly, the aim is the honing of critical and creative problem solving skills and the enhancement of collaboration and communication skills.

The course also stresses the fiduciary and social responsibilities that adhere to the telecommunication manager's role.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 488** Writers' Seminar (3) Workshop designed for advanced students interested in professional writing, involving extensive mutual and self-criticism.

### **COMM 488 Writer's Seminar (3)**

This course is designed for advanced students interested in professional writing in the theatre, screen, and media arts. The class work involves submission and extensive revision of a variety of written projects. Revisions are based upon direct feedback from the instructor, as well as mutual critiques from classmates. Students will also learn the technique of self-criticism of their writing and in doing so develop a sense of their own writing style and subject matter preferences.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 489W** Media and Information Industries (3) The structure, conduct and performance of firms and industries in the electronic media and information sectors.

### **COMM 489W Media and Information Industries (3)**

The objective is for students to examine and learn how to apply concepts of structure, conduct and performance to firms and industries in the electronic media and information sectors, primarily in North America. Industries include broadcasting television and radio, broadband/cable television, satellite television, videogaming, Hollywood, music recording, home video, advertising, online content and entertainment and sports media. Topics include competition and competitive advantage, mergers and concentration of ownership, strategic behavior, industrial organization, industry



finance basics, industry practices in pricing, marketing and distribution, the economic impact of technological change and advances in e-commerce, industry and firm profitability and innovation, and the relationship between Wall Street and media industries. Class time is devoted to lecture, discussion (particularly about research and writing) and student presentations. Students are evaluated on an original research project, performance on tests, homework and contributions to discussion. There may also be online discussion and collaboration.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 490** Issues in Electronic Commerce: Policy and Implementation (3) Analysis of policy, strategic issues, and implications raised by the rapid growth of electronic commerce over the Internet.

### **COMM 490 Issues in Electronic Commerce: Policy and Implementation (3)**

This senior level course teaches students about the unique business, policy, regulatory and legal aspects of commerce on the Internet, as well as the social implications of the global implementation of such commerce for areas such as privacy and consumer protection. Learning objectives include creative problem-solving, critical thinking and writing, basic financial literacy and management considerations in ethics, globalization, diversity and free speech.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 490A** Convergent Media Seminar (3) This seminar examines media convergence issues, trends, and effects on society through discussions, presentations, and creation of a capstone project.

### **Convergent Media Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 491** International Telecommunications and Trade Policy (3) Development in the law, policy, and business of international telecommunications; emphasis on multilateral forums--International Telecommunications Union and World Trade Organization.

### **COMM 491 International Telecommunications and Trade Policy (3)**

The study of international telecommunications policy requires an interdisciplinary perspective. Students should understand the past and present technological, business, philosophical, geographical and legal environment. Success in either the public or private sectors may depend on one's ability to anticipate and react to future trends and upheavals. This course will provide a forum for students to investigate and debate ongoing or anticipated conflicts in international telecommunications and trade policy. The resulting confrontations may stem from technological innovation, real or perceived changes in the marketplace, or the imperatives of prevailing regulatory, political or economic philosophies. Conflict resolution often results from persuasive advocacy, coalition building, and accommodation of outsiders with new perspectives or entrepreneurial visions, rather than applying legal precedent or treaty interpretations. The course also will examine how various nations have organized and reorganized the telecommunications sector. In this portion, we will consider such developments as privatization, liberation, deregulation and globalization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 492** Internet Law and Policy (3) Development in the law, policy, and business of Internet-mediated communications and commerce; emphasis on impact on existing legal, regulatory, and economic models.

### **COMM 492 Internet Law and Policy (3)**

This course will provide a forum for students to investigate and debate ongoing or anticipated conflicts in Internet-mediated telecommunications, information processing and commerce. The resulting confrontations may stem from technological innovation, real or perceived changes in the marketplace, or the imperatives of prevailing regulatory, political or economic philosophies. Conflict resolution often results from persuasive advocacy, coalition building, and accommodation of outsiders with new perspectives or entrepreneurial visions, rather than applying legal precedent or treaty interpretations. Internet mediation has the potential to change how we communicate, educate, inform, entertain, and transact business. Technological and marketplace convergence means that Internet mediation will have a profound impact on many legal, regulatory and economic constructs, i.e., the preexisting templates we use to describe and understand the communications process and impact on individuals and society. The course also will examine the growing body of cases that have addressed aspects of Internet-mediation in each of the following general categories:

- \* Speech-commercial and political speech, obscenity, forums analysis
- \* Legal and Regulatory Consequences of Convergence-the juxtaposition of telecommunications and information processing technologies, markets and regulatory regimes
- \* Governance and regulation of the Internet-whether the need exists for government intervention on such matters as numbering and domain registration
- \* Intellectual Property Rights-the impact of Internet-mediation on copyright, trademark and patent laws
- \* Electronic Commerce-the law and policy of Internet-mediated transactions, privacy and encryption concerns
- \* Equity, Competition Policy and Consumer Protection Concerns-what, if anything, should governments do to remedy market failures

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 493 Entrepreneurship in the Information Age: Senior Seminar (3)** Provides students with knowledge/tools to take their innovation/technology idea through the business planning, capital, and operations budgeting processes.

**COMM 493 Entrepreneurship in the Information Age: Senior Seminar (3)**

COMM 493, an active learning course, provides students with knowledge and tools to take their own idea for a media or communications innovation and determine the feasibility of launching it as a small business. Students bring their own ideas for a communications product or service. They work through the market feasibility, business planning, capital and operations budgeting processes to finally researching and seeking start up capital. The final product produced by each student is a comprehensive business plan suitable for launching a real business. This course is designed for both students plan to pursue careers as entrepreneurs and those who wish to learn more about small business management in the information age. Topics include entrepreneurship, business planning and budgeting, starting and managing a small media or communication technology firm, economic history of media, telecommunications and information innovation, trends and opportunities in media and information sectors, high tech start up legal and employment issues, financing options, overview of venture capital, IPOs and market capitalization, market feasibility analysis. Cases of recent successes and failures in the information and media sectors are used to illustrate principles of business planning, market and financing trends and entrepreneurship. In addition to producing a business plan complete with market feasibility analysis and financial forecast reports, there may also be quizzes and exams. Classroom time is devoted to lecture, project work and discussion.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 494 Research Project Courses (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 494H Research Project Courses (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 495** Internship (1-3 per semester/maximum of 6) Supervised practicum with newspapers, broadcasting stations, public relations, and advertising agencies.

**Internship (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 495A** Internship (1-6 per semester/maximum of 6) Supervised practicum with newspapers, broadcasting stations, public relations, and advertising agencies.

**Internship (1-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 496H** Honors Independent Studies (1-6) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Honors Independent Studies (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 496H** Honors Independent Studies (1-6) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Honors Independent Studies (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject

which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 497A** Entrepreneurial Journalism (3) Students will learn how digital innovation is changing the practice, culture and business models of journalism, how new journalists can thrive in this new environment and what skills and abilities will be key success factors. Students should have senior standing to enroll.

### **Entrepreneurial Journalism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 497B** International Documentary Production (3) UP classroom work will consist of research and proposal of a short personal observation film. Students will shoot their film during an 8 day trip to England. Project will be edited upon return, and shown at final screening June 5.

### **International Documentary Production (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 497C** Social Media for Public Relations (3) This course will explore social media technologies and how to effectively use social media to communicate strategic public relations messages.

### **Social Media for Public Relations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 497E** (PL SC 497E) Role of the Media in the Israeli-Palestinian Conflict (3) This course examines the role of framing and selective reporting in broadcast, digital, and print media in affecting perceptions of the Israeli- Palestinian Conflict.

### **Role of the Media in the Israeli-Palestinian Conflict (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 498A** In the Game (3) Produce half-hour sports magazine style show to air on College HD channel and Web. Students will produce, report, anchor and direct the show. Registration by application.

**In the Game (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 498A** In the Game (3) Produce half-hour sports magazine style show to air on College HD channel and Web. Students will produce, report, anchor and direct the show. Registration by application.

**In the Game (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 498B** Wireless Devices and Global Markets (3) Wireless Devices and Global Markets is a new course that examines the market for wireless devices, from Android smartphones to iPhones and iPads. Students will learn about next generation smartphones and get to develop a unique product design concept.

**Wireless Devices and Global Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 498B** Wireless Devices and Global Markets (3) Wireless Devices and Global Markets is a new course that examines the market for wireless devices, from Android smartphones to iPhones and iPads. Students will learn about next generation smartphones and get to develop a unique product design concept.

**Wireless Devices and Global Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 498C** Contemporary Constitutional Problems (3) This course examines current topics in constitutional law, focusing on a wide range of issues, including the scope of privacy on your Twitter and Facebook accounts, increased pressure on Hollywood to curb violence in film, television and video games, whether the Second Amendment would permit a ban on assault weapons, and the constitutionality of California's Proposition 8 and the Defense of Marriage Act.

**Contemporary Constitutional Problems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 499** (IL) Foreign Study--Mass Communications (1-12) Study of mass communication systems and practices in selected foreign countries.

**Foreign Study--Mass Communications (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 501** Proseminar in Mass Communications (3 per semester/maximum of 99) Overview of paradigms in mass communications research

**Proseminar in Mass Communications (3 per semester/maximum of 99)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 502** Pedagogy in Communications (3) The purpose of this seminar is to train doctoral students to teach in the communications discipline at the college/university level.

**COMM 502 Pedagogy in Communications (3)**

This seminar is proposed as a dimension of the emphases on TA training and teacher preparation for doctoral students in Mass Communications in the College of Communications. The course is one aspect of the College's Graduate Teaching Academy. The seminar provides a foundation in pedagogical research, theory and classroom practice for mass communications doctoral students. The Graduate Teaching Academy demonstrates our faculty's commitment to the integration of training in research and teaching. The work of the seminar focuses on the unique characteristics of undergraduate and graduate education in the communications discipline. The principles and practices covered in the seminar have applications for teaching communications in a number of venues including the academic, business and government professional settings. The course involves students in collaborative learning, assessment skills, powerful pedagogies, practical workshops and substantive reviews and applications of curricular and pedagogical research in the communications discipline.

The Graduate Teaching Academy in the College of Communications involves students in a number of activities that will prepare them for teaching. This seminar is one of those activities. Graduate Teaching Academy participants:

1. Take coursework in communications curriculum and pedagogical development that stresses a teaching scholarship of learning theory and a pedagogy of active and engaged learning practices.
2. Study the scholarship of learning within a disciplinary context in order to understand the system of organized knowledge in the communications discipline within which our teaching takes place. This orientation encourages a critical review of the comparative costs/benefits of a disciplinary - versus interdisciplinary-based communications pedagogy.
3. Eligible doctoral students become Teaching Associates, under faculty supervision, for selected College of Communications courses
4. Teach an undergraduate course in the College as an instructor.
5. Develop a teaching portfolio.
6. Attend College colloquia.
7. Have access to College resources like the Academic Services Center, the Office of Multicultural Affairs, and University resources such as the Center for Excellence in Learning and Teaching at Penn State's Schreyer Institute.
8. Complete the Teaching with Technology certification.

**Faculty Member Proposing Course:** Anne Hoag

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 504** Seminar in the History of Mass Communication (3) No description.

**Seminar in the History of Mass Communication (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 505** International Communication Problems (3) Legal and communications problems of the international flow of news and opinion; international press codes.

**International Communication Problems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 506** Introduction to Mass Communications Research (3) The scientific method; survey of basic concepts of theoretical and empirical research; variety of methodology; criteria for adequate research.

**Introduction to Mass Communications Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 507** News Media and Public Opinion (3) Problems in the function, techniques, and responsibilities of press, radio, and television in forming and interpreting opinion.

**News Media and Public Opinion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 508** The Literature of Journalism (3) No description.

**The Literature of Journalism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 510** Comparative Theories of Press Systems (3) Institutional structure and normative functions of press systems in modern societies, as shaped by prevailing world view and social organization.

**Comparative Theories of Press Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 511** Mass Communications Research Methods II (3) Problems of bibliographical research; evaluation of sources and materials in mass communications history, biography, structure, ethics, and other areas.

**Mass Communications Research Methods II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 512** Government and Mass Communications (3) Problems of freedom of information; governmental efforts to control mass communication agencies; government news coverage; public information agencies.

**Government and Mass Communications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 513** Constitutional Problems of the News Media (3) Problems involving conflict between guarantees of press freedom in the First and Fourteenth Amendments and rights and privileges of others.

**Constitutional Problems of the News Media (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 514** Political Economy of Communications (3) Structure and functions of United States and global media systems and their relationship to political and economic systems.

**Political Economy of Communications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 515** MA Proseminar in Mass Communications (3) An introduction to graduate studies for MA students in Media Studies and Telecommunications Studies.

**MA Proseminar in Mass Communications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 516** Introduction to Data Analysis in Communications (3) To understand and be able to use data analysis techniques common to research in communications.

**COMM 516 Introduction to Data Analysis in Communications (3)**

This class serves as an introduction to data analysis techniques commonly employed in the field of communications and in related disciplines. The course will employ a commonly-used statistical package to illustrate concepts (e.g., Statistical Package for the Social Sciences, SPSS), and instruction will be provided on how to employ statistical software to conduct a variety of specific analysis techniques. These techniques will include descriptive statistics, analysis of variance, correlation and regression, and exploratory factor analysis. Examples of research from the communications discipline and related fields will be used throughout the semester to illustrate concepts. Emphasis will be placed on decisions involved in the data analyses process, interpretation of data, and effective presentation of results in journal-article format. Evaluation will be based on short take-home assignments, exams, and a final paper.

**Faculty Member Proposing Course:** Mary Beth Oliver



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 517 Psychological Aspects of Communication Technology (3)** Investigation of psychological aspects of human-computer interaction (HCI) and computer-mediated communication (CMC).

### **COMM 517 Psychological Aspects of Communication (3)**

This graduate seminar is devoted to the investigation of psychological aspects of human-computer interaction (HCI) and computer-mediated communication (CMC). Theories and empirical research from communication, psychology, and human-computer studies will be used to explore social responses to communication technologies; uses and effects of unique technological features such as interactivity and navigability upon individual users' thoughts, emotions, and behaviors; nature and dynamics of interpersonal and group interaction when mediated by technology; how issues of "source" and "self" are altered by computer-based media; and psychological consequences of internet use, such as addiction and depression. A primary goal of the seminar is to draw out, through readings, discussion and empirical exploration, fundamental theoretical and practical implications of these lines of research for interface design, psychological processing of mediated form and content, human-web site interaction, and internet-based mass, group and interpersonal communication.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 518 Media Effects (3)** Advanced study of the effects of media messages and technologies via theories and empirical evidence pertaining to processes of effects.

### **Media Effects (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 520 Seminar in Advertising Problems (3)** No description.

### **Seminar in Advertising Problems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 521 Advertising Perspectives (3)** An overview of advertising in industrial societies including institutional issues; socio-demographic issues; public policy issues; and ethical issues.

### **Advertising Perspectives (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 522 Social and Cultural Aspects of Advertising (3)** Analysis of advertising from a cultural/literary perspective; emphasis on semiotic and hermeneutic analysis; advertising as social communication.

### **Social and Cultural Aspects of Advertising (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 550** Film Theory and Criticism (3) Studies in traditional and contemporary film theory and criticism.

**COMM 550 Film Theory and Criticism (3)**

COMM 550 seeks to introduce students to a variety of theoretical approaches to the critical analysis of film. The course devotes attention to aesthetic as well as social, cultural, political and economic issues, assuming that they are, in fact, inseparable. It involves viewing films closely, and researching the contexts of their production and reception. It stresses critical thinking, reading, viewing and writing skills.

COMM 550 assumes that films can reveal, both directly and indirectly, something about the experiences, identity, and culture of the people who produce and consume them. That is, movies can be analyzed--even psychoanalyzed--to reveal something about the cultural conditions that produced them and attracted audiences to them. The course seeks both to familiarize students with works they probably haven't seen, and to "defamiliarize," through critical and historical analysis, works they very well may have seen. Films are examined as formal constructs, market commodities, and cultural artifacts.

Individual instructors may emphasize film authorship, styles, genres, systems or cycles. They may focus on the context, text or reception of a film, filmmaker, or group of films. The emphasis of COMM 550 is always on the self-conscious, theoretically informed analysis of cinematic texts.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 553** Special Problems in Film and TV (1-3) No description.

**Special Problems in Film and TV (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 580** Seminar in Telecommunications (3) Study of the historical and contemporary issues and problems in telecommunications.

**Seminar in Telecommunications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 582** Ethics and Emerging Communications Technology (3) Identification and analysis of ethical issues raised by electronic communications technologies.

**Ethics and Emerging Communications Technology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 583** Seminar on United States Telecommunications Policy (3) Examination of the United States telecommunications policy process and current issues.

**Seminar on United States Telecommunications Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 584 International Telecommunications and Trade Policy (3)** An interdisciplinary perspective that investigates contemporary debates and ongoing or anticipated conflicts in international telecommunications and trade policy.

**COMM 584 International Telecommunications and Trade Policy (3)**

The study of international telecommunications policy requires an interdisciplinary perspective. Students should understand the past and present technological, business, philosophical, geopolitical and legal environment. Success in either the public or private sectors may depend on one's ability to anticipate and react to future trends and upheavals.

The course presents, investigates and debates ongoing or anticipated conflicts in international telecommunications and trade policy. The resulting confrontations may stem from technological innovation, real or perceived changes in the marketplace, or the imperatives of prevailing regulatory, political or economic philosophies. Conflict resolution often results from persuasive advocacy, coalition building, and accommodation of outsiders with new perspectives or entrepreneurial visions, rather than applying legal precedent or treaty interpretations.

The course also will examine how various nations have organized and reorganized the telecommunications sector. We will consider such developments as privatization, liberalization, deregulation and globalization.

Faculty: Rob Frieden

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 585 Media & Telecommunications Industries (3)** Study the structure and performance of media, telecommunications and information industries applying principles and ideas from microeconomics, finance and communications.

**COMM 585 Media & Telecommunications Industries (3)**

The objective of this graduate seminar is twofold. First, the course provides exposure to the applications of selected concepts, principles and topics in microeconomics to the analysis of the media, telecommunication and information markets. This course is not intended as a general introduction to microeconomic theory and practice - however, students will have the opportunity to begin their study of selected applications of microeconomic principles at a fundamental level and advance their understanding to a high level of complexity worthy of graduate coursework. The second objective of the course is to connect ideas and principles from microeconomics to a body of communications theories, demonstrating possible complements and conflicts across the two disciplines. Discussion of both theoretical and empirical scholarship is emphasized. This in turn gives students a framework for further research on the structure of information industries and the conduct and performance of communications firms. Course covers international markets but focus is on North America. Topics may include selected industries such as wired and wireless telephony, satellite communications, broadband/cable, broadcasting, film, advertising, publishing, computing and Internet; industrial organization; competition and competitive advantage, growth and the economic causes of innovation; economics of intellectual property protection; electronic markets, hierarchies and transactions cost economics; the economic justification and effects of regulation; natural monopoly economics; cost modeling, demand forecasting and pricing in regulated monopoly and competitive industries; telecommunications deregulation and privatization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 587 Internet Law and Policy (3)** Examination of legal, policy and business developments in Internet-mediated communications emphasizing the impact on existing regulatory and economic models.

**COMM 587 Internet Law and Policy (3)**

This course will provide a forum for students to investigate and debate ongoing or anticipated conflicts in

Internet-mediated telecommunications, information processing and commerce. The resulting confrontations may stem from technological innovation, real or perceived changes in the marketplace, or the imperatives of prevailing regulatory, political or economic philosophies. Conflict resolution often results from persuasive advocacy, coalition building, and accommodation of outsiders with new perspectives or entrepreneurial visions, rather than applying legal precedent or treaty interpretations. Internet mediation has the potential to change how we communicate, educate, inform, entertain, and transact business. Technological and marketplace convergence means that Internet mediation will have a profound impact on many legal, regulatory and economic constructs, i.e., the pre-existing templates we use to describe and understand the communications process and impact on individuals and society. The course also will examine the growing body of cases that have addressed aspects of Internet-mediation in each of the following general categories: Speech - commercial and political speech, obscenity, forums analysis; Legal and Regulatory Consequences of Convergence - the juxtaposition of telecommunications and information processing technologies, markets and regulatory regimes; Governance and regulation of the Internet - whether the need exists for government intervention on such matters as numbering and domain name registration; Intellectual Property Rights - the impact of Internet-mediation on copyright, trademark and patent laws; Electronic Commerce - the law and policy of Internet-mediated transactions; privacy and encryption concerns; and Equity, Competition Policy and Consumer Protection Concerns what, if anything, should governments do to remedy market failures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 594A** Telecommunications Studies Masters Paper (3) A significant research paper completed under the direction of a faculty adviser.

#### **Telecommunications Studies Masters Paper (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 594B** Research Project Apprenticeship (1-3 per semester, maximum of 3) Provides opportunities for doctoral students to enhance their knowledge of comparative research methods by working on established faculty research projects.

#### **Research Project Apprenticeship (1-3 per semester, maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 595** Internship (1-18) Supervised off-campus, non-group instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 597A** Media and Culture (3) This course will examine the ongoing effort to theorize the complex relationship between media and culture during the 20th Century and into our own. We will begin with seminal thinkers like Adorno and Benjamin who framed the debate, and work our way toward contemporary theorists like Zizek and Ranciere who have continued to problematize how different forms of media exert their forces on individuals and the cultures in which they live.

#### **Media and Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

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#### **Media and Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 597A** Media and Culture (3) This course will examine the ongoing effort to theorize the complex relationship between media and culture during the 20th Century and into our own. We will begin with seminal thinkers like Adorno

and Benjamin who framed the debate, and work our way toward contemporary theorists like Zizek and Ranciere who have continued to problematize how different forms of media exert their forces on individuals and the cultures in which they live.

### **Media and Culture (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 597B** Advanced Data Analysis in Communications (3) An examination of advanced data analytic techniques in communications, with an emphasis on applied understanding and hands-on application of data-analysis software.

### **Advanced Data Analysis in Communications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 597D** Ethnography in Communication Research (3) This course is designed to provide students with a working knowledge of the intellectual history and major concepts, premises, theoretical approaches, analytical techniques and methodologies germane to the study of ethnography as a form of qualitative research. Concurrently, the students will engage the praxis of fieldwork during the course, allowing us to personally/ collectively explore what it means to define/investigate/understand "the Field" in all its permutations and consider ethnographic engagement as it occurs across its wider contemporary spectrum ranging from traditional approaches to evolving methodologies related to understanding emerging communications technologies. Finally, the challenges, perspectives, roles, and ethical implications related to the "research" will be a central motif.

### **Ethnography in Communication Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 597E** Feminist Media Studies (3) We will examine classic and contemporary debates that span the histories, methodologies, and texts central to feminist media criticism. We will also explore the political, historical, economic, cultural, and academic struggles that such debates contributed to and were shaped by as the field of feminist media studies became an established discipline.

### **Feminist Media Studies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching or assisting in School of Communication courses by graduate students with previous news-editorial, advertising, and broadcasting experience.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMM 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Communications-CI (COMMS)

**COMMS 438** Magazine Editing (3) Study and practice of the editing and design of magazines and newsletters.

**COMMS 438 Magazine Editing (3)**

Prepares students to manage, edit, and design newsletters and magazines. Topics include copyediting, layout and design, and managing serial publication work flows. Students in this course are expected to be proficient writers, as they need a critical eye when editing for writing style, grammar, and punctuation. Students do various assignments that build practical skill level in copyediting, headline and photo caption writing, layout, design, and publication management.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 500** Communications and Cultural Theory (3) This course is designed to provide students a broad background in communications and cultural theory.

**COMMS 500 Communications and Cultural Theory (3)**

This course is an advanced study of various interpretive approaches and methodological tools that are central to the analysis of media artifacts, including newspaper articles, magazines, films, advertising, and television programs. It begins with an overview of various interpretive traditions, including culturalism, psychoanalytic theory, structuralism, ethnic and racial critiques, poststructuralism, postmodernism, feminism, postcolonial studies, and queer theory. It prepares students

to critically examine philosophical assumptions regarding the relationship between the nature of knowledge, expression, writing and creative production on one hand, and conceptions of personhood, community, social structures and authority, on the other. Students are required to do significant reading and writing in this course, and to propose and conduct analyses of communication artifacts.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 503 Research Methods in Communications (3)** This course prepares students to conduct research in communications using both qualitative and quantitative research methods.

**COMMS 503 Research Methods in Communications (3)**

This course prepares students to conduct research in communications. It begins with an overview of the different strategies and philosophies of research methodology including scientific method, inference, skepticism, hypothetico-deductive reasoning, critical, humanistic, and naturalistic inquiry. The course focuses on four major types of communications research methodology: experimental, survey, textual analysis and naturalistic inquiry. Students are required to do significant reading and writing in this course, as well as propose and conduct a research project of their own design. This course is a fundamental element of the masters program curriculum in that it prepares students to conduct their thesis projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 519 Communication Technology and Culture in History (3)** An advanced study of various interpretive approaches and methodological tools that are central to the analysis of cultural artifacts.

**COMMS 519 Communication Technology and Culture in History (3)**

This course is an advanced study of various theoretical approaches that are central to the analysis of communication technology and culture in historical context. It begins with an overview of various communication historiographies, including the works of Harold Innis, Walter Ong, Umberto Eco, Elizabeth Eisenstein, James M. Carey, Marshall McLuhan, Lewis Mumford, and others. It engages students in the critical examination of such critical issues as communication and public memory, discourse in historical context and the historical basis of identity. Students are required to do significant reading and writing in this course, and to propose and conduct historical research employing one of the theories discussed in this course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 525 Advanced Writer's Seminar (3-9 per semester/maximum of 9)** This course supports the development of advanced writing projects in a range of different genres.

**COMMS 525 Media Writer's Seminar (3-9 per semester/maximum of 9)**

This course is an advanced study of narrative styles and research techniques used in various forms of writing, including journalism and creative non-fiction, memoir, opinion pieces, cultural criticism, copy writing, writing for interactive media, and writing for performance media. Offerings in different semesters will focus on different topics in these writing genres. The course prepares students to create original material in a variety of writing genres, and for a variety of media. It is well-suited for the development of creative master's projects, and for extending the student's graduate research into a professional portfolio. The first portion of the course defines the elements of the genre through textual analysis and establishes a theoretical framework. Students will then submit for peer review a project proposal that addresses the appropriateness of the subject to the genre, outlines research methods, defines the intended audience, and provides examples of potential outlets. Students will then submit a first draft for peer review, and finally a finished draft for peer review and evaluation.

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 555 Media Discourse Analysis (3)** This course provides students with advanced theoretical approaches and methodological tools to analyze a variety of media discourses.

**COMMS 555 Media Discourse Analysis (3)**

This course provides students with both theoretical approaches and methodological tools to analyze a variety of media discourses. It begins with an overview of linguistic theories, including structuralism, poststructuralism, semiotics, and critical discourse analysis. The course highlights the philosophical relationship between language, culture, identities, politics, and intercultural communications. It also prepares students to examine discourses from multiple angles, such as textually oriented analysis, critical analysis, linguistic analysis, ethnographic analysis, etc. The course then leads into a discussion of several common discursive models in media: ritual, myth, and social drama. It ends with case studies of discourse in films, television, news, advertisement, the Internet, and politics. Students are required to do significant reading and writing in this course, and to propose and conduct a project of discourse analysis of their own design.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 560 Seminar on Global Culture and Communication (3)** This course explores the globalization of communication and communication technologies within a broad political, economic and cultural context.

**COMMS 560 Seminar on Global Culture and Communication (3)**

Developments in technology have led to new levels of interaction and interdependency of human groups and processes across the boundaries that historically separated them - geography, national identity, state borders, and local community. In such a context, we must re-examine many of our assumptions about space, place, identity, and belonging, and about human social organization and human agency - the potential to purposefully transform ourselves and our surroundings. Globalization calls into question our assumptions about politics, economics, culture, and communication. In this course, students will consider the challenges and opportunities that globalization creates for human community and agency - that is, for the multiple ways in which human activity becomes socially organized and purposeful. They will survey the dominant theories of globalization and regionalization and examine the current trends in regionalization and globalization of politics, culture, communication, economic processes, and regulatory structures. They will focus on the challenges communication globalization poses to past forms of identity, the transformation of traditional understandings of space and place, and the opportunities for new forms of identity, community, and action.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 568 Media Production Workshop (3-9 per semester/maximum of 9)** This course prepares students for the creation of advanced media projects in traditional and digital media.

**COMMS 568 Media Production Workshop (3-9 per semester/maximum of 9)**

This course is a workshop for the creation of advanced media projects in traditional and digital media. Workshop topics will alternate coverage of different media, and will include photography, graphic design, interactive media, video, audio, and other media to reflect the needs of the graduate program. Students will submit proposals that address their project objectives, production plans, and intended audiences. After submitting proposals for peer review and faculty evaluation, students will begin a three-stage process of pre-production, production, and post-production in the creation of their work. This process will require the organization of production elements, the acquisition of media, and the creation of the finished project. This seminar is intended for graduate students who wish to gain experience with new media technologies, pursue creative outlets for their research interests, or develop their professional portfolios. It is an intensive workshop with demanding writing and technology requirements.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 580** Communications Master's Project (3-6 per semester/maximum of 6) An original master's paper or creative production with critical paper.

**COMMS 580 Communications Master's Project (3-6 per semester/maximum of 6)**

This course may be a scholarly master's paper or it might instead be by a creative production supplemented by a descriptive and analytical paper. The production should display integration in skills and knowledge gained in the program as well as depth within an area of concentration. A committee of Communications faculty, supplemented by outside consultants where appropriate, would be needed to judge the final project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 600** Thesis Research (1-15 per semester/maximum of 99) No description.

**Thesis Research (1-15 per semester/maximum of 99)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMMS 610** Thesis Research (1-15 per semester/maximum of 99) No description.

**Thesis Research (1-15 per semester/maximum of 99)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Community Psychology (CMPSY)

**CMPSY 500** Theories and Issues in Community Psychology (3) Contemporary issues in community psychology will be discussed within the framework of its development from clinical and social psychology.

**Theories and Issues in Community Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 510** Change Processes (3) Social change as it takes place within institutions and communities.

**Change Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 511** Social Impacts on Psychological Functioning (3) Psychological functioning, as it is affected by social contexts.

**Social Impacts on Psychological Functioning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 519** Research Methods I (3) In-depth examination of research methods utilized by community psychologists and social change activists; course followed by CMPSY 520.

**CMPSY 519 Research Methods I (3)**

This course, along with CMPSY 520-Research Methods II, will examine the key research methods available to community psychologists and social change activists. The course will emphasize a hands-on experience for students so that they can understand all the components of conducting program assessments. All students will develop pilot projects under the guidance of the instructor that will give the students experience in developing action research/program evaluation questions, completing research literature reviews, developing specific methodologies appropriate to their action research/program evaluation questions, data base design, data analysis, and report writing. There will be a balance between action research, program evaluation, quantitative and qualitative approaches. A final report and presentation of the findings of the pilot project are required. This course is the research methods course required of all community psychology and social change graduate students. This course assumes a basic understanding of introductory statistics and the use of statistical software will be undertaken in the course. The course is the introductory research methods course and will be offered in a sequence with CMPSY 520-Research Methods II. Both CMPSY 519 and CMPSY 520 must be taken in order to complete the Community Psychology and Social Change research methods requirement for graduation. This course is for 3 credits.

Faculty: Richard Fiene and Robert Colman

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 520** Research Methods II (3) In-depth examination of research methods utilized by community psychologists and social change activists. (Continuation of CMPSY 519).

**CMPSY 520 Techniques in Action Research (3)**

This course is the second of two research methods courses required of all Community Psychology and Social Change graduate students, emphasizing action research, program evaluation, and both qualitative and quantitative measurement.

Faculty: Richard Fiene and Robert Colman

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 521** Roles and Methods in Community Psychology (3) Advanced course entailing the development of Master's Projects with both fieldwork and research; each student writes a formal proposal.

**Roles and Methods in Community Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 522** Practicum (3-6) Fieldwork implementing planned change.

**Practicum (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 594** Research (3-6) Supervised research on a master's paper.

**Research (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Community S P & D (CSP D)**

**CSP D 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSP D 596** (H P A 596) Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSP D 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSP D 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSP D 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised and graded teaching experience in undergraduate Community Development, Health Planning and Administration, and Law Enforcement and Corrections courses.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSP D 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSP D 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

## Community and Economic Development (CEDEV)

**CEDEV 430 Principles of Local Economic Development (3)** Concepts, strategies, and techniques of local economic analysis, planning, and development; case studies and decision-making exercises.

### **CEDEV (AG EC) 430 Principles of Economic Development Planning (3)**

This course is designed to introduce the issues giving rise to concern for rural and regional economies, and the theories, concepts and tools of rural and regional economic development. The goal is to integrate theory and practice and apply them to economic development problems. Tools are presented in a "how to" manner. Topics include current issues in rural economies, the economic view of rural development; business retention, expansion and location; entrepreneurship and its role in the economy; understanding the local economic structure and the forces of change; introduction to economic growth theories; export base theory and economic base analysis; the role of labor and capital in development; techniques of market area, central place, shift-share and input-output analysis; policies of local economic development and growth.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 452 Community Structure, Processes and Capacity (3)** Social organization, processes and change in communities; use of sociological principles in analysis of community problems and development.

### **CEDEV (R SOC) 452 Rural Organization (3)**

This course combines an introduction to the social theories of communities with real-life examples of applications to understanding community problems and concerns. The focus is on the special circumstances facing small towns and rural communities, but the concepts are applicable in all communities, from urban neighborhoods to suburbs. Topics covered include local community in a global economy, power and decision-making, the role of governments and other social institutions, development of community and the importance of building social infrastructure as well as economic and physical infrastructure, multi community collaboration and building sustainable communities. Those taking the class will gain experience in conducting a case study of a small Pennsylvania community, build skills in working in a team, and gain understanding of the complexity of factors that influence community (and your own) well-being. If your future career involves operating within a community setting this course can increase your knowledge of that setting and how to function within it. And, even if you don't plan on working with communities in your job, you will be living in a community. This course can help you to understand the ways that you can contribute to improving your own quality of life by becoming involved in your community. Grades in this class are based on the community case study report, take-home mid-term and final exams, short team exercises, and class participation. Graduate students taking the course also are required to write reaction papers to three different topics during the semester.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 500 Community and Economic Development: Theory and Practice (3)** Understanding theories, concepts, and frameworks of community and economic development and community decision-making models in application to community development practice and issues.

### **CEDEV 500 Principles of Community and Economic Development and Leadership (3)**

What factors affect the quality of life of American communities? How can citizens and leaders affect change in their community? This course provides an overview of principles of community and economic development and an introduction to approaches to organizing, planning and managing change in communities. Students gain an understanding of principles and strategies of community and economic development in relation to general systems theory, community decision making, and leadership strategies in group and community settings.

Students who complete the course should be able to discuss theories and models of development, to apply general systems theory to development issues, and to understand approaches and techniques for community leadership. They will gain an appreciation of conflict and consensus approaches to decision making and change, and understand action strategies for community development and change.

This is a required introductory course for all incoming students in the new Community and Economic Development graduate program. The course will also be of interest to graduate students in other programs who have an interest in community and economic development.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 505** (R SOC 505, AEE 505) Leadership Development (3) Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

**CEDEV (R SOC) 505 Leadership Development (3)**

Leadership is integral to professional roles of community and economic development practitioners. This course introduces students to the four basic elements of leadership personal, interpersonal, group/organization, and community. A deliberate blend of substantive, theoretical, and application perspectives permits students to understand and apply leadership theories and techniques to community and economic development situations. In this course students will have the opportunity to examine sociological theories of leadership such as exchange theory, attribution theory, group dynamics, community change theory, and formal organizations. Practical aspects of leadership covered include influence, authority, and power; group dynamics; collaborative leadership skills; mediation and dispute settlement; and, deliberation in community settings. The course is problem based and student-centered, meaning that the specific content and process vary from year to year based on the needs and wants of the student cohort involved.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 509** Population, Land Use, and Municipal Finance (3) Understanding the interaction of population characteristics, land use, municipal funds, and taxation in a locality and how they impact the operation and management of government jurisdictions.

**CEDEV 509 Population, Land Use and Municipal Finance (3)**

How do people approach the task of providing and funding the infrastructure and services in American communities? What effect does different population characteristics and demographic mix have on local governance? Should land use be tied to the changing character of community populations? Where does funding originate for providing municipal goods and services and how do communities manage municipal budgets? This course provides a multidimensional overview of three key aspects of community and economic development. Population - the people. Land Use - the place. Municipal finance - the things they do there. Students will gain an understanding of how to analyze population and demographic issues in communities. They will learn about planning and land use laws, regulations and issues. They will come to understand the elements and dynamics of municipal finance. The course is designed to integrate the above aspects of community into an overall understanding of key interactions in American communities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 516** (R SOC 516) Change in Rural Society (3) Social change in rural society, emphasizing prediction and control of the change process; even years.

**CEDEV (R SOC) 516 Change in Rural Society (3)**

Rural America has experienced change throughout its history, but the most rapid have occurred in the past three decades. Forces of urbanization, industrialization, technological change and globalization of the economy drive change in rural America, and the effects of these forces differ across the United States. Some rural areas benefit from the changes that occur while others are devastated. Some rural people and places are able to adapt and view change as an opportunity, while others are unable to respond to the forces that threaten them. Individuals, families, and communities have changed in response to these broad forces. This becomes manifest in new patterns of inequality, family life, educational attainment, migration, age and racial patterns, health and well being, and local service availability. Questions examined in this course include: What are the theories that explain or describe the social change that has been affecting rural people and places? What industrial restructuring and economic change has occurred in rural areas, how has it affected rural areas, and what drives this restructuring? What other social change has taken place, and can we determine potential sources of that change? What are the options available to rural people and communities as they adapt to forces of change, and how much can they influence their own futures? Underlying each of these questions is the issue of whether the well-being of rural people, families, and communities has improved or is threatened by these changes, and which rural areas are most likely to benefit and which are threatened. Students will leave the class with a broad understanding of the forces affecting rural America, and how and why those forces influence some people and places differently. Grades are assigned in this class

based on a term paper on a topic related to rural social change, reaction papers written about each set of reading assignments, serving as discussion leader, and class participation.

Faculty: Drew Hyman and Diane McLaughlin

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 517 (R SOC 517) International Rural Social Change (3)** Implications of planned change for international rural societies, considering basic structural constraints, known institutional linkages, and potential synergetic consequences.

**CEDEV (R SOC) 517 International Rural Social Change (3)**

Three-quarters of the world's population live in developing countries where problems of hunger, malnutrition, underemployment, high morbidity and mortality, overurbanization, and inadequate housing (to name just a few) often are severe. This seminar covers the sociology of economic change in developing countries. Through an extensive list of readings, a series of topical videos, and in-depth class discussions, seminar participants should come away with a firm grounding in the ways development has been defined, the social and economic problems facing developing countries today, the basic ways in which economic development has been approached theoretically and empirically, the implications for developing countries of being embedded in a larger world economy, the influence of multinational corporations, the policies that developing countries have followed in fostering economic growth, the nature of foreign aid, the causes and consequences of Third World debt, the nature of the informal economy, rural development and land reform, world hunger and the Green Revolution, and other topics.

Faculty: Drew Hyman and Leif Jensen

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 533 (AERE 533) Rural Development Research Methods and Topics (3)** Advanced theories and methods for rural economic development research.

**CEDEV (AG EC) 533 Rural Development Research Methods and Topics (3)**

This course is designed to study theories and methodologies to analyze rural and regional economics and sources of economic growth. Objectives are (1) introduce regional and rural economic development theories and the literature, (2) study the assumptions and components of the theories for their policy implications, and (3) learn selected methods to analyze rural/ regional economies and economic change. Topics include theoretical paradigms, market failure and externalities, neoclassical growth and development theories, factor mobility, economic base theory and analysis, location theories and analysis, and the "new" economic growth theory/ increasing returns. The theories will be examined from the perspective of the types of problems to which they are applied and the questions they can be expected to answer. The theories will be studied, along with examples of research that utilize the theories.

Faculty: Drew Hyman and Steve Smith

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 560 Regional Development: Principles, Policy, and Practice (3)** Regional growth and development, focusing on challenges to theory, policy, and practice, emphasizing change in metropolitan, micropolitan, and rural areas.

**CEDEV 560 Regional Development: Principles, Policy, and Practice (3)**

Effective regional development requires that history, theory, and policy are reflected in practice. Globalization impacts the development of regions and places in the United States and around the world. In this context, the development of regions impacts and is impacted by the pace and level of development elsewhere. Regional development addresses issues of how growth and disparity are spatially distributed and differentiated, and what causes these patterns to occur. The challenge is twofold. The first challenge is defining exactly what a region is and identifying who ultimately decides the policies and practices that determine its fate. The second is determining who benefits and who bears the costs of particular local and regional development approaches.



The purpose of this course is to introduce students to concepts and frameworks of regional development. The first part of the course focuses on definitions and theories of regional growth and development, and begins to uncover ambiguities in pre-existing definitions and theories of regional development associated with topics such as growth and development theory, the new geography, cluster economics, and sustainability. It then delves into various policy approaches and issues including regional, environmental, and rural issues. The course culminates with a discussion of putting regional theory and policy into practice through case studies.

Issues and topics addressed in this course include identifying a region and defining 'place'; understanding the relationship between economic efficiency and sustainability; sustainable development and place-based development; the use of policy and its framing to allow regions and places to build on their assets. Additionally, the course will address how regions become interdependent and how relationships can be optimized in this context, and determining the best way and available sources to garner capital to fund development projects. Students will learn how to identify the assets of a region and the impact of interregional collaboration. The course will provide students with the opportunity to analyze the politics of regional development and the important considerations in regional development planning and practice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 567 Resilient Communities and Environments (3)** Understanding connections between communities and surrounding ecosystems; exploration of management techniques for building adaptive, resilient, and sustainable communities and environments.

### **CEDEV 567 Resilient Communities and Environments (3)**

This course provides students with a foundation in concepts which can be used to explore the interconnections of communities and environments, particularly as they apply to community and economic development. The focus of this course is applying concepts from resilience thinking to sustainable community and economic development. In this course, students will explore how communities, whether rural or urban, are linked to their environment, and how this, in turn, can affect the success of community development projects. The class explores the social, political, economic, and ecological barriers guiding these relationships. Topics covered in this context include environmental law and regulation; environmental and land use planning; risk and risk management; the rhetoric of sustainability; natural resource dependency; and interconnections between social and environmental justice. The last portion of the course discusses possible management techniques for building adaptive, resilient, and sustainable communities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 575 Methods and Techniques for Community and Economic Development (3)** Understanding and applying methods and hands-on experience with techniques used in community and economic development. Lab.

### **CEDEV 575 Methods and Techniques for Community and Economic Development (3)**

How do I find out what is happening in my community? The economy? The environment? What methods and techniques should I use? I need a "toolbox" for change! This is a "hands-on" course designed to provide students with an understanding of community and economic development methods and techniques, and experience in applying them to a variety of problems that they might expect to encounter in the field. The course is based on modules developed and offered by faculty in the Community and Economic Development graduate program. The specific content varies from year to year depending on the needs of each cohort of students. Typical topics include several methods and techniques from each of the following three areas:

General Community Assessment Techniques, including identifying power structures, industry structure and employment, natural resources and amenities, human and social capital, local government and services, and land use patterns.

Specialized Techniques for Community and Economic Development, including retail trade area analysis, use of GIS, program evaluation, IMPLAN, Input/Output modeling, location quotient, shift-share analysis, survey design and implementation, and the use of social and economic indicators.

Leadership and Process Skills, including visioning, goal setting, and strategic planning; grant writing; small group dynamics; conflict management, negotiation, principled bargaining, and deliberation; public speaking and working with the mass media; coalition building, project management; and use of the Internet, design and implementation of Web pages.

This is a required course for all students in the MS in Community and Economic Development.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 576** Applications and Practices for Community and Economic Development (1-6) Consideration of community and economic development applications in communities and practices of public and private organizations and agencies.

#### **Applications and Practices for Community and Economic Development (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 597C** Research Application & Practice (3) Course outlines the steps for students to apply CEDEV theories and methods to a topic in writing their Master's paper.

#### **Research Application & Practice (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 597C** Research Application & Practice (3) Course outlines the steps for students to apply CEDEV theories and methods to a topic in writing their Master's paper.

**Research Application & Practice (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 599** (IL) Foreign Studies (1-12, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Studies (1-12, maximum of 24)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CEDEV 602** Supervised Experience in College Teaching (1-3) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Comparative Literature (CMLIT)**

**CMLIT 400Y** (US;IL) Senior Seminar in Literary Criticism and Theory (3) Discussions of theories of literature, of literary criticism, and particularly of the distinct methods of comparative study; individual projects.

**Senior Seminar in Literary Criticism and Theory (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 401Y** (IL) The Western Literary Heritage I (3) Major literary movements and authors in the literature of the Western world from the beginnings through the early Renaissance.

**The Western Literary Heritage I (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 402Y** (US;IL) The Western Literary Heritage II (3) Major literary movements and authors in the literature of the Western world from the late Renaissance to the present time.

**The Western Literary Heritage II (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 403 (US) (LTNST 403) Latino/a Literature and Culture (3)** Literary and other forms of cultural expression (film, music, art, and theater) are compared across different Latina/o communities.

**CMLIT (LTNST) 403 Varieties of Latina/o Cultural Expression (3) (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course provides students with a multi-faceted comparative view of Latina/o literature in relation to other forms of cultural expression. First, the course presents a variety of cultural expressions to students in an effort to teach them the different ways that form affects content. Each text will be studied in its historical context as well, thereby providing students with a sense of Latina/o cultural history. Second, this course compares works from within the same genre, allowing students to recognize the ways that Latina/o culture has worked to build identity, to deconstruct identity, and to challenge cultural stereotypes. Such comparison further facilitates comparison of the ways that different cultural forms have been used by diverse Latina/o communities. Third, this course compares cultural forms, allowing students to see how Latina/o poetry affects music or how Latina/o theater affects novels. Fourth, this course will include texts that represent a variety of linguistic and national contexts, including many countries in Latin America, thereby allowing students to see the relationship between history, culture, language, geography, and identity. These are all themes that are at the center of both Latina/o Studies and Comparative Literature. A comparative perspective facilitates appreciation of the vast and varied ways that Latina/o communities have used cultural expression. A particular point of contact between Latina/o Studies and Comparative Literature is the influence of hybridity. A central issue explored in this course concerns the intricate connections between multiple ways of expressing identity, in the arts, literature, music, etc., in diverse circumstances, such as locations where Latina/o cultures may be in the mainstream (such as in Latin America) and in the minority (in the U.S.). Drawing upon approaches offered by comparative literature and theories such as post-structuralism, feminism, and post-colonialism, we will examine the complex process through which Latina/o culture has been defined, disseminated, contested, and commercialized. Of particular interest from a comparative perspective are the ways that Latina/o cultures are created through hybridization, processes of mutual borrowing and differentiation, as well as through transnational processes of migration, urbanization, and cultural contact. The course's objective is to show not only how complex societies consolidate a shared culture but also how diverse Latina/o communities have produced a multiplicity of cultures that have been expressed via a broad range of cultural registers. These communities often span vast geographical areas, not only in the U.S. but across the Americas as people continue to look to their countries of origin for artistic inspiration.

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 404 (IL) (ASIA 404) Topics in Asian Literature (3)** Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan.

**CMLIT 404 Topics in Asian Literature (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course focuses on Asian literature in a comparative and international frame. Different iterations of this course will have different topics as well as different historical or geographic foci, but may include literatures from the countries of East Asia (China, Japan, Korea), Southeast Asia (Thailand, Vietnam, Laos, Indonesia, Cambodia), or South Asia (Bangladesh, India, Pakistan). Because the course is comparative it will highlight relationships between and among literary traditions of Asia, or between Asia and the rest of the world, whether in the fields of poetry, drama, or fictional and non-fictional prose.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 404Y (IL) (ASIA 404Y) Topics in Studies of Asian Literature (3)** Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan, taught with focus on written analysis and interpretation.

**CMLIT (ASIA) 404Y Topics in Studies of Asian Literatures (3)**

This course focuses on Asian literature in a comparative and international frame. Different iterations of this course will have different topics as well as different historical or geographic foci, but may include literatures from the countries of East Asia (China, Japan, Korea), Southeast Asia (Thailand, Vietnam, Laos, Indonesia, Cambodia), or South Asia (Bangladesh, India, Pakistan). The various course modules will incorporate writing to allow students to further explore their understanding of Asian literatures. Because the course is comparative, it will highlight relationships between and among literary traditions of Asia, or between Asia and the rest of the world, whether in the fields of poetry, drama, or fictional and non-fictional prose. The course will provide students with opportunities to develop writing skills necessary for academic scholarship in comparative literature and Asian Studies.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 405 (US;IL) Inter-American Literature (3)** This course examines the development of literature in Canada, the United States, Spanish America, the Caribbean area, and Brazil.

### **Inter-American Literature (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 406 (IL) Women and World Literature (3)** Literature written by women, especially women from non-Western cultures; the spectrum of genres in which women writers have excelled.

### **Women and World Literature (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 408 (IL) Heroic Literature (3)** Traditional heroes, their traits and adventures; typical themes and examples chosen from the epics and sagas of world literature.

### **Heroic Literature (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 410 (IL) Literary Translation: Theory and Practice (3)** Emphasizing literary translation, a study of the theoretical and practical problems encountered in the processes of translation, transmission, and interpretation.

### **CMLIT 410 Literary Translation: Theory and Practice (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course focuses on the history and practice of literary translation, ranging across space and time to provide a comparative, international perspective. It addresses such issues as the difficulties of literary language; theories of translation and translatability; theories of semantic equivalence; alternative modes of translation including sound- and graph-translation; and the history of important moments of translation in shaping the literary imagination. No second language is required, but students interested in learning how to translate literature may be given assignments allowing them to practice important skills connected to that task.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 415** (GH;US;IL) World Graphic Novels (3) Critical analyses of form, genre, medium, and discourse of the graphic novel and its historical precedents in an international and comparative context.

**CMLIT 415 World Graphics Novels (3)**  
**(GH; US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course considers the graphic novel (also known as graphic fiction, comics, or sequential narrative) as an emergent literary medium and global phenomenon. The course focuses on texts that engage issues of contemporary identity, ethnicity, sexuality, technology, and/or history (personal, family, and national). These graphic novels engage these issues through the medium of text joined with image. This course explores the aesthetic of sequential narrative, its methods of production and consumption, and its place in a contemporary culture of reading. Assigned texts include titles from the United States, France, Japan, Italy, Canada and Norway. All texts will be read in English translation.

General Education: GH  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 422** (IL) African Drama (3) Traditional and popular drama forms; modern anglophone and francophone drama; nationalism and social criticism in contemporary African drama.

**African Drama (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Humanities  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 423** (IL) African Novel (3) From traditional oral narratives to modern autobiographical, historical, satirical, sociological, and allegorical forms; novelist as social critic.

**African Novel (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Humanities  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 429** (ENGL 429) New Media and Literature (3) New media literary genres; critical discussion of creative works in digital media.

**New Media and Literature (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 430** (IL) Global Modernisms (3) A comparative investigation of global Modernisms, with an emphasis on the relations between modernism, modernity, and modernization.

**CMLIT 430 Global Modernisms (3)  
(IL)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores and reassesses, comparatively, the ironies, conundrums, paradoxes, and the self-defying and self-engendering strategies of Modernism's relentless activity as aesthetic movement and as complement to modernity. Readings from theoretical texts and literary works across cultural contexts, international traditions, and linguistic frontiers.

Students will learn how to do critical analyses of written texts, and how to analyze and write about the history of aesthetic and particularly literary modernism and the concepts of modernism, modernity, and modernization. Students will leave the course as better critics of literary work and with an increase ability to perform literary and cultural analysis that relies on a solid grasp of relevant historical and theoretical contexts. Grading will involve a combination of class discussion, writing assignments, and exams, depending on class size and instructor preference.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 435 (IL) Cultures of Globalization (3)** Cultural and literary effects of the process of globalization, with an emphasis on world literatures and transnationalism.

**CMLIT 435 Cultures of Globalization (3 per semester/maximum of 6)  
(IL)**

This course focuses on the cultural and literary effects of the process of globalization, with an emphasis on world literatures and transnationalism. It invites students to think about the ways in which the globalization of culture, politics, and/or the economy affects literary production, and the ways in which such literary features as genre, form, medium, style, and theme in turn reflect and attempt to shape our understanding of the global and its becoming.

The course will have a significant focus on primary material (literature, film, other media) and secondary material (philosophy, journalism, criticism, and so on). It will introduce students to the main theoretical concepts that govern thinking about globalization and global culture, as well as to important literary and cultural texts that articulate those values. It will prepare them for further research in comparative literary studies and in the critical history of globalization.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 438 (IL) Fantastic Worlds: International and Comparative Perspectives (3)** A comparative, international study of fantastic worlds in literature and visual culture.

**CMLIT 438 Fantastic Worlds: International and Comparative Perspectives (3)  
(IL)**

This course will explore a wide range of "fantastic" narrative voices, crossing the boundaries of genres, periods, and nations, through literary and visual texts from the 19th century to contemporary eras, and from Asia to Americas. Students will examine various types of literary techniques and concepts, such as magic realism, grotesque realism, the absurdity, the fantastic, etc., and learn how texts best capture/grasp the nature of "realities" in their creation of "fantastic" worlds. Students will develop more profound understanding of literatures through global lenses, develop and refine critical thinking, in speech and writing, and comparative methods of literary analysis, and develop communications skills in essays, response papers, class discussions, presentation and research papers.

Instructional objectives:

- 1) Students will develop more profound understanding of literatures through global lenses
- 2) Students will develop and refine critical thinking, in speech and writing, and comparative methods of literary analysis
- 3) Students will develop communications skills in essays, response papers, class discussions, presentation and research papers

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 443 (US;IL) Transatlantic Literature (3 per semester/maximum of 6)** Comparative literary and cultural relations across the Atlantic Ocean; may include Europe, Africa, the Americas, and/or the Caribbean.

**Transatlantic Literature (3 per semester/maximum of 6)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 446 (IL) Postcolonial Literature and Culture (3)** Postcolonial literature and theory in a comparative and international context.

**CMLIT 446 Postcolonial Literature and Culture (3 per semester/maximum of 6)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Taking a comparative and transnational approach, this course will provide an advanced introduction to the field of postcolonial literature and theory. Readings will include the foundational anti-colonial writings of the early twentieth century, the postwar literature of decolonization, and the most recent literature on cultures of globalization. Themes to be discussed may include nationalism, subalternity, neocolonial formations, migration, and cultural translation. In general, this course will be taught in the active learning mode, featuring in-class discussion, writing projects, and group presentations.

CMLIT 446 is one of the many courses, which count towards the Comparative Literature major and the World Literature minor.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 448 (IL) Literary Cultures of Buddhism (3)** Comparative exploration of various Buddhist literary cultures, from the classical Indian subcontinent to modern movements like the Beats and dalit writing.

**CMLIT 448 Literary Cultures of Buddhism (3)  
(IL)**

This course will provide an in-depth exploration of various cultures of Buddhist literary production. Readings will cover a broad temporal and geographical range. Prior study of Buddhism or literature is not required and materials will be in English. Students will learn about major genres of Buddhist literature, such as sutras (scripture), j?taka (stories of the Buddha's previous incarnations), hagiography, miracle tales, religiously inspired poetry, and k?an meditational riddles. The course will also examine the various forms into which contemporary authors have adapted these materials (such as manga, novels, memoirs, and film). The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the literary cultures that gave rise to the works under study.

Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students' appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities.

The course is designed to be suitable for all students generally interested in religious cultures of writing, in Buddhism, or in literature, whether or not they have previously studied in any of these areas. The Comparative Literature major requires a certain number of electives at the 400-level, of which this could be one, depending on its content. Further, the course is designed to count as General Education and as an IL ("International") course. It will be taught, as feasible, every 2-3 years with an enrollment of 20-30 students. With the addition of supplementary reading and research assignments, the course may also be suitable for certain graduate students. This course would benefit from access to a laptop and digital projector.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 449 (IL) Literary Cultures of Islam (3)** Comparative discussion of the literary cultures of Islam from the seventh century to the present.

**CMLIT 449 Literary Cultures of Islam (3-6)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is an advanced introduction to the literary cultures of the Islamic world, from the seventh century to the present. No prior knowledge is required. Works will be read in translation. Students will study the foundational text of Islam, the Quran, as a literary text, and learn about major genres of Islamic literatures (ghazal, masnavi, and maqamah, among others). They will also examine how these genres have been adapted in modern literature and media (novels, memoirs, and film). Supplementary historical readings will be provided to contextualize the primary texts.

CMLIT 449 is one of the many courses which count toward the Comparative Literature major and the World Literature minor.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 453 (IL) (COMM 453) Narrative Theory: Film and Literature (3)** Comparative study of the aesthetics and techniques of film and literature; close analyses of masters of each art form.

**Narrative Theory: Film and Literature (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 455 (IL) Ethics, Justice, and Rights in World Literature (3)** Concepts of ethics, justice, and rights, appearing in world literature and/or film.

**CMLIT 455 Ethics, Justice, and Rights in World Literature (3)  
(IL)**

The course will consider how literature and culture address common concerns, including morality, justice, equality, and agency from different perspectives, aesthetic styles, and formal constraints. Students will consider how cultural texts, like legal and philosophical texts, have the power to influence politics and society. Literature is important for understanding ethics, justice, and rights because it teaches ways of thinking and of relating to others that are central to social values. How do we develop the commitment to social equity? How do stories develop ideas of altruism, of prejudice, of pathos, and more in their audience? What role does culture play in developing the moral imagination required to think through social crises? Each class will explore one or more interrelated topics through a variety of cultural and philosophical works. Readings might include works by Melville, Shakespeare, Kafka, Glaspell, Morrison, Capote, Garcia Marquez, and others. Topics might include: formalism; the paradoxes of equity; narrative, storytelling, and framing; custom, law and the political order; law, society, and power; interpretation, authority, and legitimacy; punishment, retribution, and redemption; and others. This course will provide an opportunity to think about the law and ethics in a new way, to read engaging works of fiction and non-fiction, and to examine the humanistic and philosophical perspectives that are at the core of the ethical imagination.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 459 Topics in Theory (3)** Selected topics in this history of theory and literary criticism within a global, comparative context.

**CMLIT 459 Topics in Theory (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Covers specific topics in the history and practice literary criticism, cultural and political theory, and the history of ideas, within a comparative context. Introduces students to major issues, ideas, thinkers, schools, or traditions that have shaped the study of comparative literature. Students will learn how to read, think critically about, and write about theoretical texts, and how to analyze literary texts through the lenses of theory.

They will also engage critically with problems of intellectual and literary history and genealogy.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 470 (IL) The Modern Novel (3)** Major novels of Joyce, Proust, Kafka, Thomas Mann, Nabokov, and others; their contributions to the art of the novel.

**CMLIT 470 The Modern Novel (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course focuses on the modern novel in a comparative and transnational perspective. It explores the basic connections between the modern period and the novel as a form, noting the rise to prominence of the novel in the modern period, and focuses on several important examples of the genre. Some versions of this course may adopt specific organizing themes, such as the novel and the city, the novel and war, the novel and love, and so on. Other versions may focus on the historical development of the novel over time or on crucial interpretive or narratological issues, including the problems of character, time, or point of view; still others may concentrate on major sub-genres of the modern novel, including realism, magic realism, modernism, and postmodernism.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 471 (IL) Poetry and Poetics (3)** Theoretical and practical concepts in the comparative, global history of poetry and/or poetics.

**CMLIT 471 Poetry and Poetics (3)  
(IL)**

This course explores theoretical and practical concepts in the history of poetry and/or poetics. Like all comparative literature courses, it pursues this task through discussions of poetry from a wide variety of national or linguistic origins and ranges widely across historical period, medium, and social form, where appropriate.

Students will develop a broad array of interpretive skills appropriate to poetry and poetics; they will acquire a knowledge of a wide variety of poetic forms; they will undertake comparative analyses of poems and poetic structures; they will learn how to think about poetics outside poetry.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 480 (IL) The International Folktale (3)** Traditional tales from various parts of the world: their origin, characteristics, forms; their transmission as oral narrative and written literature.

**The International Folktale (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 486** (IL) Tragedy (3) Development of tragic drama and its relationship to social background and philosophical theory.

**Tragedy (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 487** (IL) Comedy (3) Development of comic drama and its relationship to social background and philosophical theory.

**Comedy (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 488** (IL) (ENGL 488) Modern Continental Drama (3) From Ibsen to the drama of today: Strindberg, Chekhov, Hauptmann, Pirandello, Ionesco, Beckett, Genet, and others.

**Modern Continental Drama (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 489** (IL) Contemporary World Fiction (3) A survey of developments in contemporary world fiction in translation.

**CMLIT 489 Contemporary World Fiction (3)  
(IL)**

The purpose of this course is to expose students to the developments in world fiction in the last 50 years and to expose them to a range of authors from a number of countries. This course, then, also involves getting to know the novel-writing histories of those countries and in many cases, the recent histories of those countries (for example, in novels like Rushdie's *Midnight's Children* or Garcia Marquez's *Hundred Years of Solitude*). The class will approach these fictions from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Pamuk, Grass, Murakami, and Marquez. Time allotted for the study of the works under consideration will vary.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 490** Video Game Studies (3) A comparative look at the nature and history of video games as cultural artifacts, from Pong to online role-playing.

**CMLIT 490 Video Game Studies (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The video game industry is larger than the film industry, and yet the academic study of video games has only just begun. This course is a comparative introduction to the nature and history of video games as cultural artifacts, from Pong to online role-playing. It introduces students to academic discussion on and creative work in new digital forms including hypertexts, video games, cell phone novels, machinima, and more. Students will learn basic narrative theory, and study its impact on game studies and game production. They will survey major debates over the meaning and value of video games, and review its history from Pong to contemporary games, including online world-based games.

The course extends students' skills in literary interpretation to a variety of new objects, and makes them aware of the role medium plays in aesthetic development and production. Students will leave with a far sharper understanding of how the interpretive tools used in the humanities can be extended to include new media, and with a sense of the historical role video games have played and will continue to play in global cultural production.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 491** (IL) Literary Adaptation: International and Comparative Perspectives (3) A comparative, international study of adaptations between literature and other media (film, theater, photography, music).

**CMLIT 491 Literary Adaptations: International and Comparative Perspectives (3 per semester/maximum of 6) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

From the very first expressions of literary impulses in prehistoric times, and continuing through the present, literary material has been re-used and creatively recycled through processes of adaptation and appropriation, often involving translations not only between languages, but also between media. This course uses a global perspective to explore the processes and aesthetics of adaptations of literary works, including adaptations into other genres or media, such as the visual arts, a film, opera, stage play (or vice versa — adaptations from other media into literature). Drawing upon a broadly international selection of materials, we will explore multiple discourses surrounding adaptation; address the importance of translation and the dynamics between languages, audiences, and texts; study how adaptations address common themes such as race, class, gender, and sexual orientation; discuss international taxonomies of literary genres; and critically assess different cultural notions of authorship, intellectual property, and communal vs. individual ownership. From year to year the works and authors studied in this course may change.

Course objectives include (1) to encourage students to think critically about adaptations within and between cultures and media, in different parts of the world (2) to critically evaluate several of the often conflicting analytical paradigms which characterize the study of literary adaptations; (3) to assess varied approaches to genre in adapted works in different cultural settings; (4) to understand different perspectives on the concept of the author, such as the literary author and the 'author' in theatre studies; (5) to question assumptions about the world, re-examine personal points of view, and understand an expanded international range of ethical and value systems as expressed in literature. For methods of student evaluation, see the syllabus for each section; options include class presentations, response papers, research projects, and exams. This course may form part of the Comparative Literature major, the World Literature minor, and other majors.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 499** (IL) Foreign Study--Comparative Literature (3-6) Advanced courses offered on comparative literary topics as part of a foreign-study program.

**Foreign Study--Comparative Literature (3-6)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 501** Comparative Method in Literary Studies (1-6 per semester/maximum of 6) Bibliography, research methods, and studies in comparative literature.

**Comparative Method in Literary Studies (1-6 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 502** Comparative Criticism I: Classical to Neoclassical (1-3 per semester/maximum of 3) Issues in literary criticism from Plato and Aristotle to the mid-eighteenth century.

**Comparative Criticism I: Classical to Neoclassical (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 503** Comparative Criticism II: Romantic to Contemporary (1-3 per semester/maximum of 3) Principles and theories of literary criticism from eighteenth- and nineteenth- century beginnings to twentieth-century expansion and application.

**Comparative Criticism II: Romantic to Contemporary (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 504** Studies in Literary Genres (3-6) The concept of genre and the evolution of genre theory; application to a specific genre, e.g., the lyric or the novel.

**Studies in Literary Genres (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 505** Studies in Literary Periods and Movements (3-6) Comparative approaches to cohesive units within literary history, e.g., the Renaissance, the Enlightenment, Romanticism, Surrealism.

**Studies in Literary Periods and Movements (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 506** Studies in Literary Themes and Motifs (3-6) Comparative approaches to recurrent literary themes and motifs; application to a specific example, e.g., literary Utopias or the Faust theme.

**Studies in Literary Themes and Motifs (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 507** Comparative Poetics (3 per semester/maximum of 6) Theoretical and practical concepts in the comparative, global history of poetry and/or poetics.

**CMLIT 507 Comparative Poetics (3 per semester/maximum of 6)**

This course explores theoretical and practical concepts in the history of poetry and/or poetics. Like all comparative literature courses, it pursues its task through discussions of texts from a wide variety of national or linguistic origins and ranges widely across historical period, medium, and social form, where appropriate.

Students will develop a broad array of interpretive skills appropriate to poetry and poetics; they will acquire a knowledge of a wide variety of poetic forms; they will undertake comparative analyses of poems and poetic structures; they will learn how to think about poetics outside poetry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 508** Global Visual Culture (3-6 per semester/maximum of 6) Comparative study of transnational forms of visual cultural production; e.g. new media, cinema, television, public culture.

**Global Visual Culture (3-6 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 509** Comparative Modernisms (3-6 per semester/maximum of 6) Aesthetic and historical development of Modernism in diverse cultures.

**Comparative Modernisms (3-6 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 510** Theory and Practice of Translation (3) Theories of translation and interpretation; importance of translation in literary transmission; application of theoretical concepts to individual translation projects.

**Theory and Practice of Translation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 521** Comparative Seminar in Inter-American Literatures (1-12) Comparative topics presenting literary works of the Americas--North America, South America, and the Caribbean--from early to present times.

**CMLIT 521 Comparative Seminar in Inter-American Literatures (1-12)**

This course forms one series of three new-course proposals for seminars in comparative literature with a focus on various parts of the world. While existing seminars focus on comparative studies organized according to concepts such as literary theory, period, theme, or genre, through the proposed new seminars the Department of Comparative Literature seeks to provide visibility for the full complement of courses that reflect the department's global perspective. These proposals also respond to the College's policy to avoid repeated use of the 597 number for similar subject-matter. Thus we are proposing three separate comparative courses on Asian, African, and Inter-American literatures. All represent subject-matter previously taught as CMLIT 597 or other less clearly defined CMLIT numbers.

Comparative study of Inter-American literatures is an important part of the curriculum of our Comparative Literature Department. It is a field of study identified as one of our specialties in our recent strategic plans. Joining existing graduate seminars in European literatures, and supplementing proposed seminars in African and Asian literatures, this course and the other two new graduate courses now being proposed will make visible the ways in which the departmental curriculum to covers the diverse geographic areas relevant to comparative literary study.

Our department has long taught 100-level and 400-level courses on Inter-American Literature. We believe that we were the first U.S. university to have created such courses some twenty-five years ago. Many of our graduate students possess appropriate languages (such as Spanish, Portuguese, and French) necessary for study in this field.

The Americas as two joined continents have produced thousands of writers and a highly diverse literature written in English, Spanish, French, Portuguese, and other languages, including Native American languages. A comparative approach to the study of these literatures provides an appropriately internationalized context for understanding the relations among various literatures of the Americas and for seeing them in the purview of world literature as a whole.

In sum, we have long had separate numbers for our undergraduate Inter-American Literature courses and we have previously offered graduate Inter-American courses under general numbers. In addition to complying with College policy and not continuing to use 597 repeatedly, we wish to make this field more visible within our curriculum by giving it a course number of its own.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 522 Comparative Seminar in Asian Literatures (1-12)** Comparative topics presenting literary works of Asia, from the origins of literature in Asia to the present time.

**CMLIT 522 Comparative Seminar in Asian Literatures (1-12)**

This course forms one of a series of three new-course proposals for seminars in comparative literature with a focus on various parts of the world. While existing seminars focus on comparative studies organized according to concepts such as literary theory, period, theme, or genre, through the proposed new seminars the Department of Comparative Literature seeks to provide visibility for the full complement of courses that reflect the department's global perspective. These proposals also respond to the College's policy to avoid repeated use of the 597 number for similar subject-matter. Thus we are proposing three separate comparative courses on Asian, African, and Inter-American literatures. All represent subject-matter previously taught as CMLIT 597 or other less clearly defined CMLIT numbers.

Comparative study of Asian literatures is an important part of the curriculum of our Comparative Literature Department. It is a field of study identified as one of our specialties in our recent strategic plans. Joining existing graduate seminars in European literatures, this course and the other two new graduate courses now being proposed will make visible the ways in which the departmental curriculum covers the diverse geographic areas relevant to comparative literary study.

Our Department offers instruction in three Asian languages (Chinese, Japanese, and Korean), has long taught 100- and 400-level courses in Asian literatures (Comp Lit 004 and Comp Lit 404), has linkages with universities in China and Japan, and has attracted a steady stream of graduate students who work in Asian literatures and languages. Interest in the literatures of Asia is strong. As a further indication of our Department's globalization, we are establishing a new undergraduate major in Japanese (this proposal is presently in the Senate).

In sum, we have long had separate numbers for our undergraduate Asian language and literature courses and we have previously offered graduate Asian literature courses under general numbers. In addition to complying with College policy and not continuing to use 597 repeatedly, we wish to make this field more visible within our curriculum by giving it a course number of its own.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 523 Comparative Seminar in African Literatures (1-12)** Comparative topics presenting literary works of Africa, from the origins of literature in Africa to the present time.

**CMLIT 523 Comparative Seminar in African Literature (1-12)**

This course forms one of a series of three new-course proposals for seminars in comparative literature with a focus on various parts of the world. While existing seminars focus on comparative studies organized according to concepts such as literary theory, period, theme, or genre, through the proposed new seminars the Department of Comparative Literature seeks to provide visibility for the full complement of courses that reflect the department's global perspective. These proposals also respond to the College's policy to avoid repeated use of the 597 number for similar subject-matter. Thus we are proposing three separate comparative courses on Asian, African, and Inter-American literatures. All represent subject-matter previously taught as CMLIT 597 or other less clearly defined CMLIT numbers.

Comparative study of African literatures is an increasingly important part of the curriculum of our Comparative Literature Department. It is a field of study identified as one of our specialties in our recent strategic plans. Joining existing graduate seminars in European literatures, this course and the other two new graduate courses now being proposed (on Asian and Inter-American literatures) will make visible the ways in which the departmental curriculum covers the diverse geographical areas relevant to comparative literary study.

Our Department offers language instruction in Swahili and Arabic, has long taught 100-level and 400-level courses on African literature, has developed linkages with several African universities, and has attracted a steady stream of graduate students to work in African literature during the last two decades. Interest in the literatures of Africa is strong.

Africa as a continent has produced thousands of writers and a highly diverse body of literature written in English, French, Arabic, Portuguese and over 50 African languages. It is also a rich source of literature recorded from oral traditions maintained in the more than 1,000 languages spoken on the continent. A comparative approach to the study of these literatures provides an appropriately internationalized context for understanding African literatures and for seeing them in the purview of world literature as a whole.

In sum, we have long had separate numbers for our undergraduate African languages and literature courses and we have previously offered graduate courses on African literatures under general numbers. In addition to complying with College policy and not continuing to use 597 repeatedly, we wish to make this field more visible within our curriculum by giving it a course number of its own.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 543** Literary Relations (3 per semester/maximum of 6) Mutual influences among specific literatures and cultures; for example, German-American, French-American, Inter-American, or East-West literary relations.

**Literary Relations (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 570** Forces in Contemporary Literature (3-6) Intellectual currents and experimental forms in contemporary world literature.

**Forces in Contemporary Literature (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 580** Contemporary Literary Theory (3) Major issues in contemporary literary theory and their significance for criticism, with emphasis on continental European theorists and their influence.

**Contemporary Literary Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 589** (FR 589, GER 589, SPAN 589) Technology in Foreign Language Education: An Overview (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)

**Technology in Foreign Language Education: An Overview (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 590** Colloquium (1-3) Continuing seminars which consist of a series of lectures by faculty, students or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual

basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 599** (IL) Foreign Study--Comparative Literature (1-12) Graduate-level courses offered on comparative literary topics as part of a foreign-study experience approved by the program head.

### **Foreign Study--Comparative Literature (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 601** Ph.D. Dissertation Full Time (0) No description.

### **Ph.D. Dissertation Full Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Supervision of teaching; consideration of instructional aims and objectives, methods of lecturing and leading discussions, evaluation of student work.

### **Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMLIT 611** PH.D. Dissertation Part-Time (0) No description.

**PH.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Comparative Med-Hy (C MED)**

**C MED 501** Biology and Care of Laboratory Animals (3) Presentation of the anatomic and physiologic characteristics of the commonly used laboratory animal species and their relation to biomedical research.

**Biology and Care of Laboratory Animals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 503** Laboratory Animal Genetics (3) Genetic principles applied to laboratory animals used for investigations of diseases that may be controlled or influenced by genetic factors.

**Laboratory Animal Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 507** Techniques of Laboratory Animal Experimentation (3) Techniques of drug administration, infusion, and collection of body fluids and materials; gnotobiology; use of radioisotopes and bioinstrumentation.

**Techniques of Laboratory Animal Experimentation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 515** Experimental Surgery of Laboratory Animals (3) Surgical techniques, including nephrectomy and Goldblatt clamp, bladder and gastric pouches, bile duct cannulation, intraventricular operation, cardiac and cerebrovascular catheterization.

### **Experimental Surgery of Laboratory Animals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 530** Diseases of Laboratory Animals I (3) Physiological and pathological expressions of both infectious and metabolic- degenerative diseases of rodents, with emphasis on diagnostic and control methods.

### **Diseases of Laboratory Animals I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 531** Diseases of Laboratory Animals II (3) Physiological and pathological expressions of both infectious and metabolic- degenerative diseases of nonhuman primates and other species of animals.

### **Diseases of Laboratory Animals II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 535** Comparative Pathology (3) Comparative pathologic characteristics of infectious and metabolic diseases of animals and man.

### **Comparative Pathology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C MED 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Comparative and International Education (CI ED)**

**CI ED 401** (IL) (EDTHP 401) Introduction to Comparative Education (3) Origins, nature, scope, basic literature, and methodology of comparative education. Study of sample topics.

### **CI ED (EDTHP) 401 Introduction to Comparative and International Education (3) (IL)**

The course introduces undergraduate students to global issues in education and provides a survey of schooling practices used in various educational systems around the world. Students will have the chance to create an individual research project that will allow them to explore one country and one global educational issue in depth. Students are required to attend all classes, participate in the discussion sections, and take notes on the films shown. These films play an integral part in the course and provide students with views into classrooms and schools around the world. Students will also have access to international databases and be expected to make use of these databases in developing their projects. Finally, in-class discussions will focus on how comparative educational studies have been used by politicians to influence educational reform around the world.

In this course, we will survey the state of public education in the world today. Each student will focus on one nation and provide a synopsis of educational practice in that nation. We will then move on to focus on global or cross-national issues such as how competition between "core" nations like Singapore and the U.S. drives reform (GOALS 2000 or No Child Left Behind). Other issues will include power differences between north and south, education for democracy, barriers to girls and women's education in developing nations, as well as education and national identity.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 440** (EDTHP 440) Introduction to Philosophy of Education (3) Introduction to the examination of educational theory and practice from philosophical perspectives, classical and contemporary.

**CI ED (EDTHP) 440 Introduction to Philosophy of Education (3)**

The major objective of EDTHP (CI ED) 440, Introduction to Philosophy of Education, is to broaden and deepen the students' understanding of the nature of education. Such a study involves exploring the ends as well as the means of education. It includes both an examination of some of the distinctive or defining characteristics of "educated persons" as well as the different elements of the learning experience (including curricula, pedagogies, and evaluative processes) that encourage the development of such persons. As part of developing an understanding of the educational enterprise, this course will introduce students to some of the important ideas and theories that comprise the rich tradition of educational philosophy. In the design of a course of this nature with constraints established by space, time, and the background of the student, it is necessary to confront the task of making judicious selections from the vast literary wealth accumulated over the centuries. In doing so, the decision made has been to focus primarily on the literary contributions of western philosophers of education. In the interest of making the sample varied and interesting, however, an effort has been made to include writings of some philosophers of education from different cultural contexts. The educational thoughts of A.S. Neill, John Dewey, Eliot Wigginton, Maxine Greene, Paolo Freire, Mohandas Karamchand Ganddhi, David Orr, Ivan Illich, and Wendell Berry, among others, will be explored in this class. The exposure to diverse, rich, and provocative ideas of the educators included for study here will, it is hoped, stimulate students to re-examine and further develop their own philosophy of education into a more comprehensive, coherent, and consistent one.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 444** (WL ED 444) Language, Culture and the Classroom: Issues for Practitioners (3) Critical understanding of cultural linguistic diversity to facilitate the inclusion of English Language Learners in a globalized classroom.

**CI ED (WL ED) 444 Language, Culture and the Classroom: Issues for Practitioners (3)**

In this course we will focus on the issues of power raised by the use of Standard English as the school language while in its grounds there are an increasing number of students who are using more than one language/dialect to communicate. We will also discuss how language mutates into an exceptional hegemonic/counterhegemonic device central to the problematic regarding school socialization. Finally, we will critically understand teachers' and schools' roles in building a safe classroom where diversity of languages and cultures are welcome and encouraged.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 457** (AGECO 457) Principles of Integrated Pest Management (3) Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester and graduate students.

**Principles of Integrated Pest Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 457** (AGECO 457) Principles of Integrated Pest Management (3) Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester and graduate students.

**Principles of Integrated Pest Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 497B** Humphrey Seminar (3) The Humphrey Seminar is a two-semester sequence planned to bring a group focus to the various elements of the Humphrey program. The seminar is intended to ensure that you, the Humphrey Fellows, have an adequate understanding of the U.S. higher education environment and institutions, and that you have the opportunity to explore issues in professional areas that maybe of interest to you. The seminar is also a forum in which you learn from each other. In the first semester, you will be expected to make a presentation on your country for the benefit of the other Fellows and community members at large. Four Information Sharing Sessions (ISS) and Movie Nights are also organized during each semester where you will be asked to share your professional development experiences with your colleagues or discuss cultural or professional issues and trends.

### **Humphrey Seminar (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 500** Comparative Education Proseminar I (3) Methods of comparative education and case studies of governance and administration; first of two part sequence.

### **Comparative Education Proseminar I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 503** (EDTHP 507, HI ED 503) Ethnicity, National Identity, and Education (3) Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.

### **Ethnicity, National Identity, and Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 504** Perspectives in African Education (3) Educational systems in selected african countries are examined with respect to colonial history, social, political, and cultural factors.

### **Perspectives in African Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 508** (ADTED 508) Globalization and Lifelong Learning (3) Examination of globalization discourses and their relationships, implications and impacts on lifelong learning processes and contexts.

**CI ED (ADTED) 508 Globalization and Lifelong Learning (3)**

The course is designed to help students to critically examine the nature and impacts of globalization on lifelong learning. The main goal is to enhance the students' ability to learn and work in a globalizing world and to challenge traditional perspectives about globalization and lifelong learning. As such, the course will adopt a critical perspective on globalization while helping the students to develop a reflective stance on the theory and practice of lifelong learning. A central focus of the course will be to develop a critical analysis that contributes to the building of a more active and socially responsible adult learner. Students will be evaluated using a number of assignments/projects. The major research paper, class presentation, two critiques of theories of lifelong learning, country profile of lifelong and a short reaction paper will count for 90% of the course grade. Class participation will be awarded 10%.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 509** (ADTED 509) Language, Literacy, Identity, and Culture in a Global Context (3) Examines the relationship between issues of language, identity, and culture for adult learners in an increasingly global context.

**CI ED (ADTED) 509 Language, Literacy, Identity, and Culture in a Global Context (3)**

This core required course provides graduate students in the ADED Ph.D. program a critical overview of the literature, theories, and scholarship examining the complexities inherent in an increasingly diverse global and post-colonial sphere. Explorations of historical, theoretical, postcolonial perspectives will be the focus, as will the daily portrayals of diverse peoples by the media. Participants in the course will be expected to familiarize themselves with the readings portraying the complexities of ethnicity, indigeneity, race, gender, and social class. Evaluation will focus primarily on writing a scholarly paper, preparing video materials that illustrate the issues, writing their personal educational histories, and participating in class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 516** (EDTHP 516) Education and Demographic Change in the United States and Abroad (3) Interrelationship between schooling and employment, marriage, fertility, and migration. Focus comparatively on the United States and developing countries.

**Education and Demographic Change in the United States and Abroad (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 534** (EDTHP 534, SOC 534) Childhood and Education in Sociological and International Comparative Perspective (3) The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.

**Childhood and Education in Sociological and International Comparative Perspective (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 541** (EDTHP 541) Contemporary Philosophies of Education (3) Educational theory and practice in relation to contemporary movements in philosophy.



**CI ED (EDTHP) 541 Contemporary Philosophies of Education (3)**

This graduate seminar explores a range of contemporary philosophies of education viewed from the perspective of different varieties of postmodernism. The study of modern and postmodern western thought is combined with explorations of eastern thought including viewpoints that are emerging today in both the northern and southern hemispheres. While focusing on contemporary educational ideas, it traces their roots in classical and non-modern philosophical sources. This look at the present in terms of the past reveals the paradigm shift presented by contemporary postmodern educational thought. In doing so, considerations for the issues of race, class, gender, ecology, multiculturalism and the regeneration of diverse incommensurable cosmovisions, severed or overlooked by some educational philosophers, are explored in their reintegration by contemporary postmodern philosophers of education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 542 (LL ED 542) Issues in Literacy Education (3)** Discussion of philosophical, sociological, historical, and curricular issues in literacy education.

**Issues in Literacy Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 553 (EDTHP 553, HI ED 553, SOC 553) Educational Mobility in Comparative Perspective (3)** Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America.

**CI ED 553. (SOC 553, EDTHP 553, HI ED 553) Educational Mobility in Comparative Perspective (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Faculty member proposing course: David Post

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 555 (EDPSY 555) Validity of Assessment Results (3)** Concepts, issues, and methods of validation of educational and psychological assessment including models and approaches to validation, bias, and utility.

**CI ED (EDPSY) 555 Validity of Assessment Results (3)**

The goal of this course is to enable the student to acquire a broad perspective on issues and considerations in the process of validating interpretation and uses of tests, scales, assessment procedures, or protocols. Issues of validity are examined from many perspectives including a review of current dominant and alternative validity theories, of known threats to validity, of some advanced specialized statistical techniques; and of test bias, legal issues, psychological/behavioral issues, social/consequential considerations, and philosophical considerations. Additionally, applications are provided through in-depth cross-cultural and historical studies, technical reviews of published commercial tests, and in-depth examinations of controversies.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 564** (ADTED 564) Social and Cultural Contexts of Learning and Work (3) Examines the relationship between learning and work with special attention given to how certain forms of learning are legitimized.

### **CI ED (ADTED) 564 Social and Cultural Contexts of Learning and Work (3)**

This course is designed to provide students with the knowledge and skills required to critically examine the concepts and meanings of learning and work and their relationship to community. The course focuses on formal, nonformal, informal, and incidental learning, with particular emphasis given to how different types of knowledge and different forms of learning are legitimized. The course will allow students to develop and understand the social context in which learning and work operate and how those concepts shape and impact the community. Students will write critiques of readings as well as a major literature review, participate in class discussion, and do a class presentation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 570** (ADTED 570) Comparative and International Adult Education (3) Critical and comparative analysis of adult education theory and practice outside North America, including international agency involvement.

### **Comparative and International Adult Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 571** (HI ED 571) Comparative Higher Education (3) Comparative methods of studying structural variations in systems of higher education in principal industrialized nations and other selected countries.

### **Comparative Higher Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 572** (ADTED 572) Policy Studies in Lifelong Learning (3) Examine lifelong learning policies and the relationship between lifelong learning issues and problems, policy development, policy actors and institutional structures.

### **CI ED (ADTED) 572 Policy Studies in Lifelong Learning (3)**

The main purpose of the course is to help students develop a deeper understanding of the relationship between lifelong education issues, policymaking, and institutions and structures that support them. The course focuses on a critical examination of the policymaking structures and institutions in various regional contexts. The roles and impact of various policy actors are examined. Finally, the course will critically examine a selected number of case studies from various regions. Students will be evaluated using a variety of assignments. The term paper, a policy practice paper, annotated bibliography and two policy critiques will count for 90% of the course grade. Class participation will be awarded 10%.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 587** (E C E 587) Curriculum, Culture, and Child Development (3) Examines human development and cultural factors in planning, designing, and implementing curriculum and instruction in early childhood and childhood education.

### **Curriculum, Culture, and Child Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 597A (ADTED 597C)** Multicultural Education in Schools and the Workplace (3) Describes multicultural education as "an educational reform movement designed to increase educational equity for all students from diverse racial and ethnic groups, gender groups, exceptional students, and students from each social-class group."

**Multicultural Education in Schools and the Workplace (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 597A** (ADTED 597C) Multicultural Education in Schools and the Workplace (3) Describes multicultural education as "an educational reform movement designed to increase educational equity for all students from diverse racial and ethnic groups, gender groups, exceptional students, and students from each social-class group."

**Multicultural Education in Schools and the Workplace (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 597B** (EDTHP 597B) Research in Comparative Education (3) This course introduces large-scale international assessment databases and demonstrates how to use these data to conduct comparative education research.

**Research in Comparative Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 597C** Politics, Language, and Pedagogy: Applying Paulo Freire Today (3) This course examines the tenets, critiques, and application of Paulo Freire's educational philosophy in diverse international settings.

**Politics, Language, and Pedagogy: Applying Paulo Freire Today (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 597F** (EDTHP 597F) Issues and Trends in Early Childhood Education (3) This course explores historical and contemporary examples of downward schooling expansion in the US and other nations.

**Issues and Trends in Early Childhood Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CI ED 845** (AYFCE 845) Intergenerational Programs and Practices (3) Background, intervention strategies, and issues related to developing intergenerational programs and practices aimed at addressing vital social and community issues.

**Intergenerational Programs and Practices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Complement Alter Medic (CAM)**

**CAM 742** Herbal and Natural Products as Therapeutics (5) This course will assess safety, efficacy, and applicability of natural products as therapeutic options for management of common medical conditions.

**Herbal and Natural Products as Therapeutics (5)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Computer Science (CMPSC)

**CMPSC 402** UNIX and C (3) UNIX OS including file system, utilities, and shell scripting; C programming, including I/O, pointers, arrays, dynamic memory, macros, and libraries.

### **CMPSC 402 Unix and C (3)**

The primary goal of the course is to provide students with sufficient information to enable them to write structured and readable C programs for realistic applications. In particular, after completing the course students should be familiar with and be able to use pointers and dynamic memory management techniques.

A secondary goal is for the students to be fluent in using the Unix operating system, particularly those parts needed for program development.

Students will be evaluated on midterm and final exams, and four to five problem sets. The exams will be worth 50% of the total grade and the problem sets will be worth the remaining 50%.

This course is an elective in the computer science (COMP) BS program. Students in other programs generally use it as an elective. Students cannot take this course after having taken CMPSC 422.

No special Facilities, are needed for this course. The course will usually be offered once a year with an expected enrollment of 30-40.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 412** Data Structures Lab (1.5) Programming with common data structures; recursion; stacks, queues, dictionaries, priority queues; string searching and manipulation; sorting; trees; combinatorics.

### **Data Structures Lab (1.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

Concurrent: CMPSC 462 or CMPSC 465

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 413** Algorithms Lab (1.5) Programming with common algorithm design techniques; divide and conquer, greedy method, dynamic programming, and tree and graph traversals.

### **Algorithms Lab (1.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

Concurrent: CMPSC 463

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 421** Net-centric Computing (3) This course introduces JavaScript and AJAX for creating Rich Internet Applications, and XML for client-server communication and Web Services.

### **CMPSC 421 Net-centric Computing (3)**

This course will build on the client-server computing concepts and techniques that students learned about in prerequisite courses. The goal of the course is to introduce students to the most significant and fundamental of those technologies that are used in the computing paradigm known by a number of terms including "Net-centric", "Web 2", and "cloud"

computing.

On the client: We will use Dynamic XHTML, Cascading Style Sheets, JavaScript and AJAX to develop the client side of Rich Internet (or Web) Applications.

For client-server-communication: We will learn how to create and validate XML documents and use these as the primary language for transmission of data from the server to the client. We will also consider how JavaScript Object Notation (JSON) can sometimes be used as a viable alternative to XML for server to client data transmission.

On the server: We will learn about a variety of server-side technologies for consuming, storing, transforming, and generating content. We will use the three main types of XML parsers to consume, transform, and generate XML; we will use XSL and XPath to style and transform XML; we will use XML binding tools to convert XML to and from classes (in some high-level language); we will use Data Access Objects and object-relational mapping tools for data persistence. We will learn how servers use Web services and RSS feeds to provide XML structured content, and we will consume existing Web services and RSS feeds and produce simple Web services.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 425 Advanced Object-Oriented Programming (3)** Advanced object-oriented programming paradigm, exception handling, application programming interface, secure programming, network programming, threads and synchronization.

### **CMPSC 425 Advanced Object-Oriented Programming (3)**

The primary goal of this course is to introduce advanced object-oriented programming and network programming concepts. The course emphasizes an in-depth study of object-oriented programming paradigm including advanced topics in:

- \* Inheritance: abstract classes, interfaces, multiple inheritance, and protected members
- \* Polymorphism: inheritance hierarchies, type hierarchies, dynamic dispatch, superclass method invocation, multiple inheritance vs multiple types,
- \* Application programming interface: GUI programming, event dispatch/handling, nested classes, and other utility classes,
- \* Exception handling: throwing and catching exceptions
- \* Network programming and security: client-side and server-side application development, threads and synchronization, ports and communication protocols, application security policies, encryption and digital signatures, code signatures

The study of these topics should provide a solid basis for students to draw on in a course on object-oriented design or courses requiring a higher level programming language.

Topics, and approximate time allotted to topics, include:

- \* Object Oriented Programming Paradigm (7 weeks)
  - o Object orientation: objects, classes, abstract classes, interfaces, inheritance
  - o Polymorphism: inheritance hierarchy, type hierarchy, multiple inheritance, multiple types
  - o Exception handling
- \* Application Programming Interface (3 weeks)
  - o Graphical User Interface (GUI) Programming
  - o Event dispatch/handline in GUI
  - o Other utility classes
- \* Introduction to Network Programming (3 weeks)
  - o Client-server architecture, threads, synchronization
  - o Understanding ports
  - o Connection using Transmission Control Protocol (TCP)
  - o Connection using User Datagram Protocol (UDP)
  - o Connection using Uniform-Resource Locator (URL)
- \* Introduction to Secure Programming (2 weeks)
  - o Network Security
  - o Application security policies
  - o Encryption and digital signatures
  - o Code signatures

After taking this course, the student should be able to:

1. Describe encapsulation and information hiding
2. Describe inheritance, overloaded and overridden methods, polymorphism, and dynamic binding
3. Describe multiple inheritance, multiple types, inheritance hierarchy, and type hierarchy
- 4 Design, develop, and test applications in an object-oriented programming language, including event-driven, client-side network-based applications with a simple graphical user interface threads, and synchronization techniques
5. Understand network security issues that arise in network-based applications.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010 Ending: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 426** Object-oriented Design (3) Object-oriented analysis and design; design patterns such as creational, structural, and behavioral patterns; UML; and unified process.

### **CMPSC 426 Object-Oriented Design (3)**

The primary goal of this course is to study the object-oriented design paradigm, including modeling languages, classes and objects, the inheritance relationship, polymorphism, and software engineering topics relating to object-oriented design. Study of this topic should provide a solid understanding of object-orientation for students to use in studying diverse topics such as operating systems, software engineering, and database design. This course is an elective for students in the BS COMP program. The course builds on topics learned in earlier object-oriented programming courses.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 426** Object-oriented Design (3) Object-oriented analysis and design; design patterns such as creational, structural, and behavioral patterns; UML; and unified process.

### **CMPSC 426 Object-Oriented Design (3)**

The primary goal of this course is to study the object-oriented design paradigm, including modeling languages, classes and objects, the inheritance relationship, polymorphism, and software engineering topics relating to object-oriented design. Study of this topic should provide a solid understanding of object-orientation for students to use in studying diverse topics such as operating systems, software engineering, and database design. This course is an elective for students in the BS COMP program. The course builds on topics learned in earlier object-oriented programming courses.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 428** Programming in Ada (3) Structured program design using Ada; strong typing, data abstraction, packages, subprograms, separate compilation, visibility, exceptions, generic units.

### **CMPSC 428 Introductory Ada and Program Design (3)**

Ada is a modern language with a broad field of use, appropriate for both technical and administrative applications. Ada is also a standardized language with strong support internationally; most other languages are found in different versions and dialects for different computers. Excellent programming craftsmanship depends on excellent tools, and the programmer's most important tool is the programming language used. Students should find Ada to be an extremely good programming environment and should discover that developing and implementing object-oriented programs in such a rich language provides benefits that will carry well into their careers.

After successfully completing CMPSC 428, the student should be able to: use Ada to develop programs, from the initial problem statement to the final implementation, using top-down design and structured programming principles; test programs written in Ada; use appropriate data structures and language constructs when developing programs written in Ada; use operators, operands, expressions, and statements in the development of Ada programs; use the various control structures inherent in the Ada language; use the data types inherent in the Ada language; create generic types, subprograms, and packages; create and use complex data types; describe the software engineering goals of understandability, modifiability, reliability, efficiency, and portability; describe the software engineering concepts of data abstraction, modularity, information hiding, and completeness; implement exception handling in Ada programs; develop concurrent programs in Ada using multiple tasks.

Students will be evaluated on homework (35% of grade), semester exams (35%), and a final comprehensive exam (30%).

This course is an elective in the computer science (COMP) BS curriculum. This course is intended for juniors or seniors. The material learned in this course is beneficial in understanding programming concepts covered in the required courses CMPSC 462, CMPSC 460 and CMPSC 422, as well as in the elective course CMPSC 470. This course is also a prerequisite for the elective course CMPSC 429.

No special facilities are required for this course. The software necessary is available in the computer labs or for students

to use at home. This course will be offered once per year, with an expected enrollment of 40.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 430 Database Design (3)** Relational database model, query languages, integrity, reliability, normal forms for design.

### **CMPSC 430 Database Design I (3)**

The main goal of this course is to explore the relational database model, with special emphasis on the design and querying of relational databases. Secondary goals include exploration of the mathematical basis for relational databases and exploration of the relationship of database to the rest of computer science. Study of these topics should improve student skills in programming, modeling the structure of data and using and administering databases.

Grades will be based on midterm and final exams totaling 250 points, and 10 - 12 homework assignments totaling approximately 200 points. Grades will be based directly on percentage of the total points received from those listed.

This course is an elective for students in the BS COMP program and is required for admission into the MS COMP program. The course builds on concepts learned in earlier programming, data structure and discrete mathematics courses.

No special facilities are required for this course. This course will be offered once per year, with an expected enrollment of 60 - 70 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 431W Database Management Systems (3)** Topics include: conceptual data modeling, relational data model, relational query languages, schema normalization, database/Internet applications, and database system issues.

### **Database Management Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 431W Database Management Systems (3)** Topics include: conceptual data modeling, relational data model, relational query languages, schema normalization, database/Internet applications, and database system issues.

### **Database Management Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 436 Communications and Networking (3)** Data transmission, basic signaling, data encoding, error control, communication protocols, security, network topologies, routing, switching, internetworking, emerging high speed networks.

### **CMPSC 436 Communications and Networking (3)**

This course introduces the elements and architecture of computer and data communication networks, demonstrates the fundamental principles of computer networking, and provides experience in the practical use of current networking technology. Topics in this course include: data communications (basic signaling, data transmission, data encoding, errors and error control), communications architecture and protocols (communication protocols, internetworking, transport protocols, layered network architecture, network security) and computer networks (WANs, LANs, network topologies, internetworking, routing and switching strategies and emerging high speed networks).



After taking CMPSC 436, students should be able to:

- 1) understand the fundamentals of networking concepts and terminology
- 2) define and contrast the classifications local area network (LAN), metropolitan area network (MAN), and wide area network (WAN)
- 3) name and describe basic networking elements
- 4) define the roles of clients, servers, and peers as they relate to computer networks
- 5) define the term "protocol" and explain how it relates to computer networks
- 6) identify specific network management areas and describe the organizational issues relating to each of them

Students will be evaluated on homework (35% of grade), semester exams (35%), and a final comprehensive exam (30%).

This course is an elective in the computer science (COMP) BS curriculum. This course is intended to be taken by second semester juniors or seniors.

No special facilities are required for this course. This course will be offered once per year, with an expected enrollment of 60.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 438** Computer Network Architecture and Programming (3) Network architectures, communication protocols, internetworking, network security, client-server computing, web application development, programming with APIs.

### **CMPSC 448 Machine Learning and Algorithmic AI (3)**

Machine learning and artificial intelligence are closely-related branches of computer science that deal with the development of software that can "learn" how to perform useful tasks from prior data. Machine learning is mostly concerned with inferring trends from data in order to use them for future predictions. Artificial intelligence is mostly concerned about how to use knowledge gained from previous data to achieve specific goals.

This course provides an introduction to important concepts in machine learning and artificial intelligence, as well as probabilistic and mathematical tools needed for applications of technology from both fields. Students will learn about important models and algorithmic frameworks used in machine learning such as linear models, neural networks, decision trees, support vector machines, k-nearest neighbor, adaboost, k-means clustering, and agglomerative clustering as well as methods for evaluating and tuning these models. Students will also learn about key artificial intelligence concepts such as A\* search and reinforcement learning which are used by software agents (such as game AI's) to navigate and explore their environment.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 438** Computer Network Architecture and Programming (3) Network architectures, communication protocols, internetworking, network security, client-server computing, web application development, programming with APIs.

### **CMPSC 448 Machine Learning and Algorithmic AI (3)**

Machine learning and artificial intelligence are closely-related branches of computer science that deal with the development of software that can "learn" how to perform useful tasks from prior data. Machine learning is mostly concerned with inferring trends from data in order to use them for future predictions. Artificial intelligence is mostly concerned about how to use knowledge gained from previous data to achieve specific goals.

This course provides an introduction to important concepts in machine learning and artificial intelligence, as well as probabilistic and mathematical tools needed for applications of technology from both fields. Students will learn about important models and algorithmic frameworks used in machine learning such as linear models, neural networks, decision trees, support vector machines, k-nearest neighbor, adaboost, k-means clustering, and agglomerative clustering as well as methods for evaluating and tuning these models. Students will also learn about key artificial intelligence concepts such as A\* search and reinforcement learning which are used by software agents (such as game AI's) to navigate and explore their environment.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 441 Artificial Intelligence (3)** Problem solving, search techniques including local search and genetic algorithms, knowledge representation, planning, learning, and neural networks.

### **CMPSC 441 Artificial Intelligence (3)**

The primary goals of this course are (1) to provide the students with an introduction to Artificial Intelligence concentrating on some fundamental areas of AI, and (2) to provide the students with a working knowledge of LISP so that they can investigate some basic problems in AI using LISP as a vehicle language.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 441 Artificial Intelligence (3)** Problem solving, search techniques including local search and genetic algorithms, knowledge representation, planning, learning, and neural networks.

### **CMPSC 441 Artificial Intelligence (3)**

The primary goals of this course are (1) to provide the students with an introduction to Artificial Intelligence concentrating on some fundamental areas of AI, and (2) to provide the students with a working knowledge of LISP so that they can investigate some basic problems in AI using LISP as a vehicle language.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 442 Artificial Intelligence (3)** Introduction to the theory, research paradigms, implementation techniques, and philosophies of artificial intelligence.

### **Artificial Intelligence (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:  
 Concurrent: CMPSC 465

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 443 Introduction to Computer and Network Security (3)** Introduction to theory and practice of computer security with an emphasis on Internet and operating system applications.

### **Introduction to Computer and Network Security (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 444 Secure Programming (3)** Secure software design principles/practice, common threats, applied cryptography, trust management, input validation, OS-/programming language- specific issues, software validation.

### **CMPSC 444 Secure Programming (3)**

This course presents an overview of the principles and practice of secure software design. The course begins with a presentation of overarching principles of secure software development that enable the design, implementation, and testing of secure systems that can withstand attacks. These principles and strategies for realizing them will be illustrated through an analysis of common security issues and pitfalls in the software development process. The course will cover a variety of programming languages including C/C++, Java, and scripting languages; different classes of systems including standalone applications, client/server systems, and peer-to-peer applications; and development issues specific to different operating systems. Students will develop and analyze programs that demonstrate security principles, strategies, coding techniques, and the use of tools that can help make code more resistant to attacks.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: CMPSC 430 or CMPSC 431 or CMPSC 421W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 444 Secure Programming (3)** Secure software design principles/practice, common threats, applied cryptography, trust management, input validation, OS-/programming language- specific issues, software validation.

### **CMPSC 444 Secure Programming (3)**

This course presents an overview of the principles and practice of secure software design. The course begins with a presentation of overarching principles of secure software development that enable the design, implementation, and testing of secure systems that can withstand attacks. These principles and strategies for realizing them will be illustrated through an analysis of common security issues and pitfalls in the software development process. The course will cover a variety of programming languages including C/C++, Java, and scripting languages; different classes of systems including standalone applications, client/server systems, and peer-to-peer applications; and development issues specific to different operating systems. Students will develop and analyze programs that demonstrate security principles, strategies, coding techniques, and the use of tools that can help make code more resistant to attacks.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: CMPSC 430 or CMPSC 431 or CMPSC 421W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 448 Machine Learning and Algorithmic AI (3)** Evaluation and use of machine learning models; algorithmic elements of artificial intelligence.

### **Machine Learning and Algorithmic AI (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 450 Concurrent Scientific Programming (3)** Problems of synchronization, concurrent execution, and their solution techniques. Design and implementation of concurrent software in a distributed system.

### **Concurrent Scientific Programming (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 451 (MATH 451) Numerical Computations (3)** Algorithms for interpolation, approximation, integration, nonlinear equations, linear systems, fast FOURIER transform, and differential equations emphasizing computational properties and implementation. Students may take only one course for credit from CSE/MATH 451 and CSE/MATH 455.

**Numerical Computations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 452 Numerical Analysis (3)** Algorithm efficiency and accuracy, function interpolation and polynomial approximation, numerical differentiation and integration, initial-value problems, and approximation of eigenvalues.

**CMPSC 452 Numerical Analysis I (3)**

General principles for evaluating the accuracy and efficiency of floating point algorithms; methods for solving single equations and systems of linear equations, function interpolation and polynomial approximation, numerical differentiation and integration, initial-value problems, approximation of eigenvalues.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 455 (MATH 455) Introduction to Numerical Analysis I (3)** Floating point computation, numerical rootfinding, interpolation, numerical quadrature, direct methods for linear systems. Students may take only one course for credit from CMPSC (MATH) 451 and CMPSC (MATH) 455.

**Introduction to Numerical Analysis I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 456 (MATH 456) Introduction to Numerical Analysis II (3)** Polynomials and piecewise polynomial approximation; matrix least square problems; numerical solution of eigenvalue problems; numerical solutions of ordinary differential equations.

**Introduction to Numerical Analysis II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 457 Computer Graphics Algorithms (3)** Graphics systems/hardware, color models, transformations, projections, clipping, hidden line/surface removal, aliasing, parametric curves/surfaces, 3D modeling animation.

**CMPSC 457 Computer Graphics Algorithms I (3)**

Concepts and techniques needed to draw geometrical objects with a discrete device: Coordinate systems, clipping, curves and regions, geometric transformations, parallel and projective projections, hidden line and surface removal, animation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 458 Fundamentals of Computer Graphics (3)** Fundamentals of computer graphics: input/output devices, transformation, projection, clipping, hidden line/surface elimination.

**Fundamentals of Computer Graphics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 459 Scientific Visualization (3)** Visualization techniques for data analysis and presentation. Applying visualization and perceptual theory. Using extending platform independent visualization software.

**CMPSC 459 Scientific Visualization (3)**

Visualization of scientific data and processes has always been important for gaining insights into scientific phenomena. Historically, such visualization has taken place in the scientist's imagination and was then rendered in drawings, graphs and diagrams. The rapid advance of computer technology, and in particular, computer graphics, has made new tools available to the scientist to aid in the interpretation and communication of scientific information. In this course students will study a variety of computer graphics, scientific visualization, and virtual reality techniques and apply them to scientific visualization projects. The projects will be drawn from all of the sciences and the resulting projects will then be available to faculty and students to use as tools in their disciplines.

The prerequisites for this course are CMPSC 122. Students will apply the writing skills gained in ENGL 202C and refine them in the context of scientific writing. They will also have the opportunity to apply the knowledge and skills gained in CMPBD 360 and its predecessors, CSE 103 and CSE 120 within the context of a significant natural science or mathematical visualization problem. Software and languages used in this course will change as the discipline of scientific visualization evolves. Currently, programming will be done in C++ and Java; VRML and other virtual reality languages, and scientific specialty languages such as IDL, muPad, xpp, Mathematica, Maple, etc. Projects initiated in this course can form the basis for further development as a 494 research project.

The course will take advantage of a variety of computing platforms available at Behrend including Windows NT and Unix.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 460 Principles of Programming Languages (3)** Design and implementation of high level programming languages and survey of language paradigms including imperative, functional, and object-oriented programming.

**CMPSC 460 Principles of Programming Languages (3)**

The primary topics of this course include run-time systems for imperative programming languages and aspects of the object-oriented, functional and declarative paradigms that have applications in industrial software development. Study of these topics should improve student skills in programming, debugging and problem solving.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: CMPSC 469

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 460 Principles of Programming Languages (3)** Design and implementation of high level programming languages and survey of language paradigms including imperative, functional, and object-oriented programming.

**CMPSC 460 Principles of Programming Languages (3)**

The primary topics of this course include run-time systems for imperative programming languages and aspects of the object-oriented, functional and declarative paradigms that have applications in industrial software development. Study of these topics should improve student skills in programming, debugging and problem solving.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: CMPSC 469

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 461** Programming Language Concepts (3) Fundamental concepts of programming language design, specifications, and implementation; programming language paradigms and features; program verification.

### **Programming Language Concepts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 462** Data Structures (3) In-depth theoretical study of data structures such as balanced trees, hash tables, priority queues, B-trees, binomial heaps, and Fibonacci heaps.

### **CMPSC 462 Data Structures (3)**

The primary goals of this course are (1) to provide the students with a set of basic data structures useful in the design of efficient algorithms, and (2) to provide the students with the ability to design and analyze new data structures as needed to solve problems. The secondary goal of this course is to introduce basic algorithm analysis techniques to prepare the students for the follow up course CMPSC 463, Design and Analysis of Algorithms. This is a required course in the BS COMP program. It is also a prerequisite for a number of other courses in the COMP program such CMPSC 463, 460, 430, etc.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 462** Data Structures (3) In-depth theoretical study of data structures such as balanced trees, hash tables, priority queues, B-trees, binomial heaps, and Fibonacci heaps.

### **CMPSC 462 Data Structures (3)**

The primary goals of this course are (1) to provide the students with a set of basic data structures useful in the design of efficient algorithms, and (2) to provide the students with the ability to design and analyze new data structures as needed to solve problems. The secondary goal of this course is to introduce basic algorithm analysis techniques to prepare the students for the follow up course CMPSC 463, Design and Analysis of Algorithms. This is a required course in the BS COMP program. It is also a prerequisite for a number of other courses in the COMP program such CMPSC 463, 460, 430, etc.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 463** Design and Analysis of Algorithms (3) Recurrences, algorithms design techniques, searching, sorting, selection, graph algorithms, NP-completeness, approximation algorithms, local optimization algorithms.

### **CMPSC 463 Design and Analysis of Algorithms (3)**

The primary goals of this course are (1) to provide the students with fundamental techniques for designing and analyzing algorithms, and (2) to introduce some techniques for dealing with inherently intractable problems. This is a required course in the BS COMP program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: MATH 414 or STAT 301

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CMPSC 463** Design and Analysis of Algorithms (3) Recurrences, algorithms design techniques, searching, sorting, selection, graph algorithms, NP-completeness, approximation algorithms, local optimization algorithms.

### **CMPSC 463 Design and Analysis of Algorithms (3)**

The primary goals of this course are (1) to provide the students with fundamental techniques for designing and analyzing algorithms, and (2) to introduce some techniques for dealing with inherently intractable problems. This is a required course in the BS COMP program.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: MATH 414 or STAT 301

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 464** Introduction to the Theory of Computation (3) Computability/Complexity: finite automata, regular & context-free languages, Turing machines, Church-Turing Thesis, undecidability, reducibility, completeness, time/space complexity, P versus NP.

### **CMPSC 464 Introduction to the Theory and Computation (3)**

CMPSC 464 introduces students to an essential part of theoretical computer science: how to define abstract mathematical models of computational devices (automata), how to characterize their computational power by studying the family of languages that they can recognize (formal languages), and what the limitations of even the most powerful computational devices are (computability). The course studies regular languages by means of deterministic and nondeterministic finite-state automata and regular expressions; it studies context-free languages through the use of context-free grammars and pushdown automata; and it studies computability by means of Turing machines and recursive and recursively-enumerable languages. The unsolvability of the halting problem for Turing machines is proved by a diagonalization argument, and this result is then used to show that various problems about languages are unsolvable, such as the problem of determining whether two context-free grammars generate the same language.

Finally, the concept of computational complexity is introduced, and the classes P and NP are defined. (Informally, the former class consists of problems that can be solved computationally in a manageable amount of time, and the latter consists of problems for which a proposed solution can be verified in a manageable amount of time.) The concept of an NP-complete problem is defined, and some specific problems are proved to be values to the variable of a Boolean formula that will make the formula true).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 465** Data Structures and Algorithms (3) Fundamental concepts of computer science: data structures, analysis of algorithms, recursion, trees, sets, graphs, sorting.

### **Data Structures and Algorithms (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 467** (MATH 467) Factorization and Primality Testing (3) Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

### **Factorization and Primality Testing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 469 Formal Languages with Applications (3)** Regular, context free, recursive, and recursively enumerable languages; associated machine models; applications.

### **CMPSC 469 Formal Languages with Applications (3)**

The primary goal of this course is to explore formal language theory, including regular, context free and recursively enumerable languages. Notations for specifying these languages (regular expressions, finite automata, context free grammars and turing machines) are emphasized. Applications of these languages, including pattern recognition, scanning, parsing, specification of programming language syntax and Unix shell programming, are also discussed. Study of these topics should provide a solid theoretical basis for students to draw on in studying diverse areas such as algorithm analysis, complexity theory and compiler construction.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 469 Formal Languages with Applications (3)** Regular, context free, recursive, and recursively enumerable languages; associated machine models; applications.

### **CMPSC 469 Formal Languages with Applications (3)**

The primary goal of this course is to explore formal language theory, including regular, context free and recursively enumerable languages. Notations for specifying these languages (regular expressions, finite automata, context free grammars and turing machines) are emphasized. Applications of these languages, including pattern recognition, scanning, parsing, specification of programming language syntax and Unix shell programming, are also discussed. Study of these topics should provide a solid theoretical basis for students to draw on in studying diverse areas such as algorithm analysis, complexity theory and compiler construction.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 470 Compiler Construction (3)** Compiler design and implementation; scanning, parsing, semantic analysis, optimization (including static analysis), code generation, garbage collection, and error detection.

### **CMPSC 470 Compiler Construction (3)**

The primary topics of this course are areas of compiler construction that are applicable both in building compilers and in many other areas of computer science. Both the concepts and the implementation of these techniques will be emphasized. Study of these topics should improve student skills in programming, debugging and software engineering. This course is an elective for students in both the BS COMP and MS COMP programs. The course builds on concepts learned in earlier programming, data structure and computer organization courses.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 470 Compiler Construction (3)** Compiler design and implementation; scanning, parsing, semantic analysis, optimization (including static analysis), code generation, garbage collection, and error detection.

### **CMPSC 470 Compiler Construction (3)**

The primary topics of this course are areas of compiler construction that are applicable both in building compilers and in many other areas of computer science. Both the concepts and the implementation of these techniques will be emphasized. Study of these topics should improve student skills in programming, debugging and software engineering. This course is an elective for students in both the BS COMP and MS COMP programs. The course builds on concepts learned in earlier programming, data structure and computer organization courses.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 471** Introduction to Compiler Construction (3) Design and implementation of compilers; lexical analysis, parsing, semantic actions, optimization, and code generation.

### **Introduction to Compiler Construction (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 472** Operating System Concepts (3) Theoretical and practical issues of operating systems design and implementation, process management, concurrent programming, memory management, scheduling, I/O, and security.

### **CMPSC 472 Operating Systems Concepts (3)**

A course on operating systems is an essential part of a computer science education. This course is intended as an introduction to study the concepts, structure and mechanisms that underlie operating systems. A tremendous range and variety of computer systems exist for which operating systems are designed. Rather than focus on individual operating systems, this course discusses the key mechanisms of modern operating systems, the types of design trade-offs and decisions involved in operating system design and the context within which the operating system functions.

After completing CMPSC 472 the student should be able to:

- (1) describe and understand the four major components of an operating system: process management (including synchronization, scheduling, mutual exclusion, deadlocks and concurrency), input/output (including disk scheduling and disk I/O), memory management (including virtual memory, paging, segmentation and addressing) and management of the file systems
- (2) describe and understand how a centralized operating system functions
- (3) describe and understand the various components of an operating system
- (4) describe the various goals of protection and the security problem in general
- (5) compare centralized operating systems with distributed operating systems

Students will be evaluated on homework (35% of grade), semester exams (35%), and a final comprehensive exam (30%).

This course is required in the computer science (COMP) BS curriculum. It is intended for seniors to take this course in their fall semester. This course is also an admission requirement for the (COMP) MS program.

No special facilities are required for this course. The software necessary is available in the computer labs or for students to use at home. This course will be offered once per year, with an expected enrollment of 80.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 473** Operating Systems Design & Construction (3) Design and implementation of computer operating systems; management of various system resources: processes, memory, processors, files, input/output devices.

### **Operating Systems Design & Construction (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 474** Operating System & Systems Programming (3) Operating Systems overview and principles; processes and

signals; concurrency and synchronization; memory and file management; client-server computing; scripts; systems-programming.

### **Operating System & Systems Programming (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 475 Applications Programming (3)** Development of software for devices including smart phones, tablets, handheld units, and other general purpose computing platforms.

### **Applications Programming (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 475 Applications Programming (3)** Development of software for devices including smart phones, tablets, handheld units, and other general purpose computing platforms.

### **Applications Programming (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 479 Language Translation (3)** Design and implementation of compilers, lexical analysis, syntax/semantic analysis, optimization, and code generation.

### **Language Translation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 483W Software Design Methods (3)** Applications of scientific knowledge and methods in the design and construction of computer software using engineering concepts.

### **Software Design Methods (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 484 Computer Science Senior Project I (2)** Computer science capstone project with documentation emphasis.

### **CMPSC 484 Computer Science Senior Project I (2)**

This course is phase one preparation for completing a design for a project to serve as the capstone to the computer science degree program. The course provides instruction and specification of a simulated real-world work environment and associated activities to employ and integrate computer science concepts. Technical instruction and delivered products will be required.

Students enrolled in the program will: 1) produce a design for a significant senior project using a cooperative, team approach, 2) present concepts, progress, and products to and interact with peer and faculty review boards. The course

will: 1) provide the student with an opportunity to work in a team environment designed around sound development practice, 2) present to students current team organization and management techniques, 3) describe various forms of written communication targeted to different audiences, and 4) reinforce the technical knowledge attained through the computer science curriculum.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 485W** Computer Science Senior Project II (3) Computer science capstone project with documentation emphasis.

### **Computer Science Senior Project II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 487W** Software Engineering and Design (3) Software development process, life cycle; requirements analysis, specification, design, prototyping, testing, project management, and documentation.

### **CMPSC 487W Software Engineering and Design (3)**

The primary goal of this course is to familiarize students with the wide variety of techniques and methodologies used in software engineering to assist in the development of large software systems. Issues discussed include the human factors involved in developing software, models of the software development process, the use of formal methods in software engineering, software validation and verification, and software maintenance.

A second goal is to help students understand the importance of written communication in software engineering, and to provide opportunities for students to improve the quality of their writing - specifically in describing software systems. The primary means of accomplishing this goal is a semester long project in which students write requirements for a large software system. In writing these requirements, students describe the system for non-technical readers (clients and users) and specify it for technical readers (other system developers).

A final goal is to emphasize the role of teams in software development. Modern software systems are simply too large to reasonably be produced by one person, so the ability to work as part of a team is vital. To support achieving this goal, techniques and tools for working in groups are discussed in the course, and students work on the semester project in teams.

This course is a required course in the computer science (COMP) BS curriculum, and is intended to be taken by seniors as the capstone course for the major. As such, the course integrates material from many (potentially all) of the undergraduate computer science courses. This course is also available as an elective for students in the MS COMP program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 487W** Software Engineering and Design (3) Software development process, life cycle; requirements analysis, specification, design, prototyping, testing, project management, and documentation.

### **CMPSC 487W Software Engineering and Design (3)**

The primary goal of this course is to familiarize students with the wide variety of techniques and methodologies used in software engineering to assist in the development of large software systems. Issues discussed include the human factors involved in developing software, models of the software development process, the use of formal methods in software engineering, software validation and verification, and software maintenance.

A second goal is to help students understand the importance of written communication in software engineering, and to provide opportunities for students to improve the quality of their writing - specifically in describing software systems. The primary means of accomplishing this goal is a semester long project in which students write requirements for a large software system. In writing these requirements, students describe the system for non-technical readers (clients and users) and specify it for technical readers (other system developers).

A final goal is to emphasize the role of teams in software development. Modern software systems are simply too large to

reasonably be produced by one person, so the ability to work as part of a team is vital. To support achieving this goal, techniques and tools for working in groups are discussed in the course, and students work on the semester project in teams.

This course is a required course in the computer science (COMP) BS curriculum, and is intended to be taken by seniors as the capstone course for the major. As such, the course integrates material from many (potentially all) of the undergraduate computer science courses. This course is also available as an elective for students in the MS COMP program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPS 488** Computer Science Project (3) Project design and implementation with an emphasis on team work, documentation, and the employment and integration of computer science concepts.

### **CMPS 488 Computer Science Project (3)**

This class provides a hands-on experience designing and developing a real-world software system. The course will emphasize collaboration and teamwork to employ and integrate computer science concepts. Students will work on a project that will serve as the capstone to the computer science degree program. Technical instruction, research, software implementation and delivered products will be required.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPS 494H** Senior Honors Thesis (1-6) Supervised Honors thesis research in computer science and engineering.

### **Senior Honors Thesis (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPS 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experience, practica, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject

which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 497A** Software Testing (3) Software testing principles/practices, functional testing, structural testing, unit testing, mutation testing, system testing, test Automation.

### **Software Testing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 497A** Software Testing (3) Software testing principles/practices, functional testing, structural testing, unit testing, mutation testing, system testing, test Automation.

### **Software Testing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 497B** HTML5 and Web Game Programming (3) Explores HTML5 programming techniques, including Canvas Element, Javascript integration, game engines using HTML5/Javascript, and integration with various social media API's.

### **HTML5 and Web Game Programming (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 498F** Introduction to Bioinformatics (3) This course will introduce an undergraduate audience to the biological problems and computational solutions that motivate current applications in computational biology. Topics will be organized around three main themes: 1) Genomes, including assembly and annotation of genomic sequences; 2) Evolution, including sequence comparison, reconstructing evolutionary relationships, and detecting disease associated traits; and 3) Function, including analysis of functional genomics experimental assays and characterizing regulatory relationships between genes. By the end of the course, students will have gained a broad overview of the types of biological problems which bioinformatics methods aim to solve, will know which algorithmic and machine-learning approaches are suitable for solving each problem, and will have a detailed understanding of how each computational method works.

### **Introduction to Bioinformatics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 598** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Teaching of computer science undergraduate sections with senior faculty instruction supervision.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CMPSC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Computer Science and Engineering (CSE)

**CSE 511** Operating Systems Design (3) Concurrent programming; design of I/O subsystem, memory management, and user interface; kernel design; deadlocks, protection and security; case studies.

**Operating Systems Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 513** Distributed Systems (3) Protocol hierarchies; routing and flow control algorithms; distributed operating systems; communication and synchronization mechanisms; resource allocation problems.

**Distributed Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 514** Computer Networks (3) Network subsystems, ARPANET, SNA, DECNET, network protocols (physical databank, network, transport, sessions, presentation, application), routing and congestion control, network optimization.

**CSE 514 Computer Networks (3)**

This course discusses the characteristics and low-level protocols of computer networks. It provides basic background, design, and evaluation skills in telecommunication and communication networks.

The course will cover International Standards Organization Open System Interconnection (ISO-OSI) reference model, design issues and protocols in the data link layer, network layer and transport layer; architectures and control algorithms of local-area networks, and point-to-point networks; standards in network access protocols; models of network interconnection; and overview of networking and communication software.

The course will emphasize on Internet standards such as TCP/IP and many advanced topics in networking. Students should already have some network background before taking this course. Students should also have necessary analytical and programming skills to do networking projects.

**Faculty Members Proposing Course:** Guohong Cao and Dennis Dunn.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 515** (E E 565) Reliable Data Communications (3) Discussion of problems and solutions for ensuring reliable and efficient communication over wired and wireless links and data networks.

**Reliable Data Communications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 516** Mobile Networking (3) Algorithms, systems and design of mobile telecommunication voice and data networks.

**CSE 516 Mobile Networking (3)**

This course presents the fundamentals of mobile networking and provides simple analytical tools for designing and evaluating these networks. The course is divided into three parts. First, the architecture and algorithms for mobility management and service control in classic circuit-switched cellular networks is presented. Using simple queuing models, students analyze the performance of these networks and examine design trade-offs. GSM is used as a case study. Second, the architecture and algorithms for mobility management in packet-based mobile telecommunications networks are presented. Finally, protocols, algorithms, and performance consideration for the mobile Internet are presented. This course focuses on the practical applications of these concepts, using real systems to illustrate architecture and protocol trade-offs.

The course provides students with a venue in which to pursue research in mobile networking that complements several core areas of the graduate CSE curriculum (e.g., networks, architectures, algorithms, and formal analysis). Following the course in networking, this course enables students to learn the skills and obtain the background knowledge necessary to generate publishable research in the area of mobile networks. This course will serve as an elective for students interested in mobile networking and telecommunications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 517** Performance Evaluation (3) Tools and techniques for PE, Analytical and Simulation models, evaluation of multiprocessors, multicomputer and LANs, scheduling policies, case studies.

**Performance Evaluation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 520** Science of Computer Programming (4) Weakest preconditions, nondeterminism, terminating constructs, formal derivation of some often used algorithms, correctness of programs, formal specification of large systems.

**Science of Computer Programming (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 521** Compiler Construction (3) Design and implementation of compilers.

**Compiler Construction (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 522** Semantics of Programming Languages (3) Operational, axiomatic, and denotational semantics of programming languages; fixpoint theory of computation, verification of recursive programs; goto statements and continuations.

**Semantics of Programming Languages (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 530** Fundamentals of Computer Architecture (3) Advances in computer architecture, Pipelining, parallelism, and multiprocessing.

**Fundamentals of Computer Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 531** Parallel Processors and Processing (3) Parallel processor organization; basic algorithms suitable for such systems; parallel sorting and interconnection networks; applications and discussion of specific processors.

**Parallel Processors and Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 532** Multiprocessor Architecture (3) Fundamental structures of multiprocessors; interprocess communications, system deadlocks and protection, scheduling strategies, and parallel algorithms; example multiprocessor systems.

**Multiprocessor Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 536** Fault Tolerant Systems (3) Attributes of fault-tolerant systems and their definitions; reliability and availability techniques; maintainability and testing techniques; practice of reliable system design.

**Fault Tolerant Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 537** Interconnection Networks in Highly Parallel Computers (3) Study and comparative analysis of various classes of interconnection networks; routing problem; fault tolerance issue; performance evaluation; VLSI implementation.

**Interconnection Networks in Highly Parallel Computers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1997

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 539** Topics in Computer Architecture (3) Study of current advanced issues in design, implementation and applications of complex computer systems.

### **Topics in Computer Architecture (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 541** Database Systems I (3) Data models and relational database design; database integrity and concurrency control; distributed database design and concurrency control; query optimization.

### **Database Systems I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 542** Database Systems II (3) Important in-depth issues relating to data engineering such as distributed databases, information management for engineering design, data models.

### **Database Systems II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 543** Computer Security (3) Specification and design of secure systems; security models, architectural issues, verification and validation, and applications in secure database management systems.

### **Computer Security (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 544** System Security (3) Review current research in computer and operating system security.

### **CSE 544 System Security (3)**

This course is built around the problem of authorization (access control). After a discussion of threats of systems security, we will examine the fundamental mechanism for access control, the reference monitor. We will define the principle of the reference monitor and review how it is used to implement access control.

The second major topic is mandatory access control (MAC). We will examine the implementation of MAC in Linux via the Linux Security Modules (LSM) framework. This part of the class relies heavily on a case study of the SELinux system to illustrate how MAC can be implemented and how security goals can be enforced by using MAC.

The third major topic focuses on how network security functions are implemented in the operating system. Such functions include authentication, firewalls, and secure communication via IPsec. The implementations of such functions in the Linux operating system will be the focus of this particular section of the course.

The third major topic examines system security architectures for distributed systems. The main foci are mechanisms based on public key systems, such as trust management, integrity measurement, and web-based operating systems. We will investigate research results in these areas and hypothesize where this emerging space may evolve.

The fourth major topic focuses on lower level features of operating systems and their impact on security. We will first review virtual machine systems and recent research results that indicate an emergence of virtual machine mechanisms as a practical basis for achieving strong systems security guarantees. We will then explore work on protecting access to data on systems that is resident in traditional (file systems) and unexpected (other temporary) storage locations.

The final two sections, Special Topics and Wrap-Up, will cover a number of areas of importance to system security, but not really falling into the traditional system areas. This includes emerging topics such as language-based security, the use of source code analysis for achieving system security goals, host intrusion detection, and emerging areas of recent interest. These topics will change over time as interests and technology develop. We will conclude with a discussion of the major challenges and state of system security, and make predictions about the future of system security.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 545 Network Security (3)** Advanced methods and technologies for network security.

### **CSE 545 Network Security (3)**

CSE 545 covers the major topics and emerging trends in network security. We begin with a discussion of the basic problems, architectures and devices in current and next generation networks. This will include a discussion of how these topics relate to popular articles and the press. This part of the class relies heavily on case studies to illustrate how security impacts the social and technical aspects of the Internet and computing systems.

The second major topic focuses on the use of applied cryptography supporting network protocols. This will provide a deeper view of the basics of cryptographic constructions and consider formal methods for proving their correctness. The realities and limitations of the current use of cryptography will be considered. Students will spend a considerable amount of time developing and analyzing their own security protocols.

The third section of this course will focus on the management and vulnerabilities of current network environments. This will begin with a discussion of emerging authentication systems (federated authentication, graphical passwords, biometrics), and then turn to the security problems of large-scale network management. The class will then review major thrusts in network security: the management and vulnerabilities of wireless systems.

The course concludes with a discussion of topical areas in network security. This is the most flexible part of the class, and will reflect the needs and desires of the instructors and students on a semester-to-semester basis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 546 Cryptography (3)** Introduction to the theory and techniques of modern cryptography, with emphasis on rigorous analysis and mathematical foundations.

### **CSE 546 Cryptography (3)**

This course provides an introduction to the theory and techniques of modern cryptography. The course begins by reviewing relevant mathematical tools and moves on to develop definitions and examples of secure protocols for important cryptographic tasks such as symmetric- and private-key encryption, authentication, and digital signatures.

Students will be evaluated primarily on weekly problem sets designed to verify and improve their understanding of the materials. Grades will be based on problem sets, a mid-semester examination, a final examination, and class participation/lecture notes. With regard to "lecture notes," students (in teams) must prepare a written summary of one lecture during the course. The goal of this exercise is to practice technical writing and exposition.

This course will serve as an elective for graduate students in Computer Science & Engineering and the Post-Baccalaureate Credit Certificate Program in Computer & Network Security (under development).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 550 (MATH 550) Numerical Linear Algebra (3)** Solution of linear systems, sparse matrix techniques, linear least

squares, singular value decomposition, numerical computation of eigenvalues and eigenvectors.

### **Numerical Linear Algebra (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 551 (MATH 551) Numerical Solution of Ordinary Differential Equations (3)** Methods for initial value and boundary value problems. Convergence and stability analysis, automatic error control, stiff systems, boundary value problems.

### **Numerical Solution of Ordinary Differential Equations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 552 (MATH 552) Numerical Solution of Partial Differential Equations (3)** Finite difference methods for elliptic, parabolic, and hyperbolic differential equations; solutions techniques for discretized systems; finite element methods for elliptic problems.

### **Numerical Solution of Partial Differential Equations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 553 (MATH 553) Introduction to Approximation Theory (3)** Interpolation; remainder theory; approximation of functions; error analysis; orthogonal polynomials; approximation of linear functionals; functional analysis applied to numerical analysis.

### **Introduction to Approximation Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 554 (E E 564) Error Correcting Codes for Computers and Communication (3)** Block, cyclic, and convolutional codes. Circuits and algorithms for decoding. Application to reliable communication and fault-tolerant computing.

### **Error Correcting Codes for Computers and Communication (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 555 (MATH 555) Numerical Optimization Techniques (3)** Unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar's algorithm, global optimization, parallelism in optimization.

### **Numerical Optimization Techniques (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 556 (MATH 556) Finite Element Methods (3)** Sobolev spaces, variational formulations of boundary value problems; piecewise polynomial approximation theory, convergence and stability, special methods and applications.

### **Finite Element Methods (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 557 Concurrent Matrix Computation (3)** This course discusses matrix computations on architectures that exploit concurrency. It will draw upon recent research in the field.

### **Concurrent Matrix Computation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 560 Theory of Graphs and Networks (3)** Theory and applications of graphs, including structure of graphs, network analysis, and algorithms for computer solution of graph-theoretic problems.

### **Theory of Graphs and Networks (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 562 Probabilistic Algorithms (3)** Design and analysis of probabilistic algorithms, reliability problems, probabilistic complexity classes, lower bounds.

### **Probabilistic Algorithms (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 563 Parallel Algorithms (3)** Computational aspects of VLSI: synthesis/analysis of efficient parallel and distributed algorithms; computational structures; models of parallel computers and their interrelationships.

### **Parallel Algorithms (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 564 Complexity of Combinatorial Problems (3)** NP-completeness theory; approximation and heuristic techniques; discrete scheduling; additional complexity classes.

### **Complexity of Combinatorial Problems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Fall 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 565** Algorithm Design and Analysis (4) An introduction to algorithmic design and analysis.

#### **Algorithm Design and Analysis (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:  
 Concurrent: CMPSC 464

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 572** Microprocessors and Systems Design (3) Contemporary design issues in microprocessors, including advanced features and system integration issues.

#### **CSE 572 Microprocessors and Systems Design (3)**

In this course students will learn about contemporary state-of-the-art issues in the design and use of microprocessor based systems, including embedded systems. The specific topics covered will depend on the current state-of-the-art. These topics could include both software, hardware, and systems issues.

Students will be evaluated via a mid-term exam(s) and a final examination. In addition, at the instructors discretion homework, projects and research/survey papers may be required.

The course will not require any special laboratory facilities. The course will be offered once every other year with an expected enrollment of about 20-30 students.

Faculty: Kyusun Choi, Lee Coraor, Mary Jane Irwin, Dennis Dunn

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 575** Architecture of Arithmetic Processors (3) Algorithms and techniques for designing arithmetic processors; conventional algorithms and processor design; high-speed algorithms and resulting architectural structures.

#### **Architecture of Arithmetic Processors (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 577** VLSI Systems Design (3) Engineering design of large-scale integrated circuits, systems, and applications; study of advanced design techniques, architectures, and CAD methodologies.

#### **VLSI Systems Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 578** VLSI Computer-Aided Design Tools (3) VLSI circuit design tools: placement, routing, extraction, design rule checking, graphic editors, simulation, verification, minimization, silicon compilation, test pattern generation.

#### **VLSI Computer-Aided Design Tools (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 579** Topics in Computer Hardware Design (3) Computer hardware design; emerging technologies in hardware design; new challenges for nano-scale VLSI design.

### **Topics in Computer Hardware Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 583** (E E 552) Pattern Recognition--Principles and Applications (3) Decision-theoretic classification, discriminant functions, pattern processing and feature selection, syntactic pattern recognition, shape analysis and recognition.

### **Pattern Recognition--Principles and Applications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 585** (E E 555) Digital Image Processing II (3) Advanced treatment of image processing techniques; image restoration, image segmentation, texture, and mathematical morphology.

### **Digital Image Processing II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 586** (E E 554) Topics in Computer Vision (3) Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications.

### **Topics in Computer Vision (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 588** (MATH 588) Complexity in Computer Algebra (3) Complexity of integer multiplication, polynomial multiplication, fast Fourier transform, division, and calculating the greatest common divisor of poly- nomials.

### **Complexity in Computer Algebra (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 591** Research Experience in Computer Science and Engineering (1) Research experience for new doctoral students in computer science and engineering. Research is performed in conjunction with another 500-level CSE course.

#### **Research Experience in Computer Science and Engineering (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

Concurrent: enrollment in another 500-level CSE course

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 597C** Machine Learning (1.5) Machine learning is a subfield of AI that studies how computer system can learn from data.

#### **Machine Learning (1.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**CSE 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 598A** Machine Learning Seminar (1.5) This is a seminar for discussing the latest trends and research in machine learning. Students are expected to present at least one paper on machine learning.

**Machine Learning Seminar (1.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 598B** Concepts in Game Theory (1) Game theory, applications to computer/communication networking, network-access games (network neutrality debate), games modeling social networks.

**Concepts in Game Theory (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 598C** Theory Seminar (1.5) Recent advances in various areas of theoretical computer science: algorithms, complexity theory, combinatorics, cryptography, quantum computing, computational learning theory.

**Theory Seminar (1.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CSE 601** Ph.d. Dissertation Full-Time (0) No description.

**Ph.d. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 610** Thesis Research Off-Campus (1-15) No description.

**Thesis Research Off-Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CSE 611** Ph.d. Dissertation Part-Time (0) No description.

**Ph.d. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Computer Science-CI (COMP)

**COMP 505** Theory of Computation (3) Topics in discrete mathematics, discrete probability, first order logic and models of computation.

**Theory of Computation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 511** Design and Analysis of Algorithms (3) Amortized analysis, graph algorithms, NP-complete problems, approximation algorithms, parallel algorithms.

**Design and Analysis of Algorithms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 512** Advanced Operating Systems (3) A study of the principles and practice of distributed system design, including communication, synchronization, processes, file systems, and memory management.

### **Advanced Operating Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 513** Formal Methods for Software Engineering (3) Object-oriented software development, formal specification techniques and related CASE tools, software re-use, verification and validation, transformational development.

### **Formal Methods for Software Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 516** Advanced Programming Languages (3) Programming paradigms and styles, object-oriented programming, formal semantics, programming language design.

### **Advanced Programming Languages (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 517** Computer Security (3) Introduction to the area of computer security and current issues associated with computer security.

### **Computer Security (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 519** Advanced Topics in Database Management Systems (3) Concurrency control, crash recovery, query processing, semantic data models, advanced file access, distributed database systems, performance, case studies, advanced applications.

### **Advanced Topics in Database Management Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 520** Artificial Intelligence (3) Problem solving, knowledge representation, language understanding, perception, learning, artificial neural networks.

### **Artificial Intelligence (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 524** Evolutionary Computation (3) Topics in evolutionary algorithms and genetic algorithms.

### **Evolutionary Computation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 545** Computer Architecture (3) Cache, pipelining, memory design, interconnection networks, multiprocessor systems.

### **Computer Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 580** Master's Project (3 per semester/maximum of 6) Research into a specific computer science problem, development of a scholarly written paper, and oral defense of the work.

### **Master's Project (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 594** Master's Studies (3) Presentation of various research techniques, in-depth study of a specific computer science problem, development of a written paper or project, and an oral defense.

### **Master's Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 597A** Software Testing (3) Software testing principles/practices, functional testing, structural testing, unit testing, mutation testing, system testing, test Automation.

### **Software Testing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 597A** Software Testing (3) Software testing principles/practices, functional testing, structural testing, unit testing, mutation testing, system testing, test Automation.

### **Software Testing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**COMP 600** Thesis Research (1-6) Research into a specific computer science problem, development of a scholarly written paper, and an oral defense.

### **Thesis Research (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Constl Law/Civil Rgt (CL&CR)**

**CL&CR 956** Civil Liberties Litigation (3) This course examines the protection of individual rights afforded by the Constitution by analyzing litigation involving violations of individual rights by the government and its officers. The principal substantive areas addressed are prisoners' rights, police misconduct, and political surveillance. In the process of examining the substantive civil rights issues, the course will analyze advanced concepts of civil procedure, constitutional law, federal jurisdiction, and trial practice.

### **Civil Liberties Litigation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CL&CR 957** The Constitutional Law of Religion (3) This course examines current constitutional doctrine concerning religion under the First Amendment to the Constitution. The focus will be on the essential cases and principles of the Free Exercise and Establishment Clauses of the First Amendment. These cases and principles are organized along three thematic lines: (1) the regulation of religions activity (free exercise and neutrality, governmental interests, legislative accommodation), (2) the funding of religions activity (establishment and neutrality, governmental support of religious institutions), and (3) the treatment of religion in government's culture shaping activities (public schools, school curriculum, religious speech). The course ends with a discussion of the definition of "religion" for purposes of federal

constitutional law.

### **The Constitutional Law of Religion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CL&CR 963** Constitutional Law II (3) This course studies the development of equal protection law under the 5th and 14th Amendments, the state action issue, and the free exercise and establishment clauses of the 1st amendment.

### **Constitutional Law II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CL&CR 965** First Amendment-Free Speech (3) This course examines the history, values and function of free expression, advocacy of illegal action, expression that provokes a hostile audience reaction, defamation, commercial advertising, obscenity, hate speech and pornography, expression in public places, symbolic speech, campaign finance laws, and speech in restricted environments.

### **First Amendment-Free Speech (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CL&CR 976** Advanced Torts (3) This course focuses on torts not involving physical injury, such as misrepresentation, defamation, invasion of privacy, interference with business relations, and misuse of legal procedure. These subjects are not ordinarily covered in the four-hour Torts course required in the first year, but have become burgeoning areas of potential liability due to the emergence of electronic communications. An effort will be made to integrate substantive doctrine and practice implications with legal, economic, political and social theory.

### **Advanced Torts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CL&CR 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Core Courses (CORE)**

**CORE 900** Civil Procedure (4) Civil Procedure concerns the rules and principles that govern the litigation of a civil case. The course addresses systemic issues related to how and where a lawsuit is filed including: personal and subject matter

jurisdiction; venue; the notice required once a lawsuit has been filed; and which substantive law-- state or federal--should apply in federal court. The course also familiarizes the student with the stages of a lawsuit including: pleading; structuring the lawsuit; discovery; termination of a lawsuit without trial; trial; and actions that may be taken after a jury verdict or bench trial. Although reference is made to state laws, the course concentrates on the Federal Rules of Civil Procedure.

#### **Civil Procedure (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 902** Elements of Law (3) Elements of Law orients students to legal research and reasoning through caselaw, statutory interpretation, and legal history, processes, and institutions. The course covers topics across many substantive areas of law, and addresses legal methodology as it arises in the legal profession.

#### **Elements of Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 903** Constitutional Law I (3) This course examines the roles of the executive, legislative, and judicial branches in determining limits of national and state powers and protection of the individual and civil rights provided in the United States Constitution.

#### **Constitutional Law I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 905** Contracts (4) Contracts is concerned with the formation of contracts. The traditional offer and acceptance are analyzed in light of problems presented by modern bargaining techniques. Voidability of contracts formed by fraud, mistake, illegality, and unconscionable advantage is also stressed. The performance of contracts and the parol evidence rule are discussed.

#### **Contracts (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 907** Criminal Procedure (3) Criminal Procedure explores part of the interface between the criminal justice system and the United States Constitution. It introduces students to constitutional analysis by examining key provisions of the Fourth, Fifth, Sixth, and Fourteenth Amendments as they apply to police investigation and interrogation as well as the circumstances under which indigent defendants are guaranteed the assistance of counsel.

#### **Criminal Procedure (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 907** Criminal Procedure (3) Criminal Procedure explores part of the interface between the criminal justice system and the United States Constitution. It introduces students to constitutional analysis by examining key provisions of the

Fourth, Fifth, Sixth, and Fourteenth Amendments as they apply to police investigation and interrogation as well as the circumstances under which indigent defendants are guaranteed the assistance of counsel.

### **Criminal Procedure (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 910** Criminal Law (3) This course deals with what is called substantive criminal law, i.e. crimes. Numerous crimes such as homicide, theft, and conspiracy are examined, and defenses such as self-defense and insanity are scrutinized. A primary focus of the course is the utilization and interpretation of criminal statutes.

### **Criminal Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 912** Legal Analysis, Research and Writing I (2) The Legal Analysis, Research & Writing (LARW) course is designed to teach each student to think, write, and speak like a lawyer. Students must learn to solve clients problems by using effective research techniques, accurate and in-depth legal analysis, and clear and concise written and oral communication. These skills will improve only with practice. Therefore, the LARW course uses a problem-solving approach through which students will represent a fictional client and provide those clients with legal advice. Through this approach, students will learn essential skills of successful lawyers, including researching legal authorities, applying the law to a client's situation, and communicating that analysis in writing and verbally.

### **Legal Analysis, Research and Writing I (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 914** Legal Analysis, Research and Writing II (2) LARW II continues to build on the skills learned in LARW I. Students continue to analyze clients' problems using various sources of legal authority, to use additional research sources, and to further refine their writing style. However, LARW II focuses on persuasive writing, so students will learn to draft documents that are submitted to a court called "briefs" or "memoranda of law." Students also will learn to present an oral argument to a court. LARW II continues to implement the problem-solving approach to teach persuasive writing, and students continue to receive individualized feedback throughout the course.

### **Legal Analysis, Research and Writing II (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 920** Property (4) This course introduces the basic concepts and principles in the law of property. Topics include: acquisition and allocation of property rights; restrictions on owners' rights to use, limit access to, and sell or dispose of their property; and the relationships among multiple owners of rights in the same property. The emphasis is on real property, although the course also addresses intellectual property and other types of personal property.

### **Property (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**CORE 925 Torts (4)** Tort law seeks to remedy civil wrongs that result in harm to person or property. The class will focus on basic concepts such as the international torts, negligence, strict liability, and products liability.

#### **Torts (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CORE 934 Professional Responsibility (3)** Through the use of hypothetical situations, this course attempts to generate student sensitivity to ethical problems faced by lawyers in various kinds of practice. The ABA Model Rules of Professional Conduct and the older Code of Professional Responsibility are the basic tools, but discussion centers as well on case law, ABA opinions and standards, statutes, and the dictates of conscience. Discipline and professional malpractice are also treated.

#### **Professional Responsibility (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Corp & Comm Law (CCLAW)**

**CCLAW 952 Secured Transactions (3)** This course deals with the creation, enforcement, and priorities of personal property security interests under Article 9 of the Uniform Commercial Code and related statutes. It addresses: (a) encumbrances on consumer, commercial, and industrial goods, (b) inventory and receivables financing for manufacturers, distributors, and dealers, and (c) personal property agricultural financing. Relevant provisions of other articles of the UCC and other state and federal statutes are integrated into the course as required.

#### **Secured Transactions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 954 Nonprofit Organizations (3)** This course provides an overview of laws and policies that affect that nonprofit sector, a vital component of national and international economics. It covers alternative organizational structures, including the creation and operation of a nonprofit corporation under U.S. laws. The course examines the status, rights and fiduciary obligations of directors and members. The course introduces tax laws applicable to nonprofit organizations, including the importance of obtaining and maintaining tax exempt status, public charity or private foundation status, and the taxable status of "unrelated business income." The course looks at the laws governing charitable giving.

#### **Nonprofit Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 955 Agency, Partnerships, and Limited Liability Entities (3)** This course surveys the law of unincorporated business entities. The agency law part of the course will focus on agents' powers and responsibilities, liabilities of principals for acts of agents, and termination of the agency relationship. The partnership law part of the course will cover the fiduciary obligations of partners, partners' management and property rights, and partnership dissolutions. The final part of the course will examine the "new" limited liability entities now provided for by the law of all states; with emphasis on the formation, organization, and dissolution of limited liability companies. Although not a prerequisite, this course is strongly recommended for students planning to enroll in Corporations.

**Agency, Partnerships, and Limited Liability Entities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 956** Agricultural Law (3) This course will introduce students to the range of current and emerging issues that confront agricultural producers, agri-business firms, and other segments of that broader sector of the economy referred to as the "food industry." The course will address a variety of issues including the history and objectives of agricultural policy, land use planning for agricultural activities, resource use and allocation, industrialization in the agricultural sector, intergenerational transfers of farm businesses, international trade, and ethical issues that confront practitioners.

**Agricultural Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 957** Banking Regulation (2) This course will focus on banks as financial intermediaries and compare them to both the securities and insurance industries. The dual banking system of state and federal regulation will be explored as to bank formation, supervision and regulation. The course will explore the ownership and control issues affecting banks and the supervision and regulation of bank holding companies and their subsidiaries engaged in nontraditional banking activities. The causes of the financial crisis of 2007-2009, together with the reaction of financial institutions, the states, the U.S. Congress and the regulators to the crisis, will also be examined. The course will include an assessment of the deposit insurance system and the problems associated with troubled and failed banks. The course will emphasize the potential administrative enforcement, civil and criminal exposure of both regulated entities and individuals involved within those industries.

**Banking Regulation (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 958** Business Planning for Small Business Enterprises (3) Selected practical problems involving the planning of business transactions, with emphasis upon the small business enterprise, are examined. Topics include: organization of close corporations, partnerships and LLCs; employee compensation; sexual harassment and discrimination issues; executive hiring negotiations; and raising capital through the sale of securities. This course is strongly suggested for anyone who plans on representing businesses.

**Business Planning for Small Business Enterprises (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 959** Business Reorganizations (3) This course is a study of the law governing the reorganization of businesses under chapter 11 and related provisions of the U.S. bankruptcy code. It includes such topics as prepetition planning, the filing of a business reorganization case (either voluntary or involuntary), jurisdiction and venue, the automatic stay and "adequate protection," the bankruptcy estate, "first day" orders, use of cash collateral, postpetition financing, wage payment orders, rights of utilities, reclamation rights, executory contracts, employment and payment of professionals, professional responsibility in the bankruptcy context, creditors' (and other) committees, chapter 11 trustees and examiners, substantive consolidation, chapter 11 plans and disclosure statements, plan confirmation, claims objections, avoidance actions, coordination of international insolvency cases.

**Business Reorganizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 960** Consumer Protection (2) This course will deal with federal and state statutes and regulations that primarily protect the consumer. Federal laws covered in detail are the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, the Consumer Credit Protection Act, and federal tax lien statutes. State laws on false and misleading advertisements and full disclosure will be examined, along with state procedures for attachments in the enforcement of money judgments.

### **Consumer Protection (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 961** Bankruptcy (3) The rights, duties, and remedies of both debtor and creditor are examined. The course covers the collection process, enforcement of money judgments and insolvency proceedings. Federal bankruptcy law is emphasized.

### **Bankruptcy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 963** Corporations (3) This course primarily addresses organization and operation of commercial organizations in the Anglo-American community. Preliminarily, sole proprietorships and partnerships are considered, after which corporations-for-profit are emphasized with some attention to business trusts and non-profit corporations. In the corporate context, duties of promoters, directors, officers, and other insiders are considered. Availability in the U.S. of the derivative action is treated in terms of both unincorporated and corporate forms of organization. Also treated are the basics of securities regulation at the federal and state levels in the U.S. and the provincial level in Canada.

### **Corporations (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 964** Business Planning for Mergers and Acquisitions I (3) This course first focuses on various topics that are important in M&A transactions involving both closely-held corporations, including directors duties, shareholder voting and dissenters' rights, basic issues under the Federal securities laws, fundamentals of Federal income taxation and accounting, use of modern valuation techniques, including DCF and CAPM, in M&A, and basic issues in antitrust and pre-merger notification. The course then turns to an analysis of various forms of negotiated acquisition, including acquisitions of stock and assets of closely-held corporations and acquisitions of publicly-held corporations in negotiated transactions. The course is based on the first half of Thompson, Business Planning for Mergers and Acquisitions: Corporate, Securities, Tax, Antitrust, International, and Related Aspects (2008).

### **Business Planning for Mergers and Acquisitions I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 965** Business Planning for Mergers and Acquisitions II (3) This course builds on the topics covered in Business Planning for Mergers and Acquisition I, and is based on the second half of Thompson, Business Planning for Mergers and Acquisitions: Corporate, Securities, Tax, Antitrust, International, and Related Aspects (2008). The course starts with an examination of leveraged buyouts, and then focuses on the drafting of various types of acquisition agreements. The

course then looks at proxy contests and then turns to hostile takeovers and going private transactions regulated by the Williams Act provisions of the Securities Exchange Act of 1934. The course then looks at special topics in M&A, including spinoffs, international M&A, bank acquisitions, acquisitions of public utilities, bankruptcy acquisitions, joint ventures and ethics issues in M&A.

### **Business Planning for Mergers and Acquisitions II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 966** Financial Accounting (2) Students will acquire a basic understanding of the concepts and principles of financial accounting practice, confidence analyzing common forms of financial data (e.g., 10K or annual reports), competence to communicate effectively with accountants, awareness of the uses and limits of financial accounting data in decision-making, and perspective necessary to understand how an event affects a firm's financial statements.

### **Financial Accounting (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 969** Insurance Law (3) A study of special legal principles applicable to insurance contracts is undertaken with an examination of the insurance industry and insurance marketing, the identity of persons and interests protected, the nature and selection of risks, the rights and duties of the contracting parties, and the enforcement of claims.

### **Insurance Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 971** International Business Transactions (3) This course considers private business transactions that cross national boundaries. Topics include formation and enforcement of commercial agreements, forms of international transactions (e.g., agencies, distributorships, licensing agreements, franchising, and foreign subsidiaries), government regulation, electronic commerce, international and cross-cultural business negotiation and techniques for resolution of international business disputes (e.g., judicial procedure, arbitration, mediation).

### **International Business Transactions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 971** International Business Transactions (3) This course considers private business transactions that cross national boundaries. Topics include formation and enforcement of commercial agreements, forms of international transactions (e.g., agencies, distributorships, licensing agreements, franchising, and foreign subsidiaries), government regulation, electronic commerce, international and cross-cultural business negotiation and techniques for resolution of international business disputes (e.g., judicial procedure, arbitration, mediation).

### **International Business Transactions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 973** International Trade Law (3) Coverage of the principal laws that govern business transactions across international borders.

### **International Trade Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 978** Payment Systems and Financial Transactions (3) Payment Systems and Financial Transactions is a general overview of the law of negotiable instruments (e.g., checks) and other mechanisms for making payments, including credit cards, debit cards, ACH payments, and wire transfers. The course also will cover credit enhancement systems such as guaranties and letters of credit. The course will address both uniform state law (UCC Articles 3, 4, 4A, and 5), and applicable federal statutes and regulations (such as the Expedited Funds Availability Act, the Truth-in-Lending Act, and the Electronic Fund Transfer Act).

### **Payment Systems and Financial Transactions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 982** Products Liability (2) This course incorporates and expands the concepts derived from the basic Torts, Contracts, and Uniform Commercial Code coverage of products liability. Emphasis will be on the substantive and procedural law of contract, negligence, and strict liability developed by courts and administrative tribunals. Proposals for legislative reforms will also be studied.

### **Products Liability (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 984** Sales (3) Article Two of the Uniform Commercial Code is an integrated body of statutory law that prescribes the rights and obligations of parties involved in transactions in goods. Although we will review general principles of contract law and contrast them with the approach adopted in Article Two, this course emphasizes the special techniques of statutory construction utilized in interpreting a code as opposed to an isolated statute. Classroom discussion is devoted almost exclusively to developing analyses of written problems distributed to the students in advance of the class. The problems require students to fashion arguments based on the statutory language. The problems also require students to develop an understanding of the legal and commercial context based on the assigned readings, and then to interpret the statutory language in light of the context.

### **Sales (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 986** Federal Securities Regulation (3) This course is intended to provide an overview of the federal securities laws. Securities regulation plays a crucial role in many different fields of business law, and every lawyer should have at least a basic knowledge of its general principles. The course focuses on issues such as the offering of securities, civil liabilities connected with the sale and purchase of financial instruments, insider trading, proxy voting and M&As, takeovers, stock exchanges and brokers/dealers regulation. Specific attention is devoted to securities litigation aspects, including class actions.

### **Federal Securities Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 991** Antitrust (3) This course is principally an examination of antitrust law and policy in the U.S. as evolved through prosecutions by the U.S. Department of Justice and the Federal Trade Commission. There is brief coverage of: (a) European Union and Canadian competition laws plus evolving proposals for supranational norms; and (b) leading market regulatory schemes such as those affecting marketing of foods, drugs, textiles, toxic substances, securities, and consumer products. In the antitrust area, commercial conduct alleged to violate price fixing, market allocation, tying, exclusive dealing, asset acquisition, and price discrimination norms are considered at length with some attention to state antitrust law.

### **Antitrust (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 993** Merger Finance and Economics (2) The purposes of the course are to provide the student with (1) a fundamental understanding of the finance and economics of the M&A marketplace, and (2) the basic skills needed to succeed in various professional capacities in the M&A marketplace, such as investment banker, management consultant, strategic planner, and lawyer.

### **Merger Finance and Economics (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 994** Telecommunications Law and Regulation (3) This course will examine and debate a series of legal and regulatory issues raised by spectrum management, broadcasting, cable television, common carrier, Internet, resource allocation, and technology planning topics.

### **Telecommunications Law and Regulation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 997A** Corporate Governance Transactions (3) Corporate Governance Transactions will provide students with an intensive examination of Delaware corporate governance law as applied to corporate merger and asset acquisition strategy and transactions.

### **Corporate Governance Transactions (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 997A** Corporate Governance Transactions (3) Corporate Governance Transactions will provide students with an intensive examination of Delaware corporate governance law as applied to corporate merger and asset acquisition strategy and transactions.

### **Corporate Governance Transactions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 997B** Multinational Corporations (3) This course will introduce students to the multinational corporation as object and source of law and legal regulation, and the role of multinational corporations in world affairs. Globalization is central to the study of the regulatory and policy framework of multinational corporations, and their relationships with states and other non-state actors. With the deepening of the framework and legal structures of globalization, multinational corporations have been transformed from a mere object of law making, like individuals, to organizations that themselves now create law and legal structures. Additionally, the framework within which multinational corporations now serve as both objects and sources of law has expanded from relations only with the domestic legal orders to states to deep association with governance structures at the international level, including those of both public and private entities.

### **Multinational Corporations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 997B** Multinational Corporations (3) This course will introduce students to the multinational corporation as object and source of law and legal regulation, and the role of multinational corporations in world affairs. Globalization is central to the study of the regulatory and policy framework of multinational corporations, and their relationships with states and other non-state actors. With the deepening of the framework and legal structures of globalization, multinational corporations have been transformed from a mere object of law making, like individuals, to organizations that themselves now create law and legal structures. Additionally, the framework within which multinational corporations now serve as both objects and sources of law has expanded from relations only with the domestic legal orders to states to deep association with governance structures at the international level, including those of both public and private entities.

### **Multinational Corporations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CCLAW 997C** Operational Issues for Small Business Enterprises (3) Selected practical problems involving the operations of the small business enterprise and its owners are examined. Topics include: Legally hiring and firing employees; employee privacy; governmental intervention and compliance; handling governmental agency issues (IRS, SEC, DoL, etc.); business expansion; cessation of a business; business divorce and family business planning and transition. The course will provide practical experience for students who wish to become transactional attorneys through business problems designed to allow them to identify relevant issues and draft documents resolving those issues.

### **Operational Issues for Small Business Enterprises (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Counseling Psychology (CNPSY)**

**CNPSY 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 502** (CN ED 502) Advanced Counseling Theory and Method (3) Assessment, intervention, and evaluation procedures for counseling problems frequently encountered in school, college, and rehabilitation settings.

**CNPSY (CN ED) 502 Advanced Counseling Theory and Method (3)**

This course is concerned with the exploration of ideas that are of theoretical and applied importance to thinking about counseling and psychotherapy. The course is not a skills course, per se, although many of the readings have clear implications for enhancing your therapeutic skills. Nor is the course meant to be a review of theories of personality or counseling typically covered in earlier courses. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 515** Family Systems Therapy: Theory, Research and Practice (3) Examines theory, research, and interventions grounded in family systems framework (e.g., Bowenian, Structural Strategic, etc.) from a psychological perspective.

**CNPSY 515 Family Systems Therapy: Theory, Research and Practice (3)**

This seminar will (a) familiarize students with the history of family therapy approaches and their contributions to the field of mental health service, (b) provide students with an opportunity to learn about the major approaches in family therapy, (c) introduce students to family therapy research, and (d) encourage students to reflect on the patterns in their own family of origin and family of choice. During this introductory seminar in family systems, theory, students will gain exposure to the field of family therapy through: a variety of readings, including original articles written by theorists and journal articles discussing the research findings; experiential exercises and videotapes of family therapy and consultation sessions conducted by expert family therapists. The course is offered once a year and is open to graduate students in developmental, social and behavioral sciences and related fields.

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 554 (CN ED 554) Cross-Cultural Counseling (3)** Examines theory, research, and models of counseling relationships between counselors and clients of different racial and sociocultural backgrounds.

**CNPSY (CN ED) 554 Multicultural Counseling (3)**

This course is an advanced multicultural counseling course designed to help doctoral students: (a) develop mastery of the multicultural counseling literature, (b) promote self-awareness and self-knowledge, (c) facilitate the construction of cultural knowledge to increase awareness and sensitivity to issues affecting multicultural populations, (d) identify intervention strategies applicable to multicultural clients, and (e) promote development of a personal philosophy of multicultural counseling toward becoming a multiculturally competent counselor. The course is open to CN ED and CNPSY doctoral students who have successfully completed CN ED 507, CN ED 595A or CNPSY 595A, or equivalent courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 555 (CN ED 555) Career Counseling (3)** The examination of historical, legislative, and current models of career counseling and the development of pertinent individual and group techniques.

**CNPSY (CN ED) 555 Career Counseling (3)**

This course is an advanced extension of CN ED 505, Foundations of Counseling Information or its equivalent. In CN ED 501, students acquire a theoretical understanding of models of career development, decision-making, career education, information systems and information resources. In CN ED/CNPSY 555, students will have an opportunity to related such learning to the place of work in human behavior, models of career counseling, the role-play of such models, the practice of career appraisal and the broad economic, social, and legislative contexts, including the global economy, stimulating current emphases on career counseling. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 582 (CN ED 582) Advanced Group Psychotherapy (3)** Study of group psychotherapy and interventions, with an experiential component. Available only to majors in CN ED and CNPSY.

**Advanced Group Psychotherapy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 589 Seminar on Counseling Supervision (1)** Study of research about and theoretical models of clinical supervision of counselors; includes preparation for a practicum in counseling supervision.

**Seminar on Counseling Supervision (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 589** Seminar on Counseling Supervision (1) Study of research about and theoretical models of clinical supervision of counselors; includes preparation for a practicum in counseling supervision.

**Seminar on Counseling Supervision (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 594** Research in Counseling (2-6) The design, implementation, and evaluation of counseling research projects.

**Research in Counseling (2-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 595A** Counseling Psychology Practicum (1-3 per semester, maximum of 12) Practice in the application of counseling psychology principles and methods to cases counseled under supervision; case conferences.

**Counseling Psychology Practicum (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 595D** (CN ED 595D) Supervision of Counselors (3-9) Practical experience in supervising and evaluating work of counselors.

**Supervision of Counselors (3-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CNPSY 600** THESIS RESEARCH (1-15) NO DESCRIPTION.

**THESIS RESEARCH (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description available.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CNPSY 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Counselor Education (CN ED)**

**CN ED 401** Foundations of Chemical Dependency Counseling (3) An overview of diagnosis and assessment, models for chemical dependency prevention, counseling, and recovery; contexts of chemical dependency treatment.

**Foundations of Chemical Dependency Counseling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 404** Group Procedures in Guidance and Counseling (3) The nature and functioning of groups in educational and agency settings. Provides prospective counselors with experience in the group process.

**Group Procedures in Guidance and Counseling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 416** Interpersonal Relationships and Alcohol and Other Drugs (AOD) Dependency (3) This course examines families with chemically dependent members, dynamics, appropriate interventions, and treatment.

**Interpersonal Relationships and Alcohol and Other Drugs (AOD) Dependency (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 420** Chemical Dependency: Youth at Risk (3) Study of youth who are at-risk of developing chemical dependency including the characteristics and factors related to chemical dependency.

**Chemical Dependency: Youth at Risk (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 421** Counseling Strategies for Preventing Chemical Dependency (3) Examines helping professional's role in primary and secondary prevention of substance abuse, and related problems like delinquency, suicide, and pregnancy.

**Counseling Strategies for Preventing Chemical Dependency (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 422** Foundations of Addictions Counseling (3) Study of the fundamental principles of counseling individuals with a wide variety of addictions.

**CN ED 422 Foundations of Addictions Counseling (3)**

Students explore the fundamental principles of addictions counseling from a wide range of perspectives. These include the psychopharmacological aspects of alcohol and abusable drugs, along with theories and assessments of addictive disorders. Many treatment models are considered, and are examined in the context of individual, group, and family therapy perspectives. The course also addresses the research literature on codependence, COA's AA and other 12-step programs, dual diagnosis, relapse, prevention, and multicultural and gender issues.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 423** Student Assistance Programs (3) Exploration of early stages of adolescent "at-risk" behavior and skills for student assessment and intervention within schools and communities.

**Student Assistance Programs (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 424 (WF ED 424) Facilitating Career Development (3)** This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work.

**CN ED (WF ED) 424 Facilitating Career Development (3)**

This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work. This course addresses the following 12 Career Development Facilitator (CDF) competencies: 1) helping skills, 2) labor market information and resources, 3) assessment, 4) diverse populations, 5) ethical and legal issues, 6) career development models, 7) employability skills, 8) training clients and peers, 9) program management/implementation, 10) promotion and public relations, 11) technology, and 12) consultation.

These 12 competencies are identified by the National Career Development Association (NCDA) for those who (will) deliver career development programs and services in a variety of settings. Potential job titles of CDFs include career group facilitator, job search trainer, career resource center coordinator, career coach, career development case manager, intake interviewer, occupational and labor market information resource person, human resource career development coordinator, employment/placement specialist, and workforce development staff.

With certain years of work experience in career development, students who complete this course are eligible to apply for the Global Career Development Facilitator (GCDF) certification through the Center for Credentialing & Education (CCE), which is affiliated with the National Board for Certified Counselors (NBCC). A GCDF is a person who works in any career development setting or who incorporates career development information or skills in their work with students, adults, clients, employees, or the public. As of January 2011, about 18,000 individuals acquired the GCDF certification world-wide including Bulgaria, Canada, China, Germany, Japan, Romania, Turkey, South Korea, and New Zealand.

The goal of the GCDF credential was to provide standards, training specifications, and credentialing for diverse career development practitioners. This GCDF credential differentiates two levels of career practice, which are 1) career counseling and 2) career facilitation that does not require a counseling degree. This differentiation reflected the reality where many individuals who are currently providing career assistance are not professional counselors.

This course is taught by a nationally and internationally trained CDF Instructor (CDFI) who is certified by the NCDA. In addition, the CDF curriculum is updated every three years by the Career Development Leadership Alliance (CDLA) under the supervision of the NCDA CDF Advisory Council in order to keep up with recent changes in the field.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 430 Couples and Family Counseling (3)** The theory and practice of counseling with couples and families emphasizing family development and major intervention approaches.

**CN ED 430 Couples and Family Counseling (3)**

Students study the theory and practice of couples and family counseling with an emphasis on models of family development and major approaches to intervention with couples and families. Systemic models of family intervention are emphasized as well as the study of other historically important and contemporary approaches to couples and family therapy. The course blends didactic and experiential learning.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 431 Counseling and Teaching Youth at Risk (3)** This course is focused on how to counsel and/or teach youth at risk for a variety of social, emotions, and educational problems.

**CN ED 431 Counseling and Teaching Youth at Risk (3)**

This course is designed to provide participants with an overview of information focused on counseling and teaching youth at-risk. Emphasis will be placed on identifying youth-at-risk for depression, suicide, eating disorders, pregnancy, AIDS, use and/or abuse of alcohol and drugs, homelessness, gang membership, difficulties related to sexual orientation, and several other at-risk behaviors. Ideas for primary, secondary and tertiary prevention from individual, family, school and community perspectives will also be presented. The course provides a varied format structured to include lecture/discussion, audio-visual presentations, participant self-evaluation of their own at-risk behaviors, role-plays and small group discussion.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 432** Ethical, Legal, and Professional Issues in Counseling (3) Examination of the current ethical and legal issues related to professional counselors and counseling.

### **CN ED 432 Ethical, Legal, and Professional Issues in Counseling (3)**

Participants explore an overview of ethical and legal issues related to the professional practice of counseling. Topics include responsibility, competence, public statements, confidentiality, professional relationships, licensing and other regulatory programs, and research. The course emphasizes clinical strategies relevant to legal and ethical issues.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 500** Introduction to Counseling and Development (3) Introduces students to the profession of counseling and to the major models of human growth and development.

### **CN ED 500 Introduction to Counseling and Development (3)**

This course provides an introduction to the profession and practice of counseling and to major models of human growth and development. As such, a primary goal of this course is for students to begin the process of professionalization. Thus the course will address the history and current trends, professional standards, associations, areas of specialization, and major approaches to the field of counseling. It will also address major theories of human growth and development, as well as major developmental periods that might have pertinence for counselors. In addition, students will be expected to begin the process of their own development as professional counselors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 501** Counseling Theory and Method (3) Survey of psychodynamic, humanistic, behavioral and cognitive-behavioral approaches to counseling individuals.

**Counseling Theory and Method (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 502** (CNPSY 502) Advanced Counseling Theory and Method (3) Assessment, intervention, and evaluation procedures for counseling problems frequently encountered in school, college, and rehabilitation settings.

**CN ED (CNPSY) 502 Advanced Counseling Theory and Method (3)**

This course is concerned with the exploration of ideas that are of theoretical and applied importance to thinking about counseling and psychotherapy. The course is not a skills course, per se, although many of the readings have clear implications for enhancing your therapeutic skills. Nor is the course meant to be a review of theories of personality or counseling typically covered in earlier courses. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 503** Guidance Services in Elementary Education (3) Guidance services to elementary school students; guidance opportunities for elementary teachers and principals.

**Guidance Services in Elementary Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 504** Guidance Services in Secondary Education (3) Nature and scope of guidance in secondary schools--services, models, and strategies; the counselor as an agent of change.

**Guidance Services in Secondary Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 505** Foundations of Career Development and Counseling Information (3) Accelerating change in economic, psychological, social, educational influences upon counselees. Utilization of information systems in effecting counselee change.

**Foundations of Career Development and Counseling Information (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 506** Individual Counseling Procedures (3) Training in listening, responding, challenging skills, and action-oriented techniques for individual counseling.

### **Individual Counseling Procedures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 507** Multicultural Counseling: Foundations (3) Provide foundational information that controverts, complements and extends traditional psychology and counseling theory and practice.

### **Multicultural Counseling: Foundations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 508** Organization and Administration of Pupil Services (3) Principles, organization, personnel, functions, integration with school programs, evaluation.

### **Organization and Administration of Pupil Services (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 509** Introduction to Rehabilitation Counseling (3) Provides information about rehabilitation history, legislation, philosophy, and agencies, as well as an overview of a variety of disabling conditions.

### **Introduction to Rehabilitation Counseling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 516** Helping Skills for Student Affairs Professionals (3) Develop beginning content knowledge and skills related to practice of active listening, attending, and referral necessary for student affairs work.

### **Helping Skills for Student Affairs Professionals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:  
Concurrent: CN ED 501

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 523** Counseling Children (3) Provides school and clinic approaches for school counselors and others mental health professionals to help children with developmental problems.



**CN ED 523 Counseling Children (3)**

Counseling children includes a range of school and clinic approaches used by school counselors and others to help children. The course combines theory and research findings with practical application of techniques so that students can develop a wide range of knowledge and skills for integration into their individual counseling model and professional situation.

Classroom work will include lecture, discussion, videos, and presentations of techniques that include role-play and case studies. The combination of these activities is designed to create a sound basis of understanding and supervised opportunities to apply techniques in school and agency settings.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 524 Counseling Adolescents (3)** Provides approaches for school counselors and others working with a variety of adolescent obstacles and developmental needs

**Counseling Adolescents (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 525 Applied Testing in Counseling (3)** Using counseling assessments effectively and ethically in applied settings, with an emphasis on test analysis and evaluation of psychometric properties.

**Applied Testing in Counseling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 526 Research in Counselor Education (3)** Evaluating counselor education research from scientist-practitioner perspective; emphasis on how to develop and use research with an applied focus.

**Research in Counselor Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 530 Family Counseling: Theory and Practice (3)** Conceptualization and application of family counseling frameworks to EC-12 school settings are learned in this course.

**CN ED 530 Family Counseling: Theory and Practice (3)**

Family functioning is paramount in the educational, personal/social, and career development of children and adolescents. This course prepares school counselors and other counselors for helping children and adolescents in the context of family. Several theories and models of family counseling are presented, focusing on application of these frameworks to work in EC-12 schools. Through experiential activities connected to the course, counselor-trainees are encouraged to relate experiences in their own families to their functioning as counselors. The course is required for a master's degree in elementary or secondary school counseling. Evaluation includes multiple-choice tests and a self-reflection project. The course objectives follow: Students will: 1. know the terminology and basic concepts associated with systems thinking and family counseling. 2. adopt a family systems frame of reference and understand the family counseling perspective. 3. know the history and development of family counseling. 4. conceptualize the social constructionist perspective of family counseling and human functioning, including perspectives on substance use and abuse, gender, lifestyle, socioeconomic conditions, sociopolitical conditions, relations among diverse groups, and culture and identity. 5. understand and apply various frameworks of family counseling to the school counseling and school context, including Bowenian theory,

attachment theory, experiential/humanistic approaches, structural and strategic approaches, cognitive-behavioral approaches, solution-focused therapy, narrative therapy, and integrative models. 6. grow in their own self-awareness with regard to their families of origin. 7. understand the use of self in counseling and learn and apply this knowledge in experiential activities and personal and professional functioning. 8. understand the wounded healer concept and attachment theory implications for counselor functioning. 9. comprehend and delineate the relationships among family systems, schools, and community systems. 10. understand racial-ethnic, gender, cultural, socioeconomic, and lifestyle issues in the context of family, school, and community and institutional systems. 11. know how families, schools, and communities interact to influence students' development. 12. understand strategies used to promote effective teamwork among counselors, educational professionals, students, parents, schools, and communities. 13. understand communication, collaboration, and consultation with parents, educational and mental health professionals, guardians, and community members for promoting students educational, career, and personal development. 14. know and understand the structure of parenting styles and outcomes associated with each parenting style. 15. understand research on parenting styles and contrast the traditional view of adolescent development with the contemporary view. 16. apply parenting styles for various prevention and intervention strategies. 17. know research support for various prevention and intervention strategies, understand measurement associated with various theories and models, and understand research traditions and methods associated with various theories and models.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 531** Grief and Loss Counseling (3) Course focus is on counseling people with a variety of grief and loss issues.

### **Grief and Loss Counseling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 532** Diagnosis Counseling (3) Course examines elements of counseling diagnosis, including identification and assessment of symptoms and behaviors in determining appropriate diagnoses.

### **Diagnosis Counseling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 542** Dual Diagnosis (3) Examines issues related to diagnosis and treatment of individuals who have both a mental disorder and a substance abuse disorder.

### **CN ED 542 Dual Diagnosis (3)**

This course examines theory, research, current issues, and case examples related to the diagnosis and treatment of individuals who have both a mental disorder and a substance abuse disorder.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 554 (CNPSY 554)** Multicultural Counseling (3) Examines theory, research, and models of counseling relationships between counselors and clients of different racial and sociocultural backgrounds.

### **CN ED (CNPSY) 554 Multicultural Counseling (3)**

This course is an advanced multicultural counseling course designed to help doctoral students: (a) develop mastery of the multicultural counseling literature, (b) promote self-awareness and self-knowledge, (c) facilitate the construction of cultural knowledge to increase awareness and sensitivity to issues affecting multicultural populations, (d) identify

intervention strategies applicable to multicultural clients, and (e) promote development of a personal philosophy of multicultural counseling toward becoming a multiculturally competent counselor. The course is open to CN ED and CNPSY doctoral students who have successfully completed CN ED 507, CN ED 595A or CNPSY 595A, or equivalent courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 555 (CNPSY 555) Career Counseling (3)** The examination of historical, legislative, and current models of career counseling and the development of pertinent individual and group techniques.

### **CN ED (CNPSY) 555 Career Counseling (3)**

This course is an advanced extension of CN ED 505, Foundations of Counseling Information or its equivalent. In CN ED 501, students acquire a theoretical understanding of models of career development, decision-making, career education, information systems and information resources. In CN ED/CNPSY 555, students will have an opportunity to relate such learning to the place of work in human behavior, models of career counseling, the role-play of such models, the practice of career appraisal and the broad economic, social, and legislative contexts, including the global economy, stimulating current emphases on career counseling. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 560 Psychosocial Aspects of Disability (3)** Psychological models of reaction to disability and social consequences in adulthood; generalizations to other life crises; implications for counselor interventions.

### **Psychosocial Aspects of Disability (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 561 Job Development and Employment of Persons with Disabilities (3)** Assessing client readiness for work, job-seeking skills training, job placement strategies, modifications to the worksite, methods for employer development.

### **Job Development and Employment of Persons with Disabilities (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 580 Foundations: History and Trends in Counselor Education (3)** Overview of the foundations and issues relevant to the counseling profession and counselor education. Course available only to majors in CN ED.

### **Foundations: History and Trends in Counselor Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 581 Professional Issues in Counselor Education (3)** Forum for doctoral students to examine and analyze issues relevant for counselor educators. Available only to majors in CN ED.

**Professional Issues in Counselor Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 582** (CNPSY 582) Advanced Group Psychotherapy (3) Study of group psychotherapy and interventions, with an experiential component. Available only to majors in CN ED and CNPSY.

**Advanced Group Psychotherapy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 589** Seminar on Counseling Supervision (3) Study research and theoretical models of clinical supervision of counselors. Includes experiential supervision component as preparation for counseling supervision practicum.

**Seminar on Counseling Supervision (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 589** Seminar on Counseling Supervision (3) Study research and theoretical models of clinical supervision of counselors. Includes experiential supervision component as preparation for counseling supervision practicum.

**Seminar on Counseling Supervision (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 594A** Research Topics (3) The design, implementation, and evaluation of counseling research projects.

**Research Topics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595A** Counseling Practicum (1-6) Practice in the application of guidance principles and methods to cases counseled under supervision; case conferences; seminar in guidance techniques.

**Counseling Practicum (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595B** Supervised Practicum in Rehabilitation Counseling (1-6) Application of principles and techniques of

rehabilitation counseling to cases involving people with disabilities.

### **Supervised Practicum in Rehabilitation Counseling (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595C** Professional Experience in Rehabilitation Counseling (1-15) Supervised internship, with responsibility for a regular case load.

### **Professional Experience in Rehabilitation Counseling (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595D** (CNPSY 595D) Supervision of Counselors (3-9) Practical experience in supervising and evaluating work of counselors.

### **Supervision of Counselors (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595E** Elementary School Counseling Internship and Seminar (1-3 PER SEMESTER/MAXIMUM OF 6) Off-campus, supervised internships in elementary school settings with supplementary related topics, discussion, and skills training in on-campus seminars.

### **Elementary School Counseling Internship and Seminar (1-3 PER SEMESTER/MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595F** Secondary School Counseling Internship and Seminar (1-3 PER SEMESTER/MAXIMUM OF 6) Off-campus, supervised internships in secondary school settings with supplementary related topics, discussion, and skills training seminars.

### **Secondary School Counseling Internship and Seminar (1-3 PER SEMESTER/MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595G** Counseling Internship and Integrative Seminar (3-6 per semester/maximum of 12) Off-campus, supervised internships in counseling settings with pertinent topics, discussion; skills training seminars on campus.

### **CN ED 595G Counseling Internship and Integrative Seminar (3-6 per semester/maximum of 12)**

This course will provide students with opportunities to apply principles and techniques that facilitate the counseling process by completing a supervised 600-hour counseling internship experience. Students must have successfully passed CN ED 595A (Practicum) and gain permission from the Emphasis Coordinator before they can begin their counseling internship. Students are also required to have professional liability insurance as a prerequisite for the counseling

internship.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595G** Counseling Internship and Integrative Seminar (3-6 per semester/maximum of 12) Off-campus, supervised internships in counseling settings with pertinent topics, discussion; skills training seminars on campus.

**CN ED 595G Counseling Internship and Integrative Seminar (3-6 per semester/maximum of 12)**

This course will provide students with opportunities to apply principles and techniques that facilitate the counseling process by completing a supervised 600-hour counseling internship experience. Students must have successfully passed CN ED 595A (Practicum) and gain permission from the Emphasis Coordinator before they can begin their counseling internship. Students are also required to have professional liability insurance as a prerequisite for the counseling internship.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595I** Counselor Education Doctoral Teaching Internship (3) Practical experience in undergraduate and graduate level teaching under supervision. Available only to CN ED doctoral students.

**Counselor Education Doctoral Teaching Internship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595K** Counselor Education Doctoral Counseling Internship (3) Supervised internship, with responsibility for a regular counseling caseload. Available only to CN ED doctoral Students.

**Counselor Education Doctoral Counseling Internship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 595P** Counselor Education Doctoral Counseling Practicum (3) Practice in the application of counselor education principles and methods to cases counseled under supervision; case conferences. Available only to CN ED doctoral students.

**Counselor Education Doctoral Counseling Practicum (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 601** Thesis Preparation No description.

**Thesis Preparation**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of counselor education laboratory, clinical practice, and recitation classes under senior faculty supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 840** Trends and Issues in Addiction Counseling (3) This course provides an overview of current professional and ethical issues facing the addictions field.

**Trends and Issues in Addiction Counseling (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CN ED 843** (S PSY 843) Prevention Strategies and Programming (3) Addresses prevention program development, implementation, and evaluation, along with theoretical and empirical underpinnings, ethical and multicultural issues related to prevention.

### **Prevention Strategies and Programming (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Cp-Legal Services (FPLSC)**

**FPLSC 995** Field-Placement Clinic: Legal Services (2-3) See Student Handbook.

### **Field-Placement Clinic: Legal Services (2-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Crime, Law & Justice (CLJ)**

**CLJ 500** Introduction to Graduate Studies in Crime, Law, and Justice (1) An overview of professional activities of scholars of Crime, Law, and Justice and of Penn State's program in this field.

### **CLJ 500. Introduction to Graduate Studies in Crime, Law, and Justice (1)**

This course is intended for new students in the Crime, Law and Justice graduate program. Its purpose is to speed their transition to graduate study and to provide a good start for their professional socialization. The course offers an overview of many of the professional activities of scholars of crime, law, and justice and of Penn State's program in this field. This includes writing, publishing, teaching, and seeking funding. A major goal of the course is to help students see beyond the immediate priority of success at course work to the longer term priorities of success in these other arenas. The course is organized around a series of guest speakers from the program faculty who will discuss a range of activities that are a part of the professional life of research scholars. It also provides a forum for graduate students to get to know the faculty. The tone of the discussion is conversational. Speakers welcome questions both about the particular topic of the week and about the speaker's professional/research activities. All students in the Masters and Doctoral programs in Crime, Law, and Justice are required to take this course during their first semester. Students will read three books for the course and write one paper. Evaluation will be based on course attendance, participation in class discussion, and one brief paper about career paths in this field. This 1-credit course will be graded satisfactory/unsatisfactory, and it will be offered once a year with a typical enrollment of six students.

Faculty member(s) proposing course: Wayne Osgood, Barry Ruback, Roy Austin, John McCarthy, and Mark Hayward

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**CLJ 501** Criminal Justice Organizations and Institutions (3) Organizations and institutions involved in the formulation and implementation of criminal justice policy in complex social and organizational environments.

**Criminal Justice Organizations and Institutions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 512 (SOC 512)** Criminological Theories (3) Survey of theoretical and substantive issues in deviance and criminology, with emphasis on critical review of theories.

**CLJ (SOC) 512 Criminological Theories (3)**

This graduate course in Criminological Theories is designed to provide students with a broad understanding of the major theories that have animated the field of criminology since its inception. The course traces the development of criminological theories from the early 20th century to the present and provides students with a targeted exposure to empirical studies that have tested these theories. Major topics covered (and the approximate percentage of time devoted to each) are as follows:

Images of Crime and Criminals - 10%  
The Chicago School Approach - 10%  
Anomie and Strain Theories - 10%  
Opportunity and Routine Activity Theories - 10%  
Socialization and Learning Theories - 10%  
Conflict Theory and the Social Construction Perspective - 10%  
Criminal Organizations - 10%  
Criminal Careers - 10%  
Gendered Theories of Crime - 10%

This is a required course for both the M.A. and Ph.D. degrees in Crime, Law, and Justice and as such this course occupies a central position in the graduate curriculum. The course is offered once per year, usually during the Fall semester, and typically contains between 6 and 10 students.

Students are evaluated based on (1) the degree of preparation for class discussion; (2) a series of short written assignments (3-5 pages) covering each of the topic areas listed above; and (3) a longer term paper consisting of a theoretical analysis of critique, a critical review of the literature, or a research paper with a strong theoretical foundation. Grades are based on class participation and written work.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 515 (SOC 515)** Research Methods in Criminology and Deviance (3) Review of methodological issues; design and conduct of research; analysis and interpretation of findings; ethical and policy issues.

**Research Methods in Criminology and Deviance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 558** Victimization (3) This course discusses the individual- and community-level correlates, causes, consequences, and policy implications of criminal victimization.

**Victimization (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CLJ 591** (SOC 591) Teaching Sociology/Crime, Law, and Justice (1) Preparation for teaching sociology and/or crime, law, and justice at the college level.

**Teaching Sociology/Crime, Law, and Justice (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 597E** (SOC 597E) Sentencing and Corrections (3) The course takes a sociological and criminological view of sentencing and corrections, through classic and contemporary theory and empirical research.

**Sentencing and Corrections (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**CLJ 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CLJ 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Criminal Justice (CRIMJ)

**CRIMJ 406** (SOC 406, CRIM 406) Sociology of Deviance (3) Theory and research concerning behaviors and lifestyles viewed as significant departures from a group's normative expectations.

**CRIMJ (CRIM/SOC) 406 Sociology of Deviance (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the "Crime" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization. The evaluations methods will include written assignments on course readings (25%), research papers (25%), and/or essay-style exams (50%). This course will be offered once a year with 25-40 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 407** (US) (CRIM 407) Victimology (3) This course will explore the legal, emotional, and social responses to the process of victimization by offenders and third parties.

**CRIMJ 407 Victimology (3)  
(US)**

Victimology studies the victim-offender relationship. Victimization is analyzed using the Bible, Anglo-Saxon Law, Common Law, and legal precedent as a historical development of the status of "victim." Cultural changes during the 1950s and 1960s resulted in the reemergence of the victim and the designation of social services and community awareness for victims. Social scientific studies of the status of unique groups analyzed victimizations according to demographics and socioeconomic status. Political viability of victims in terms of restitution and community response are viewed in terms of Census data, the Department of Justice's National Crime Victimization Survey and The Uniform Crime Reports, Morbidity Reports, Emergency Room Reports, and the Insurance Industry Reports. The above data is evaluated in terms of age, race, education, socioeconomic status, and gender. The development and merging of culture, sub-cultural liaisons, social relationships, leisure activities, and routine transactions are reviewed as they apply to personal and unique group victimizations. Comparative issues and transnational crime are addressed under the format of globalization, gender, economics, and cultural mores. Interdisciplinary evaluation of Victimology considers psychology, medicine, sociology, criminal justice, legal studies, and mass media. Documentaries, case studies, problem based learning, and popular films provide numerous activities for discussion, analysis, and integration in writing and for discussion.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 408** Police Administration (3) Principles of administration as they relate to a police organization; and policy development.

### **CRIMJ 408 Legal Aspects of Law Enforcement (3)**

This course is one of the law enforcement offerings directed at students interested in pursuing a career in the field. This course builds upon legal courses and the police administration course. It is intended to challenge students to comprehend the complexities of working within a litigious society where policing is often the target of simultaneous praise and criticism. Research is introduced to allow students to consider alternatives to conflicts and the court's interpretation of the efficacy and constitutionality of such efforts. Civil liberties, use of force, use of technology, and communications have played significant roles challenging public safety. The consistent expansion of the role of law enforcement presents complexities that are often different according to the jurisdiction and community sentiment. Issues of hiring, training, education, accreditation, force, and racial profiling are the basis for assignments, research, and directed projects and class discussion.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 410** The Pennsylvania Court System (3) Tracing the steps of criminal cases through the investigative stage, arrest, trial, sentencing and appellate review in Pennsylvania.

### **The Pennsylvania Court System (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 412** (SOC 412, CRIM 412) Crime, Social Control, and the Legal System (3) Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

### **Crime, Social Control, and the Legal System (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 413** (CRIM 413, SOC 413) Advanced Criminological Theory (3) This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories.

**CRIMJ (CRIM/SOC) 413 Advanced Criminological Theory (3)**

Advanced criminological theory is intended to extend and deepen students' knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/CRIM/SOC 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with a Deviance and Criminology specialization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 414 (SOC 414, CRIM 414) Criminal Careers and the Organization of Crime (3)** Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and lifestyles; policy implications.

**Criminal Careers and the Organization of Crime (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 415 (PUBPL 415) Drug Control Policy in Comparative Perspective (3)** Examines the history of drug control policy in the United States; comparisons and contrasts with other countries' experiences.

**CRIMJ (PUBPL) 415 Drug Control Policy in Comparative Perspective (3)**

This course focuses on the history of drug control policy in the United States and the internationalization of drug prohibition. We also examine the experience of other countries with drug use, abuse and control, including alternative regulatory policies in Western Europe. This class is both historical and comparative in orientation: in tracing the roots of drug prohibition, and examining the experience of other countries, we seek to enrich our understanding of American style drug control and the feasibility of alternative approaches.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 420 Criminal Law and Procedure (3)** Common law and statutory crimes; constitutional rights of accused persons, liability of criminal justice professionals.

**Criminal Law and Procedure (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 421 (CRIM 421) Violent Crime in the United States (3)** The impact of violent crime on victims, their families, and communities; the police process as it relates to violent crime.

**CRIMJ (CRIM) 421 Violent Crime (3)**

This course will examine the nature, frequency, and causes of violence, generally and of assault, robbery, rape, and homicide, specifically. Several different theoretical and research perspectives are reviewed, including biological, psychological, social, and cultural. The course also examines individual and societal responses to violence. Students are evaluated on three objective exams (25% each) and a series of short assignments (25%). CRIM/CRIMJ 421 may be used by

both CLJBA and CLJBS degree candidates to satisfy a 400-level course requirement in the major. This course will be offered twice a year with 60 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 422 (CRIM 422) Victimization (3)** Examines the history, how victimization is measured/studied in social sciences, public policy implications of victimization movement in U.S.

**CRIMJ (CRIM) 422 Victimization (3)**

Victimology has emerged as an important area of study for the social sciences and an important arena for policy development. This course will familiarize students with the historical development of the research into victimization and the importance of the victims' movement to public policy. Areas explored will include the relationship between victim and offender, the cultural images of victims and their impact on the victim and the response of the criminal justice system to them, and how research has attempted to measure victimization. Students will be evaluated on three exams and a term paper. This course will be offered once a year with 40 seats per offering. The course will be one of the supporting courses where the student must select 6 credits at the 400 level.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 423 (US) (WMNST 423, CRIM 423) Sexual and Domestic Violence (3)** Legal, sociological, and psychological perspectives on sexual and domestic violence.

**CRIMJ (CRIM/WMNST) 423 Sexual and Domestic Violence (3) (US)**

This course investigates violence against women, specifically domestic, sexual, and relationship violence. Students will examine some of the legal, sociological, and psychological perspectives about sexual, domestic, and relationship violence as well as the social and cultural roots of violence against women. Students will also gain an understanding of the experiences of victims of domestic and sexual violence as well as the issues presented by perpetrators. Students will be evaluated based on performance on exams, and two research papers. CRIMJ/CRIM/WMNST 423 is a supporting course in both the WMNST major and minor as well as a supporting course in the CLJ major. It may also be used to satisfy a GI requirement. This course is offered fall and spring semester with an enrollment of 60 students each semester.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 424 (CRIM 424) Drugs and Crime (3)** Analysis of international narcotics trafficking in the twentieth century.

**CRIMJ (CRIM) 424 Drugs and Crime (3)**

The course examines narcotics trafficking across the world from a geopolitical and social science perspective. The course explores the history and policy of international narcotics trafficking, social science explanations of the narcotics trade, and the successes and failures of policy efforts to stop the narcotics trade. Students will be evaluated on the basis of exams, quizzes, and homework assignments. This course is one of several advanced level courses students in the CLJ major may choose from to meet 400-level requirements. This course will be offered twice a year with 60 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 424W** Drugs and Crime (3) Analysis of international narcotics trafficking in the twentieth century.

**Drugs and Crime (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 425** (CRIM 425) Organized Crime (3) This course examines organized crime in terms of historical antecedents, structure, related theories, and policy issues.

**CRIMJ (CRIM) 425 Organized Crime (3)**

This course will provide students with a historical and theoretical overview of organized crime. Students will gain an understanding of the structure of organized crime as well as an understanding of the businesses associated with traditional and nontraditional organized crime groups. The course will also provide students with a detailed analysis of state and federal laws and policies regarding organized crime. Students will be evaluated by two mid-term exams (25% each), an essay final exam (40%), and class participation (10%). Crime, Law, and Justice students may use this course to satisfy a 400-level course requirement in the Bachelor of Arts and Bachelor of Science majors. This course will be offered twice a year with 60 seats per offering. This course will be one of the supporting courses from which students are required to select six credits.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 426** Special Offender Types (3-6) Study of special offender types; relationships with criminal justice system (drug abuse, victimless crime, white collar crime considered different semesters).

**Special Offender Types (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 430** Alternatives to Incarceration (3) Control and treatment of offenders in the community, probation and parole organizations, diversion programs, innovative sentences, supervision techniques.

**CRIMJ 430 Criminal Law (3)**

This course introduces students to the system of "criminal justice" as defined and interpreted by the Supreme Court as well as lower courts. Students study the judicial process, the intricacies of opinion formation, the nature and extent of judicial power, the willingness of the courts to hear appeals, and the reality of criminal sanctioning and procedure. The adversarial process, the willingness of the courts to hear appeals, and the conflicting opinions of the court introduce students to the lack of conformity that is part of upholding Constitutional rights. Court attitudes and how the changing system is studied through stare decisis and case briefing. Particular cases and issues are critiqued such as capital punishment of the mentally ill, juveniles, and those who are mentally challenged. The tension between justice versus law is studied through cases, evaluation of court behavior, and changing attitudes towards racial inequities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 431** Offender and Prisoner Rights (3) The identification of correctional problems and the setting of objectives as reflective of court rulings, legislative change, and administrative law.

**Offender and Prisoner Rights (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 432 (CRIM 432) Crime and the American Court System (3)** This course examines the American court system including structure and the way courts process offenders with special focus on sentencing.

**CRIMJ (CRIM) 432 Crime and the American Court System (3)**

CRIM/CRIMJ 432, Crime and The American Court system, studies the courts from the lower courts to the Supreme Court and the various actors that play important roles in the functioning of the courts. First, the course studies the jurisdictions of the various courts and their organization in various state systems as well as the federal courts as well as the organization of state and federal administrative offices that manage the courts including the training of judges and the preparation of the court budget. Subsequent to the development of the basic understanding of the court jurisdiction and organization, the class studies the roles of the key actors in the day-in and day-out operation of the courts. In the spotlight are judges, prosecutors and defense attorneys although the role of the probation officers and clerk of courts are also intertwined with the processing of defendants. Of particular importance in this component of the course is the development of what is referred to as the court community and the focal concerns and goals that the court must consider as it processes cases. An understanding of court community and focal concerns serves as crucial context for understanding the role of public policy as it attempts to shift or change the decision making of the court. One important dynamic of this course is the understanding that the court, although functioning as an institution to provide a neutral field on which accusations of criminality are to be played out, operates similarly to other organizations in that they are to be efficient (move cases with minimum overhead) and to be effective (provide justice, and protect the public). How the courts balance these competing demands and the informal processes that emerge in the processing of defendants is the key focus of the class. Finally, the course explores the attempts to reform the courts from the sentencing reforms such as determinate sentencing, mandatory minimums including "3 strikes" and sentencing guidelines. These issues highlight the political context of the courts and adaptability of the courts to attempts to change their values, and decisions. Students will be evaluated on attendance and participation, two papers, and two essay exams. This course will be offered twice a year with 60 seats per offering. This course serves as one core 400-level course in the major. Each student must take two of the five core 400-level courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 435 Border Security (3)** This course provides knowledge about government organizations charged with American border security, guiding laws and policies.

**CRIMJ 435 Border Security (3)**

The Border Security course provides depth of knowledge of key border issues for students of homeland security. The course achieves this goal by focusing on border integrity strategies, the motivation and nature of criminal and other organizations which violate borders, the policies established by governments to maintain border integrity, identification of the key players in maintaining the border, and the relevant legal issues in enforcing laws on the border. This course allows the student to apply principles and concepts of homeland security to a specialized and very relevant area.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 439 (PL SC 439) The Politics of Terrorism (3)** Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

**The Politics of Terrorism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 441 (US) (CRIM 441) The Juvenile Justice System (3)** Historical and contemporary view of the juvenile justice system.



Focus on analyzing components of the system, their interactions, processing, and handling of youths.

### **CRIMJ (CRIM) 441 Delinquency and Juvenile Justice (3)**

This course examines delinquency and the juvenile justice system from a variety of viewpoints. It looks at the problems the system is expected to address, how the problems have changed through the ages, how the current juvenile justice system developed, and the programs used to prevent and control delinquency and their effectiveness. By the end of the course, students should be able to think critically about the research and issues in the field. Evaluation methods include exams, brief writing assignments and a longer paper on policy issues. Students will be evaluated through brief written assignments, a term paper, a mid-term essay, and essay final. This course will be offered twice a year with 60 seats per offering. Students in the major may select CRIM (CRIMJ) 441 as one of several required courses in either the BA or BS program. This course is one of the core courses in the curriculum from which students must choose six credits from five core courses offered. It also serves as one of the supporting courses in the curriculum from which the students must take six credits at the 400-level.

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 441W** The Juvenile Justice System (3) Historical and contemporary view of the juvenile justice system. Focus on analyzing components of the system, their interactions, processing, and handling of youths.

### **The Juvenile Justice System (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 450W** Senior Seminar (3 per semester/maximum of 6) Capstone course exploring past, current and future developments in criminal justice.

### **Senior Seminar (3 per semester/maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 451 (US)** (CRIM 451) Race, Crime, and Justice (3) This course focuses on the significance of race, class, and ethnicity to criminal justice processing and criminal offending.

### **CRIMJ (CRIM) 451 Race, Crime, and Justice (3) (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This class is designed to explore the relationship between the criminal justice system and racial minorities in the United States. Students will examine theoretical issues of race and justice, as well as empirical understandings of the relationship between race, crime, and the criminal justice system. Students will endeavor to understand some of the economic, political, and sociological reasons why racial minorities are over-represented in the criminal justice system. Students will also explore normative issues of justice and equity in broader social interactions that influence and are influenced by crime and the criminal process. This course may be used towards the additional courses requirements for the CLJ BS/BA and ADM J degrees. It will also satisfy the Intercultural/International competence (GI). Students will be evaluated by a midterm and final exam, a term paper and class participation. This course will be offered twice a year with 60 seats per offering.

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 453 (US)** (WMNST 453, CRIM 453) Women and the Criminal Justice System (3) This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system.

**CRIMJ (CRIM/WMNST) 453 Women and the Criminal Justice System (3)  
(US)**

The course will examine the role of women in the criminal justice system and look at the issues related to women as offenders, victims of crime, and as professionals in the system. Students will gain an understanding of the issues concerning women in the criminal justice system, examine how societal arrangements affect women as offenders, victims, and criminal justice professionals, and better understand the overlooked problems faced by women in the criminal justice system. Students will be evaluated on the basis of exams, presentations, and papers. CRIMJ/CRIM/WMNST 453 is a supporting course for both WMNST and CLJ majors, as well as the WMNST minor. This course may also be used to satisfy a GI requirement. This course will be offered twice a year with 60 seats per offering.

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 460** History and Function of Criminal Justice Components (3) Historical development of criminal justice system components (police, courts, corrections) related to formulation and function of the state.

**History and Function of Criminal Justice Components (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 462** Comparative Criminal Justice Systems (3) A comparison of American and selected foreign justice systems to illustrate the variety of possible responses to crime.

**Comparative Criminal Justice Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 465** Ethics in Criminal Justice (3) Ethical behavior in the criminal justice system.

**Ethics in Criminal Justice (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 467** (SOC 467, CRIM 467) Law and Society (3) Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials.

**CRIMJ (CRIM/SOC) 467 Law and Society (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Law and society teaches students' knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIM/CRIMJ 113 and CRIM/CRIMJ 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the "Law" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and

Criminology specialization. This course will be offered once a year with 25-40 seats per offering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 469** (HIST 469) Drugs and Drug Policy in the United States (3) Examines the history and dimensions of drug use and analyzes the impact of drug policy.

**CRIMJ (HIST) 469 Drugs and Drug Policy in the United States (3)**

For nearly a century, the United States has been waging its version of a hundred years' war on drugs, spending billions of dollars and incarcerating thousands of offenders while failing to significantly reduce the use of illicit drugs. This course examines drug use in a historical context while addressing the changing nature and dimension of drug use, including the pharmacology of drugs, patterns of drug use, and sentencing policies. Because drug control is inextricably linked to social, political, and public policy, the course will provide the student with a foundation for critical thinking and rational decision making relative to the efficacy of the various drug control initiatives. Since drugs seemingly permeate every level of American society and directly or tangentially touch most Americans' lives, issues such as drug testing in the workplace, the use of drug courier profiles, legalized medical marijuana, and needle exchange programs are evaluated. Students will be expected to learn the pharmacology of various drugs, the history of drug use in the United States since the colonial era, the evolution of federal drug agencies, and acquire knowledge about contemporary drug issues. They also will be expected to develop and strengthen their critical thinking skills as they assess the consequences of implementing particular anti-drug policies and their impact on reducing the use of illicit drug use. An example of the evaluation methods would be: students will be evaluated on the basis of three exams and four "think pieces" (requiring students' critical responses to an assigned topic) scheduled throughout the semester. Class attendance also will influence the grade.

**Faculty Member Proposing Course:** John C. McWilliams

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 471** Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3) Civil law issues within a justice agency and between criminal justice agencies and members of the public.

**Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 471** Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3) Civil law issues within a justice agency and between criminal justice agencies and members of the public.

**Legal Rights, Duties, Liabilities of Criminal Justice Personnel (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 473** Criminal Procedure and Evidence in the Business Community (3) Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.

**Criminal Procedure and Evidence in the Business Community (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 473** Criminal Procedure and Evidence in the Business Community (3) Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.

### **Criminal Procedure and Evidence in the Business Community (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 482** (CRIM 482) Seminar, Criminal Justice Agency Administration (3) Relates organizational and public policy management approaches to police, courts, and correctional institutions.

### **CRIMJ (CRIM) 482 Seminar, Criminal Justice Agency Administration (3)**

In this course, you will learn about the nature of criminal justice organizations, individual and group behavior within the system, and the issues involved in reforming the system. This course will NOT teach you how to become an administrator in the criminal justice system, but hopefully will teach you about the issues and theories surrounding organizations and reform-and most importantly, teach you to think and communicate (in both written and verbal form). After taking this course, you should have a more accurate perception of criminal justice organizations and have a better understanding of the complexity surrounding the administration and management of these organizations. The evaluation methods will include a research paper, two essay midterms, and an essay final. Criminal Justice Agency Administration may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. This course will be offered three times a year with 40 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 489W** Victimology: Predatory Crime (3) This course uses medical, social scientific and legal research to study the complexities of predatory crime.

### **CRIMJ 489W Victimology: Predatory Crime (3)**

This course builds upon CRIMJ 407, Victimology. Students are directed toward the development of forensic knowledge, crime scene analysis, comprehension of predatory injuries, films, and current serial crimes to initiate research and critical thinking. Issues such as gender, family abuse, protective services, trends in victim selection, and societal responses provide numerous opportunities for learning communities and interaction with other classes. The use of WEB based assignments and Department of Justice information encourages students to expand their research skills for writing assignments, short research papers, and legal research. The course also uses graphic slides to introduce students to the reality of physical and sexual child abuse, sexual assault, and homicide. Students are expected to review anatomy and use proper terminology when speaking about predatory behavior, victimization injuries, and psychological issues. Crime classification is introduced using the Federal Bureau of Investigation Manual and the DSM IV is used to classify aberrant behavior. Research completed by leaders in the field are assigned readings and special topics such as female serial killers, angels of death, spree killers, and terrorism provide a basis for class discussions and projects. The course also includes the "high crime low-war" classification of international terrorism and concepts of lethality of attack.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 494** Research Topics (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **CRIMJ 494. Research Topics**

This common course will focus on specific research issues. Issues to be covered will be social violence, legal issues, and impact on crime control. Students will study the design and implementation of topical issues as they address specific issues. The course will add to the diversity offerings within the criminal justice program.

Faculty member proposing course: M. A. DuPont-Morales

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 494H** Research Topics (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 495** Internship in Criminal Justice (3-12) Experience with a criminal justice agency coordinated through readings and discussion.

**Internship in Criminal Justice (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 497A** Problem Solving Courts (3) This course provides students with an understanding and appreciation of the procedures, functioning and criteria that govern these new tribunals by examining the operation of drug, mental health, veterans, DUI, and reentry courts. It also analyzes whether such courts adequately address the needs of the offender, safeguard the constitutional rights of the accused, and protect the safety and security of the community.

**Problem Solving Courts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 497B** The Death Penalty in America Course (3) This course provides an historical overview of US death penalty practices. Justifications for and against the death penalty are considered. Additionally, pertinent court cases and contemporary issues are examined. Current trends in death penalty legislation and practice are also emphasized.

### **The Death Penalty in America Course (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 497C** Issues in Law Enforcement (3) This course will examine several contemporary issues of relevance to law enforcement professionals. Students who are seeking a career in law enforcement would benefit from discussion and understanding of four key areas of concern facing law enforcement professionals on a daily basis. The course will provide both instruction and application of key concepts covered through lecture.

### **Issues in Law Enforcement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 497D** Constitutional Law (3) Using case studies and scholarly publications, this upper level course examines the Bill of Rights from criminal justice and civil rights perspectives. In addition to a midterm and final exam, each student will complete a comprehensive analysis of one of the first ten Amendments to the Constitution and lead class discussion on that Amendment using the Socratic method. This class is discussion-intensive.

### **Constitutional Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 499** (IL) Foreign Studies (6) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (6)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 500** Advanced Criminological Theory (3) This course reviews and critiques the major theories of crime causation.

### **CRIMJ 500 Advanced Criminological Theory (3)**

This course provides students with an understanding of the major theories of crime causation. Students completing this course will (1) articulate the historical development of criminological theories over the last three centuries; (2) critically assess the usefulness of theory to the development of sound crime-related policy; and (3) delineate the strengths and weaknesses of each theory. Since the course serves as a foundation class for the other core requirements, it should be taken by students in their first semester. Students taking this course will be required to lead class discussions, write a significant research paper, and take essay format examinations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 501** Quantitative Methods for Criminal Justice (3) Advanced research methodology for criminal justice and criminology.

**CRIMJ 501 Quantitative Methods for Criminal Justice (3)**

The purpose of this course is to assist students in becoming both critical consumers and producers of scientific research. Through an understanding of research methodology, the student should be better prepared to determine the adequacy of findings from studies reported in both technical research reports and in academic journals. Further, students should be able to plan, implement, and assess the outcomes of studies that they might initiate. More specifically, students should be able to: (1) distinguish between the various quantitative research designs as may be dictated by the overall research question; (2) understand the statistical techniques that will allow for the testing of research hypotheses; (3) appreciate the protection of human research subjects and other ethical issues associated with scientific research; and (4) communicate to a wide range of audiences the technical language of research and statistics. Students should come away from the course with an appreciation for the relationship between theory (the abstract) and research (the technical) and how both operate in society. This course will be offered each Spring semester, and should be taken co-requisitely with CRIMJ 503.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Concurrent: CRIMJ 503

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 502** Public Policy and the Criminal Justice System (3) This course studies the concepts and methods of political and legal activity within the criminal justice system and their impact on society.

**CRIMJ 502 Public Policy and The Criminal Justice System (3)**

The purpose of this course is to focus on crime policies in terms of effectiveness, efficiency, resource allocation, and societal impact. This course forms a nexus between the legal reasoning of criminal law with the theoretical and research foundations of the discipline. Crime control appears to be centered within the political community often without adequate, fair, or pertinent analysis of policy design or implementation. This course will use legal precedent to discuss the past and apply such a precedent to current issues. Students will examine how political assessments of crime is no guarantee that the resulting policy will deter the behavior. The nexus between research, criminal law, and the expectation of justice often come from disparate views about the goal of the criminal justice system.

This course will also examine the goal of justice amid diverse populations. How has racial disparity in sentencing, legal representation, the death penalty, judicial representation, and political careers persisted? Students will also study comparative issues of national and international law. Finally, students will address a policy issue by submitting a policy analysis research proposal followed by a policy analysis paper.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 503** Advanced Statistics in Criminal Justice (3) Advanced statistics in criminal justice and criminology.

**CRIMJ 503 Advanced Statistics in Criminal Justice (3)**

The purpose of this course is to teach the student the theory behind a particular statistical technique and its appropriate use. As such, it focuses on (1) the theory of statistical procedures and (2) the analysis of computer generated output. This is not an introductory statistics course in which students memorize formulas and calculate them by hand. Rather, students in this course should have had an undergraduate statistics course and move now toward the use of SPSS (statistical software for the social sciences). Through classroom discussions, reading assignments, and out of-class exercises, the student will learn which statistical technique is appropriate with regard to the research hypothesis and the level of measurement of the variables included in the analysis. Further, through data analysis, using SPSS, the student will learn how to interpret the output from that analysis. Specifically, students should be able to (1) understand the theory behind various statistical techniques; (2) use caution not to violate the underlying assumptions of statistical techniques when analyzing data; (3) develop the skills necessary to use SPSS (building a data file, analyzing data, and interpreting SPSS output); (4) communicate to a wide range of audiences the technical language of research and statistics; and (5) understand the relationship between theory, research methods, and statistical analysis.

This course will be offered each spring semester and should be taken concurrently with CRIMJ 501.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Concurrent: CRIMJ 501

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 504** Criminal Justice Organization and Management (3) The course will be a broad overview of the structure and management of criminal justice organizations.

**CRIMJ 504 Criminal Justice Organization and Management (3)**

The purpose of this course is to provide students with the ability to assess substantive policy issues regarding the organization and management of criminal justice agencies, to explain the rudiments of the day-to-day functioning of criminal justice organizations, and, most important, to get students actively engaged in discussing and thinking critically about what they consider to be good organization and management principles and policies. In addition to the text, students will be instructed to consult criminal justice and public administration journals for the most up-to-date ideas and concepts in organizational management. In particular, students should (1) understand the nature of criminal justice organizations; (2) understand the importance of effective communication and motivation of rank-and-file employees; (3) comprehend the necessity of the use of power and decision making; and (4) the necessity of change and research in criminal justice organizations. This course will be offered once every other semester, and it should be a first-semester requirement.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 563** Concepts and Practices in Police Administration (3) Discusses application of police research and management principles to the contemporary policing context.

**CRIMJ 563 Concepts and Practices in Police Administration (3)**

This course examines the multitude of factors involved in the delivery of protective services to a diverse community. The evolution of policing from its English, quasi-militaristic heritage will be analyzed in order to gain foundational knowledge for understanding its current problem-solving, community orientation. Method for attaining a community partnership will be explored. Means for attaining accountability within the new organizational philosophy will be identified. Important issues such as use of force, cultural awareness, integrity, and ethics will be extensively reviewed.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 564** Administrative and Legal Aspects of Corrections (3) This course addresses historical and contemporary correctional policy, accountability, and possible remedial alternatives.

**CRIMJ 564 Administrative and Legal Aspects of Corrections (3)**

CRIMJ 564 is the historical, administrative, and legal inquiry into the development of institutional and community criminal punishment. Currently, corrections has nearly a 70% recidivism rate. Corrections is the measure of the cost of doing crime and cultural changes which redefine that cost. CRIMJ 564 will provide a macro-perspective into the mechanics of designing and reforming the process of capital punishment.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 565** Courts in the Criminal Justice System (3) An analysis of the function and role of the courts and the personnel involved in the American criminal justice system.

**CRIMJ 565 Courts in the Criminal Justice System (3)**

The course will deal with the nature and function of the courts and their personnel within the American criminal justice system. In relation to the structure and organization of the courts, the differences in court systems and functions will be examined, as well as proposals for reform of these structures and organization in light of concerns over increasing caseloads, other docket pressures, and a variety of other issues. The course additionally examines the personnel involved in the court processes of the criminal justice system in their function, education and training, selection, role orientations



and examines the implications of these factors in how they exercise decision-making power. Proposals for reform of decision-making functions of prosecutors, defense attorneys, and judges will be examined in light of the interrelated functioning of personnel within the courts.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 567 Juvenile Justice: Issues and Practice (3)** The systematic application of the juvenile justice system and issues related to juvenile delinquency and constitutional law.

**CRIMJ 567 Juvenile Justice: Issues and Practice (3)**

This course introduces the juvenile justice system and issues associated with processing youth through that system for graduate study. The course first addresses how there came to be a separate system for juveniles in this country and explores the major philosophical foundation for that separate system. Further, the course encourages the student to think about how delinquency is defined and the challenges those definitions have faced. In addition to exploring how youth are processed through the juvenile justice system (from arrest to disposition of the case), the course also provides the student with an exploration into issues associated with minorities and females. Critical issues of importance to juvenile justice administrators will be covered in this course as well since many CRIMJ graduates will go on to serve as administrators in the criminal justice field. Students will be asked to think critically about the future of the juvenile justice system as the system moves beyond the original intent of its framers. This course should provide the student with a better understanding not only of how the juvenile justice works, but also of how the system has dealt with challenges that it has faced since its first inception in 1899.

This course will be offered once a year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 568 Qualitative Methods for Criminal Justice (3)** This course examines the many facets of qualitative research methodology.

**CRIMJ 568 Qualitative Methods for Criminal Justice (3)**

The purpose of this course is to train the student how to conduct a good qualitative study. This will be achieved by introducing the students to various methods of data collection used in qualitative research. Specifically, the student will study qualitative methods such as, case study analysis, observer as participant, covert participation, as well as effective interviewing. The student will examine examples of notable qualitative studies to increase their understanding of the various concepts associated with qualitative research.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**CRIMJ 590. Colloquium (1-3)**

This common course will focus on specific issues within each colloquia. Issues to be covered will be research, resources allocation, legal issues, and impact on crime control. This course will direct students to study the design and implementation of policies to address specific issues. The course will add to the diversity offerings within the Master of Arts in Criminal Justice.

This course will be offered in the summer and the spring with an enrollment of 20. Repeatable credit is possible. It will be offered more if enrollment patterns warrant such an increase.

Faculty member proposing course: M.A. DuPont-Morales

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**CRIMJ 594. Research Topics (1-12)**

This common course will focus on specific research issues. Issues to be covered will be resources allocation, legal issues, and impact on crime control. Students will study the design and implementation of topical issues as they address specific issues. The course will add to the diversity offerings within the Master of Arts in Criminal Justice.

This course will be offered every third semester.

Faculty member proposing course: M.A. DuPont-Morales

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**CRIMJ 595. Internship (1-18)**

The purpose of this course is to introduce students to the ethics, operations, and standards of working within a criminal justice environment. This course is individualized for each placement and student. It is offered in cooperation with the program, the internship site, and the goals of the student. An overall objective is to familiarize students with the legal and professional standards associated with working with people as colleagues, program participants, or clients.

Students will be expected to comprehend the guidelines associated with legal and social service agencies. The internship will enable students to apply these guidelines under novel and unique situations.

This course will be offered each semester with an enrollment of ten students. It will be offered more if enrollment patterns warrant such an increase.

Faculty member proposing course: M.A. DuPont-Morales

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIMJ 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Criminal Law (CRIML)**

**CRIML 952** Federal Criminal Practice (2) This course is an in-depth examination of all stages of a federal criminal prosecution, commencing with the decision to charge, and continuing through trial and sentencing. Subjects will include the Bail Reform Act of 1984, investigative techniques, motions to suppress, immunity, privileges, trial techniques, and the Federal Sentencing Guidelines. Strategic decisions involving pre-trial proceedings, trials, and sentencings will be addressed via presentations by experienced judges, practitioners, and other participants in the process. The goal of the course is to provide students with practical advice and insightful tips regarding every aspect of federal criminal litigation.

### **Federal Criminal Practice (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 953** Advanced Criminal Procedure (3) This course examines the constitutional, statutory and rule-based issues that arise in the formal processing of a criminal case. Subject include the decision to charge, prosecutorial discretion, grand jury and preliminary hearing, joinder and severance, bail and pretrial release, discovery, plea bargaining and guilty pleas, speedy trial, jury composition and selection, pre-trial publicity, confrontation, cross-examination and the privilege against self-incrimination.

### **Advanced Criminal Procedure (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 970** International Criminal Law (3) A study of the principles, history, procedures and substance of international criminal law.

### **International Criminal Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 972** Criminal Procedure (3) The Criminal Procedure course explores the interface between the criminal justice system and the United States Constitution. The course examines constitutional limits on police investigation and interrogation as well as the circumstances under which indigent defendants are guaranteed the assistance of counsel. In addition to introducing students to constitutional analysis, the course previews the ethical dimensions of defending persons accused of crime. The class also views a trial during the criminal term at the Court of Common Pleas.

### **Criminal Procedure (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2006 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 974 Juvenile Law (2)** This course examines the legal position of the child in society and the extent to which the child may be legally controlled by parent(s) or state. Subject matters include the right of the child to control reproductive decision-making, child support and paternity issues, child pornography and minors' access to pornography, child abuse and neglect, foster care, termination of parental rights, adoption, medical treatment of juveniles, and medical experimentation on juveniles. The course also examines the delinquency jurisdiction of juvenile court, the constitutional protections afforded the child accused of criminal activity, adjudications of delinquency, punishment or placement of the child in the dispositional phase of juvenile proceedings, and treatment of the child as an adult offender.

### **Juvenile Law (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 981 Pennsylvania Criminal Law Practice (2)** This course is a step-by-step analysis of the procedure, planning, tactics, and strategy in defending and prosecuting a criminal case in Pennsylvania from pre-arrest through appeal. Special emphasis is placed on all aspects of the procedure and law relating to the suppression of evidence.

### **Pennsylvania Criminal Law Practice (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 984 Post-Conviction Process (3)** This is a study of guilty pleas and sentencing alternatives, post-conviction remedies, parole, probation, commutation, and pardon. The course will also examine the law of corrections and prisoners' rights.

### **Post-Conviction Process (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIML 998 White-Collar Crime (3)** This course will cover the substantive law and procedures of major white-collar crimes, including conspiracy, fraud, the Racketeer Influenced and Corrupt Organizations law (RICO), money laundering, public corruption, and economic crimes. It will also examine their civil counterparts and civil and administrative consequences and analyze the theory and policies of these hybrid criminal statutes. Finally, the class will learn and practice skills associated with white-collar crime cases, for example, investigative techniques, negotiation, and development of effective theories of the case.

### **White-Collar Crime (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Criminology (CRIM)

**CRIM 406** (CRIMJ 406, SOC 406) Sociology of Deviance (3) Theory and research concerning behaviors and lifestyles viewed as significant departures from a group's normative expectations.

### CRIM (CRIMJ/SOC) 406 Sociology of Deviance (3)

**(BA) This course meets the Bachelor of Arts degree requirements.**

Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the "Crime" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 407** (CRIMJ 407) Victimology (3) This course will explore the legal, emotional, and social responses to the process of victimization by offenders and third parties.

### Victimology (3)

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 412** (CRIMJ 412) Crime, Social Control, and the Legal System (3) Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

### Crime, Social Control, and the Legal System (3)

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 413** (SOC 413, CRIMJ 413) Advanced Criminological Theory (3) This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories.

### CRIM (CRIMJ/SOC) 413 Advanced Criminological Theory (3)

Advanced criminological theory is intended to extend and deepen students' knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/CRIM/SOC 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with a Deviance and Criminology specialization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 414** (CRIMJ 414, CRIM 414) Criminal Careers and the Organization of Crime (3) Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and lifestyles; policy implications.

**Criminal Careers and the Organization of Crime (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 421** (CRIMJ 421) Violent Crime (3) Examines the nature and causes of violence. Several theoretical perspectives are reviewed including biological, psychological, social, and cultural.

**CRIM (CRIMJ) 421 Violent Crime (3)**

This course will examine the nature, frequency, and causes of violence, generally and of assault, robbery, rape, and homicide, specifically. Several different theoretical and research perspectives are reviewed, including biological, psychological, social, and cultural. The course also examines individual and societal responses to violence. CRIM/CRIMJ 421 may be used by both CLJBA and CLJBS degree candidates to satisfy a 400-level course requirement in the major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 422** (CRIMJ 422) Victimization (3) Examines the history, how victimization is measured/studied in social sciences, public policy implications of victimization movement in U.S.

**CRIM (CRIMJ) 422 Victimization (3)**

Victimology has emerged as an important area of study for the social sciences and an important arena for policy development. This course will familiarize students with the historical development of the research into victimization and the importance of the victims' movement to public policy. Areas explored will include the relationship between victim and offender, the cultural images of victims and their impact on the victim and the response of the criminal justice system to them, and how research has attempted to measure victimization. The course will be one of the supporting courses where the student must select 6 credits at the 400 level.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 423** (US) (CRIMJ 423, WMNST 423) Sexual and Domestic Violence (3) Legal, sociological, and psychological perspectives on sexual and domestic violence.

**CRIM (CRIMJ/WMNST) 423 Sexual and Domestic Violence (3) (US)**

This course investigates violence against women, specifically domestic, sexual, and relationship violence. Students will examine some of the legal, sociological, and psychological perspectives about sexual, domestic, and relationship violence as well as the social and cultural roots of violence against women. Students will also gain an understanding of the experiences of victims of domestic and sexual violence as well as the issues presented by perpetrators. Students will be evaluated based on performance on exams, and two research papers. CRIMJ/CRIM/WMNST 423 is a supporting course in both the WMNST major and minor as well as a supporting course in the CLJ major. It may also be used to satisfy a US requirement.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 424 (CRIMJ 424) Drugs and Crime (3)** Analysis of international narcotics trafficking in the twentieth century.

**CRIM (CRIMJ) 424 Drugs and Crime (3)**

The course examines narcotics trafficking across the world from a geopolitical and social science perspective. The course explores the history and policy of international narcotics trafficking, social science explanations of the narcotics trade, and the successes and failures of policy efforts to stop the narcotics trade. Students will be evaluated on the basis of exams, quizzes, and homework assignments. This course is one of several advanced level courses students in the CLJ major may choose from to meet 400-level requirements.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 425 (CRIMJ 425) Organized Crime (3)** This course examines organized crime in terms of historical antecedents, structure, related theories, and policy issues.

**CRIM (CRIMJ) 425 Organized Crime (3)**

This course will provide students with a historical and theoretical overview of organized crime. Students will gain an understanding of the structure of organized crime as well as an understanding of the businesses associated with traditional and nontraditional organized crime groups. The course will also provide students with a detailed analysis of state and federal laws and policies regarding organized crime. Students will be evaluated by two mid-term exams (25% each), an essay final exam (40%), and class participation (10%). Crime, Law, and Justice students may use this course to satisfy a 400-level course requirement in the Bachelor of Arts and Bachelor of Science majors. This course will be one of the supporting courses from which students are required to select six credits.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 429 Seminar in Criminal Behavior (3-4 per semester/maximum of 7)** This course explores the study of the application of criminological theories to our understanding of various forms of criminal behavior.

**CRIM 429 Seminar in Criminal Behavior (3-4/maximum of 7)**

The course is intended to provide in the curriculum an avenue for the faculty to offer special focus courses on emerging forms of criminal behavior. For example, during the past several years the criminal justice system has had to respond to new forms of criminal behavior that have developed as we have developed new technologies. Recent use of the Internet as a means of committing crime has been the focus of federal and state legislation. Thus, societies have developed new forms or new means to old forms of criminal behavior through the use of technology. CRIM 429 will provide the faculty with the opportunity to develop special criminal behavior topic courses on offenses such as these and many other topics on our understanding and ability to explain criminal behavior. The course can satisfy 400 level requirements for the students in the CLJ major. This course will evaluate the students using a combination of written assignments and oral presentations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 430 American Correctional System (3)** Study of corrections from probation, intermediate punishment, adult and juvenile correctional institutions to parole.

**CRIM 430 American Correctional System (3)**

This course examines the correctional system from the sentencing decision to reentry or release from the correctional system. The course focuses on the choices that decision-makers face in sentencing, classification and responding to violations by offenders as well as the problems that offenders face as they confront their treatment/punishment. As part of the analysis the course explores the persistent conflicting expectations that society imposes on our correctional system and the effectiveness of the system in rehabilitating, deterring and incapacitating offenders. This course expands on the brief introduction of the topic in CRIM/CRIMJ 100 and relies on the student's understanding of social science research developed in CRIM/CRIMJ 250W to critically analyze what we know about corrections. This course provides the opportunity for students to study in depth a major component of the criminal justice system and is one of five classes students may select from to meet a major core course requirement.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 432 (CRIMJ 432) Crime and the American Court System (3)** This course examines the American court system including structure and the way courts process offenders with special focus on sentencing.

**CRIM (CRIMJ) 432 Crime and the American Court System (3)**

CRIM/CRIMJ 432, Crime and The American Court system, studies the courts from the lower courts to the Supreme Court and the various actors that play important roles in the functioning of the courts. First, the course studies the jurisdictions of the various courts and their organization in various state systems as well as the federal courts as well as the organization of state and federal administrative offices that manage the courts including the training of judges and the preparation of the court budget. Subsequent to the development of the basic understanding of the court jurisdiction and organization, the class studies the roles of the key actors in the day-in and day-out operation of the courts. In the spotlight are judges, prosecutors and defense attorneys although the role of the probation officers and clerk of courts are also intertwined with the processing of defendants. Of particular importance in this component of the course is the development of what is referred to as the court community and the focal concerns and goals that the court must consider as it processes cases. An understanding of court community and focal concerns serves as crucial context for understanding the role of public policy as it attempts to shift or change the decision making of the court. One important dynamic of this course is the understanding that the court, although functioning as an institution to provide a neutral field on which accusations of criminality are to be played out, operates similarly to other organizations in that they are to be efficient (move cases with minimum overhead) and to be effective (provide justice, and protect the public). How the courts balance these competing demands and the informal processes that emerge in the processing of defendants is the key focus of the class. Finally, the course explores the attempts to reform the courts from the sentencing reforms such as determinate sentencing, mandatory minimums including "3 strikes" and sentencing guidelines. These issues highlight the political context of the courts and adaptability of the courts to attempts to change their values, and decisions. This course serves as one core 400-level course in the major. Each student must take two of the five core 400-level courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 433 Sentencing (3)** This course studies sentencing from prosecutorial charging decisions through revocation of probation, and the complex goals and responsibilities at sentencing.

**CRIM 433 Sentencing (3)**

This course focuses on the key decision in our court system--sentencing. The course covers the historical development of sentencing both within the United States and internationally as a backdrop to the reform efforts of the late 20th Century. The course explores how sentencing has changed from a judge-based discretionary system to a system where numerous restrictions to judicial discretion have been imposed by state and federal legislatures. Students will be evaluated on two essay exams (midterm and final) with the midterm worth 20 and the final 30 percent of the grade. A research analysis paper will be required that will be completed in three stages. The first stage will be the setting forth of a research problem and a scheme for analyzing the data (10%). The second stage will be an oral presentation of the findings (20%). The final stage will be a written term paper on the project (20%). This course will be used by CLJ majors as one of the six credits of 400-level elective credits required in the major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**CRIM 435 Policing in America (3)** This course will focus on current, historical, theoretical, and research issues surrounding law enforcement in the United States.

**CRIM 435 Policing in America (3)**

This course is designed to provide a basic knowledge of the structure of policing in America and to explore findings from research considering police behavior. Students will examine and discuss controversial issues relating to policing in American society. Current trends in policing philosophies and strategies will be identified and their effectiveness will be debated. The relationship between police and citizens will be stressed. CRIM 435 can be used to satisfy a core 400-level course requirement in the CLJBA and CLJBS majors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 441 (US) (CRIMJ 441) Delinquency and Juvenile Justice (3)** Course examines delinquency and the juvenile justice system including delinquency's nature, causes, and prevention and the processing of juveniles.

**CRIM (CRIMJ) 441 Delinquency and Juvenile Justice (3)**

This course examines delinquency and the juvenile justice system from a variety of viewpoints. It looks at the problems the system is expected to address, how the problems have changed through the ages, how the current juvenile justice system developed, and the programs used to prevent and control delinquency and their effectiveness. By the end of the course, students should be able to think critically about the research and issues in the field. Evaluation methods include exams, brief writing assignments and a longer paper on policy issues. Students will be evaluated through brief written assignments, a term paper, a mid-term essay, and essay final. This course will be offered twice a year with 60 seats per offering. Students in the major may select CRIM (CRIMJ) 441 as one of several required courses in either the BA or BS program. This course is one of the core courses in the curriculum from which students must choose six credits from five core courses offered. It also serves as one of the supporting courses in the curriculum from which the students must take six credits at the 400-level.

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 451 (US) (CRIMJ 451) Race, Crime, and Justice (3)** This course focuses on the significance of race, class, and ethnicity to criminal justice processing and criminal offending.

**CRIM (CRIMJ) 451 Race, Crime, and Justice (3)  
(US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This class is designed to explore the relationship between the criminal justice system and racial minorities in the United States. Students will examine theoretical issues of race and justice, as well as empirical understandings of the relationship between race, crime, and the criminal justice system. Students will endeavor to understand some of the economic, political, and sociological reasons why racial minorities are over-represented in the criminal justice system. Students will also explore normative issues of justice and equity in broader social interactions that influence and are influenced by crime and the criminal process. This course may be used towards the additional courses requirements for the CLJ BS/BA and ADM J degrees. It will also satisfy the United States Cultures and International Cultures requirement.

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 453 (US) (CRIMJ 453, WMNST 453) Women and the Criminal Justice System (3)** This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system.

**CRIM (CRIMJ/WMNST) 453 Women and the Criminal Justice System (3)  
(US)**

The course will examine the role of women in the criminal justice system and look at the issues related to women as offenders, victims of crime, and as professionals in the system. Students will gain an understanding of the issues concerning women in the criminal justice system, examine how societal arrangements affect women as offenders, victims, and criminal justice professionals, and better understand the overlooked problems faced by women in the criminal justice system. Students will be evaluated on the basis of exams, presentations, and papers. CRIMJ/CRIM/WMNST 453 is a supporting course for both WMNST and CLJ majors, as well as the WMNST minor. This course may also be used to satisfy a US requirement.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 467** (CRIMJ 467, SOC 467) Law and Society (3) Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials.

### **CRIM (CRIMJ/SOC) 467 Law and Society (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Law and society teaches students' knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIM/CRIMJ 113 and CRIM/CRIMJ 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the "Law" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 469** Seminar in the Law (3-4 per semester/maximum of 7) The focus of this seminar is the law such as the laws of sentencing, appellate course decisions and their impact.

### **CRIM 469 Seminar in Law (3-4 per semester/maximum of 7)**

This seminar explores topics related to the law and will vary from semester to semester depending on current events, faculty research and other areas of study related to the criminal law. Evaluation methods will vary depending on the focus of the seminar, however, student evaluations will rely on techniques such as writing and presentations to enhance student presentation skills as well as evaluate their understanding of the course material. Students may take this course twice. This course serves as one of the supporting courses from which students must select 6 credits at the 400-level. It also serves as one of the additional courses from which students must select 18 credits under the Legal Studies Option.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 480H** Research Topics in Crime, Law, and Justice (1) Students are exposed to a variety of research topics related to crime, law, and justice.

### **CRIM 480H Research Topics in Crime, Law, and Justice (1)**

This one-credit seminar is intended for Scholars in the fall semester of their third year who intend to complete their Honors thesis in Crime, Law, and Justice. Students are exposed to a wide variety of research topics related to crime, law, and justice. The specific topics depend on the interests of the students and on the current research being conducted by the faculty of the Crime, Law, and Justice program. Students read and summarize research reports, engage in discussions with Crime, Law, and Justice faculty, and attend lectures by visiting scholars. At the conclusion of the seminar, students select a research topic for their honors thesis and a CLJ faculty member to supervise that thesis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 481H** Information Literacy in Crime, Law, and Justice (1) Students are exposed to a variety of information sources related to crime, law, and justice.

**CRIM 481H Information Literacy in Crime, Law, and Justice (1)**

This one-credit seminar is intended for Scholars in the spring semester of their third year who intend to complete their honors thesis in Crime, Law, and Justice. This course surveys the structures of information, patterns of information retrieval, and the resources and technologies used to research topics related to crime, law, and justice. Students complete a series of assignments involving information retrieval and the effective use of information technologies. This includes working with their faculty supervisor and collecting information on the topic they have selected for their honors thesis. At the conclusion of the class, students present a research proposal for their honors thesis, including a review of the relevant literature and a schedule for completing the thesis during their fourth year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 482** (CRIMJ 482) Seminar, Criminal Justice Agency Administration (3) Relates organizational and public policy management approaches to police, courts, and correctional institutions.

**CRIM (CRIMJ) 482 Seminar, Criminal Justice Agency Administration (3)**

In this course, you will learn about the nature of criminal justice organizations, individual and group behavior within the system, and the issues involved in reforming the system. This course will NOT teach you how to become an administrator in the criminal justice system, but hopefully will teach you about the issues and theories surrounding organizations and reform-and most importantly, teach you to think and communicate (in both written and verbal form). After taking this course, you should have a more accurate perception of criminal justice organizations and have a better understanding of the complexity surrounding the administration and management of these organizations. Criminal Justice Agency Administration may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 490** Crime Policy (3) This course focuses on criminal justice policy and the factors that influence policy development and implementation.

**CRIM 490 Crime Policy (3)**

This class will study crime and criminal justice in the context of law and the development and implementation of public policy. The course will focus on the politics of law and social control by exploring the construction of crime as a social problem, fundamental aspects of the policy development and implementation process, the legal interpretation of public policy, and the role of federal, state, and local governments in crime control. Students will be evaluated on essay exams and a term paper. This course is intended to be a capstone course for advanced undergraduates. The course will draw on the broad range of course work that students will have taken prior to taking this course to develop a course that takes what we know about crime, the law and the justice system and focus on public policy as it relates to these areas. The course may be used toward the six credits required at the 400 level under Additional Courses or as one of the courses under the Legal Studies Option.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or

small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 497A** (SOC 497A) Communities and Crime (3) Students will critically assess theory and empirical research on the effects of neighborhood structure and social organization on crime.

### **Communities and Crime (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**CRIM 805** (HLS 805) Violence, Threats, Terror, and Insurgency (3) This course provides an overview of the domestic and global issues related to homeland security.

### **CRIM (HLS) 805 Violence, Threats, Terror, and Insurgency (3)**

This course will explore key theories and methods of insurgency and terrorism. We will focus on the key why's how's and what's in the study of terrorism and insurgency. The focus in the class is less on a specific geographic and substantive area than on learning the skills to think conceptually and theoretically, with an emphasis on analytical thinking and application of knowledge. Each week we will read foundational works in the field and discuss not only the findings but how they were found. This will be then applied to the ongoing analytical thinking and application of knowledge efforts that students will be making in the class. The students will learn how to apply what they have learned in real world scenarios and learn to assess the long and short term ramifications of policy options.

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General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Curriculum and Instruction (C I)

**C I 400** Introduction to Research Literature (3) Introduction to research literature and methodology; stress on interpretation, sources, and research reporting.

### Introduction to Research Literature (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1981  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 405** (EDLDR 405) Strategies in Classroom Management (3) Managing and coping with disruptive student behavior in instructional settings so that they support the teaching/learning process.

### C I (EDLDR) 405 Strategies in Classroom Management (3)

This course has been designed to engage students in in-depth examination of the process of creating and sustaining a classroom learning community that fosters and enables success for all children. Emphasis is placed on understanding a variety of theoretical models of classroom management as well as observing and studying individual children to develop a better understanding of their needs. The result should be the development of a coherent set of beliefs concerning the creation of classroom learning environments that support learners and meet their individual needs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 412W** Secondary Teaching (3) Study of the teacher's responsibilities, steps in planning instruction, and various strategies for implementing and assessing teaching.

### Secondary Teaching (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 494H** Research Techniques in Curriculum and Instruction (1-3) Examination, application, assessment, and presentation of research modes and techniques in Curriculum and Instruction. Limited to University scholars in the College of Education.

### Research Techniques in Curriculum and Instruction (1-3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**C I 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495A** Clinical Application of Instruction--PK--4 (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

### **C I 495A Clinical Application of Instruction--Early Childhood Education (3)**

The emphases in C I 495A are on meeting professional expectations of teaching professionals and planning and teaching lessons. Teacher candidates are placed in classrooms in the Central Region of Pennsylvania, which is an area within a 70-mile radius of State College. A university supervisor observes candidates on a weekly basis during this field experience. In addition to the on-going field experience, teacher candidates enrolled in CI 495A meet in weekly seminars. During seminars, candidates are engaged in discussions addressing lesson planning, differentiation of instruction, classroom management techniques, and teacher professionalism.

C I 495A is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

Concurrent: regular professional methods courses in area of certification.

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495A** Clinical Application of Instruction--PK--4 (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

### **C I 495A Clinical Application of Instruction--Early Childhood Education (3)**

The emphases in C I 495A are on meeting professional expectations of teaching professionals and planning and teaching lessons. Teacher candidates are placed in classrooms in the Central Region of Pennsylvania, which is an area within a 70-mile radius of State College. A university supervisor observes candidates on a weekly basis during this field experience. In addition to the on-going field experience, teacher candidates enrolled in CI 495A meet in weekly seminars. During seminars, candidates are engaged in discussions addressing lesson planning, differentiation of instruction, classroom management techniques, and teacher professionalism.

C I 495A is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

Concurrent: regular professional methods courses in area of certification.

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495B** Clinical Application of Instruction--Middle Level Education (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

### **C I 495B Clinical Application of Instruction--Elementary and Kindergarten Education (3)**

C I 495B for Middle Level Education is a full-time teaching practicum. It provides an opportunity for teacher candidates to integrate concepts, theories, and ideas from their coursework. Specifically, C I 495B engages candidates in examining 1) what it means to be a professional and establish professional relationships with colleagues, students, and families, 2) how to use various tools (e.g., observation, writing, reflection, teaching, case studies, etc.) that are available to them in learning to be a teacher, 3) how to make connections across the various courses and experiences they are taking during the semester, and 4) how effectively they are developing their knowledge and skills as a beginning teacher and what sources of evidence they should use in judging their effectiveness.

Teacher candidates in C I 495B are expected to achieve desired outcomes in four domains: 1) planning and preparing for student learning, 2) teacher, 3) inquiry and analysis of teaching and learning, and 4) fulfilling professional responsibilities.

C I 495B is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: MTHED 420 SCIED 458 SS ED 430W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495B** Clinical Application of Instruction--Middle Level Education (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

### **C I 495B Clinical Application of Instruction--Elementary and Kindergarten Education (3)**

C I 495B for Middle Level Education is a full-time teaching practicum. It provides an opportunity for teacher candidates to integrate concepts, theories, and ideas from their coursework. Specifically, C I 495B engages candidates in examining 1) what it means to be a professional and establish professional relationships with colleagues, students, and families, 2) how to use various tools (e.g., observation, writing, reflection, teaching, case studies, etc.) that are available to them in learning to be a teacher, 3) how to make connections across the various courses and experiences they are taking during the semester, and 4) how effectively they are developing their knowledge and skills as a beginning teacher and what sources of evidence they should use in judging their effectiveness.

Teacher candidates in C I 495B are expected to achieve desired outcomes in four domains: 1) planning and preparing for student learning, 2) teacher, 3) inquiry and analysis of teaching and learning, and 4) fulfilling professional responsibilities.

C I 495B is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: MTHED 420 SCIED 458 SS ED 430W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495C** Clinical Application of Instruction--Secondary Education (3) Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

### **Clinical Application of Instruction--Secondary Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1997

Prerequisite:

Concurrent: C I 412 and special methods course(s) in area of certification

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495D** Practicum in Student Teaching--Childhood and Early Adolescent Education (12) Full-time classroom instruction in early childhood and elementary education. Students supervised by University personnel and practicing teachers. No

concurrent courses other than C I 495F permitted.

**Practicum in Student Teaching--Childhood and Early Adolescent Education (12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495D** Practicum in Student Teaching--Childhood and Early Adolescent Education (12) Full-time classroom instruction in early childhood and elementary education. Students supervised by University personnel and practicing teachers. No concurrent courses other than C I 495F permitted.

**Practicum in Student Teaching--Childhood and Early Adolescent Education (12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495E** Practicum in Student Teaching--Secondary Education (15) Full-time classroom instruction in secondary education. Students supervised by university personnel and practicing teachers. No concurrent courses permitted.

**Practicum in Student Teaching--Secondary Education (15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495F** Professional Development Practicum (3) Instruction concurrent with student teaching practicum. Students focus on the solution of instructional problems identified at the practicum site.

**Professional Development Practicum (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:  
 Concurrent: C I 495D

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 495G** Practicum in Student Teaching - Secondary Education (9) Full-time professional development internship in secondary English education. Students supervised by University personnel and practicing teachers.

**Practicum in Student Teaching - Secondary Education (9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 496A** Clinical Experience (6) A clinical experience offered for a specific group of MEd science students.

**Clinical Experience (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 497B** CEAED Discipline Inquiry Block (12) Course serves as block until CEAED students are registered by Department for appropriate section of MTHED 420, SCI ED 458, SS ED 430W and C I 495A.

**CEAED Discipline Inquiry Block (12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 497B** CEAED Discipline Inquiry Block (12) Course serves as block until CEAED students are registered by Department for appropriate section of MTHED 420, SCI ED 458, SS ED 430W and C I 495A.

**CEAED Discipline Inquiry Block (12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 497C** IUG and Honors Thesis Workshop (3) Workshop offering support for students writing theses in the Reading/SPLED IUG as well as honors theses in any education major.

**IUG and Honors Thesis Workshop (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 497E** Teaching Reading and Writing to English Language Learners (3) The course focuses on conceptually and pedagogically effective ways to teach reading and writing for English language learners in the US.

**Teaching Reading and Writing to English Language Learners (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 500** Multiple and Mixed Methods in Curriculum Inquiry (3) Multiple and mixed methods of inquiry to investigate problems in the practice of curriculum and instruction.

**C I 500 Multiple and Mixed Methods in Curriculum Inquiry (3)**

This course focuses on practice-embedded curriculum inquiry and surveys an array of approaches and methods that are quantitative, qualitative or both. The course is intended as a gateway seminar to other C&I disciplined inquiry courses (i.e., C&I 501, 502, 503) in which curriculum and instruction students can discuss and participate in learning activities related to the readings and in which guest speakers can inform C&I graduate students about current issues and topics related to systematic inquiry with application to curriculum and instruction.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 501** Teaching as Inquiry (3) Course guides teachers to develop systematic inquires into effective teaching and learning.

**Teaching as Inquiry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 502** Qualitative Research in Curriculum and Instruction I (3) Presentation of theoretical and practical issues related to designing and proposing qualitative research concerning curriculum, teaching and/or learning.

**Qualitative Research in Curriculum and Instruction I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 503** Qualitative Research in Curriculum and Instruction II (3) Considers forms of qualitative data, data analyses, procedures to generate data relationships, interpretation, and presentation of data.

**Qualitative Research in Curriculum and Instruction II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 534** Historical Research in the Curriculum (3) The course addresses the practice of historical research in curriculum, burrowing from the techniques of historians, journalists, and educators.

**Historical Research in the Curriculum (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 550** Overview of Contemporary School Curriculum (3) Current school programs and options and their impact on pupils; problems in introducing new content into the curriculum.

**Overview of Contemporary School Curriculum (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1981  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 577** (LL ED 577) Multicultural Issues in Literacy Education (3) Explores research questions, and theoretical frameworks, and analyzes multicultural issues in popular media in the context of American schools.

**Multicultural Issues in Literacy Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 580** (LL ED 580) Media Literacy, Language, and Literacy in Schools (3) Theories of media literacy, issues of non-print technology in language and literacy.

**Media Literacy, Language, and Literacy in Schools (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 595** Internship in Curriculum, Supervision, or Instruction (1-6) Internship in schools or other educational settings under supervision of graduate faculty in student's area of specialization.

**Internship in Curriculum, Supervision, or Instruction (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 596** Individual Studies (1-9) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered frequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597A** The Place of Place(s) in Learning and Teaching (3) Interdisciplinary study of place(s), focused on how place and places shape and are shaped by living, learning, and teaching.

**The Place of Place(s) in Learning and Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597A** The Place of Place(s) in Learning and Teaching (3) Interdisciplinary study of place(s), focused on how place and places shape and are shaped by living, learning, and teaching.

**The Place of Place(s) in Learning and Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597A** The Place of Place(s) in Learning and Teaching (3) Interdisciplinary study of place(s), focused on how place and places shape and are shaped by living, learning, and teaching.

**The Place of Place(s) in Learning and Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597B** Children's Books and Toys as Objects and Texts (3) This course examines historical and contemporary children's materials (books, toys, games) through theoretical lens such as book history, material culture and media studies.

**Children's Books and Toys as Objects and Texts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597B** Children's Books and Toys as Objects and Texts (3) This course examines historical and contemporary children's materials (books, toys, games) through theoretical lens such as book history, material culture and media studies.

**Children's Books and Toys as Objects and Texts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597C** Differentiated Curriculum in Secondary Schools (3) Curricular theory and design of literacy activities for students with varying abilities and needs mainstreamed in inclusive classroom settings.

**Differentiated Curriculum in Secondary Schools (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597C** Differentiated Curriculum in Secondary Schools (3) Curricular theory and design of literacy activities for students with varying abilities and needs mainstreamed in inclusive classroom settings.

**Differentiated Curriculum in Secondary Schools (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597D** Judith Butler, Gender and Education (3) In-depth reading of the works of Judith Butler and their applications in the analysis of education.

**Judith Butler, Gender and Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597D** Judith Butler, Gender and Education (3) In-depth reading of the works of Judith Butler and their applications in the analysis of education.

**Judith Butler, Gender and Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597E** Narrative Approaches to Educational Research (3) Utilizes interdisciplinary readings and student inquiry to construct a sense of affordances and constraints of narrative approaches to educational research.

**Narrative Approaches to Educational Research (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597I** Theories of Childhood (3) Explore highly variable ways that childhood has been constructed and enacted across multiple cultures and throughout history.

**Theories of Childhood (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 597I** Theories of Childhood (3) Explore highly variable ways that childhood has been constructed and enacted across multiple cultures and throughout history.

**Theories of Childhood (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching experience in Curriculum and Instruction undergraduate faculty supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

#### **Foreign Academic Experience (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Curriculum and Supervision (C & S)**

**C & S 470** Workshop in Selected Studies in Curriculum (1-6) Intensive work on selected current problems in curriculum.

#### **Workshop in Selected Studies in Curriculum (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 551** (EDLDR 551) Curriculum Design: Theory and Practice (3) The analysis and use of the foundations which underlie models of curriculum design.

**C & S (EDLDR) 551 Curriculum Design: Theory and Practice (3)**

This course looks at the analysis and use of foundations that underlie models of curriculum design. The investigation into such models is designed to be a critical review of previous and current design models that reflects the specific, preferential vantage point of teachers as leaders and significant participants in this form of curriculum work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 553 (EDLDR 553) Issues in Curriculum (3 per semester/maximum of 6)** In-depth study of issues and trends in the understanding and practice of curriculum.

**C & S (EDLDR) 553 Issues in Curriculum (3 per semester/maximum of 6)**

This course provides for in-depth study of issues and trends in the understanding and practices of curriculum. Readings and class activities provide students with the opportunity to examine theoretical implications for the world of practice and life in schools.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 555 Development of Teacher Education Programs (3)** Study of the components and design of teacher education programs within the constraints of institutional, professional, and legal contexts.

**C & S (EDLDR) 555 Development of Teacher Education Programs (3)**

Enrollees study various models of teacher preparation such as professional development schools and fifth year programs. Participants also discuss various aspects of teacher education such as field experiences teaching and learning ("methods") courses, and content knowledge courses and review research in each of these areas as it relates to the initial continuing education of teachers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 557 (EDLDR 557) Seminar in Curriculum Research (3)** Analysis of particular curriculum studies, methods and paradigms, and the general status of current research in the general curriculum field.

**C & S (EDLDR) 557 Seminar in Curriculum Research (3)**

This course is a foundational course that supports the diverse inquiries undertaken by doctoral students within the Department of Curriculum & Instruction and throughout the broader university community. Readings and class activities provide students with the opportunity to learn about different research epistemologies and to explore taken-for-granted assumptions about educational research in general and research design and methodology in particular.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 558 Standard Works in Curriculum and Instruction (3)** Study of significant empirical, historical, evaluative, philosophical, and critical works having an impact on curriculum and instruction practice.

**C & S (EDLDR) 558 Standard Works in Curriculum and Instruction (3)**



This course explores significant empirical, historical, evaluative, philosophical, and critical works having an impact on curriculum and instruction. Toward the end students read and study primary documents, analyses of these documents, and other books and essays that locate these standard works and responses to them within their historical contexts.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 560** (EDLDR 560) Principles of Instructional Supervision (3) Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.

**C & S (EDLDR) 560 Principles of Instructional Supervision (3)**

This course explores themes, trends, and key ideas that influence current supervisory practices. Course content gives specific attention to supervisory practice in relation to teaching practices and to life in schools.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 562** (EDLDR 562) Methods of Classroom Supervision and Coaching (3) Strategies and techniques for supervision/coaching of instruction intended to enhance teacher reflection, self-direction, and autonomy.

**C & S (EDLDR) 562 Methods of Classroom Supervision and Coaching (3)**

This course has been designed to equip students with the knowledge, skills, and dispositions necessary to engage in a variety of supervisory processes aimed at teacher growth and renewal as well as enhanced student learning. The outcome of these supervisory activities should be the development of teachers who are more analytical about their practice and its impact on learners, are more adept at solving the complex problems of teaching practice, and are more reflective about their teaching capabilities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 563** (EDLDR 563) Designing Staff Development Programs (3) Designing, implementing, and evaluating effective staff development programs for personnel in educational settings.

**C & S (EDLDR) 563 Designing Staff Development Programs (3)**

This course has been designed to provide students with the opportunity to develop a deep understanding of the process of professional development in education at the theoretical and practical levels as well as the ability to apply this understanding to the design, evaluation, and analysis of professional development activities and programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 564** Supervision Theory (3) Critical analysis of alternative theories of instructional supervision and in-depth examination of trends and issues in supervision.

**C & S (EDLDR) 564 Supervision Theory (3)**

This course entails critical analysis of alternative theories of instructional supervision and in-depth examination of trends and issues in supervision. Students critique and contrast existing models of instruction, identify and analyze issues in supervision and conceptualize and articulate their own supervisory model.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C & S 576** (EDPSY 576) Research Methods in Teacher Education (3) A basis in theory, findings from research, research design, and methodologies related to teacher education.

### **Research Methods in Teacher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Demography (DEMOG)**

**DEMOG 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DEMOG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DEMOG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Dermatology (DERM)**

**DERM 720** Dermatology (3) Interdisciplinary - Medical Education Course

### **Dermatology (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DERM 732** Dermatology Elective (5) Designed to provide students with an extensive, in-depth exposure to clinical dermatology; involved in the evaluation and management of patients in dermatology clinics.

### **Dermatology Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DERM 740** Dermatology/Pathology Elective (5) Intended for students pursuing a career in dermatology or pathology; involves the study of the pathology of cutaneous disorders. The elective complements what is learned in dermatology and pathology rotations.

### **Dermatology/Pathology Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DERM 796** Dermatology Individual Studies (5) This course provides an opportunity for senior medical students to pursue individual dermatology research projects with a supervising faculty dermatologist.

### **Dermatology Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DERM 796A** Dermatology Individual Studies for 3rd Year Students (2.5) Dermatology Individual Studies for 3rd Year Students.

### **Dermatology Individual Studies for 3rd Year Students (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**DERM 797** Dermatology Special Topics (5) Dermatology Special Topics.

### **Dermatology Special Topics (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **E-Business (EBIZ)**

**EBIZ 543** (MKTG 543) e-Marketing (2) Using the Internet and related technologies to enhance and transform marketing functions and processes.

**e-Marketing (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EBIZ 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Early Childhood Education (E C E)

**E C E 451** Instruction in Early Childhood Education Derived from Development Theories (3) Curriculum and instruction for early childhood education; program practice with pluralistic theoretical foundations for early childhood education.

**E C E 451 Instruction in Early Childhood Education Derived from Development Theories (3)**

As one of the introductory courses to early childhood education for undergraduate students, this class presents a foundational base of the early childhood education field, including the study of children/childhood, current practices, various roles of practitioners, environments for learning, and approaches to teaching.

This course provides an historical overview of influential thinkers and the roots of early childhood education, multidisciplinary perspectives of the development of the young child (for example, perspectives on children/childhood from anthropology, behaviorism, developmental psychology, neuroscience, postmodernism and post-structuralism, psychoanalysis, etc.), and resources for planning curriculum and instruction.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 451** Instruction in Early Childhood Education Derived from Development Theories (3) Curriculum and instruction for early childhood education; program practice with pluralistic theoretical foundations for early childhood education.

**E C E 451 Instruction in Early Childhood Education Derived from Development Theories (3)**

As one of the introductory courses to early childhood education for undergraduate students, this class presents a foundational base of the early childhood education field, including the study of children/childhood, current practices, various roles of practitioners, environments for learning, and approaches to teaching.

This course provides an historical overview of influential thinkers and the roots of early childhood education, multidisciplinary perspectives of the development of the young child (for example, perspectives on children/childhood from anthropology, behaviorism, developmental psychology, neuroscience, postmodernism and post-structuralism, psychoanalysis, etc.), and resources for planning curriculum and instruction.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 452** Approaches to Contemporary Early Childhood Education Programs (3) Description and analysis of early childhood programs; cycles, trends, progressions in early childhood education.

**Approaches to Contemporary Early Childhood Education Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 453** parent Involvement in Home, Center, and Classroom Instruction (2-3) Parent involvement, programs, and methodologies that strengthen bonds between home and community for educators of children.

**parent Involvement in Home, Center, and Classroom Instruction (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 454** (HD FS 454) Development and Administration of Child Service Programs (3) Planning, administering, and evaluating child service programs at several administrative levels using methods from relevant disciplines.

**Development and Administration of Child Service Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 479** The Young Child's Play as Educative Processes (3) Young child's play as educative processes and uses of materials in curricular settings are examined.

**The Young Child's Play as Educative Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 497A** Environmental Design for Diverse Learners in Early Childhood Education (3) This course introduces students to planning, designing, building and facilitating learning for diverse learners using child-centered environmental designs and activities.

**Environmental Design for Diverse Learners in Early Childhood Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 497B** Multimodal Learning and Literacy in Early Childhood (3) This course explores the processes of visual, auditory and embodied ways of knowing as a foundation for children's meaning making.

**Multimodal Learning and Literacy in Early Childhood (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 572** Issues and Trends in Early Childhood Education (3 per semester/maximum of 9) Research, experimental programs, and emerging trends in early childhood education; relationships between educational experiences and later intellectual and emotional development.

**Issues and Trends in Early Childhood Education (3 per semester/maximum of 9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 580** Young Multilingual/Multicultural Learners (3) Multilingual/multicultural dimensions of young learners; language, cultural- ethnic social milieu and family, school, community, religious impacts, and acculturation philosophies.

**Young Multilingual/Multicultural Learners (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1993

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 587** (CI ED 587) Curriculum, Culture, and Child Development (3) Examines human development and cultural factors in planning, designing, and implementing curriculum and instruction in early childhood and childhood education.

**Curriculum, Culture, and Child Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 588** Educational Role of the Family (3) Parent-child-teacher relationships, cognitive socialization, and academic attainments; proximal/distal variables: family structure, history, processes, content, community, culture.

### **Educational Role of the Family (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 589** Play and Early Childhood Education (3) Developmental significance of play, processes, and development; role of the adult in child's play; educational practices.

### **Play and Early Childhood Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E C E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Early Start Program (ESPRG)

**ESPRG 997** Special Topics (0.5) Early Start Program Course.

### Special Topics (0.5)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Earth Sciences (EARTH)

**EARTH 400** Earth Sciences Seminar (3) Interdisciplinary study of environmental problems in the earth sciences.

### Earth Sciences Seminar (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

### Internship (1-18)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### Independent Studies (1-18)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### Special Topics (1-9)

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 501 Contemporary Controversies in the Earth Sciences (3)** Exploration of current areas of research in the Earth Sciences.

### **EARTH 501 Contemporary Controversies in the Earth Sciences (3)**

Students will be introduced to a variety of topics from different disciplines within the Earth sciences with the aim of piquing their interest in topics of current research beyond the level found in typical secondary school or introductory college textbooks. The current topics will include subjects in which a consensus has recently been reached as well as scientific questions that are so far unanswered. Students will learn the appropriate state of the art scientific content relevant to each topic by performing basic data in order to complete the activities in each lesson. They will finally construct a plan to teach a selected topic to the audience of their choice. This course provides an entry into the other courses in the Master's Degree Program in Earth Science Education.

Students will learn scientific content by completing activities in each of six lessons that will span either the 12-week or 15-week semester. These activities will be in the form of background reading and discussion that outlines a current scientific problem or debate, the collection and manipulation of appropriate data, and the assessment of the results of this work. By doing this, students will simultaneously become familiar with the content as well as the practice of science. Students will also participate in online discussions about how to teach this content to specific secondary school audiences. They will complete a capstone project in which they will construct a teaching plan based on the topic of their choice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 520 Plate Tectonics and People: Foundations of Solid Earth Science (3)** Solid Earth geophysics and geological hazards presented within the grand unifying theory of plate tectonics.

### **EARTH 520 Plate Tectonics and People: Foundations of Solid Earth Science (3)**

This course will cover current areas of research in solid Earth geophysics, especially focusing on the human population's interaction with the solid Earth system.

Students will be introduced to a variety of current topics of active research within the field of solid Earth geophysics. They will learn the appropriate state of the art scientific content relevant to each topic by performing basic data analysis (e.g. collection, interpretation and assessment) using publicly available data in order to complete the activities in each lesson. They will finally construct a plan to teach a selected topic to the audience of their choice.

Students will learn scientific content by completing activities in each of nine lessons that will span either the 12-week or 15-week semester. These activities will be in the form of background reading that outlines a current scientific problem or debate, the collection and manipulation of appropriate data, and the assessment of the results of this work. By doing this, students will simultaneously become familiar with the content as well as the practice of science. Students will also participate in online discussions about how to teach this content to specific secondary school audiences. They will complete a capstone project in which they will construct a teaching plan based on the topic of their choice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 530 Earth Surface Processes in the Critical Zone (3)** Introduction to Earth surface processes including weathering and soils, geomorphology, erosion and sedimentation, hydrogeology, low-temperature geochemistry and Earth systems.

### **EARTH 530 Earth Surface Processes in the Critical Zone (3)**

Rapid changes in Earth's surface largely in response to human activity have led to the realization that fundamental questions remain to be answered regarding natural functioning of the Critical Zone, the thin veneer at Earth's surface where the atmosphere, lithosphere, hydrosphere and biosphere interact. To understand these processes requires a broad array of scientific expertise spanning: geology, soil science, biology, ecology, geochemistry, geomorphology and hydrology. EARTH 530 will introduce students to the basic information necessary for understanding Earth surface

processes in the Critical Zone through an integration of various scientific disciplines. Those who successfully complete EARTH 530 will be able to apply their knowledge of fundamental concepts of Earth surface processes to understanding outstanding fundamental questions in Critical Zone science and how their lives are intimately linked to Critical Zone health. EARTH 530 will combine digital video, audio, simulation models, virtual field trips to on-line data resources, text, and interactive quizzes that provide instantaneous feedback.

The overarching goal of the course is to help secondary science teachers understand Earth surface processes at a level they can communicate to their students. These processes will be presented in a Critical Zone framework - the teachers and subsequent students will leave with a better knowledge of how their daily lives are impacted by natural processes, and conversely how their daily activities impact Earth's surface and the Critical Zone.

Students will be required to complete weekly assignments. There are 12 lessons divided into 7 units in EARTH 530. Each unit will contain interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of Critical Zone science.

Students will also be assigned four unit projects throughout the semester (Units 2-6). Projects require students to apply the principles they have learned to various scientific inquiries of Earth surface processes in the Critical Zone. A capstone Semester Project will require students to use the skills and knowledge they develop in the course to produce a learning module that they, in turn, will be able to use to teach course concepts to their own secondary school students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 540** Essentials of Oceanography for Educators (3) Chemical and physical principles of the oceans and their interaction with the biosphere, atmosphere and the solid Earth.

#### **EARTH 540 Essentials of Oceanography for Educators (3)**

EARTH 540 introduces knowledge and broadens understanding of the oceans and their role in climate, coastal processes, and life within the fluid Earth. Students will gain insight into the physical and chemical processes that determine properties of the ocean and govern interactions between the ocean, atmosphere, groundwater, and the fluid/solid Earth. Topics will reinforce fundamental scientific principles such as heat transfer, chemical equilibrium, and conservation of energy. EARTH 540 will combine digital video, audio, simulation models, virtual field trips to on-line data resources, text, and interactive quizzes that provide instantaneous feedback.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 591** Individual Studies: Research Project (3) Development of a capstone project, supervised on an individual basis outside the scope of formal courses.

#### **EARTH 591 Individual Studies: Research Project (3)**

EARTH 591 broadens the content knowledge of students in the program, while deepening their understanding of a specific topic of their choosing. Students will gain insight into the essence and process of current scientific research by working with an academic advisor who is a member of the graduate faculty. They will practice transforming the results of their own investigations into modules that can then be taught to others.

Students will design, develop, and conduct a project in consultation with an advisor. Appropriate projects are expected to combine basic scientific research and pedagogical techniques. Examples of projects could include (but of course are not limited to): development of a new curriculum appropriate for grades 7-12 based on a specific discipline in the Earth Sciences, such as meteorology; or an independent research project in a specific scientific subfield, such as a recent climate change, the results of which may then be taught to students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 597A** Plate Tectonics Workshop (2) This course is designed to develop both practical and conceptual knowledge of plate tectonics as well as to promote innovative approaches to teaching earth science.

**Plate Tectonics Workshop (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 597B** Astronomy (2) This course engages teachers in innovative approaches to teaching solar system phenomena, while learning new astronomy themselves.

**Astronomy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 597C** Energy (2) This course highlights the human use of energy beginning with the controlled use of fire up to modern power production methods and associated consequences.

**Energy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EARTH 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Earth and Mineral Sciences (EM SC)

**EM SC 420** (SOC 420, S T S 420) Energy and Modern Society (3) Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

### Energy and Modern Society (3)

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 440** Science Diving (4) Advanced scuba diving skills applied to underwater research.

### EM SC 440 Science Diving (4)

EM SC 440 is a four credit intermediate science diving course for students already holding a basic open water scuba diving certification from an internationally recognized certification agency (e.g. PADI, NAUI, CMAS, YMCA, SSI etc.).

Scientific diving is concerned with the observation of underwater phenomena and the acquisition of scientific data. This course introduces students to advanced scuba diving skills following the standards established by the American Academy of Underwater Sciences (AAUS) -- with a significant emphasis on diver safety.

The course covers theoretical aspects of the physics of diving, dive physiology, and underwater environments. There is a strong emphasis on diver safety with theoretical and practical training in cardiopulmonary resuscitation, diving-related first aid, accident management and dive rescue. The course will cover advanced recreational diving techniques, including deep diving and enriched air (nitrox) diving. A significant component of the course will involve scuba diving accident analysis, the focus of the course textbook. The course will also include an introduction of advanced underwater sign language.

The course will include classroom sessions, pool sessions, and open water dives focusing on underwater skills development for eventual application in research settings.

Each government or university underwater research program certifies its own divers based on standards that, at a minimum, conform to those of the AAUS. Successful completion of the course will allow the student diver in training to enroll in EM SC 441, Advanced Science Diving. Successful completion of EM SC 441 will allow the student diver in training to apply for science diver certification from the Penn State Science Diving Program. Certification is also dependant on a medical examination and is at the discretion of the University Dive Safety Officer; it is not automatically offered on completion of the course. The course is usually offered once a year in the spring semester and will involve several day trips (usually at weekends) to various river, lake, and quarry locations within the state. There will be an additional fee charged to cover the costs of the open water dives and administrative charges for recreational dive certifications.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 441** Advanced Science Diving (4) Advanced scuba diving skills applied to underwater data collection and research.

### EM SC 441 Advanced Science Diving (4)

EM SC 441 is a four credit advanced science diving course for students who have completed EM SC 440 (Science Diving), an equivalent course at a recognized AAUS member institution, or have been approved by the University Dive Safety Officer based on acceptable demonstration of practical and academic dive experience. Students must have a minimum of 20 logged dives beyond their basic open water certification dives by the start of the course.

Scientific diving is concerned with the observation of underwater phenomena and the acquisition of scientific data. This course introduces students to some of the basic skills and techniques used in scientific diving, following the standards established by the American Academy of Underwater Sciences (AAUS) -- with a significant emphasis on diver safety.

The course covers theoretical aspects of science diving techniques. The course will focus on advanced techniques in underwater ecology, geology, paleontology and archaeology, leveraging expertise from PSU faculty in these disciplines. The course will include classroom sessions, pool sessions, and open water dives. The classroom and pool sessions and the open water dives will involve skills development and their application in research settings. Research will involve a variety of projects (e.g. fish surveys, lake sediment sampling for climate reconstruction, underwater mapping) – the exact nature of which will vary depending on the areas of expertise of the faculty and students involved.

Each government or university underwater research program certifies its own divers based on standards that, at a

minimum, conform to those of the AAUS. Successful completion of the course will allow the student diver in training to apply for science diver certification from the Penn State Science Diving Program. Certification is also dependant on a medical examination and is at the discretion of the University Dive Safety Officer; it is not automatically offered on completion of the course. The course is usually offered once a year in the fall semester and will involve several day trips (usually at weekends) to various river, lake, and quarry locations within the northeastern United States. There will be an additional fee charged to cover the costs of the open water dives and administrative charges for recreational dive certifications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 470W** Undergraduate Collaborative Research in Earth and Materials Sciences (1-6 per semester/maximum of 6) Interdisciplinary research seminar involving students in the process of discovery, writing, and debate on issues of broad interest to Earth and Materials Sciences.

**Undergraduate Collaborative Research in Earth and Materials Sciences (1-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 494** Research Project Courses (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 494H** Research Project Courses (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EM SC 602** Supervised Experience in College Teaching (2-3) Students enrolled will lead discussion sections, grade papers and examinations, give an occasional lecture, and assist instructors in planning survey level courses.

#### **Supervised Experience in College Teaching (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Ecology (ECLGY)**

**ECLGY 510** Classical Ecology (2) Classical Ecology.

#### **Classical Ecology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 515** Advances in Ecology (3) Advances in Ecology.

#### **Advances in Ecology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECLGY 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Economics (ECNMS)**

**ECNMS 510** Managerial Economics (3) Economic analysis of demand for the firm's output and production costs; implications of various market structures; government regulation.

### **Managerial Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

## Economics (ECON)

**ECON 400M** Honors Seminar in Economics (3-12) Readings, discussion, and oral and written reports on selected topics in economics.

### Honors Seminar in Economics (3-12)

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 401** History of Economic Thought (3) Survey of economic ideas from Greco-Roman times to the present.

### History of Economic Thought (3)

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 402** Decision Making and Strategy in Economics (3) Development and application of the tools for decision making under uncertainty and for game theoretic analysis of economic problems.

### Decision Making and Strategy in Economics (3)

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 403** The Economics of Arts and Entertainment (3) Supply and demand of creative goods and services; industry structures; role of information; policy issues.

### The Economics of Arts and Entertainment (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 404W** Current Economic Issues (3) An analytical survey of significant problems of current economic policy and the application of economic analysis to important social issues.

### Current Economic Issues (3)

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 406** The Economics of Social Conflict (3) Economic theory of the resolution of social conflicts: social choice theory, voting, noncooperative games, voluntary trade, and allocation by force.

### The Economics of Social Conflict (3)

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 406W** The Economics of Social Conflict (3) Economic theory of the resolution of social conflicts: social choice theory, voting, noncooperative games, voluntary trade, and allocation by force.

### **ECON 406W The Economics of Social Conflict (3)**

This course is devoted to the economic theory of the resolution of social conflicts. The first two-thirds of the course will cover economic models of social choice, majority rule, and voluntary trade. The latter part of the course will focus on the emerging theory of allocation by force.

The course is an advanced writing-intensive seminar in which students will learn about economic theories of social conflict. It is one of a series of 400-level seminars in each of seven broad areas of economics, and this course constitutes a seminar in microeconomic theory. The course counts toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 407** (COMM 407) Political Economy (3) Applications of the tools of game theory to analyze topics in collective decision making.

### **Political Economy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 407W** Political Economy (3) Applications of the tools of game theory to analyze topics in collective decision making.

### **ECON 407W Political Economy (3)**

The course covers two main topics. First, the course will analyze elections as a mechanism to aggregate preferences of the electorate. It will be shown that elections provide a good tool to strike a compromise between all members of the electorate if the scope of disagreement in the electorate is one-dimensional. A simple model of taxation in which citizens' preferences over tax rates are "one-dimensional" in the above sense will be developed. This model will be used to predict how tax rates in democratic countries change with the income distribution. It will be shown next that no satisfaction mechanism of preference aggregation exists in a slightly more general model of taxation. This result is a special case of the famous Impossibility Theorem by Arrow.

Secondly, conditions will be given under which elections are a good mechanism to aggregate information that is spread throughout the electorate. It turns out that theories of information aggregation yield a convincing theory about abstention. A model in which the less informed voters delegate the decision to the more informed voters by simply abstaining will be discussed. The discussion of political debates and the media will be framed in terms of an information aggregation model. Finally, the potential of information aggregation theories to explain social movements will be discussed.

Game theory provides a framework to think about many issues in the social sciences. This particular course focuses on some applications of game theory to politics. The first, and very specific goal, is to use the lens of game theory to understand the workings of various political institutions. The second, more general, goal is to enable students to apply game-theoretic reasoning to a wide range of topics in the social sciences. The third is to make the research frontier in the field of political economy as accessible as possible. It is hoped that students would get a better understanding of what graduate school would be like.

This course has as its broad objective to expose students to the use of the tools of game theory to analyze collective decision making. Students will learn how to use economic theory to analyze real-world situations of collective decision making. They will develop their analytical skills as well as their skills in writing in economics.

The writing-intensive course is one of a series of 400-level writing intensive seminars that the Economics Department is offering to its advanced undergraduates in seven different areas of economics. This seminar is in the area of microeconomic theory.

The course will count toward the major and the minor in economics as a 400-level course. Further, it will count toward

completion of a module (specialization) in the area of theory and quantitative methods.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 408 Intellectual Property (3)** A comparative and cost-benefit analysis of intellectual property that examines patents, copyrights, governmental supported research, and prizes.

### **Intellectual Property (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 408W Intellectual Property (3)** A comparative and cost-benefit analysis of intellectual property that examines patents, copyrights, government supported research, and prizes.

### **ECON 408W Intellectual Property (3)**

We live in a society that has a decentralized system based on the institutions of private property and trade. In such a system, things belong to people and can be transferred by their owners to other people. An exchange that moves something to someone who values it more than its present owner produces a net benefit, which may be shared between the parties to the exchange. Thus such a system tends to move everything to those who most value it, producing an efficient allocation of goods and services. The logic and limitations of this process make up the branch of economics called price theory.

The course undertakes an examination of intellectual property, a subfield of property rights.

In the context of intellectual property, there are five specific areas of note: patent races, poorly constructed incentives, standards, licenses, and an examination of costs.

There are three factors relevant to the costs of providing legal protection to some particular sort of intellectual property. One is how easy it is to define and defend property in that sort of idea. Another is the degree in which someone who creates and claims ownership in that particular sort of intellectual property reduces, by so doing, the options available to other people. The more serious these problems are, the less the gains from defining and enforcing property rights in ideas. Where they are sufficiently serious, we are better off with an intellectual commons--a legal regime in which certain classes of ideas are free for all to use than with intellectual property. These three costs must be balanced against the benefits--production of more and better intellectual property and better coordination of intellectual property once produced. The larger these benefits are likely to be, the greater the costs we are willing to bear in order to get them.

The course objectives are to apply the framework of comparative and cost-benefit analysis to the study of intellectual property. The course will examine the empirical evidence, and also consider policy issues in this area.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 409 Economics of Terrorism (3)** Terrorism throughout history; economic causes, costs, sources, and consequences.

### **Economics of Terrorism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 409W Economics of Terrorism (3)** Terrorism throughout history; economic causes, costs, sources, and consequences.

**ECON 409W Economics of Terrorism (3)**

This microeconomics seminar examines the economics of terrorism. Beginning with a survey of terrorism through history and extending to terrorism in the 21st century, economic tools are deployed to better understand the causes and sources of terror.

Terrorism imposes substantial economic costs, but there are also significant costs with policies to combat terrorism. A society is better off if the threat of terrorism can be reduced, or even eliminated, just as it is better off if the threat of crime can be reduced or eliminated. There are some economic roots of terrorism, but these have more to do with the incentives and constraints that individuals and organizations face than with any specific set of easily quantifiable factors that push people toward involvement in terrorist organizations. This suggests that policy responses to terrorism need to be multi-faceted and flexible. Security policies, for example, need to be more cost effective, in order for both to achieve results and to limit the negative consequences of devoting excessive resources to security purposes. Similarly, aid policies need to concentrate on achievable objectives, both to obtain positive results and to provide a more representative and optimistic outlook on the future. Policies need to be targeted at filling in the voids left by weak states and shifting incentive structures within societies away from the use of violence.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 410 Economics of Labor Markets (3)** Economic analysis of the employment relationship from the microeconomic perspective, with emphasis on current labor-market problems and public policy issues.

**Economics of Labor Markets (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 411 Behavioral Economics (3)** Topics in behavioral economics; selected games; evolutionary models of social behavior, herding, overconfidence.

**Behavioral Economics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 411W Behavioral Economics (3)** Topics in behavioral economics; selected games; evolutionary models of social behavior; culture and social behavior; herding; overconfidence.

**ECON 411W Behavioral Economics (3)**

Behavioral economics examines recent evidence from experiments that seems to violate the hypotheses of economic rationality in traditional microeconomic theory. The course considers, among others, the following three topics: (1) Altruism in human behavior, as demonstrated, for example, in public goods experiments where people typically contribute some positive amount, even with the individually optimal strategy being to contribute nothing. (2) The prevalence of co-operative behavior in societies, which seems essential to their functioning, but which is hard (but not impossible) to explain on the basis of the actions of purely self-interested individuals. (3) Fairness in distribution: for example, people do not try to extract everything that their partners or opponents can give even when they are in a position of power (as in being the proposer of a take-it-or-leave-it offer).

Students play some well-known games with each other to generate examples of their own behavior in multi-person interaction contexts; the results of the games are analyzed to detect regularities in the observed behavior; and the class discusses possible explanations drawn from economics, evolutionary biology and psychology as to why people (specifically the students) played the way they did in these games.

Overall, then, students will learn about various aspects of behavioral economics, including several games and evolutionary models of social behavior, and how these aspects square with conventional economic theory. Students will develop the skill of analyzing behavior from a behavioral economics perspective.

This course is a 400-level seminar, part of the Economics Department's offerings, many of them writing-intensive, for our

advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of microeconomic theory. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 412 Labor Economics and Labor Markets: Theory, Evidence, and Policy (3)** Advanced topics in labor economics: theory, empirical evidence, and policy.

**ECON 412 Labor Economics and Labor Markets: Theory, Evidence, and Policy(3)**

This course is an advanced course in labor economics. Its coverage of topics overlaps somewhat with the topics covered in ECON 315, but typically the treatment of the topics considered will be distinctly more rigorous for this 400-level course. The broad areas that will be focused on in the course include labor supply, investment in human capital, labor demand, wage determination, search and unemployment, and earnings inequality.

The objective of this course is to introduce students to topics in labor economics with a rigorous and advanced analytical approach. For each topic, the course will consider the underlying theory, pertinent empirical evidence, and implications for public policy. The instructional and educational objectives are to provide students with a strong background in labor economics. This will allow them to take advanced seminar courses in the labor field.

This course is an advanced introduction to labor economics, and as such has a prerequisite of either ECON 302 or ECON 315. In turn, this course will serve as a gateway to advanced seminar courses in labor economics at the 400 level that the Economics Department is in the midst of creating. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 413 Economic Growth and the Challenges of World Poverty (3)** Challenges imposed by poverty; growth; growth rates; microfinance; foreign aid.

**Economic Growth and the Challenges of World Poverty (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 413W Economic Growth and the Challenge of World Poverty (3)** Economic prosperity in historical perspective; recent successes (East Asia, China, India); ongoing challenges (the bottom billion; sub-Saharan Africa).

**ECON 413W The Challenge of World Poverty (3)**

This course will first consider economic growth and the spread of economic prosperity in historical perspective. Then contemporary success stories, including the East Asian miracle and growth in China and India, will be studied. The last part of the course focuses on the poor worldwide, and examines poverty traps in Africa, why aid doesn't work, and why globalization hasn't helped.

Students are expected to learn about the barriers to reducing world poverty and proposals aimed at alleviating poverty. Students will also learn about the growth and diffusion of economic prosperity, with both historical and contemporary examples. Students will develop analytical skills as well as writing skills.

This course is one of a series of 400-level seminars, many of them writing-intensive, for our advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of economic growth and development. The course will count toward both the major and the minor in economics.

Students will read four books about world poverty, write short book summaries, and write a term paper focuses on one feasible solution to alleviating poverty in Africa. In addition, there will be a midterm exam and a final exam.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 414** The Economic Way of Looking at Life (3) Economics/life according to Gary Becker: criminal behavior; economics of the family (marriage, divorce, intrahousehold resource allocation, bequests), policy issues.

### **The Economic Way of Looking at Life (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 415** The Economics of Global Climate Change (3) Evidence on climate change; economic models of the environment and market failure; cost-benefit analysis of policy options; carbon markets.

### **The Economics of Global Climate Change (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 415W** The Economics of Global Climate Change (3) Evidence on climate change; economic models of the environment and market failure; cost-benefit analysis of policy options; carbon markets.

### **ECON 415W The Economics of Global Climate Change (3)**

The first part of the course reviews the scientific evidence on global climate change (IPCC studies). This is followed by an analysis of market failure in the production of greenhouse gas emissions, and consideration of carbon markets as a policy response. A cost-benefit study of the control of greenhouse gases (the Stern Report) is examined, and the concluding part of the course looks at a computer model of economic activity and the environment.

Students will learn about the scientific evidence on global climate change, and the associated economic implications, market failures, and policy options to mitigate those market failures. Students will develop skills to assess policy options in this area, and they will become conversant with applied cost-benefit analysis and a computer model of economic activity and the environment.

This course is one in a series of 400-level seminars, many of them writing-intensive, for advanced economics students in each of seven broad areas of economics. This writing-intensive seminar is in the area of applied microeconomics. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 417** The Economics of Uncertainty (3) Uncertainty and Risk as related to finance, insurance, health, labor, industrial organization, and macroeconomics.

### **The Economics of Uncertainty (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 417W** The Economics of Uncertainty (3) Uncertainty is examined in contracts, with an emphasis on limited liability. Asymmetric information and economic puzzles are also considered.

**ECON 417W The Economics of Uncertainty (3)**

This course studies the allocation of resources under uncertainty. Decisions without perfect information require the use of probability theory and expected utility preferences. The seminal work of Arrow and Debreu is used as a starting point. Probability and utility theory are then used to interpret insurance contracts. Limited liability is introduced and the Modigliani-Miller Theorem is applied to loan guarantees, deposit insurance, and insurance claims. Finally, asymmetric information is discussed and the resulting problems of moral hazard and adverse selection are addressed.

The course objectives are to introduce students to the theoretical framework used by economists to study uncertainty and to apply that framework in order to explain various regularities observed when decisions are made without complete information, to examine the empirical evidence, and to consider policy issues in this area.

The course will count toward both the major and a minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 418 A Comparative and Cost-Benefit Analysis of State Government Activities (3)** This course examines federalism with a particular focus on the activities undertaken by the state of Pennsylvania.

**A Comparative and Cost-Benefit Analysis of State Government Activities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 418W A Comparative and Cost-Benefit Analysis of State Government Activities (3)** This course examines federalism with a particular focus on the activities undertaken by the state of Pennsylvania.

**ECON 418W A Comparative and Cost-Benefit Analysis of State Government Activities (3)**

This course provides a framework for a comparative and cost-benefit analysis of state government activities. Our federal system of government gives rise to large disparities among the activities undertaken by state governments. This course will focus on activities undertaken by the state of Pennsylvania. Students will pick out particular activities - e.g., state aid and loans to students in higher education, lottery revenues, incidence, state regulation of the sale of alcoholic beverages, and the operation of toll roads and produce a comprehensive project that will involve two related analyses: a comparative analysis comparing Pennsylvania to other states and a cost-benefit analysis.

The course objectives are to apply two frameworks regularly used by economists -- comparative and cost-benefit analysis -- to the study of state government activities. The course will examine the empirical evidence, and also consider policy issues in this area.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 421 Analysis of Economic Data (3)** Economic analysis of data: sources, variable definitions, miscodings, missing observations, censoring and truncation, applications.

**ECON 421 Analysis of Economic Data (3)**

There are many data sets but the information contained within them for economic analysis is often unclear without substantial investigation. The reliability of data sources, the ambiguity in variable definitions, the miscoding of variables, and missing data are topics covered in the course. In addition, truncation and censoring from the data collection methodologies are examined. Several economic data sets are examined to illustrate the concepts.

This course is an applied course in the field of econometrics and will seek to provide students with the analytical methods for understanding the economic content of data. The instructional and educational objectives are to expose students to the practical details of analyzing economic data in the context of an advanced seminar. The course objectives are to familiarize students with the deficiencies of real-world data and how to address those deficiencies.

The Economics department seeks to provide students with a series of seminar courses in each of seven broad fields in the discipline; this is a course in the field of econometrics, and has a prerequisite of ECON 490 plus either ECON 402 or ECON 451. The course will count toward both the major and minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 422** Applying Monetary Theory and Monetary History (3) Monetary history is examined. Special attention is paid to commodity-based systems, private money, and government monopolies on currency.

### **Applying Monetary Theory and Monetary History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 422W** Applying Monetary Theory to Monetary History (3) Monetary history is examined. Special attention is paid to commodity-based systems, private money, and government monopolies on currency.

### **ECON 422W Applying Monetary Theory to Monetary History (3)**

This course provides a framework for the analysis of monetary history. In the past, there have been many advances in monetary theory. Some of the advances are directly inspired by the varieties of monetary systems that have existed in the past - for example, systems in which private banks issue currency (bank-notes). There is scope for reexamining existing analyses of many of those historical systems in the light of advances in monetary theory.

The course objectives are to introduce students to the theoretical framework used by economists to study monetary theory, and to apply that framework in order to explain various monetary systems that have existed in the past. We will examine the empirical evidence, and also consider policy issues in this area.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 424** Income Distribution (3) Inequality and poverty in the United States, measurement problems, determinants of inequality, arguments for and against equality, impact of redistributive policies.

### **Income Distribution (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 425** Economics of Public Expenditures (3) Analytic and policy aspects of public expenditure decisions; applications from areas of contemporary public interest.

### **Economics of Public Expenditures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 427** Economics of Energy and Energy Security (3) Energy economics studies topics related to the supply, energy

markets, and environmental impacts of energy use.

### **Economics of Energy and Energy Security (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 428** Environmental Economics (3) Environmental pollution, the market economy, and optimal resource allocation; alternative control procedures; levels of environmental protection and public policy.

### **Environmental Economics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 429** Public Finance and Fiscal Policy (3) Analysis of public revenue and expenditure structure primarily at the federal level; federalism; fiscal policy and public debt.

### **Public Finance and Fiscal Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 430** Regional Economic Analysis (3) Analysis of personal and industrial location decisions, regional economic growth, migration patterns, and regional policy; emphasis on tools and techniques.

### **Regional Economic Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 432** Urban Economics (3) Theories and methods for economic analysis of such urban problems as housing, segregation, government services, and transportation.

### **Urban Economics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 433** Advanced International Trade Theory and Policy (3) Causes/consequences of trade; effects of tariffs and quotas; strategic trade policy; political economy of trade restrictions and other topics.

### **Advanced International Trade Theory and Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**ECON 434** International Finance and Open Economy Macroeconomics (3) Trade balance movements, exchange rate determination; monetary and fiscal policies in open economies; international policy coordination; the world monetary system.

**International Finance and Open Economy Macroeconomics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 436** Economics of Discrimination (3) Analysis of the economic characteristics of women and minorities; with examination of race and sex discrimination and related government policies.

**Economics of Discrimination (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 436W (US)** Economics of Discrimination (3) Analysis of the economic characteristics of women and minorities, with examination of race and sex discrimination and related government policies.

**ECON 436W Economics of Discrimination (3)  
(US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course constitutes an examination of the economics of discrimination. More precisely, the course will focus on economic theories of discrimination and on efforts by economists to measure the extent of labor market discrimination. An important objective of the course is thus to learn how economists conceptualize and study discrimination. This, in turn, requires that we examine how economists view and study economic differences by race, ethnicity, and gender (these are the types of discrimination that will be focused on in the course, although we will also consider other types of discrimination). Following the existing economic literature, much of our emphasis will be on labor market discrimination, but we will also consider discrimination in education and in housing. The first substantive section of the course outline below involves examination of data on the economic characteristics of women and blacks in relation to white males, considering both the current situation and recent trends. Data on Hispanics will also be presented. This work will be done by the students, working in groups. We will look at how mainstream economists conceptualize economic differences by gender and by race/ethnicity, respectively. Then we will focus on formal models of discrimination and empirical issues in attempting to measure discrimination, and we'll also examine an alternative approach to understanding economic inequality. The concluding section of the course will examine public policy issues related to discrimination. The course will count toward either a major or a minor in economics, and will meet the writing requirement for students in economics.

General Education: None  
Diversity: US  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 437** Multinationals and the Globalization of Production (3) Globalization entails many dimensions: trade, migration, FDI, offshoring, cross-border licensing of technologies.

**Multinationals and the Globalization of Production (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 437W** Multinationals and the Globalization of Production (3) This course will focus on trade, multinationals and

offshoring, and explore their implications for the U.S. and developing countries.

### **ECON 437W Multinationals and the Globalization of Production (3)**

This seminar examines the international economy and the effects of multinational activity on globalization.

Some of the key questions that will be examined include:

Is globalization really a new phenomenon?

Is it irreversible?

What are the effects on wages and inequality?

What are the effects on production and innovation?

These questions will be addressed through a careful reading of the historical timeline, an extensive analysis of capital flows, multinational enterprises and development. Students are expected to synthesize their findings into a final paper and present what they have learned to the class.

The Economics Department seeks to provide students with a series of seminar courses in each of seven broad fields in the discipline; this is a course in the field of Trade.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 438** Winners and Losers from Globalization (3) Globalization, US, International, Trade, Finance, Growth, Labor, Industrial Organization, Political Economics.

### **Winners and Losers from Globalization (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 438W** Winners and Losers from Globalization (3) The economic effects of globalization on individuals, governments, nation- states and business.

### **ECON 438W Winners and Losers from Globalization (3)**

This seminar explores the various effects of globalization on individuals in the United States and abroad. It integrates material from a variety of sub-disciplines in economics, including international trade, international finance, growth theory, labor economics, industrial organization, and political economy. Discussion of each core topic is model-based and informed by empirical evidence from the recent economic literature. The objectives of the course are to (1) deepen students' understanding of the basic forces at play as globalization takes place, and their implications for individuals' well-being; (2) sharpen students' ability to critically evaluate policy issues, both theoretically and empirically; and (3) develop students' ability to craft tightly reasoned economic reports.

This course is an applied seminar in international economics. The impact of globalization is explored from a cost-benefit perspective. Winners and losers are identified using the tools and framework of economics. The instructional and educational objectives are to provide in-depth analysis of the consequences of globalization in the context of an advanced seminar. The course objectives are to analyze the winners and losers from globalization.

This is a course in the field of international economics. The course will count toward both the major and minor in economics.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 439** Economics of Technology Diffusion (3) Technology Diffusion: Globalization, productivity measurement, intellectual property.

### **ECON 439 Economics of Technology Diffusion (3)**

This seminar examines the relationship between technology diffusion, globalization of the world economy, and

intellectual property. This course has four parts. It begins with a review of international trade. This is followed by an examination of globalization of the world economy. Then both the theoretical and empirical aspects of technology diffusion across national borders are analyzed. The course concludes with consideration of international aspects of intellectual property.

This course is an applied economics seminar in international economics. The interplay between globalization and technology diffusion is examined with special attention to intellectual property. The instructional and educational objectives of the course are to expose students to the economic and policy issues surrounding diffusion of technology, in the context of an advanced seminar. The course objectives are to understand the determinants and consequences of international technology diffusion.

The Economics Department seeks to provide students with a series of seminar courses in each of seven broad fields in the discipline; this is a course in the field of international economics, and has a prerequisite of ECON 433. The course will count toward both the major and minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 442** Managerial Economics (3) Application of economic theory to managerial decision making; risk, uncertainty; models and statistical techniques.

### **Managerial Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 443** Economics of Law and Regulation (3) An economic analysis of property rights, contractual arrangements, illegal activities, and regulation; competitive problems due to externalities and market failure.

### **Economics of Law and Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 444** Economics of the Corporation (3) Coordination and incentive issues within a corporation. Topics include employment contracts, performance incentives and pricing of financial assets.

### **Economics of the Corporation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 445** (H P A 445) Health Economics (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

### **Health Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 445W** (H P A 445W) Health Economics (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

**ECON (H P A) 445W Health Economics (3)**

The healthcare sector comprises a set of markets that differ in some significant ways from the textbook model. In the US, this sector performs well in some respects and questionably in others. Notably, there has been sustained improvement over time in life expectancy and other indicators of the effectiveness of health care for most people, but the resources devoted to producing this improvement have been growing considerably faster than GDP. The goal of this course is to examine several broad questions raised by these facts.

The course begins with an overview of evidence on wealth, health expenditure, and life expectancy across countries, and then examines increasing life expectancy and medical expenditures in the US and their causes. Issues in measuring the value of medical expenditures are addressed, and an overview of the industrial organization of health care is provided. A major component of the course covers the economics of health insurance, and the course also examines medical R&D and the pharmaceutical industry as well as issues in the financing of medical care for the elderly.

The course seeks to introduce students to the economic analysis of health care. It is in the area of applied microeconomics, and deals with issues relating to labor markets and public finance, in particular. This writing-intensive course will be one of several 400-level W seminars that the Economics Department is seeking to establish, with the broad objective of exposing our advanced undergraduate students to economic analysis in a seminar setting requiring significant writing by the students.

The course counts toward the major and the minor in economics, as a 400-level course. In addition, it also counts toward a "module" (area of concentration) in human resource and public economics.

Student performance in the course will be evaluated based on three papers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 446** Economics of Industry Evolution (3) Dynamics of industry evolution; empirical evidence and theoretical modeling of firm entry, growth, and exit; entrepreneurship; investment and strategic behavior.

**Economics of Industry Evolution (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 446W** Economics of Industry Evolution (3) Dynamics of industry evolution; empirical evidence and theoretical modeling of firm entry, growth, and exit; entrepreneurship; investment and strategic behavior.

**ECON 446W Economics of Industry Evolution (3)**

Industries are not static entities. They continually evolve as new products and production techniques are developed. In response to changes in demand and technology, new firms enter while existing firms grow, decline, and exit. This course studies the dynamics of industry evolution using both empirical tools and theoretical models of firm decisions to analyze the following broad questions: How does a new entrant establish a foothold in an industry? How does the entry process differ between industries built around new products versus industries for well-established products? What is the role of entrepreneurship and human capital? How do firms affect their growth and survival prospects by investing in R&D and other types of innovation? How does the life-cycle of high-tech industries differ from consumer products or capital-intensive manufacturing or services? The roles of antitrust policy and regulation in affecting firm turnover and industry evolution are also addressed.

This course will seek to provide students with both theoretical and empirical methods to analyze the economic forces underlying the evolution of industries. Students will develop analytical and writing skills in the course.

This course is one of a series of advanced, writing-intensive seminars in each of seven broad fields in economics; this is a course in the field of industrial organization. The course will count toward both the major and the minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 447** Economics of Sports (3) Topics in sports; demand, owners, ticket resale, leagues, markets, efficiency, antitrust, discrimination, collegiate sports.

### **Economics of Sports (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 447W** Economics of Sports (3) Examination of economic issues pertaining to professional and collegiate sports, including analysis of industrial organization, labor markets, and local economies.

### **ECON 447W Economics of Sports (3)**

Sports play a pervasive role in life in these United States, and this course examines a wide-ranging set of issues in considering the economics of sports. Students will learn about various aspects of sports in the United States, including the "players" (players, owners, fans), the institutional settings (sports leagues), and the effects of sports on the cities in which they are played. Students will develop the skills to analyze a wide variety of issues in sports economics. The course will touch on aspects of three distinct fields in economics: labor economics, industrial organization, and urban economics.

This course proposal is one of a series of 400-level seminars, many of them writing-intensive, for advanced students in economics in each of seven broad areas of the discipline. This writing-intensive seminar is in the area of applied microeconomics. The course will count toward both the major and the minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 448** Economics of Auctions and Procurements (3) Theoretical and empirical analyses of auctions and procurements; different modeling environments; econometric analysis of auction and procurement data.

### **Economics of Auctions and Procurements (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 448W** Economics of Auctions and Procurements (3) Theoretical and empirical analyses of auctions and procurements; different modeling environments; econometric analysis of auction and procurement data.

### **ECON 448W Economics of Auctions and Procurements (3)**

This course provides the basic framework for theoretical and empirical analyses of auctions and procurements. The course begins with the foundations of game theory. Both complete and incomplete information models are emphasized. The main auction and procurement modeling environments are then covered. Included among these are the independent private value model, common value model, affiliated private value model, and basic forms of asymmetry. Several data sets are provided for discussion and analysis including FCC spectrum auction data, timber auction data, and road procurement data. Empirical models are proposed for the econometric analysis of the auction and procurement data.

This course seeks to provide students with the analytical methods of both the theoretical and empirical analysis of auctions and procurements. Students should develop their analytical skills pertinent to the economics of auctions and procurements, and they will also develop their skills in writing in economics.

This course is part of a series of advanced writing-intensive seminars in each of seven broad fields in economics. This is a course in the field of applied microeconomics. The course will count toward both the major and a minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 449** Economics of Collusion (3) Collusion, Bidding Rings, Antitrust, Price Fixing, Incentives, Law

### **Economics of Collusion (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 449W** Economics of Collusion (3) Theoretical and empirical analysis of collusion among firms, case studies of cartel behavior, bidding behavior at auctions and procurements.

### **ECON 449W Economics of Collusion (3)**

Collusion by firms -- the explicit suppression of interfirm rivalry -- is profitable. However, it is often difficult to accomplish meaningfully. This course provides frameworks to analyze interfirm interactions, both theoretically and empirically. In addition, several case studies of cartel behavior in the U.S., Europe, and elsewhere are presented. Bidder behavior at auctions and procurements will also be examined to understand some of the underlying issues of collusion. Following an introductory section, the course examines first the law regarding collusion and then the history of collusion, focusing on notable cases in the U.S. and Europe. Economic models of collusion are then reviewed, along with the distinction between tacit and explicit collusion. The final substantive section of the course examines issues encountered in prosecuting collusion. The broad objective of the course is to use the tools of economics to analyze the interactions of firms in settings where collusion may occur. Educationally, then, the course seeks to expose students to the application of economic analysis in a context with major economic and legal implications. This is an advanced undergraduate course in the field of Industrial Organization (IO), and hence will add to our offerings in the IO field (our beginning IO course is ECON 342). Econometrics (ECON 490) is also a prerequisite because of the empirical analyses that will be an important component of the course. The course is one that may be used to satisfy requirements for the major and the minor in economics, as a 400-level course. It may also be used to complete a module (area of specialization) in the Economics of Business and Law. And it will serve as one of the Economics Department's writing-intensive 400-level seminars. Student performance will be evaluated via two midterm exams and a substantial term paper. The exams will each count for 15% of the overall course grade, and the term paper will count for the remaining 70% of the course grade.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 450** The Business Cycle (3) Measurement and theories of the business cycle; stabilization policies; forecasting.

### **The Business Cycle (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 451** Monetary Theory and Policy (3) Monetary and income theory; monetary and fiscal policy.

### **Monetary Theory and Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 452** Economics of the Financial Crisis (3) This course studies the economics of financial crises with special emphasis on 2008.

### **Economics of the Financial Crisis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 452W** Financial Crises (3) Examination of causes and consequences of financial crises; asset pricing theory, market efficiency, speculative bubbles; policy considerations.

### **ECON 452W Financial Crises (3)**

This course focuses on the causes and consequences of financial crises. We study famous crashes from the South Sea Bubble to Long-Term Capital Management, as well as international financial crises such as the Asian Crisis of 1997-98 and the Argentine Crisis of 2001. We examine both the history of the crises and the economic factors that are the fundamental causes, in part with a view to determining if these crises were the inevitable outcome of speculative markets, or the result of regulatory error.

The instructional and educational objectives of the course are to provide students with the opportunity to explore financial crises in a small, advanced seminar setting. The course objectives are to provide students with a theoretical framework for examining financial crises, to examine evidence on historical and more recent financial crises using that theoretical framework, and to consider policies aimed at avoiding and/or alleviating the effects of financial crises in light of the theoretical framework and the empirical evidence.

The course is part of a curriculum overhaul of 400-level courses in economics, in which advanced seminar courses are being created in seven broad areas of economics. This seminar is in the area of macroeconomics. This course may be used to meet major or minor requirements.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 454** Economics of Mergers (3) Economic analysis of horizontal and vertical mergers; econometric issues in measurement of unilateral and coordinated effects; policy issues.

### **ECON 454 Economics of Mergers (3)**

It is not uncommon for two separate and distinct corporate entities within an industry to merge and become one firm. This course examines the economics of mergers as well as economic policy with regard to mergers. There often are both pro-competitive and anti-competitive effects of mergers. In the U.S. the Federal Trade Commission has primary responsibility for assessing the balance between effects. This course examines unilateral effects and coordinated effects as identified in the horizontal merger guidelines. Vertical mergers are analyzed as well. Econometric issues associated with the measurement of unilateral and coordinated effects are discussed. The course concludes with ex post merger reviews.

This course is an applied microeconomics seminar in the field of industrial organization and will seek to provide students

with the analytical methods of both the theoretical and empirical analysis of mergers. The course will count toward both the major and minor in economics. This course is one of a series of advanced seminar courses in each of seven broad fields in the disciplines; this is a course in the field of industrial organization, with prerequisites of ECON 444 and ECON 490.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 455** Economics of the Internet (3) Economics of the Internet; electronic commerce and network economics; pricing issues; intellectual property.

### **Economics of the Internet (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 455W** Economics of the Internet (3) Economics of the Internet; electronic commerce and network economics; pricing issues; intellectual property.

### **ECON 455W Economics of the Internet (3)**

The Internet has become an important part of the economy in the United States and worldwide. Often we think of the information available on the Internet as a free good, much like the air we breathe. However, the Internet is an active marketplace with unique characteristics. Internet access providers sell keywords and advertising space by means of special auction and exchange mechanisms. Intellectual property is an important and evolving concept within the Internet, especially given its worldwide application.

This course is an applied microeconomics course and will seek to provide students with the analytical methods of both the theoretical and empirical analysis of the economics of the Internet. The course will count toward both the major and minor in economics. This proposal is part of a broader curriculum overhaul to 400-level economics courses. The Economics Department seeks to provide students with a series of advanced seminar courses in each of seven broad fields in the discipline; this is a course in the field of applied microeconomics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 457** Economics of Organizations (3) Consumers, Firms, Utility Maximization, Profit Function, Equilibrium, Firm Distribution.

### **Economics of Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 457W** Economics of Organizations (3) An advanced course in the economics of organizations. The focus is on coordination, incentives, contracts, and information in corporations.

### **ECON 457W Economics of Organizations (3)**

An advanced course in the economics of organizations. The focus is on coordination, incentives, contracts, and information in corporations. The goal of the course is to analyze coordination, incentives, contracts, and information in corporations. The formal tools used in the course will be drawn from game theory, contract theory, mechanism design, and information economics.



All students are required to have taken Strategy prior to enrollment.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 460** Issues in Sports Economics (3) Economic analysis of professional and collegiate sports: organization, input and output markets, the public sector, decision-making, and public policy.

### **ECON 460 Issues in Sports Economics (3)**

This course is designed to provide students the opportunity to examine and understand the sports industry. The course integrates the perspectives of various economic areas (i.e., industrial organization, managerial economics, labor economics, public economics) with those of marketing, finance, and accounting into a single approach to industry analysis. It provides students with an appreciation for the unique realities of the professional and amateur sports enterprise. Case studies and assignments are developed so students can apply theoretical and statistical concepts to real sports activities and/or policies. Students have the opportunity to complete case analyses in teams, present their results and suggestions to the class, and respond to questions and critical reviews by their peers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 463** (IL) Economic Demography (3) Microeconomics of demographic behavior; interrelationships between demographic and economic factors, in developing and industrialized economies; economic welfare and policy implications.

### **Economic Demography (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 463W** Economic Demography (3) Microeconomics of demographic behavior; interrelationships between demographic and economic factors, in developing and industrialized economies; economic welfare and policy implications.

### **ECON 463W Economic Demography (3)**

Economic demography is concerned with the interrelationships between economic phenomena and demographic phenomena. Fundamental demographic variables - fertility, mortality, migration, age composition - are related to economic factors, as both consequences and determinants. This course uses an economic perspective to study population phenomena and issues, with a focus on both theoretical and empirical analysis of demographic questions. Indeed, a major objective of the course is to provide you with the analytical tools from economics that are useful in analyzing issues in demography.

The instructional and educational objectives of this course are to teach students about economic demography in an advanced, writing-intensive seminar. The objective of the course is to provide a disciplinary perspective from economics on numerous issues in the multidisciplinary field of demography. This course is an advanced course that touches on topics in two different fields of economics: labor economics and growth and development. The course will count toward both the major and the minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 465** Cross Sectional Econometrics (3) Econometrics, simultaneous equations, discrete choice, sample selection.

**Cross Sectional Econometrics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 465W** Cross Sectional Econometrics (3) Discrete choice models, censored and truncated regression models, longitudinal models, applications.

**ECON 465W Cross Sectional Econometrics (3)**

This course extends the econometric analysis of Introduction to Econometrics (ECON 490) to consider three broad categories of models: discrete choice models, censored and truncated regression models, and longitudinal models. Approximately three-quarters of the course will consist of examination of models in these three areas and the issues that those models address. The last four weeks of the course will then focus on applications of these models.

Discrete choice models are used for the analysis of decisions by economic agents facing a fixed number of choices (whether to work or not, which are to buy, etc.). Students will learn how economists model such decision problems and how they can be analyzed empirically.

Censored and truncated regression models can arise for multiple reasons, e.g., because economic agents are generally constrained to consume a nonnegative amount of a given product, which introduces nonlinearities into the relationship of interest. Students will learn how economists model such problems and how they can be analyzed empirically.

Longitudinal models are, e.g., used to analyze durations of (un) employment spells. Students will learn how to analyze such data sets empirically.

Overall, then, students will learn advanced econometric techniques for dealing with discrete choice models, censored and truncated regression models, and longitudinal models. The skills to be developed consist in being able to apply these techniques in practical applications of data analysis.

This course is one of a series of 400-level seminars, many of them writing-intensive, for our advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of econometrics. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 466** Panel Data Models (3) Random and fixed effects, endogeneity, balanced and unbalanced panels, censoring of spells, differences in differences, applications.

**Panel Data Models (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 466W** Panel Data Models (3) Random and fixed effects, endogeneity, balanced and unbalanced panels, censoring of spells, differences in differences, applications.

**ECON 466W Panel Data Models (3)**

Panel data sets, consisting of repeated interviews over time of a panel of individuals (in effect, a time series of cross-sectional data on the same individuals) offer multiple opportunities for sophisticated econometric analyses, while at the same time posing some unique problems. This course will cover advanced econometric techniques for dealing with panel data. Random- and fixed-effects models are addressed initially, followed by consideration of endogeneity, balanced and unbalanced panels, censoring of spells, and differences in differences. The concluding part of the course will focus on applications.

The objective of the course is to provide students with exposure to models and techniques designed to deal with panel data (e.g., data on a set of individuals at various points in time), and to equip them with the skills to utilize those techniques in practical applications of data analysis.

In particular, students will learn to exploit the panel nature of a data set to allow for individual-specific heterogeneity

(e.g., random and fixed effects). They will learn how to address endogeneity problems, which can arise for various reasons including forward-looking behavior of individuals. Because data are often not available for the same set of (e.g.) individuals at all points in time, care must be taken to deal with such unbalanced panels, especially when such data are absent because of actions of the individuals.

In addition, since this is a writing-intensive course, an additional objective is to provide students with the opportunity to develop their skills in writing in economics.

This course is one of a series of 400-level seminars, many of them writing-intensive, for advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of econometrics. The course will count toward both the major and the minor in economics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 470 (IL) International Trade and Finance (3)** Economic analysis of why nations trade, barriers to trade, the international monetary system, and macroeconomic policy in an open economy.

### **International Trade and Finance (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 471 Growth and Development (3)** Problems of capital formation, institutional considerations, theories of economic growth.

### **Growth and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 472 Transition to Market Economies (3)** Economics of transition to a market economy; problems of former Soviet-type economies; privatization, stabilization, and institutional change.

### **ECON 472 Transition to Market Economies (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

With the demise of communism in Central and Eastern Europe, former socialist economies are in the process of transition from centrally-planned to market economies. Transition is a comprehensive change, involving all aspects of the economy, including labor markets, capital markets, and the organization of industry, especially privatization. The focus of this course is on the experience of economies in transition and the problems encountered. Special emphasis will be given to the experience of Russia and the other countries of the former Soviet Union. In addition to Central Europe and the former Soviet Union, we will also examine the experience of China.

The broad objectives of the course are to provide students with economic analyses of the wide range of issues that arise in considering economies in transition, and to assess the record on transition. The course will examine the following topics: the legacy of central planning; how to organize transition; macroeconomic stabilization in transition economies; privatization; restructuring, ownership change, and improvements in performance; and institutional development and transition. In addition, the concluding section of the course will examine the record transition.

As a 400-level course in economics, this course may be used to meet requirements for the major and for the minor in economics. It requires ECON 302 or ECON 304 (intermediate microeconomic theory and intermediate macroeconomic theory, respectively) as a prerequisite. And the course may be used toward completing a module (area of concentration) in economics in the area of International, Development, and Transition Economics.

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 473** (IL) China in the Global Economy: History, Culture, and Society (3) Analysis of China's role in the global economy and the impact on U.S. as well as global business and society.

**China in the Global Economy: History, Culture, and Society (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 475** Migration and Development (3) Human Capital Approach to Migration; Economics of Family Migration; Evidence: Micro and Macro Perspectives; Migration Policies.

**Migration and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 475W** Migration and Development (3) Human Capital Approach to Migration; Economics of Family Migration; Evidence: Micro and Macro Perspectives; Migration Policies.

**ECON 475W Migration and Development (3)**

This course introduces students to migration in the developing world. What factors influence such migration, and how does migration affect economic development? The course provides a theoretical framework for examining migration (a human capital approach), and takes into consideration aspects specific to migration in the developing world, family considerations, and different types of migration. Immigration and remittances are also considered. The course examines empirical evidence on migration, and considers public policies that seek to influence migration and development.

The course objectives are to provide students with a theoretical framework for examining human mobility and economic development, to examine evidence on migration using that theoretical framework, and to consider policies aimed at influencing migration and development in light of the theoretical framework and the empirical evidence. The integration of these three activities will develop student's skills in economic analysis and the writing aspect of the course will enhance their writing skills.

This course is one of a series of writing-intensive seminars in seven broad areas of economics. This seminar is in the area of economic development, with relevance as well to labor economics. This course may be used to meet major or minor requirements.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 476** The Economics of Fertility in the Developing World (3) Demand for children, supply of children, and costs of fertility regulation; fertility transition; public policies to affect fertility.

**The Economics of Fertility in the Developing World (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 476W** The Economics of Fertility in the Developing World (3) Demand for children, supply of children, and costs of fertility regulation; fertility transition; public policies to affect fertility.

**ECON 476W The Economics of Fertility in the Developing World (3)**

Population growth provides more hands on work, and more mouths to feed. Consequently, it has important implications for numerous aspects of a nation's economic development (and vice versa). And population growth, in turn, largely reflects fertility behavior. This course will introduce students to an economic approach to fertility behavior, emphasizing the demand for children, the supply of children, and the costs of fertility regulation. This economic framework for fertility analysis will then be used to examine fertility transitions, past and present, with particular emphasis on the current and prospective status of fertility transition in the developing world. The course will also consider public policies that seek to influence fertility behavior.

Students will learn about the economic approach to fertility behavior and they will apply that approach to consideration of fertility and fertility transition in developing countries. This writing-intensive course will enhance their writing and their data analysis skills.

This course is in the broad area (field) of development economics. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 477 Labor Markets in Developing Countries (3)** Labor demand and supply in developing countries; urban and rural labor markets, modern and informal sectors; policy issues.

**ECON 477 Labor Markets in Developing Countries (3)**

In the course of economic development, labor markets emerge and evolve. While some elements of standard labor market analysis, such as the emphasis on demand for labor and supply of labor, remain most relevant here, there are also institutional aspects that are specific to developing countries. This course will examine labor markets in rural areas and in urban areas, and the factors influencing these markets in both settings. Traditional labor market variables (labor force participation, employment and unemployment, earnings) will be examined for several case studies, and policy issues will also be considered.

The proposed course is an advanced seminar in the broad area of development economics. The course objectives are to enable students to learn about labor markets in developing countries, how they are different from as well as similar to those in industrialized countries, and the problems and policy issues that pertain to these labor markets. Students will develop their analytical skills in this area, and their writing skills in economics. This course is one of a series of advanced seminars in seven fields of economics. This course is in the broad area (field) of development economics, and has a prerequisite of ECON 471. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 478 Incomplete Markets (3)** Rural land markets, fragmented credit markets, risk and insurance, human capital and labor markets, innovation and technology spillovers, coordination failures.

**ECON 478 Incomplete Markets (3)**

An important part of the process of economic development consists of the emergence of highly developed, well-functioning markets. Developing economies, then, are often characterized by incomplete markets. This course studies such markets. With respect to the agricultural economy, incomplete markets are evident for land, credit, and insurance. Other areas covered by the course include human capital and labor markets, innovation and technology spillovers, and coordination failures.

The objective of this course is to provide students with the opportunity to learn about the incomplete markets that are often found in developing nations. Students will develop their skills in analyzing markets in developing countries, and in writing in economics.

This course is a specialized seminar in the broader area of economic development, and hence has ECON 471 as a prerequisite. It is one of a series of advanced seminars in seven major areas of economics. The course will count toward both the major and the minor in economics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 479** Economics of Matching (3) Economic application of matching to employment, marriage, organ markets, and medical residents.

### **Economics of Matching (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 479W** Economics of Matching (3) Economic application of matching to employment, marriage, organ markets, and medical residents.

### **ECON 479W Economics of Matching (3)**

There are many resource allocations that are not unilateral decisions but instead require approval from two sides of the market. Examples include employment and marriage. This course provides the theoretical constructs for the analysis of matching in market environments. Two applications of current interest - human organ allocations and medical resident employment - are given special attention.

Following a review of game theory, the course develops the theory of matching. This is followed by economic applications, in the areas of employment, marriage, human organs, and medical residents.

This course is an applied economics course with relevance to the areas of microeconomics, macroeconomics, and labor economics. The course objectives is for students to learn the analytical methods for understanding the economics of matching. Students will develop skills in applying matching models and analysis to practical situations.

The course is one of a series of 400-level writing-intensive seminars in each of seven broad fields in economics; this is a course with relevance to microeconomics, macroeconomics, and labor economics. The course will count toward both the major and minor in economics.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 480** Mathematical Economics (3) Mathematical techniques employed in economic analysis; formal development of economic relationships.

### **Mathematical Economics (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 481** Business Forecasting Techniques (3) A survey of contemporary business forecasting techniques, with emphasis on smoothing, decomposition, and regression techniques.

### **Business Forecasting Techniques (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 483** Economic Forecasting (3) Forecasting time series, using linear regression models and econometric software; useful forecasting models; financial and seasonal time series; trends.

**ECON 483 Economic Forecasting (3)**

This course is an applied econometrics course, and will seek to provide students with hands-on experience in forecasting. The goal of this course is to teach the students how to forecast time series, using econometric software, and what kinds of models are useful for that purpose. Topics to be covered include a review of regression analysis, with applications to forecasting; introduction to an econometric software package; introduction to time series regression analysis, with applications; the Box-Jenkins approach to time series modeling and forecasting; modeling and forecasting seasonal time series; deterministic and random trends, and how to distinguish them; and modeling and forecasting volatility of financial time series. The course will count toward both the major and the minor in economics. This course is one of a series of 400-level seminars in each of seven broad areas of economics; this is a seminar in econometrics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 485 Econometric Techniques (3)** Applying statistical techniques to test and explain economic relationships; integration of economic theory with observed economic phenomena.

**Econometric Techniques (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 489M Honors Thesis (1-6)** No description.

**Honors Thesis (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 490 Introduction to Econometrics (3)** Use of simple and multiple regression models in measuring and testing economic relationships. Problems including multicollinearity, heteroskedasticity, and serial correlation.

**ECON 490 Introduction to Econometrics (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is designed for a wide range of students, including those interested in a variety of fields in business (e.g. finance and management studies) and economics, to those in the sciences and engineering who are interested in learning about data analysis and regression techniques. The course is also a good starting point for learning about empirical economics, and may thus be useful for those intending to pursue graduate studies in economics and business. Economics 490 is designed to reach a large audience, and the ultimate goal of the course is to show students that the "application of statistics to the study of economics" is not only fun, but also indispensable for a well rounded economics education. Put another way, the primary focus of the course is on applied or empirical economics. Learning about empirical methods in this course entails extensive computer work which focuses on the analysis of economic data using currently available software packages (some completely mouse driven), such as SAS, EASYREG, GAUSS, STATA, and EVIEWS. Computer analysis ranges from constructing and interpreting plots of economic data, to forming, fitting, and interpreting regression models. In addition to the computational component of the course, students are familiarized with numerous tools used in applied work, such as mean and variance, hypothesis testing (using statistics with t-,F-, and Chi-Squared distributions), regression model building, regression model estimation, and coefficient analysis. All of the tools learned throughout the course are used in the computational exercises. Completion of this course is useful particularly for students pursuing careers in business, economics, government, banking, insurance, finance, management, consulting, and academics, for example.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 496A** Readings in Economics (1-6) Readings and discussion of five books on economics with short writing assignment.

**Readings in Economics (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 496B** Economic Value of Athletic Departments to Division Universities (1-6) Addresses the economic value of athletic departments to division one universities.

**Economic Value of Athletic Departments to Division Universities (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 499** (IL) Foreign Study--Economics (2-6) Study in selected countries of economic institutions and current economic problems.

**Foreign Study--Economics (2-6)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 500** Introduction to Mathematical Economics (3) Mathematical Economics: Applications of Mathematical Techniques to Economics.

**Introduction to Mathematical Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 501** Econometrics (3) Econometrics: Applications of Statistical Techniques to Economics

**Econometrics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 502** Microeconomic Analysis (3) Economic behavior under pure and imperfect competition; price and output determination in product markets; prices and employment in factor markets.

**Microeconomic Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 503** Macroeconomic Analysis (3) National income accounts; determination of income, employment, interest rates, and the price level; stabilization policy.

**Macroeconomic Analysis (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 507** International Trade (3-6) Theory of international trade and investment; effect of commercial policy on trade and income distribution; multinational corporations and international trade.

### **International Trade (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 510** Econometrics I (3) General linear model, multicollinearity, specification error, autocorrelation, heteroskedasticity, restricted least squares, functional form, dummy variables, limited dependent variables.

### **Econometrics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 511** Econometrics II (3) Stochastic regressors, distributed lag models, pooling cross-section and time-series data, simultaneous equation models.

### **Econometrics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 512A** Empirical Methods in Economics I (1) The course will provide a foundation for students in the computational methods used to numerically solve and simulate economic models and program econometric estimators.

### **Empirical Methods in Economics I (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 512B** Empirical Methods in Economics II (2) The course will provide continued exposure to the computational methods used to numerically solve and simulate economic models and program econometric estimators.

### **Empirical Methods in Economics II (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 515** Labor Economics I (3) Labor supply and income maintenance; human capital, job search and training; labor demand, minimum wage, and discrimination.

### **Labor Economics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 516** Labor Economics II (3) Earnings differentials, unemployment, and related policy. Institutional aspects of labor economics, including dual labor markets, collective bargaining, and unionism.

**Labor Economics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 517** Open Economy Macroeconomics and International Finance (3-6) The balance of payments, portfolio allocation, monetary and fiscal policy in an open economy, exchange rate regimes, selected policy issues.

**Open Economy Macroeconomics and International Finance (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 521** Advanced Microeconomic Theory (3-6) Theory of consumer behavior; theory of the firm; price determination in product and factor markets; introduction to welfare economics.

**Advanced Microeconomic Theory (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 522** Advanced Macroeconomic Theory (3-6) Measurement of income; theories of consumption, investment, and money holdings; static determination of income and employment; introduction to dynamic analysis.

**Advanced Macroeconomic Theory (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 529** Public Finance (3-6) Effects of taxes, expenditures, debt on allocation, employment, distribution; cost-benefit analysis; collective decision mechanisms; fiscal federalism; current fiscal policy problems.

**Public Finance (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 534** Game Theory (3) Foundations of current research in game theory.

**ECON 534 Game Theory (3)**

This is an advanced graduate course in game theory and its applications to economics. The course content is mathematical in nature and emphasizes formal statements of key propositions and their proofs. It begins by presenting two alternative ways in which a game may be represented: the extensive (or tree) form and the strategic (or normal) form. The relationship between these two representations is studied and the key idea of a strategy is introduced. Pre-equilibrium notions of dominance, iterated dominance and rationalizability are studied. Nash's fundamental theorem on the existence of equilibrium in finite games is proved. Strategic form based refinements of Nash equilibrium, including perfect, proper and stable equilibria are considered. Extensive form based refinements, including subgame perfection and sequential equilibrium are also considered and compared. Harsanyi's conception of a game of incomplete information is introduced. Other subjects covered include repeated games and the folk theorem, bargaining, common knowledge. Additional topics of current interests may also be covered.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 543 Industrial Organization and Public Policy (3-6)** The structure of American industry; performance and behavior; public policies toward business.

**Industrial Organization and Public Policy (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1980

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 558 Development of Monetary Theory (3)** Classical and neoclassical quantity theories of money and contemporary criticism; Keynesian monetary theory and its critics.

**Development of Monetary Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 559 Current Monetary Theory and Policy (3)** Post-Keynesian reformulation of quantity and Keynesian theories of money; liquidity and general equilibrium approaches; current issues in theory and policy.

**Current Monetary Theory and Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 570 Development Economics (3-6)** Resources and institutions; quantitative measures; theories of economic growth in developing areas; developmental policies.

**Development Economics (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 589 Seminar in Econometric Theory (3)** Theories and methods relevant to the application of statistical methods to economics.

**Seminar in Econometric Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECON 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Economics-Behrend (ECNS)

**ECNS 596** INDIVIDUAL STUDIES (1-9) CREATIVE PROJECTS, INCLUDING NONTHESIS RESEARCH, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.

### INDIVIDUAL STUDIES (1-9)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ECNS 597** SPECIAL TOPICS (1-9) FORMAL COURSES GIVEN ON A TOPICAL OR SPECIAL INTEREST SUBJECT WHICH MAY BE OFFERED INFREQUENTLY; SEVERAL DIFFERENT TOPICS MAY BE TAUGHT IN ONE YEAR OR SEMESTER.

### SPECIAL TOPICS (1-9)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Educ Leadership Prog (EDLDR)

**EDLDR 405** (C I 405) Strategies in Classroom Management (3) Managing and coping with disruptive student behavior in instructional settings so that they support the teaching/learning process.

### EDLDR (C I) 405 Strategies in Classroom Management (3)

This course has been designed to engage students in in-depth examination of the process of creating and sustaining a classroom learning community that fosters and enables success for all children. Emphasis is placed on understanding a variety of theoretical models of classroom management as well as observing and studying individual children to develop a better understanding of their needs. The result should be the development of a coherent set of beliefs concerning the creation of classroom learning environments that support learners and meet their individual needs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 409** Leadership Studies in Popular Film (3) In-depth analysis of leadership dynamics revealed in popular film. Focus on cinematic depictions of theory and practical application of leadership.

### EDLDR 409 Leadership Studies in Popular Film (3)

Leadership Studies in Popular Film aims at enhancing students' understanding and application of leadership in three primary ways. First, using the films as case studies, students will critically analyze, evaluate, and discuss the moral, ethical, and administrative challenges, decisions, and behaviors portrayed in the films. Second, these challenges, decisions, and behaviors will serve to highlight and illustrate important leadership concepts and how they might be applied to authentic situations in schools and other organizational settings. Finally, the films will challenge and spark students' imagination and inspire them to consider new possibilities for practice and research.

During the course, students will view 10-12 classic popular films, each revealing a set of key leadership concepts and problems. Students are expected to rigorously participate in whole class and on-line discussions about the meanings expressed in the films. These discussions will be coupled with and enhanced by the instructor's presentation of relevant concepts of leadership and organizational theory. Students are also expected to maintain a continuing reflective log of each film's plots and characters, the practical and theoretical problems presented, and their own reactions to and ideas about each film. Using these logs as a starting point, students will be expected to write three short (3-4 pp.) essays and one more substantial final essay (10-12 pp.). Rather than simple plot narratives, it is expected that these essays will thoughtfully analyze and synthesize actions and concepts from the films, and attempt to apply them to school or other organizational settings. Students' grades will be based on the completeness of their logs, the analytic quality of their papers, and the frequency and quality of their contribution to on-line and in-class discussions.

The course is intended for graduate, undergraduate, and certification students. Indeed, the course has benefited in the past from having students with diverse backgrounds and levels of professional experience. The course effectively complements and reinforces other EDLDR courses, such as Introduction to Educational Leadership (EDLDR 480), The Principalship (EDLDR 568), Leadership in Today's Schools (EDLDR 597), and Schools as Organizations (EDLDR 580).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 476 The Teacher and the Law (3)** An introduction to education law as it affects the teacher.

**EDLDR 476 The Teacher and The Law (3)**

This course will provide an overview of major issues in law related to teachers. The course will focus primarily on case law including U.S. Supreme Court decisions as well as relevant state and federal lower court opinions. State legislation and administrative laws will also be considered. Topics to be covered include an introduction to education law as it affects teachers, including teachers' privacy rights, school safety, special education, sexual harassment, discrimination, student assessment, slander/libel, tenure and constitutional issues as related to education. The class will be a combination of lectures and discussions on particular legal topics related directly to the training of teachers and based on the text and selected handouts. From time to time, the class will break up into small groups to work on in-class dilemmas.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 480 Introduction to Educational Leadership (3)** Development of educational leadership. Relationships among local, state, and federal agencies. Introduction to current concepts and theories.

**EDLDR 480 Introduction to Educational Leadership (3)**

Through lectures, readings, case study, film, and discussion, this course examines basic topics in organizational theory, school administration, and educational policy. In addition, the course presents a historical perspective, suggesting how understandings about education have varied and changed throughout American history. The primary aim of the course is to help students begin to perceive, understand, and apply the important connections between educational theory, research, and practice in a critical and thoughtful fashion.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 485 Principal as Instructional Leader (3)** Knowledge and skills principals need to lead instructional design and implementation.

**EDLDR 485 Principal as Instructional Leader (3)**

The purpose of this course is to investigate the new conceptions of instructional leadership in schools, especially as these apply to the principal. With new emphases in K-12 education focusing on teaching and learning concerns, the role that the principal plays in instructional leadership is more critical than ever. This course examines the different areas of emphases and roles that are central to promoting effective instructional leadership in schools. This examination will include the development of educational administrative and leadership perspectives and the process of change and reform in educational organizations. The form and function of the instructional leadership will be explored by examining major theories on the nature of school leadership and linking these to the issues of school improvement and school change. An

integrated agenda of readings, lecture, class discussions, written assignments and case study work will explore and emphasize the relationship of theory to practice. The readings and activities are designed to integrate thoughtful reflective practices for problem framing and solving, provide a foundational knowledge of instructional leadership best practices, develop an increased awareness of individual values and beliefs, and promote the development of interpersonal and group dynamics skills.

Specifically, the objectives of the course are to assist students: (1) to acquire the ability to establish clear instructional goals for a school; (2) to understand and be aware of the most effective means for promoting and supporting educational change and reform; (3) to develop a school culture and climate conducive to and focused on teaching and learning concerns; (4) to understand how to develop and communicate effectively the vision and mission of the school; (5) to investigate how best to develop teacher leadership within schools; and (6) to become familiar with best practices in professional development.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 528** Educational Politics in the United States (3) Social and institutional forces which shape the public school system and determine national, state, and local educational policy and politics.

### **EDLDR 528 Educational Politics in the United States (3)**

"Educational Politics in the United States" focuses on the social and institutional forces that shape the public school system and determine national, state, and local educational policy and politics. The rationale underlying this course is that citizens and educators, particularly those in administrative roles, need to understand the social forces that influence educational policy and politics. Until the late 1960's there was a pervasive myth that school affairs could and should be separated from the world of politics. Few people now believe that schooling can be entirely separated from politics, but many people lack an understanding of the broad, recurrent forces and competing values that ensure that schooling in pluralistic societies will be affected by political factors. This course is intended to provide a sophisticated understanding of this subject, with emphasis on the acquisition of conceptual and analytical skills that will be useful for leaders in education. Student performance is assessed through group and individual activities and projects, students' contributions to class discussions, and exams.



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 530** Leadership for Inclusive Education (3) In-depth analysis and discussion of the school leaders's role in creating and sustaining an inclusive learning enviroment for all.

**Leadership for Inclusive Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 531** Leadership and Diversity (3) This course examines what it means to lead educational orgnaizations in an increasingly diverse society.

**EDLDR 531 Leadership and Diversity (3)**

This course examines what it means to lead educational organizations in an increasingly diverse society. Specifically, this course will focus on policy, theory and practice as they relate to school leadership and diversity. Students from culturally, linguistically, socially, and economically diverse backgrounds account for an increasing percentage of the school-age population in the United States. Unfortunately, many of these students are not successful in school. This presents a number of challenges for school leaders as they work to facilitate the teaching and learning process. This is a seminar type course aimed at facilitating discussion and exploration around issues related to education and diversity. Discussions and reflective inquiry will be facilitated by assigned readings and case studies as well as the personal experiences of both the instructor and the students in this course. This course will assist students in developing a better understanding of the knowledge and skills needed to effectively lead increasingly diverse educational organizations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 533** The Politics of Local School Districts (3) Theory and practice of the politics and governance of local school districts; issues and methods in studying political decision making.

**EDLDR 533 The Politics of Local School Districts (3)**

"The Politics of Local School Districts" focuses on the theory and practice of politics in local school districts, with attention to the study of political decision-making and influence. The rationale underlying the course is that citizens and educators need to understand the social and political factors affecting school-community relations and the factors affecting the Relihood school-community conflict. Although communities vary greatly, rural, urban, and suburban communities each tend to have some distinctive features that influence the character of school-cornmunity relations and politics. At the same time, communities in general vary in the extent to which they possess characteristics that promote or inhibit the incidence and intensity of community conflict. The governance of education in local communities is heavily influenced by such factors. Consequently, educational leaders need to be knowledgeable and perceptive in this area. This course is intended to provide the knowledge and analytical skills needed for effective leadership in local school districts. Student performance is assessed through group and individual activities and projects, students' contributions to class discussions, and exams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 535** Interagency Relations in Education (3) This course examines historical and contemporary relationships between schools and other service agencies interacting with the education of American youth.

**Interagency Relations in Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 536** Federal Role in Education (3) This course examines the Federal role in education, emphasizing relationships between the Federal government and states, tribes and schools.

**Federal Role in Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 540** Technology Applications in Educational Leadership (3) Development and use of information technology applications to analyze common problems faced by educational administrators.

**EDLDR 540 Technology Applications in Educational Leadership (3)**

EDLDR 540 teaches the development and use of electronic spreadsheet models to analyze common problems faced by educational administrators. The format of the course is a computer laboratory in which students work through a series of assignments designed to introduce them to the basics of spreadsheets and then to teach a broadening range of modeling and analytical skills using progressively more complex problems. Applications are stressed through the creation of models that emphasize the organization, analysis, and presentation of data concerning such topics as salary schedules, budget preparation and analysis, expenditure control, cost projections, and data development. In conjunction with model building, a variety of analytical techniques are used, such as graphing, frequency distributions, regression, what-if tables, pivot tables, and database applications.

The work in the course is individual and students move at their own pace through the assignments. New concepts and techniques are introduced and demonstrated periodically by the instructor and are then used by the students in succeeding assignments. The course accommodates widely differing ranges of abilities possessed by students taking the course. No prior computer experience is necessary. Satisfactory completion of all assignments is required for the passing R grade.

The course emphasizes the development of useful information for administrative decision-making. Students should finish the course with a new or renewed confidence in their ability to deal with a problem in which some quantitative analysis is necessary, to be able to organize the available data in a logical and helpful fashion, and to use an electronic spreadsheet to develop a serviceable model to aid in the analysis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 549** School District Improvement and Systemic Change (3) This course focuses on understanding and leading systemic district improvement efforts.

**School District Improvement and Systemic Change (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 551** (C & S 551) Curriculum Design: Theory and Practice (3) The analysis and use of the foundations which underlie models of curriculum design.

**EDLDR 551 Curriculum Design: Theory and Practice (3)**

This course looks at the analysis and use of foundations that underlie models of curriculum design. The investigation into such models is designed to be a critical review of previous and current design models that reflects the specific, preferential vantage point of teachers as leaders and significant participants in this form of curriculum work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 553 (C & S 553) Issues in Curriculum (3 per semester/maximum of 6)** In-depth study of issues and trends in the understanding and practice of curriculum.

**EDLDR 553 Issues in Curriculum (3 per semester/maximum of 6)**

This course provides for in-depth study of issues and trends in the understanding and practices of curriculum. Readings and class activities provide students with the opportunity to examine theoretical implications for the world of practice and life in schools.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 557 (C & S 557) Seminar in Curriculum Research (3)** Analysis of particular curriculum studies, methods and paradigms, and the general status of current research in the general curriculum field.

**EDLDR 557 Seminar in Curriculum Research (3)**

This course is a foundational course that supports the diverse inquiries undertaken by doctoral students within the Department of Curriculum & Instruction and throughout the broader university community. Readings and class activities provide students with the opportunity to learn about different research epistemologies and to explore taken-for-granted assumptions about educational research in general and research design and methodology in particular.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 559 School Improvement (3)** The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.

**EDLDR 559 School Improvement (3)**

The last 20 years have witnessed unparalleled efforts to improve schools and raise student achievement. These initiatives include but are not limited to: (1) new content standards for mathematics, science, English, and social studies (2) increased requirements for high school graduation, (3) reduced class sizes, especially in the early grades, (4) new high-stakes state testing and assessment programs, and (5) the performance-based accountability requirements set by No Child Left Behind. Yet, despite all this activity and attention, significant changes in student achievement and in basic school practices have been slow at best. While there has been some improvement, success has been largely scant and spotty.

The reasons for slow progress are many and complex. However, one that is receiving growing attention is the need for stronger school leaders (including teachers, principals, superintendents, and other educators) who can direct and implement changes in curriculum, instruction, and school organization. There is growing consensus in the research literature that school improvement and school leadership are largely inseparable - that leadership is a critical element in order for schools to improve. While focusing on leadership without attending to the many other conditions that affect school effectiveness is not productive, it is clear that leadership is an important ingredient in the mix of strategies for improving schools.

The course addresses three major questions: (1) What is school improvement? (2) What does it involve? (3) How do we do it? To accomplish this, the course first focuses on several general models developed for school improvement purposes. After this the focus shifts to an examination of the component pieces of school improvement, including leadership, professional development/professional learning communities, and a focus on teaching and learning (including standards, instruction, and assessments). All these are connected the larger discussion of what education leaders need to know and be able to do to strengthen instruction and raise student achievement. If leaders are to nurture better teaching and learning, they will need greater familiarity with promising instructional approaches, new curricular materials, and ways to adapt them to a particular school's circumstances.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 560** (C & S 560) Principles of Instructional Supervision (3) Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.

**EDLDR 560 Principles of Instructional Supervision (3)**

This course explores themes, trends, and key ideas that influence current supervisory practices. Course content gives specific attention to supervisory practice in relation to teaching practices and to life in schools.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 562** (C & S 562) Methods of Classroom Supervision and Coaching (3) Strategies and techniques for supervision/coaching of instruction intended to enhance teacher reflection, self-direction, and autonomy.

**EDLDR 562 Methods of Classroom Supervision and Coaching (3)**

This course has been designed to equip students with the knowledge, skills, and dispositions necessary to engage in a variety of supervisory processes aimed at teacher growth and renewal as well as enhanced student learning. The outcome of these supervisory activities should be the development of teachers who are more analytical about their practice and its impact on learners, are more adept at solving the complex problems of teaching practice, and are more reflective about their teaching capabilities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 563** (C & S 563) Designing Staff Development Programs (3) Designing, implementing, and evaluating effective staff development programs for personnel in educational settings.

**EDLDR 563 Designing Staff Development Programs (3)**

This course has been designed to provide students with the opportunity to develop a deep understanding of the process of professional development in education at the theoretical and practical levels as well as the ability to apply this understanding to the design, evaluation, and analysis of professional development activities and programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 565** Personnel Management and Contract Administration (3) Practice and theory of personnel supervision at the central office and building level, including contract administration and grievance handling.

**EDLDR 565 Personnel Management and Contract Administration (3)**

This course will provide an overview of major issues in the practice and theory of personnel management and contract administration. An approach focusing on legal requirements, ethical dimensions, and what constitutes "good" administrative practice will be used to assist students in better understanding pertinent concerns. Topics to be covered include recruitment, hiring, an professional development of faculty/staff, contract negotiations, teacher/staff rights under the 1st and 4th Amendments to the U.S. Constitution, and issues associated with equal educational opportunities for various groups including racial and linguistic minorities, individuals with disabilities, women, older employees, and gays/lesbians. The class will be a combination of lectures and discussions on particular topics related to personnel

management. From time to time, the class will break up into small groups to work on in-class dilemmas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 567** Organizational Supervision (3) Principles and practices of supervision in schools related to instructional and support personnel.

### **EDLDR 567 Organizational Supervision (3)**

"Organizational Supervision" focuses on principles and practices of supervision in schools related to instructional and support personnel. The rationale for this course is that organizational supervision is that aspect of administration that demands that the administrator focus on the instructional and non-instructional program as he/she facilitates the learning process. While the major topic in this course is the role of the administrator in the supervision of the organization, other considerations in this course are how to relate leadership, change, management, and evaluation to organizational supervision. Other topics include the nature of supervision and its place in the schools; the organizational environment for supervision; leadership behavior and supervisory effectiveness; a contingency approach to supervision; power, authority, and conflict in supervision; teacher motivation and supervisory effectiveness; and supervision and group effectiveness.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 568** The Principalship (3) Principles and practices of administration of elementary and secondary schools.

### **EDLDR 568 The Principalship (3)**

The course is intended to help students gain theoretical and practical insight into what it means to be an effective principal. EDLDR 568 is not a "how to" course; that is, it makes no effort to explicitly lay out rules, procedures, "best practices," or techniques associated with being a principal. Rather, the course calls on students to read, think, write about, and discuss:

What do we mean by management? By leadership? What's the difference?  
What social and political factors help shape the principal's organizational role and behavior?  
How can principals acquire and maintain power and authority? And what is the difference between these two concepts?  
How do different school social contexts influence principal effectiveness?  
What do we mean by school culture and climate? How do these relate to effectiveness?  
How do principals become "instructional leaders?" When should they?  
How should student performance be evaluated? Teacher performance?  
What legal issues do principals need to be aware of?

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 569** Decision Making in Educational Organizations (3) Decision making in organizational and environmental contexts; case studies of administrative problems; application of decision making models.

### **EDLDR 569 Decision Making in Educational Organizations (3)**

Decision making is one of the central processes in the leadership of educational organizations. The effective decision maker is one who can define a problem, establish criteria for its successful solution, identify and evaluate alternative problem solutions and their consequences, and choose an appropriate plan of action. The course utilizes a case study approach to examine and practice decision making in an educational context. Emphasis is placed on a systematic approach to making decisions, based on theory, research, and best practice knowledge. Various models of decision making are introduced and their usefulness and appropriateness in different types of situations are examined. Working in teams, students analyze increasingly complex cases and prepare both verbal and written presentations, which are tested in general class discussion. Through active learning experiences provided by the case method, students will study significant problems of practice while developing teamwork skills in collaborative work groups.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 573 Public School Finance (3)** Financing of public education, including values underlying system, revenue sources and taxation, school funding formulas, equity, and school finance reform.

**EDLDR 573 Public School Finance (3)**

This course analyzes the systems and mechanisms for financing public elementary and secondary schools in the United States. It provides both an overview of basic school finance concepts and issues and an examination of Pennsylvania's system of financing schools. Throughout the course there is a continuing effort to blend the theoretical foundations of school finance with their practical applications at state and local levels. Microcomputer models are used to explore the applications of concepts to policy and practice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 575 Ethics in Educational Leadership (3)** Course explores the moral and ethical dimensions of the work of educational leaders.

**EDLDR 575 Ethics in Educational Leadership (3)**

This course will: 1) examine traditional ethics as well as alternative forms of moral development (critical theory applied to justice and feminist ethics); 2) compare and contrast one's own code of ethics with that of a professional code of ethics; 3) explore approaches to moral and ethical reasoning and to use these approaches to work through ethical dilemmas related to the practice of educational administration; and 4) have students design and present authentic ethical dilemmas providing theoretical background, appropriate questions, solutions, and reflection.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 576 The Law and Education (3)** Legal bases for education; rights and responsibilities of school board members, administrators, teachers, students, and parents; due process.

**EDLDR 576 The Law and Education (3)**

This course will provide an overview of major issues in school law. The course will focus primarily on case law including U.S. Supreme Court decisions as well as relevant state and federal lower court opinions. State legislation and administrative laws will also be considered. Topics to be covered include church/state issues, teacher and student rights, and law associated with equal educational opportunities for various groups including racial and linguistic minorities, individuals with disabilities, and women. The class will be a combination of lectures and discussions on particular legal topics based on the text and selected handouts. From time to time, the class will break up into small groups to work on in-class school law dilemmas.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 577 Law and Ethics in Education (3)** Course focuses on legal and ethical dimensions issues for educational leaders and their impact on best interests of the students.

**EDLDR 577 Law and Ethics in Education**

The instructor will present various paradigms of ethical decision making: justice, care, critique, community, and the ethics

of the profession as well as historical and philosophical perspectives on the rights of students. Participants will then apply what they have learned to authentic legal cases involving issues such as students' free speech rights, corporal punishment, strip searching, assessment, and the right to an education. Analyses will consider questions such as: Even if an action is legal, is it ethical? and What is the "best interests of the student"?

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 578 Schools as Organizations (3)** Intraorganizational relationships; administration and the school in its organizational and environmental contexts.

### **EDLDR 578 Schools as Organizations (3)**

This course is planned to provide students with an orderly introduction into organizational theory and administrative leadership concepts. A primary objective behind the organization and design of this course is to firmly link theory to practice by addressing the question of what does organizational theory and research have to say that is generally important and useful to the educational practitioner/scholar. This objective is addressed through the belief that practitioners must be self-conscious about what they are doing so organizational action becomes enlightened action; that is, action that has to do with understanding and using multiple perspectives of reality. What are needed are purposeful attempts to construct or reconstitute knowledge so that events, situations and problems are confronted or engaged from multiple points of view. Decision-making and problem-solving activities thus become acts of deliberate, conscious thoughtfulness (reflective thinking, if you will) designed to reconstruct holistic knowledge in order to facilitate enlightened action.

Specifically, the objectives of the course are to assist students: (1) to acquire a foundational knowledge of organizational and administrative theory; (2) to use multiple organizational theories in understanding school organizations and leadership roles in these organizations; (3) to develop a framework or schema from which to reflectively think about and develop an understanding of school organizations and problems of practice; (4) to develop a concept of leadership within school organization; (5) to develop an understanding of organizational change processes and attending issues of school change; and (6) to become familiar with organizational perspectives on schools and schooling issues and problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 579 Financial Management for Schools (3)** Financial management concepts and techniques for educators: district and school level budgeting process, hands-on budget preparation workshop, and budget management.

### **EDLDR 579 Public School Business Administration (3)**

Public schools are funded almost exclusively from revenues received from local, state, and federal taxes-public funds-and school administrators are accountable for the proper usage and stewardship of these funds. This course examines the fiscal management concepts and techniques needed by educational leaders in order to plan, control, and evaluate their operations effectively. The primary means for managing the fiscal resources of the district is through the annual budget. Administrators and other educators use the budgeting process to plan educational programs for the upcoming year, to allocate the available funds among competing programs, and to control expenditures in order not to exceed allowable limits. The primary purpose of the course is to acquaint students with the central importance of budgeting in management of schools and districts and to show how mastery of budgeting will make them more effective educational leaders. Procedures for identifying the necessary budgetary activities, as well as constraints, are discussed to provide a management context for the process. Emphasis is placed on the critical, and often neglected, step of formulating expenditure and revenue estimates to teach students how budget numbers are created. Budget modification and analysis techniques are reviewed to provide skills for changing and explaining budget amounts. Monitoring procedures that prevent overexpenditure of budgeted funds are also discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 580 The Use of Theory in Educational Administration (3)** Critical analysis of current theories; problem finding and hypothesis formulation.

### **EDLDR 580 The Use of Theory in Educational Administration (3)**

This course provides an introduction to problem finding in educational leadership and the development of research problems and hypotheses for conducting systematic inquiries in educational leadership. The focus will first be on the major research paradigms-the structural-functionalist, phenomenological-symbolic interactionist, and critical-constructivist-and on a overview of the kinds of approaches, questions, and problems posed in each. The emphasis will be on developing an understanding and appreciation of the different as well as complementary aspects of each of these research paradigms and the appropriate uses of each for inquiry in support of improved understanding of and practice in education. An integrated agenda of readings, lecture, group discussions and presentations, and completion of a research project will explore and emphasize the relationship and interdependence of all elements of systematic research. Activities are designed to integrate conceptual knowledge and understanding with active and collaborative participation.

This course is designed to provide students with an orderly introduction to and apprenticeship in educational research. Specifically, the objectives of this course, inclusive of both semesters, are: (1) to become familiar with the major research paradigms pertinent to inquiry in educational leadership; (2) to understand the basic tenants, philosophical foundations, and epistemological beliefs of the major research paradigms; (3) to develop an understanding of the different elements involved in the educational research process; (4) to read as widely as possible in relevant literature; and, (5) to explore the research development process by identifying and developing a researchable problem statement and supporting conceptual framework

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 581** Field Research in Educational Leadership (3) Field study and qualitative methods in research on educational organizations.

### **EDLDR 581 Field Research in Educational Leadership (3)**

This course provides an introduction to the various research methodologies available for conducting inquiry in educational leadership across the three paradigms - structural-functionalist, phenomenological-symbolic interactionist, and critical-constructivist. Specifically, this course will focus on relationships between research questions, the theoretical/conceptual framework, and research methods but focus specifically on the methods for data collection and analysis. Part of the course will focus developing an understanding and appreciation of the different as well as complementary aspects of qualitative and quantitative research methods and the appropriate uses of each for inquiry in support of improved understanding of and practice in education. However, the majority of the course will center on the development of an understanding of the qualitative research skills needed to conduct field research. An integrated agenda of readings, lecture, group discussions and presentations, and completion of a research project will explore and emphasize the relationship and interdependence of all elements of systematic research. Activities are designed to integrate conceptual knowledge and understanding with active and collaborative participation.

This course is designed to provide students with an orderly introduction to and apprenticeship in educational research. Specifically, the objectives of this course are: (1) to become familiar with specific research designs and methods used in qualitative research; (2) to read as widely as possible in the relevant qualitative research literature; (3) to become familiar with appropriate field-based research skills for data collection; (4) to conduct field-based research investigating a specific problem related to educational practice; (5) to develop the skills necessary for qualitative data analysis; and, (6) to develop the skills needed for writing qualitative research.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 583** Current Administrative Practice (3) Practice oriented skills and experiences facilitating effective administration.

### **EDLDR 583 Current Administrative Practice (3)**

This course focuses on practice-oriented skills and experiences facilitating effective administration. The course is intended to help students achieve the following goals: To become familiar with the interstate School Leaders Licensure Consortium (ISLLC) model standards for school leaders; to apply these standards to case studies for principals; to develop problem solving skills through analysis and discussion; to become familiar with the reality of the demands of the principalship through interaction and discussion with current practicing administrators; to promote an understanding of the school code, applicable case law and state board regulations and to use that understanding for effective management and organization; to understand the scheduling process and apply that knowledge to scheduled development; to understand finance and the terms associated with it and apply that to budget management and development, activity funds, allocation of resources, building priorities and district and state procedures; to gain understanding of the principal role and responsibilities in curriculum implementation including special education and related services; to establish the role of the principal in staffing and utilizing human resources in administering the school; and to gain expertise in establishing a positive school climate that is characterized by clear communications and is responsive to various stakeholders.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 584** Evaluation in Educational Organizations (3) Naturalistic and empirical evaluation methods and procedures for educational organizations.

**EDLDR 584 Evaluation in Educational Organizations (3)**

"Evaluation in Educational Organizations" examines methods and procedures for conducting effective evaluations of educational programs. It reviews naturalistic and empirical evaluation methods and procedures for educational organizations. Government demands for educational accountability, and political and social requirements for educational improvement, have increased the need for scientific and systematic evaluation of the effectiveness and efficiency of educational programs. This course provides an introduction to both qualitative and quantitative methods of program evaluation, and examines the strengths and weaknesses of alternative models and approaches for program evaluation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 585** (EDTHP 585, HI ED 585) Research Design: Implications for Decisions in Higher Education (3) A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.

**EDLDR (EDTHP, HI ED) 585 Research Design: Implications for Decisions in Higher Education (3)**

By the end of this course you should be able to: (1) Define and explain the following concepts/tools of social science research: The scientific method-Theory and its role, Constructs and variables, Hypotheses and relations, Experimental designs, Quasi-experimental designs and Ex post facto designs. Sampling theory and designs-Survey designs and methods, Approaches to data collection, Measurement reliability and validity, Quantitative analytical designs, and Ethical practices. (2) Apply these concepts/tools in designing a study relating to educational research. (3) Effectively critique both the theoretical bases and methods of a journal article or report of research or policy analysis. (4) Prepare a sound research proposal.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 586** (EDTHP 586, HI ED 586) Qualitative Methods in Educational Research (3) Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques.

**EDLDR (EDTHP, HI ED) 586 Qualitative Methods in Educational Research (3)**

This course is the introductory course in the EPS qualitative research methods sequence. This is the first course in a three-course sequence departmental sequence intended to take students from basic knowledge of qualitative methods through mastery of advanced topics. This course was designed specifically to 1) orient students to the various types of qualitative methods most widely used in educational policy research and their theoretical underpinnings; 2) provide training in basic qualitative research techniques; 3) introduce students to basic research design; 4) provide systematic practice (and feedback) in evaluating qualitative research that would allow students to become sophisticated consumers of qualitative studies; 5) prepare students for the Level 11 course. The course will begin with a brief review the development of qualitative methods in related fields (anthropology, sociology, linguistics) and quickly move on to an overview of qualitative methods in education. Students must have read the material prior to class in order to take part in in-class exercises and discussions. We will focus on key issues such as validity, interpretation and representation. Students will be asked to read studies, assess the general quality of the work, and provide a critical evaluation. Students will study specific methods of qualitative field research, and most weeks we will practice and discuss a particular research technique (e.g. participant observation, focus group interviews). These practice sessions will be informed by relevant readings. Students will practice developing coding schemas as well as get a quick overview of qualitative data analysis (QDA) packages. Finally, in small groups, students will design a basic qualitative study to be presented as a final product in the course.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 587** (EDTHP 587, HI ED 587) Education Policy and Politics (3) The political economy and bureaucratic politics of educational organizations, with special attention to the policy making, implementation, and evaluation processes.

### **Education Policy and Politics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 588** (EDTHP 588, HI ED 588) Qualitative Methods in Educational Research II (3) Advanced study of methods involved in executing and analyzing qualitative research in education.

### **EDLDR (EDTHP, HI ED) 588 Qualitative Methods in Educational Research II (3)**

The course will provide practical experience with methods of qualitative data collection, data management, and preliminary data analysis that extends and deepens students' understanding of qualitative research in education. The class, limited to 15 students, will take as the focus with inquiry a common "site" around which projects of individual and group interest will be designed. Sessions will take place in "workshop" blocks during which students will present and critique the work of the project. Readings will be interspersed with the practicing of methods. The final project for the course will be the compilation of a synthesized data set that could serve as the basis of further analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 589** Mixed Methods in Educational and Social Scientific Research (3) This course considers the epistemological and paradigmatic implications of mixed methods research within educational and other social scientific research contexts.

### **Mixed Methods in Educational and Social Scientific Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 594** Seminar in School Law (3) Research in substantive issues in school law.

### **EDLDR 594 Seminar in School Law (3)**

The purpose of this seminar is to provide an extensive exploration of one problem in educational law. This requires a command of legal research sources. The seminar is mostly dependent upon the participants' work and sharing of ideas. The major outcomes of this course are to be able to use sources of the law selectively in writing a scholarly paper on the law and education; write a paper on a topic in educational law which is publishable in a refereed journal; make a verbal presentation on a topic on educational law which includes a rationale, a position, and examples for or defense of the positions; and critique the verbal and written presentations on law of others in the seminar.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 595** Internship (1-15) Guided experience in a school or other educational organization in which the student is not regularly employed, under supervision of a graduate faculty member.

#### **Internship (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 595A** Principal Internship (3) Required field experience for students in order to receive their principal certificate from the PA Dept. of Education.

#### **Principal Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 595B** Superintendent Internship (3) Required field experience for students seeking their letter of eligibility certificate from the PA Dept. of Education.

#### **Superintendent Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 596** Individual Studies (1-9) Creative projects including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597A** Pro-seminar in Educational Leadership (3) Introduce new EDLDR graduate students to the field of educational research and graduate studies at Penn State; to offer some preliminary discussions about the disciplinary and methodological traditions within educational research.

**Pro-seminar in Educational Leadership (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597A** Pro-seminar in Educational Leadership (3) Introduce new EDLDR graduate students to the field of educational research and graduate studies at Penn State; to offer some preliminary discussions about the disciplinary and methodological traditions within educational research.

**Pro-seminar in Educational Leadership (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597B** Letter of Eligibility Seminar (3) This course will focus on the position of superintendent of schools as chief executive officer for the board of school directors and the educational leader of the school district.

**Letter of Eligibility Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597C** (EDTHP 597C, HI ED 597C) Foundations of Educational Research (3) This course is designed to begin a reading of the history and philosophies of education research.

**Foundations of Educational Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597E** (EDTHP 597E, HI ED 597E) Reviewing and Editing for Educational Policy Journals (3) This course introduces advanced doctoral students to the major journals in Education Policy and provides a systematic introduction to reviewing and editing policy journals in the field of education.

**Reviewing and Editing for Educational Policy Journals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 597F** (HI ED 597F, EDTHP 597F) Race, Law and Education: Six U.S. Supreme Court Cases (3) This class is designed to introduce students to the legal standards used to examine "race-conscious" policies intended to address racial/ethnic inequities in K-12 and higher education. We will consider the justifications educators have presented to support these policies, which justifications have been convincing to the Court, and how these justifications intersect across K-12 and higher education. We will also focus on how social science research has informed the legal developments in these cases. Over the course, we will cover six landmark U.S. Supreme Court cases on race and education, including *Brown v. Board of Education* (1954), the Court's most recent decision on K-12 voluntary desegregation policies, *Parents Involved in*

Community Schools v. Seattle School District No 1 (2007), and the Court's forthcoming opinion on affirmative action in higher education, Fisher v. University of Texas (2013).

**Race, Law and Education: Six U.S. Supreme Court Cases (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 801** Introduction to Teacher Leadership (3) This course focuses on understanding teacher leadership and its function with the school system.

**EDLDR 801 Introduction to Teacher Leadership (3)**

EDLDR 801 Introduction to Teacher Leadership provides an orderly introduction to new conceptions of teacher leadership in schools. The course focuses on three main areas that are foundational to building understandings of teacher leadership. The first of these areas focuses on who teacher leaders are, how they become teacher leaders, and what it is that teacher leaders do. Both formal and informal roles are discussed along with professional and personal qualities that appear to distinguish teacher leaders. Finally, a clear distinction is made between formal administrative leadership, i.e., building principals and their duties, and the role of teacher leaders. The second area uses a systems perspective to focus on the organizational supports and capacities that are necessary for teacher leadership to grow and flourish. At the district level, the focus is on the development of supportive policies and appropriate programs. At the school level, the focus is on developing a culture of continuous learning/continuous improvement in support of teacher leadership. The third area examines not only how one develops teacher leadership but also what is necessary to sustain and nourish it in

schools. The focus is on building relationships, distributing power and authority, and aligning professional learning. These three areas culminate in the development of a practice-based conceptual model of teacher leadership.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 802 How Schools Work (3)** Course focuses on understanding schools as learning organizations and how teacher leadership works in such organizations.

### **EDLDR 802 How Schools Work (3)**

The continuing development of the capacities of schools to become learning organizations is a key aspect of creating capable, competent student learners and effective teachers. A learning organization challenges assumptions, authors and reflects upon essential questions, explores innovative approaches, and through collaborative leadership structures applies these learnings to improve instructional and environmental practices for students and teachers.

The objective of this course is to examine four critical areas contributing to the understanding of how schools do work and, most importantly, how they can work, as learning organizations. Effective educational leaders must (1) understand the nature of schools as learning organizations; (2) the significant impact of global social, economic, and demographic changes on schooling; (3) the challenges, opportunities, and constraints of implementing systemic change initiatives; and, (4) the complexities of leadership in such multifaceted organizations as schools.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDLDR 894A Capstone Inquiry Project (3)** Completion and public presentation of an inquiry project reflecting an understanding of the five leadership strands.

### **EDLDR 894A Capstone Inquiry Project (3)**

EDLDR 894A is the culminating course for the on-line M.Ed. in Educational Leadership with an Option in Teacher Leadership. The course is designed around the presentation of a independent inquiry project that reflects the student's developing understanding of the five leadership strands upon which the program is based. While a good deal of latitude is provided to students in designing their project (usually in conjunction with the First Tier course, CI 501 Teacher Inquiry), course faculty and academic advisors also support and guide the student in project development and continuing work across the program. In addition, several general principles guide and shape the specific project work which continues over the course of the M.Ed. program. In addition to the inquiry project being focused on a problem of practice taken from the student's professional work, the final inquiry project should also give evidence of the following elements: (1) a focus on improvement of schooling practices and/or student learning; (2) the use of current research and instances of exemplary practices; (3) incorporation of authentic learning experiences anchored in practice; (4) the use of an inquiry-based model of learning and reflection; and (5) collaborative work either among on-line program participants or with participants outside the program.

A portfolio of evidence pertaining to (1) individuals' reflections on teacher leadership, (2) other forms of documentation of instances of opportunities for teacher leadership, and (3) the development of the individual inquiry project will be maintained across the student's progression through the program and can be incorporated into the presentation of the inquiry project or into the synthesis and reflection paper.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Education (EDUC)**

**EDUC 400 Diversity and Cultural Awareness Practices in the K-12 Classroom (3)** This course addresses diversity, cultural awareness and sensitivity about cultures, concepts and methods in society, communities and educational settings.

**EDUC 400 Diversity and Cultural Awareness Practices in the K-12 Classroom (3)**

This course is an examination of diverse cultures, stereotypes, concepts and issues that impact the way individuals interact with one another in society. In relation to EDUC 315, it takes students to the next level as they experience cultural attributes from a media perspective, as well as being immersed into diverse settings throughout the course. It is designed for students to develop sensitivity and awareness of cultural influences in America and the public school systems. An emphasis is placed on sociopolitical aspects of the United States and other world cultures, sources of cross-cultural conflict, and approaches to cross-cultural conflict resolution as they relate to P-12 settings, their communities and the communities in which they teach.

Cultural awareness is concrete and/or visible in society and is necessary for promoting sensitivity and respect of cultural beliefs and values amongst teachers, administrators and students. Course participants will be required to demonstrate knowledge of with regard to developing sensitivity and awareness of cultural influences on behavior as these relate to the community, society and schooling processes. Course participants will be required to analyze methods of teaching Multicultural Education and its various camps including: Culturally Responsive Pedagogy, Critical Multiculturalism, and Anti-Racist Pedagogy.

The creative tension between dominant and subordinate voices will lead to both visual and written responses. The major goal of the course is to help students identify their diversity in American society and to develop their own creative voices, while drawing on issues of race, ethnicity, gender, geographical location, sexual identity, age, ability, social class, social status and other cultural attributes that make individuals uniquely diverse.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 401 Early Childhood Education (3) Organization, methodology, and materials for nursery school and kindergarten programs.**

**Early Childhood Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 402 Language Development, Self-Expression, and Literature in Early Childhood Education (3) Examining the development of language and self-expression in young children, and the role of children's literature in facilitating development.**

**Language Development, Self-Expression, and Literature in Early Childhood Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 403 Curriculum for Early Childhood (3) Examining early childhood programs and methodology, focusing on areas of social studies, mathematics, and science.**

**Curriculum for Early Childhood (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 404 Young Children's Behavior: Observation and Evaluation (3) Observation, recording and evaluation of student behaviors, and the use of prescription techniques for early childhood students with special needs.**

**Young Children's Behavior: Observation and Evaluation (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 408** Administration of Early Childhood Education Programs (3) The role of the early childhood administrator as it relates to regulations, staffing, management, funding and curriculum.

### **Administration of Early Childhood Education Programs (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1981  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 410** The Child and Social Institutions (3) The effects of the family on a child's development, especially in the infancy and preschool years.

### **The Child and Social Institutions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 412** Early Literacy Intervention I (3) Participants will better understand factors affecting early reading behavior through diagnostic techniques, observation techniques, and literacy intervention strategies.

### **Early Literacy Intervention I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 415** Teaching Secondary Social Studies (3) Study of the objectives, content, methods, and evaluation of procedures of social studies. Students design units and lesson plans.

### **Teaching Secondary Social Studies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 416** Teaching Secondary English and the Humanities (3) Study of the objectives, content, and methods of English and humanities courses.

### **Teaching Secondary English and the Humanities (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 417** Teaching Secondary Mathematics (3) Study of the objectives, content, methods, and evaluation procedures of mathematics.

### **Teaching Secondary Mathematics (3)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 418** Positive Classroom Climate for Positive Attitudes About Learning (3) Participants will learn strategies for creating classroom climates which encourage positive attitudes toward learning while preventing and correcting student misbehavior.

### **Positive Classroom Climate for Positive Attitudes About Learning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 421** Children's Literature (3) Knowledge of literature appropriate for elementary school children and utilization of literature-related activities in teaching reading.

### **Children's Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 422** Literature for Children and Adolescents (3) Literature for children and adolescents, approaches for using such literature in the school curriculum.

### **EDUC 422 Literature for Children and Adolescents (3)**

This course, which is required for students enrolled in the Reading Specialist Program and those who wish to complete the language arts option in the Teaching and Curriculum Program, is designed to assist Pre-K through grade 12 educators who are interested in incorporating children's and/or adolescent literature into the curriculum. The course will focus on an in-depth exploration of selecting, evaluating, and using a wide range of contemporary (published in the last ten years) literature for children and young adults. This course will provide participants the opportunity to explore reader response theory and its relationship to classroom teaching practices, in particular to reading and literacy instruction. The study and application of principles and techniques of integrating literature circles, discussion strategies and literature extension projects will be addressed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 425** Literacy Assessment (3) This course emphasizes alternative literacy measures focusing on portfolio assessment and performance assessments.

### **Literacy Assessment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 432** Children's Literature in Teaching Writing (3) Introduction to introduces methods for transferring writing skills and literary devices from literature to student writing in all subject areas.

### **Children's Literature in Teaching Writing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 435** Addressing the Needs of Special Learners (1) An examination of attitudes toward, barriers experienced by, and special needs of special learners in the schools.

#### **Addressing the Needs of Special Learners (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 436** Inclusion Practices in Education (3) The educational, social, and political foundations for inclusion practices in public education.

#### **Inclusion Practices in Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 440** Educational Statistics and Measurements (3) Descriptive statistics, correlation, reliability, validity, scaling techniques, and introduction to item analysis.

#### **Educational Statistics and Measurements (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 450** Current Topics in Education (1-15) No description.

#### **Current Topics in Education (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 452** Teaching Writing (3) Techniques for teaching the writing process, kindergarten through grade 12, including writing in content areas; workshop format.

#### **Teaching Writing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 458** Behavior Management Strategies for Inclusive Classrooms (3) Provides knowledge and skills essential for designing positive learning environments in secondary classrooms with the inclusion of exceptional learners.

**EDUC 458 Behavior Management Strategies for Inclusive Classrooms (3)**

Well-organized and effectively managed classrooms provide task-focused instructional environments where students are actively engaged in learning. The inclusion of exceptional learners in the general education classroom has brought the need for a unique set of knowledge and skills to promote student task engagement and prosocial behavior. Topics to be addressed include: characteristics and specific (or unique) needs of exceptional learners and their effect on student learning; components of effective classroom organization and management; principles of applied behavior analysis and research-based behavior management strategies appropriate for use with exceptional learners in the secondary classroom. This course will be a required course for all Secondary English, Math, and Social Studies students seeking initial certification. Course delivery methods will include lectures, reflections, online discussions, projects, class presentations, library research, and other relevant media

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 459 Strategies for Effective Teaching in Inclusive Classrooms (3)** Course examines effective strategies for accommodating and adapting instruction for exceptional learners in secondary classrooms.

**EDUC 459 Strategies for Effective Teaching in Inclusive Classrooms (3)**

This course will examine strategies for teaching exceptional students in inclusive secondary classrooms. The course will focus on academic assessment; instructional planning, development and implementation; and strategies for making the curriculum more accessible, flexible and supportive for diverse learners. Topics to be addressed include the following: multidisciplinary evaluation and programming for exceptional learners; designing instruction based on assessment data; progress monitoring; technology for teaching and learning as a way to promote access to curriculum; designing appropriate and legally acceptable accommodations and/or modifications to promote access to the standards-based curriculum for students with exceptional learning needs; research-based instructional strategies to facilitate literacy development and instruction across academic content areas and collaborative structures to support exceptional learners in general education classrooms. This course will be required for all Secondary English, Math, and Social Studies Education students seeking initial certification and will be offered during the 8th semester (student teaching) to optimize performance of students during their student teaching experience. Course delivery methods will include lectures, reflections, online discussions, projects, class presentations, case studies, and other relevant forms of media.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 460 Field Study in Ecology (4)** Study and analysis of the ecology of various regions of the world. May be repeated for credit.

**Field Study in Ecology (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 462 Computers for Classroom Teachers (3)** An introduction: microcomputers and their educational applications.

**Computers for Classroom Teachers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 463 The Internet and K-12 Education (3)** Relates educational theory and practice to applications of the Internet, applying content from educational foundations, curriculum, and research.

**EDUC 463 The Internet and K-12 Education (3)**

This course focuses on the Internet as a valuable resource for K-12 education. Designed for teachers, curriculum supervisors, and building administrators, this course relates educational theory and practice to applications of the Internet in classrooms and schools. Class participants apply resources available through the Internet to content from the fields of educational foundations, learning theories, curriculum development, educational assessment and evaluation, and educational research. Students maintain a documentation of weekly assignments that form the basis for the final project: the development of a technology-based teaching portfolio. Students also complete a mid-term project that entails the design of an online learning activity for students. This activity requires the student to apply principles of learning theory to web-based resources identified and evaluated to support an identified classroom learning objective or set of objectives. The final project consists of a technology-based teaching portfolio, demonstrating application of the key concepts covered in the course. The portfolio should contain a professional resume; journal entries discussing educational experiences and philosophies related to technology; selected teaching lessons, activities, projects, or assessments; and samples of student work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 464 Technology and the Learning Process (3)** Evaluates the relationship between technology-based resources and learning theories through design, implementation, and evaluation of online instructional modules.

**EDUC 464 Technology and the Learning Process (3)**

Designed for teachers, curriculum supervisors, and building administrators, this course examines and evaluates the relationship between technology-based resources and learning theories. Students explore learning theories in terms of how technology may or may not support implementation of those theories in the classroom. Students also examine problem-based learning approaches and how they can be combined with technology, resulting in what has been defined by Dr. Bernie Dodge as a "WebQuest" for classroom use. In the WebQuest development process, students identify a real life problem for their students to solve. They correlate that problem to their academic standards and district curriculum. They then design, implement, and evaluate instructional modules with integrated technology resources designed to lead to a solution of the identified problem, while promoting student acquisition of higher order thinking skills. Through this experience, students must plan for their students' learning tasks and activities, resource needs, performance evaluation and rubrics. As a culminating experience, students design an action research project related to the implementation of their learning module in the classroom setting.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 465 Serving Culturally and Linguistically Diverse (CLD) Learners (3)** The course provides teachers with knowledge, understandings, and skills to engage culturally and linguistically diverse (CLD) students in mainstream classrooms.

**EDUC 465 Serving Culturally and Linguistically Diverse (CLD) Learners (3)**

This course is designed to encourage understandings and appreciation for linguistic and cultural diversity, and to enhance the knowledge and skills of teachers working with culturally and linguistically diverse learners, their families, and their communities. The six areas of emphasis within EDUC 465 are as follows: a) the legal, historical, and cultural implications of ESL, which explores the legal and historical bases of ESL and analyzes the differences among home and school cultures, especially as they relate to language; b) multicultural education, which focuses on helping teachers acquire knowledge, develop cultural sensitivity, and identify educational strategies that address the needs of multilingual and multicultural learners and their families; c) a brief overview of first and second language acquisition theories; d) developmentally appropriate teaching strategies for culturally and linguistically diverse learners specifically related to their speaking, listening, reading, and writing skill development; e) Pennsylvania and TESOL standards and the Pennsylvania ELL assessment systems; and f) the integration of language components across the curriculum. This course aims to provide theoretical understandings of culturally responsive teaching and pedagogical strategies for CLD learners.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 466** Foundations of Teaching English as a Second Language (3) Overview of various legal, historical, and socio-cultural implications of teaching and learning English as a Second Language.

**EDUC 466 Foundations of Teaching English as a Second Language (3)**

EDUC 466 is the first course in a four-course sequence designed to meet the Pennsylvania Department of Education's (PDE) requirements for the ESL Program Specialist endorsement. EDUC 466 addresses the legal, historical, and socio-cultural issues related to non-native speakers of English, and the implications for ESL curriculum, instruction, and assessment within the K-12 school setting. The course is designed: (1) to encourage understanding and appreciation for language diversity and culture, and (2) to enhance the knowledge and skills of teachers working with culturally and linguistically diverse learners, their families, and their communities. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire in order to be endorsed as an ESL Program Specialist: PDE Competency IV-Developing cultural awareness/sensitivity. The four areas of emphasis within EDUC 466 are:

- a) *The legal, historical, and cultural implications of English as a Second Language*, which explores the legal and historical bases of ESL and analyzes the differences among home and school cultures, especially as they relate to language;
- b) *Fundamentals of developing English language skills*, which provides an introduction to the structure of the English language, grammar, and pronunciation, including lexical, morphological, syntactical, and phonological components;
- c) *An overview of second language acquisition*, which introduces the topics of linguistic skill development, and first and second language acquisition; and
- d) *Multicultural education*, which focuses on helping teachers acquire knowledge, develop cultural sensitivity, and identify educational strategies that address the needs of multilingual and multicultural learners and their families.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 467** English Language Structure for English as a Second Language Teachers (3) An in-depth study and review of general linguistic concepts and their application to ESL pedagogy.

**EDUC 467 English Language Structure for ESL Teachers (3)**

EDUC 467 is the second course in a four-course, 12-credit sequence designed to meet the Pennsylvania Department of Education's (PDE) requirements for an ESL Program Specialist Certificate. The 12-credit sequence which has previously been approved by PDE has been offered as "Special Topics" courses. The 12-credit sequence is consistent with other approved ESL certificate programs. EDUC 467 introduces students to general linguistic concepts and their application to ESL pedagogy and practice. The course provides an intensive study and review of major linguistic concepts and issues, including but not limited to: phonetics, phonology, morphology, syntax, semantics, pragmatics and discourse analysis, sociolinguistics and dialectology, historical linguistics and world languages, and writing systems. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire to meet the minimum requirements as an ESL Program Specialist: PDE Competency I-English usage and developing linguistic awareness; and PDE Competency III-English language learners [ELLS] language and language services knowledge. The three areas of emphasis within EDUC 467 are:

- a) *Language and communication*, which explores the use of dictionaries, English use and usage, social conventions and English usage, American English variations, meaning and significance.
- b) *Grammar, pronunciation, literacy development for second language learners*, which focuses on the significance of these areas for ESL learners; and
- c) *Evaluative classroom instruments to measure student progress in grammar, pronunciation and English language structure*, which highlights the incorporation of linguistic tools in the assessment of ESL learners' language skills and needs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 468** Language Acquisition for English as a Second Language Teachers (3) Study of the theory, research, and processes involved in first and second language development, acquisition, and assessment.

**EDUC 468 Language Acquisition for ESL Teachers (3)**

EDUC 468 is the third course in a four-course sequence designed to meet the Pennsylvania Department of Education's (PDE) requirements for an ESL Program Specialist Certificate. The 12-credit sequence has previously been approved by PDE. The 12-credit sequence is consistent with what other PDE-approved ESL certificate programs offer. This course builds upon EDUC 466, Foundations of Teaching English as a Second Language, and EDUC 467, English Language Structure for

Teachers, with an emphasis on the processes involved in second language acquisition. EDUC 468 explores first and second language learning, socio-cultural contexts and learner variables, and the issues related to cognition and developmental psycholinguistics. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire to meet the minimum requirements as an ESL Program Specialist: PDE Competency I-English usage and developing linguistic awareness; and PDE Competency III-English language learners [ELLS] language and language services knowledge. The four areas of emphasis within EDUC 468 are:

- a) *Learning a first language*, which provides an in-depth study of the process involved in the acquisition and development of first language interrelations between psycholinguistics and cognition, as well as understanding of the processes involved in the acquisition and development of language in human species.
- b) *Learning a second language*, which explores the interrelationships between psycholinguistics and cognition, and first and second language acquisition, as well as identifying issues related to developmental psycholinguistics?
- c) *Differences in how children, adolescents and adults learn language*, major contributions of leaders in the field of the psychology of language learning.
- d) *Evaluative classroom instruments to measure student progress in listening, speaking, reading and writing*, which identifies linguistic tools that can be used to assess the language skills and needs of ESL learners.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 469** Teaching Methods and Assessment of English as a Second Language (3) Integration of theory, research, and practice about ESL curriculum, instructional methods, assessment, and literacy development.

### **EDUC 469 Teaching Methods and Assessment of English as a Second Language (3)**

EDUC 469 is the fourth and final course in a four-course sequence designed to meet the Pennsylvania Department of Education's (PDE) requirements for an ESL Program Specialist Certificate. The 12-credit sequence has previously been approved by PDE. The 12-credit sequence is consistent with what other PDE-approved ESL certificate programs offer. The emphasis in EDUC 469 is to learn and integrate curricular, instructional, and assessment theories and practices into the K-12 classroom setting to promote language and literacy development. The course specifically addresses three of the PDE competencies necessary for a teacher to acquire to meet the minimum requirements as an ESL Program Specialist: PDE Competency I-English usage and developing linguistic awareness; PDE Competency II-English as a Second Language-instructional materials/development; and PDE Competency III-English language learners [ELLS] language and language services knowledge. The three areas of emphasis within EDUC 469 are:

- a. *English as a Second Language methods and collaboration with academic content areas*, which focuses on: the preparation for ESL teaching by exploring trends, major theories, methodologies, and assessment in second language learning; the study of second language teaching approaches applicable to elementary and secondary students; materials development and evaluation; and the development of a broad base of knowledge and skills that will enhance teacher effectiveness in meeting the needs of diverse learners through appropriate instructional, curricular, and behavioral strategies;
- b. *Assessment and evaluation of English Language Learners (ELLs)*, which explores: the use of multiple measures of assessment to evaluate academic achievement; the development and implementation of authentic assessment tools; and various approaches and challenges to classroom assessment; and
- c. *Literacy development*, which focuses on elementary and secondary ESL students by exploring ways in which to enhance English language learning in elementary students and to enrich content-area instruction for secondary ESL students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 470W** Higher-Order Thinking for Educators (3) Presentation of strategies, techniques, and principles of higher-order thinking which are grounded in relevant research and practice will be presented.

### **EDUC 470W Higher Order Thinking for Educators (3)**

This required course for elementary education majors focuses on three primary objectives. The first objective is to develop students' metacognitive, critical thinking, creative thinking, decision making, problem solving and reflection skills. A second objective is for students to become aware of ways to increase the higher order thinking of children in the elementary classroom. The third objective is to improve the students' ability to write critical thinking/reflection papers on educational problems and issues. This course serves as one of the foundation courses for the Elementary Education Program as one of the goals of the program is to develop reflective practitioners. Students are evaluated on the quality of eight writing samples, the quality and quantity of their contributions during whole class discussions, and the quality of their performance during cooperative group activities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 471 Best Practices in Literacy (3)** An application of best literacy practices to classroom instruction and assessment of reading, writing, listening, and speaking.

### **EDUC 471 Best Practices in Literacy (3)**

This course is offered to support the Masters of Education degree in Teaching and Curriculum at Penn State Harrisburg by providing an application of research in best language arts. It is a required course in the Reading Specialist Certification Program. The course acquaints students with an instructional and assessment framework that has been embraced by the educational community on a nationwide basis. Objectives for the course include the following: (1) Students will demonstrate an understanding of the theoretical underpinnings of the established best practices in literacy. (2) Students will demonstrate the ability to implement effective literacy practices. (3) Students will be able to assess and evaluate student performance according to established best practices. Evaluation methods will include: (1) attendance and participation in class discussion and exercises (10%); (2) a 5-7 page paper dealing with the use of children's books to teach reading and writing (25%); (3) a 5-7 page paper on the most current methods of assessing students' reading, writing, speaking, and listening skills (25%); and (4) the creation of an integrated Thematic Unit for instruction (40%).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 472 Teaching Reading Through the Content Areas (3)** Designed to enable teachers of content areas to improve the reading/study skills needed by their students.

### **Teaching Reading Through the Content Areas (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 475 ESL Leadership, Research and Advocacy (3)** Teachers will develop their skills as instructional leaders and researchers by conducting school-based action research projects.

### **EDUC 475 ESL Leadership, Research and Advocacy (3)**

EDUC 475, the capstone course in the ESL Specialist and Leadership Certificate program (now the online SCOPE program), is a hybrid course involving online readings and discussions and field-based action research in PreK-12 educational settings with English Language Learners. ESL faculty will provide mentoring/coaching in the field. This course is designed to familiarize ESL candidates with the processes for developing, implementing, and evaluating action research projects. The ESL candidates will explore best practices in ESL pedagogy through implementation of various models of action research. The four areas of emphasis within EDUC 475 are as follows: a) the principles of ethical and methodologically sound action research related to ELLs; b) culturally and linguistically inclusive best practices supported by ESL research; c) collaborative partnerships between school and community to advocate for ELLs and their families; and d) ESL research, evaluation, and assessment for dissemination of research findings, professional development, and continuous quality improvement within ESL programs. ESL faculty will coach and mentor ESL candidates in the field while they conduct action research. By the conclusion of this course, ESL candidates will have gathered, analyzed, and summarized their data into a research paper for potential publication, as well as developed either: a) a workshop training presentation for their school or district; or b) a draft of a conference proposal for a national, regional, or state conference.

By conducting action research projects and subsequently disseminating the results of their research through professional development presentations and potential publications, candidates are expected to become instructional leaders in the ESL field.

This course is the final capstone 3-credit ESL course for the ESL Specialist and Leadership Certificate program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**EDUC 477 Teaching Struggling Readers and Writers (3)** A comprehensive overview of learning problems and effective strategies for teaching K-12 students who have difficulties reading and writing.

**EDUC 477 Teaching Struggling Readers and Writers (3)**

EDUC 477 is a required course in the M. Ed. in Literacy Education Program. The primary goals of the course are to increase the participants' understanding of special learning problems and to provide participants with teaching techniques for helping struggling K-12 readers and writers. Emphasis is placed on improving these students' reading, writing, listening, and speaking skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 478 Secondary Transition for Students with Disabilities (3)** Process and procedures for successful transition of secondary students with disabilities.

**Secondary Transition for Students with Disabilities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 484 School Law for Teachers (3)** This course will focus on increasing teacher awareness of law and how it impacts on daily performance and job security.

**School Law for Teachers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 490 Student Teaching (1-12)** Observation and teaching in selected elementary or secondary schools under direction of cooperating classroom teachers and University supervisors. Regular seminars. GPA 3.0 or higher. Passing scores on required Praxis I tests.

**EDUC 490 Student Teaching (1-12)**

This course fulfills one of the certification requirements established by the Commonwealth of Pennsylvania. Students are assigned for a period of twelve weeks to teach in either an elementary or secondary school. Students have the option of selecting either the primary or intermediate level in elementary education, or the middle or high school level in secondary education. Cooperating classroom teachers provide the day-to-day direction, evaluation and mentoring, and an assigned university supervisor makes weekly visits and observations. Students are phased into the full responsibilities of a classroom teacher, with the ultimate goal being, the assumption of all duties and responsibilities for a period of several weeks. Students plan, implement, evaluate and reflect on a variety of instructional activities throughout their experience. In addition to planning and implementing instruction, students assume responsibilities for classroom management, assessing student progress, communicating with all stakeholders, and participating in professional and co-curricular activities. Student teacher evaluations are based on clearly defined expectations and criteria. The assessment criteria are linked to Commonwealth and national standards.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.



**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 495** Internship (1-15) Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.

**Internship (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 495A** Junior Field Experience (1) Second semester juniors assigned to a suburban elementary school for the purpose of actively participating in classroom activities.

**EDUC 495A Junior Field Experience (1)**

This course is designed to provide Elementary Education majors with an intensive field experience that acquaints the student with the "real" world of elementary education in a suburban setting. The experience will be under the direction of a certified elementary teacher in a suburban Harrisburg setting. Students will have an opportunity to actively work at the primary (K-3) and/or the intermediate (4-5) level, and will be directed to accomplish specific field tasks assigned by their course instructors. These tasks are directly related to each course in which the student is enrolled. Students are assigned a university supervisor who observes and consults with the students throughout the experience. Specific activities will vary depending on the grade level and the school district's curriculum. Students are evaluated by both the cooperating teacher and the university supervisor, and the evaluations are based on classroom observations. This course is offered each semester and is required of all students enrolled in the Elementary Education program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 495B** Senior Field Experience (1) First semester seniors assigned to an urban elementary school for the purpose of actively participating in classroom activities.

**EDUC 495B Senior Field Experience (1)**

This course is designed to provide Elementary Education majors with an intensive field experience that acquaints the student with the "real" world of elementary education in an urban setting. The experience will be under the direction of a certified elementary teacher in the Harrisburg or Steelton-Highspire School Districts. Students will have an opportunity to actively work at the primary (K-3) and/or the intermediate (4-6) level, and will be directed to accomplish specific field tasks assigned by their course instructors. These tasks are directly related to each course in which the student is enrolled. Students are assigned a university supervisor who observes and consults with the students throughout the experience. Specific activities will vary depending on the grade level and the school district's curriculum. Students are evaluated by both the cooperating teacher and the university supervisor, and the evaluations are based on classroom observations. This course is offered each semester and is required of all students enrolled in the Elementary Education program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 495C** Early Childhood Field Experience (1) First semester seniors assigned to an urban elementary school for the purpose of actively participating in an early childhood classroom.

#### **EDUC 495C Early Childhood Field Experience (1)**

This course is designed to provide Early Childhood Education majors with an intensive field experience that acquaints the student with the, "real" world of early childhood education in an urban setting. The experience will be under the direction of a certified elementary teacher in an urban Harrisburg setting. Students will have an opportunity to actively work at the primary (K-3) level and will be directed to accomplish specific field tasks assigned by their course instructor. These tasks are directly related to early childhood courses in which the student was previously enrolled. Students are assigned a university supervisor who observes and consults with the students throughout the experience. Students are evaluated by both the cooperating teacher and the university supervisor. The evaluations are based on classroom observations and the completion of learning activities correlated with the required text. This course is offered each semester and is required of all students enrolled in the Early Childhood Education program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497A** American History for the Classroom (3) An examination of the history of American history education and instructional strategies to engage K-12 students today.

#### **American History for the Classroom (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497A** American History for the Classroom (3) An examination of the history of American history education and instructional strategies to engage K-12 students today.

#### **American History for the Classroom (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497B** Teacher Action Research (2) Action Research Implementation focuses on developing an action plan to determine the impact of students' practices on student performance; it includes guided practice, peer review and individual meetings with the instructor.

**Teacher Action Research (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497B** Teacher Action Research (2) Action Research Implementation focuses on developing an action plan to determine the impact of students' practices on student performance; it includes guided practice, peer review and individual meetings with the instructor.

**Teacher Action Research (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497C** Special Topics in Education with Embedded Study Abroad to Brazil (1-3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics in Education with Embedded Study Abroad to Brazil (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497D** The Essential Role of Writing in Contemporary K-12 Classrooms (3) This course requires student engagement, reflection, analysis, and application of concepts to maximize effective teaching in writing, assessment, and collaboration.

**The Essential Role of Writing in Contemporary K-12 Classrooms (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497E** International Field Experience: Germany (0.5-3.0) This course is intended to: develop student perceptions on education, provide pre-service teachers with opportunities to participate in culturally diverse classrooms, and engage in political dialogue regarding education in Germany.

**International Field Experience: Germany (0.5-3.0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 497F** Using a Writer's Notebook to Empower Writers (3) Introduces the effective use of a writer's notebook as a valuable tool for students to use prior to drafting. The course will explore the endless possibilities of using a writer's notebook to strengthen and broaden both student writing and classroom instruction.

**Using a Writer's Notebook to Empower Writers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 499** (IL) Foreign Studies (1-12) Study of educational topics in a country other than the United States.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 500** Professional Learning Communities (3) Defines elements of effective learning communities and explores educators' roles as consumers and creators of research, theory, and best practices.

**EDUC 500 Professional Learning Communities (3)**

This course is intended to help teachers' understanding of and skills in assuming leadership roles and responsibilities in the learning community. Elements of effective learning communities are defined and educators' roles are explored. Teachers will analyze the learning community as consumers and creators of research, theory, and best practices. Particular attention will be paid to the relationship among teacher leadership, school effectiveness, and site-based accountability.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 501** History of American Education (3) An examination of the rise and transformation of American public schools from pre-colonial America to the present.

**History of American Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 503** Cultural and Ethnic Groups Education (3) Approaches to teaching in an environment of differing cultures and

ethnic groups.

### **Cultural and Ethnic Groups Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 505 Curriculum Foundations (3)** Provides a comprehensive overview of the philosophical, historical, psychological, and social foundations that affect the school curriculum.

### **EDUC 505 Curriculum Foundations (3)**

This course provides a comprehensive overview of the philosophical, historical, psychological, and social foundations that affect the school curriculum. The course calls attention to the global and multicultural perspective in education. It involves the study of the implications and applications of these curricular foundations in the form of issues and theoretical trends that shape the field of curriculum. Participation in the course activities allows candidates to identify and analyze their personal values, beliefs, and perspectives, as well as theories and research which shape their own professional practice as educators within diverse educational settings with children.

By the end of the course, participants will be able to 1) develop and demonstrate understanding of how major foundations (disciplines) shape the curriculum of schooling, including philosophy, history, politics/policy, social psychology, and cultural studies; 2) consider and critique selected educational issues, both past and present, examining how they are anchored in and influenced by the foundations of curriculum; 3) investigate how social, economic, cultural, and political/policy debates and representations in the public sphere help to shape the foundations of curriculum; 4) engage in critical inquiry regarding the future roles of teachers, students, and other stakeholders in the learning community and society at large, and exercise the faculty of imagination as a means of thinking "outside the box" for educational purposes; 5) continue to develop professional scholarly attitudes, skills, and dispositions, including critical analysis and constructive use of questioning; scholarly use of research; dedication to continuous learning; positive group interaction and participatory collaboration; and reflective envisioning and enacting of curricular reform; 6) examine issues of race/ethnicity, linguistic variation, social class, gender, and sexual orientation and their relationships to the curriculum and schooling; and 7) continue to develop a professional scholarly writing style with a practical focus sharpened by theoretical awareness, using the APA Writing Manual as a style guide.

The key assessment in the course is a critical analysis paper in which participants apply aspects of curriculum theory to their personal philosophies of education and how both impact practical applications in the schools. Other assessments include midterm or final examinations, quizzes, class presentations, online activities, discussion forums (Message Board), collaborative class activities, research papers, journal reflections, cultural learning process activities, application papers, or class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 506 Curriculum Development and Instructional Design (3)** Examination of theory, issues, problems, organization, and application of instructional design in planning and developing a curriculum.

### **EDUC 506 Curriculum Development and Instructional Design (3)**

This course is an examination of theory, issues, problems, organization, and application of instructional design for teachers in planning and developing a curriculum. The course also presents examples of effective strategies including concept-based curricula, backward design, interdisciplinary approaches, integrated curricula (curriculum mapping), assessment, and reporting techniques.

At the conclusion of the course, participants will be able to 1) describe scientific and non-scientific approaches to curriculum development, design, and implementation; 2) define the universal elements of curriculum development and implementation cycle, including knowing the learner, identifying aims and objectives, selecting content, organizing learning experiences and evaluating; 3) discuss the history, philosophy, and scope and sequence of various models of curriculum; 4) describe the contributions of numerous educators to the development of curriculum, including Tyler, Taba, Eisner, Doll, Cornbleth, and McDonald; 5) analyze the complexity of curricular design, articulation, continuity and balance, and their relationships to materializing an educational vision and philosophy; 6) describe the importance of community resources and their relationship to the curriculum; 7) examine governments' roles (federal, state, and local) in curriculum, including Pennsylvania Chapter 4; 8) discuss approaches to and methodological issues involved in curriculum evaluation; and 9) examine the problems, prospects, and future trends and challenges of implementing innovative curricula and school reform.

The key assessment for the course is a curriculum development outline in which participants develop a curriculum for 15-16 weeks in their areas of interest and present the curriculum to the class. Other assessments include midterm or

final examinations, class presentations, online activities, group reports, research papers, journal reflections, application papers, or class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 508 Teaching Gifted Students in Heterogeneous Groups (3)** This course is designed to help regular classroom teachers to meet the needs of gifted students in a heterogeneous classroom.

### **Teaching Gifted Students in Heterogeneous Groups (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 520 Learning Theory for the Classroom (3)** An application of learning theories from psychological, sociological, and physiological disciplines to educational settings for children and adolescents.

### **EDUC 520 Learning Theory for the Classroom (3)**

This course is an application of learning theories from psychological, sociological, and physiological disciplines to educational settings for children and adolescents. At the conclusion of the course, participants will be able to 1) analyze the educational implications of cognitive, language, personal and social/emotional development; 2) describe and distinguish among major learning theories from biological, psychological, and sociological disciplines; 3) employ knowledge of learning theories to analyze learning strategies, strengths, and needs; 4) apply learning theories to optimize learning for all students, that complements their cultural background, race, gender, ethnicity, socioeconomic status or special needs; and 5) analyze through a theoretical lens the impact on student learning of current educational issues and trends. The key assessment of the course is a case study analysis of a student whose learning is not optimized, based on biological, behavioral, cognitive, and sociological learning theories. Other assessments include examinations, research papers, class presentations, classroom inquiry projects and/or performance assessments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 539 Educational Assessment (3)** This course will prepare students with the knowledge and skills necessary to monitor, assess, and report student achievement.

### **EDUC 539 Educational Assessment (3)**

This course will prepare students with the knowledge and skills necessary to monitor, assess, and report student achievement.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 560 Classroom Management (3)** Analysis of teaching styles, classroom behavior and interaction, organization and correlation of classroom activities and subject areas. (Requires practical application in an actual teaching situation.)

### **Classroom Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 561** Psychology of Reading (3) Examination of the theoretical bases for reading which have direct practical implication for teaching reading.

### **EDUC 561 Psychology of Reading (3)**

This is a required course in the reading specialist certification program. The primary goals for this course are to (1) examine the foundations that affect the fields of literacy and reading education, including philosophical, historical, psychological, and social foundations, and (2) to assist students in becoming more aware of race/ethnicity, linguistic variation, social class, gender, and sexual identity in relationship to literacy and schooling. Throughout the course, the graduate students will examine the complexity of literacy to become aware of how to situate one's own literacy practice and experience in multiple contexts. Students become reacquainted with mainstream theories and are introduced to those of critical theorists who challenge traditional perspectives that have often marginalized race, class, and linguistic variety in learning and in literacy development. At the conclusion of the course, students will be able to utilize traditional and critical theories in thinking about literacy/reading research, theory and practice. Assessments and evaluation of course requirements occur through instructor observations of demonstrations of mastery during a variety of discussion and presentation modes, observation and analysis of children's language use, reflective and reflexive analysis of one's own practice, and development of perspectives and a philosophy of literacy demonstrated through scholarly writing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 562** Diagnostic Evaluation of Reading Problems (3) Utilization of formal and informal instruments and techniques appropriate in analyzing reading disabilities, grade K through 12; includes practicum.

### **EDUC 562 Diagnostic Evaluation of Reading Problems (3)**

This course is required in the graduate Reading Specialist Certification Program. It is designed to develop students' understanding of (1) the factors related to reading disability; (2) assessment bias in relation to race/ethnicity, class, linguistic variety, and gender; (3) appropriate selection, use, and interpretation of formal and informal inventories; (4) basic measurement concepts, e.g., reliability, validity; (5) procedures for preparing and writing a diagnostic case study report in order to communicate effectively the findings of reading assessment data with all stakeholders. Emphasis is placed on developing analytical thinking abilities related to reading assessment as well as developing skill in professional writing. Methods of evaluation include written reviews of professional journal articles, the presentation of a formal assessment instrument to the class, and an in-depth written diagnostic case study report of a school-aged student having reading difficulties.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 563** Methods in Teaching Reading (3) Development of advanced diagnostic and instructional techniques for teaching reading, with emphasis on individual and small group instruction.

### **EDUC 563 Methods in Teaching Reading (3)**

This course is required in the graduate Reading Specialist Certification Program and is designed to familiarize graduate students with a wide range of traditional and current instructional strategies and resources for meeting the literacy/reading needs of students across the lifespan. Opportunities will be provided to re-examine connections between theory and assessment and to develop an awareness of how instruction in literacy/reading is informed by social and political forces. As they become familiar with the sub-texts and inter-texts of literacy and schooling, candidates also examine race as a foreground for literacy instructional practices. After successful completion of the course, students will be able to utilize all the language arts in planning and implementing instruction, coaching classroom teachers, and advising others about "best practices" in literacy/reading instruction. The requirements for the course allow candidates to gain additional experience administering standardized and informal assessment instruments; analyze assessment data and write a case study report; develop, present and critique lessons in reading and other language arts; reflect on their own instruction; and discuss "racialized" beliefs about student's abilities. Assessment and evaluation of course requirements occurs through instructor observation of demonstrations of mastery during roundtable discussion, peer-conferencing, and through completion of assignment-specific rubrics for lesson plans and the case study.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 564 Reading Clinic (6)** Culminating course for the M.Ed. degree in literacy education requiring demonstration of competency in working with children possessing reading problems.

### **EDUC 564 Reading Clinic (6)**

This is the capstone or final course in the graduate level Reading Specialist Program. All other required courses for the degree program and for certification as a reading specialist must be completed prior to enrollment in this course. The major goal of the course is to provide a supervised clinical setting where candidates may gain practical experience in assessing and evaluating literacy difficulties, implementing effective instruction, and reporting those findings to various stakeholders (e.g., students, parents, school personnel). More specific objectives include demonstration of the following: knowledge of the major components of reading and writing and how they are integrated; the use of a wide range of instructional methods, materials, and assessment tools; how to motivate learners to be life-long readers; the ability to collaborate effectively with colleagues, and the understanding of how to promote positive and effective literacy connections with the home. Candidates conduct interviews, administer formal and informal assessments, provide instruction to students with reading problems, participate in collaborative groups and roundtable discussions, maintain a reflective journal, communicate regularly with parents or guardians, and prepare an extensive case study of each student tutored.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 565 Literacy and Leadership (3)** Principles of supervision, organization, management, and evaluation of literacy programs will be presented.

### **EDUC 565 Literacy and Leadership (3)**

This course is required in the graduate Reading Specialist Certification Program and is designed to prepare graduate students to assume the role of literacy leader or literacy coach within a school or school district. This role includes the planning, implementation, management, and evaluation of the literacy/reading program. Objectives for the course allow candidates to connect theory to the development of effective literacy/reading programs and intervention frameworks, to understand the elements of literacy coaching as critical to teacher and staff development, and to understand the interrelated nature of literacy policy, curriculum, assessment, and instruction. Throughout the course, candidates develop dispositions that allow them to work collaboratively alongside classroom teachers, district officials, and other professionals as advisors and coaches developing curriculum, determining appropriate assessments, conducting professional development training, and evaluating program effectiveness. Course requirements include (1) analyzing journal articles and/or case studies articulating the theories related to the connections among professional dispositions, motivation and achievement; (2) providing assistance to a classroom teacher in creating a professional development plan; (3) working with colleagues to observe, evaluate, and provide feedback on each other's practice; (4) planning, implementing, and evaluating a professional development plan for an elementary or secondary building; (5) working with linguistically diverse learners, parents, paraprofessionals, and teachers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 571 Great Teachers (3)** Study of one or more great teachers, e.g., Socrates, Comenius, Locke, Rousseau, Pestalozzi, Herbart, Froebel, Dewey, Kilpatrick.

### **Great Teachers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**EDUC 572** Comparative Education: World Perspectives (3) An evaluative comparison of American education with Western and non-Western educational systems.

**Comparative Education: World Perspectives (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 582** (HLHED 582) Spirituality and Culture in Health and Education Professions (3) This course focuses on the cultural aspects of spirituality and its place in the health and education professions.

**EDUC (HLHED) 582 Spirituality and Culture in Health and Education Professions (3)**

This course will focus on the examination of the place of the cultural aspects of spirituality and its place in the education and health professions and its implications for culturally responsive education and/or health care in a multicultural society. In particular the goals of the course are as follows:

- 1) To clarify the difference between spirituality and religion and to understand how spirituality is currently being examined in the fields of adult education, medical education and the health professions.
- 2) To examine how culture informs spirituality generally, and more specifically, to examine how culture relates to one's own spiritual development and overall health in the world.
- 3) To develop a sense of how people construct knowledge through image and symbol, which for many people, maps to their spirituality and culture, as they make new and deeper meaning of their own lives.
- 4) To begin to consider WHEN and HOW one might appropriately draw on one's own spirituality and that of participants in adult and higher educational practices and health care settings to increase cultural understanding and/or responsiveness to patient needs and when such discussion might seem to impose a spiritual or religious agenda.
- 5) To examine the connections among spirituality, culture, some complementary and alternative medicine modalities and overall holistic health and education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 583** Problems in Teaching: Selected Subject Areas (3) An analysis of a teaching problem with review of research literature to seek solutions to that problem.

**Problems in Teaching: Selected Subject Areas (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 584** Analysis of Research: Selected Topics (3) A review and analysis of research in a specified area.

**Analysis of Research: Selected Topics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 586** Educational Research Designs (3) Focuses on methods of research in educational settings to help participants become informed consumers of the educational research literature.

**EDUC 586 Educational Research Designs (3)**

This course focuses on methods of research appropriate in educational settings to help participants become informed consumers of the educational research literature. Throughout the course participants will 1) identify an appropriate research problem and justify the importance for investigation; 2) identify and classify the types of variables used in research; 3) utilize electronic search and communication tools; 4) critically examine various research designs and their practical applications; 5) interpret analysis of data using statistical treatments; 6) describe strengths and weaknesses in research designs; 7) critique research studies; 8) describe PSU requirements for conducting research with human subjects; and 9) develop a writing style consistent with scientific/research work with emphasis on objectivity and utilizing appropriate APA style. The key assessment for the course is a critique of a published research article. Instructors will also include assessments such as: midterm or final examinations, quizzes, class presentations, online activities or discussions, research projects, research proposals, dialogue journals, research problem descriptions, article analyses, or class participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 587** Master's Project (3) The development of an original master's project (paper, essay, production, practicum) supervised and judged by an appropriate faculty committee.

### **Master's Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 589** Problems in Urban Education (3) Independent study of selected topics related to urban education.

### **Problems in Urban Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 591** Education Seminar (1-6) The capstone seminar course for the M.Ed. degree requiring an appropriate scholarly term paper.

### **EDUC 591 Education Seminar (6)**

This performance-based course is intended to serve as a culminating or capstone experience for students enrolled in the Master of Education degree program in Teaching and Curriculum. A constructivist seminar format, augmented by significant readings, will be used to facilitate in-depth discussions of important, timely, and controversial issues in education. Students will be asked to reflect upon all previous course work toward the degree as a foundation for analyzing the past, evaluating the present, and speculating about the likely future of the numerous issues that collectively constitute the education arena. Students will be expected to demonstrate their ability to analyze and synthesize material through the guiding of, and participation in, class discussions of the readings, through satisfactory completion of in-class assignments, and through the completion of a major scholarly paper and a corresponding class presentation that both focus on the same aspect of an educational theme.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDUC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Educational Psychology (EDPSY)**

**EDPSY 400** Introduction to Statistics in Educational Research (3) The foundations of statistical techniques used in educational research; distributions, central tendency, variability, correlation, regression, probability, sampling, hypothesis testing.

### **Introduction to Statistics in Educational Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 406** Applied Statistical Inference for the Behavioral Sciences (3) Common techniques (parametric) covered through two-factor analysis of variance (independent samples); hypothesis testing, confidence interval, power, robustness; MINITAB frequently used.

### **Applied Statistical Inference for the Behavioral Sciences (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 408 (SPLED 408)** Meeting Instructional Needs of English Language Learners with Special Needs (3) The course content and activities focus on instruction and assessment for English Language Learners with special needs.

### **EDPSY (SPLED) 408 Meeting Instructional Needs of English Language Learners with Special Needs (3)**

The purpose of this course is to bring together two bodies of research to prepare future teachers of learners with special needs who are also English language learners to be effective teachers. The course has been developed to fulfill requirements of Pennsylvania Department of Education and in recognition of the growing number of English Language Learners (ELL) in the general population and thus in special education settings. The course presents (1) theory and

research on the instructional needs of English Language Learners (ELLs) and (2) the knowledge base on effective instruction for students with special needs and assists students to integrate the two. Major topic areas include principles and issues in second language acquisition; ELL characteristics including linguistic and cultural factors that affect second language acquisition; techniques and methods of research-based instruction for English Language Learners with special needs; lesson planning and instructional modifications for ELLs with special needs; and appropriate assessment practices for ELLs with special needs. A major objective of this course is for students to be able to develop or modify instructional plans that reflect evidence based practices for adapting for the needs of ELL learners with special needs. Evaluation will be based on a combination of methods including, tests and quizzes, analyses of videos and case studies and reports of observations and interviews.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 421** Learning Processes in Relation to Educational Practices (3) An introduction to the empirical study of variables and conditions that influence school learning.

### **Learning Processes in Relation to Educational Practices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 450** (PSYCH 404) Principles of Measurement (3) Scale transformation, norms, standardization, validation procedures, estimation of reliability.

### **Principles of Measurement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 475** Introduction to Educational Research (3) Scientific method; classes of variables in educational research; the measurement of classroom behavior; survey, predictive, and experimental studies.

### **Introduction to Educational Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 505** Statistical Applications in Educational Research (3) Statistical techniques for education research including multiple regression, one-way, two-way, and repeated measures ANOVA. Use computer software for statistical analyses.

### **Statistical Applications in Educational Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 506** Advanced Techniques for Analyzing Educational Experiments (3) Analytical and experimental control considerations for designs involving nested and/or crossed subjects. Analysis of variance and multiple comparisons via computers.

### **Advanced Techniques for Analyzing Educational Experiments (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 507** Multivariate Procedures in Educational Research (3) Introduction to matrix algebra, computer programming, multiple regression analysis, multiple and canonical correlation, multiple discriminant analysis, classification procedures, factor analysis.

### **Multivariate Procedures in Educational Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 512** Group Processes in the Classroom (3) Basic concepts and perspectives in the study of group processes; instructional group interaction; analysis of classroom behavior.

### **Group Processes in the Classroom (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 513** Individual and Group Differences (3) Description, causes, and interpretation of individual variation over the life-span, with application to school and institutional practices.

**Individual and Group Differences (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 521** Learning and Cognition: Educational Applications (3) This course focuses on understanding human learning and thinking through examining learning theories and research related to educational psychology.

**Learning and Cognition: Educational Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 523** Concept Learning and Problem Solving (3-4) Theoretical-empirical trends in concept learning, problem solving, and creativity related to instructional psychology.

**EDPSY 523 Concept Learning and Problem Solving (3 to 4 per semester/maximum of 4)**

This course explores how people acquire knowledge of concepts and the nature of that knowledge. Students will also learn about major models of problem solving and issues related to how people solve problems. The two main topics of the course, concept learning and problem solving, are tied together by exploring how the knowledge that one has influences problem solving and how the experiences of problem solving influence the knowledge that is gained. Students are encouraged to apply the topics of this course to their own areas of study through activities such as selecting relevant research articles, development of a research proposal, and applying research findings to new areas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 523** Concept Learning and Problem Solving (3-4) Theoretical-empirical trends in concept learning, problem solving, and creativity related to instructional psychology.

**EDPSY 523 Concept Learning and Problem Solving (3 to 4 per semester/maximum of 4)**

This course explores how people acquire knowledge of concepts and the nature of that knowledge. Students will also learn about major models of problem solving and issues related to how people solve problems. The two main topics of the course, concept learning and problem solving, are tied together by exploring how the knowledge that one has influences problem solving and how the experiences of problem solving influence the knowledge that is gained. Students are encouraged to apply the topics of this course to their own areas of study through activities such as selecting relevant research articles, development of a research proposal, and applying research findings to new areas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 524** Theories of Learning and Instruction (3) Study of major classical theories of learning and recent developments in learning and instructional theory.

**EDPSY 524 Theories of Learning and Instruction (3)**

Exploration of major classical and current theories of learning from behaviorism to situated cognition through the reading of original works, extensive overview chapters, and contemporary empirical research. Course content and readings assume that students have prior knowledge or experience with learning theory.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 524 Theories of Learning and Instruction (3)** Study of major classical theories of learning and recent developments in learning and instructional theory.

### **EDPSY 524 Theories of Learning and Instruction (3)**

Exploration of major classical and current theories of learning from behaviorism to situated cognition through the reading of original works, extensive overview chapters, and contemporary empirical research. Course content and readings assume that students have prior knowledge or experience with learning theory.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 526 The Psychology of Reading (3)** Psychological principles underlying the process of reading and comprehending, with application to instruction.

### **EDPSY 526 The Psychology of Reading (3)**

This course explores the psychological processes of reading including topics such as phonological processing, vocabulary development, and comprehension. Students in this course will complete readings that help them to understand the research foundations for these psychological processes of reading and how these processes can be understood in relation to one another. Throughout the course, students will be encouraged to consider how each topic relates to broader considerations in the field of reading. For example, the class may explore how knowledge of psychological processes can be applied to address questions of beginning reading instruction, second language learning, and text design. A variety of class formats, such as small group discussions and topic presentations, may be used to support these explorations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 526 The Psychology of Reading (3)** Psychological principles underlying the process of reading and comprehending, with application to instruction.

### **EDPSY 526 The Psychology of Reading (3)**

This course explores the psychological processes of reading including topics such as phonological processing, vocabulary development, and comprehension. Students in this course will complete readings that help them to understand the research foundations for these psychological processes of reading and how these processes can be understood in relation to one another. Throughout the course, students will be encouraged to consider how each topic relates to broader considerations in the field of reading. For example, the class may explore how knowledge of psychological processes can be applied to address questions of beginning reading instruction, second language learning, and text design. A variety of class formats, such as small group discussions and topic presentations, may be used to support these explorations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 527 Psychology of Adults as Learners (3)** Psychological principles related to learning by adults, with application to instruction and other educational practices.

### **EDPSY 527 Psychology of Adults as Learners (3)**

This course is oriented to appeal to students who are or will be practitioners who work with teachers in in-service activities. Also, the course will be of interest to those who teach adults in extension service, community planning, adult education, clinical/counseling relationships, or in other activities where intervention is used or where it is desirable simply to know more about the learning capabilities and limitations of adults as learners. As such this course is an application of psychological principles to an area of practical concern to education. This course will provide a foundation for those students who desire to pursue research in the area of adult learning, who want to engage in a practitioner role, or who simply wish to understand this facet of the behavior of an adult.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 527 Psychology of Adults as Learners (3)** Psychological principles related to learning by adults, with application to instruction and other educational practices.

### **EDPSY 527 Psychology of Adults as Learners (3)**

This course is oriented to appeal to students who are or will be practitioners who work with teachers in in-service activities. Also, the course will be of interest to those who teach adults in extension service, community planning, adult education, clinical/counseling relationships, or in other activities where intervention is used or where it is desirable simply to know more about the learning capabilities and limitations of adults as learners. As such this course is an application of psychological principles to an area of practical concern to education. This course will provide a foundation for those students who desire to pursue research in the area of adult learning, who want to engage in a practitioner role, or who simply wish to understand this facet of the behavior of an adult.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 528 Instructional Psychology (3)** Application to instructional design of current developments in research on human development, information processing, learning strategies, memory structures, instructional processes.

### **EDPSY 528 Instructional Psychology (3)**

The objective of this course deals with psychological research on mental structures and on the relation of these to learning of basic skills and school subjects exhibiting increasing capability for investigating and implementing emerging principles that meet the complex demands of education and instructional practice. The content and requirements of this course will be shifting continually to keep up with these developments. This course relates various phases of instruction to correlated processes engaged by the learner. The readings will be from the journal literature and/or recent textbooks.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 528 Instructional Psychology (3)** Application to instructional design of current developments in research on human development, information processing, learning strategies, memory structures, instructional processes.

### **EDPSY 528 Instructional Psychology (3)**



The objective of this course deals with psychological research on mental structures and on the relation of these to learning of basic skills and school subjects exhibiting increasing capability for investigating and implementing emerging principles that meet the complex demands of education and instructional practice. The content and requirements of this course will be shifting continually to keep up with these developments. This course relates various phases of instruction to correlated processes engaged by the learner. The readings will be from the journal literature and/or recent textbooks.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 530** Achievement Motivation (3) Within a seminar format, this course addresses both theoretical and empirical approaches to motivation and other related affective constructs.

### **Achievement Motivation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 550** Design and Construction of Psychological Measures (3) Lecture-practicum involving planning, construction, administration, and analysis of a psychological test; lectures stress construct validity, item analysis, and predictive validity.

### **Design and Construction of Psychological Measures (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 554** Theories of Psychological Measurement (3) Basic true-score and error models; their extensions to test reliability and test validity; problems of item analysis and weighting.

### **Theories of Psychological Measurement (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 555** (CI ED 555) Validity of Assessment Results (3) Concepts, issues, and methods of validation of educational and psychological assessment including models and approaches to validation, bias, and utility.

### **EDPSY (CI ED) 555 Validity of Assessment Results (3)**

The goal of this course is to enable the student to acquire a broad perspective on issues and considerations in the process of validating interpretation and uses of tests, scales, assessment procedures, or protocols. Issues of validity are examined from many perspectives including a review of current dominant and alternative validity theories, of known threats to validity, of some advanced specialized statistical techniques; and of test bias, legal issues, psychological/behavioral issues, social/consequential considerations, and philosophical considerations. Additionally, applications are provided through in-depth cross-cultural and historical studies, technical reviews of published commercial tests, and in-depth examinations of controversies.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**EDPSY 556** Foundations and Applications of Item Response Theory (3) Unidimensional models for dichotomously scored and polytomously scored items and their applications in instrument/test development.

### **Foundations and Applications of Item Response Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 557** Hierarchical Linear Modeling in Educational Research (3) Statistical techniques for the analysis of multilevel data such as in nested designs or hierarchical data.

### **EDPSY 557 Hierarchical Linear Modeling in Education Research (3)**

Hierarchical Linear Modeling (HLM) models are particularly important when analyzing data for school settings. This course is designed as an applied statistics course specifically geared to analyzing data from educational settings and using data sets from educational research. Data collected in these ecological contexts with nested designs, such as students enrolled in classrooms, classrooms in schools, and schools within school districts, must be analyzed carefully as relations between and among variables could change given a particular level (e.g., student-level, classroom-level) for analysis. The topics of this course highlight the importance of studying random versus fixed effects for data collected in multilevel educational research settings. Two-level HLM models, growth-curve models, three-level HLM models, and Hierarchical Generalized Linear Models with binary and ordinal outcomes are the four primary types of models that will be the focus of the class. Students will also learn how to use HLM software to analyze their data given the four types of models. Other topics covered in this class will include: a) centering of independent variables; b) restricted maximum likelihood estimation; c) effect sizes and power analysis; and d) the relevance of educational theory and psychometric analysis in variable selection, and model specification.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 558** Foundations and Applications of Structural Equation Modeling (3) Model specification, identification, estimation, evaluation, and modification for measurement models, path models, and full structural models.

### **EDPSY 558 Foundations and Applications of Structural Equation Modeling (3)**

Structural Equation Modeling (SEM) is considered an advanced multivariate statistical tool. It subsumes general linear models such as ANOVA and regression and can model binary, ordinal, or count data like logistic and Poisson regression. SEM is multi-disciplinary and is most widely used in Social and Behavioral sciences. This course covers foundational issues in Structural Equation Modeling. Path analysis, confirmatory factor analysis, and full structural models will be discussed in terms of model specification, identification, estimation, evaluation, and modification. Students will learn how to specify models of theoretical interest, recognize identification problems, perform model estimation and modification using an SEM software of choice, and defend the final model selected. Examples of model fitting will be illustrated in class with the LISREL program. However, students are encouraged to explore other SEM programs that best suit their skills and research interests. A class project involving the application of the newly acquired techniques is required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 560** Contemporary Issues in the Evaluation of Educational Programs (3) Practical and theoretical issues in the planning, execution, and interpretation of program evaluations.

### **Contemporary Issues in the Evaluation of Educational Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 575** Seminar in Educational Psychology (1-6) A seminar dealing with specific topics in educational psychology. Open to advanced students in the behavioral sciences.

### **Seminar in Educational Psychology (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 576 (C & S 576)** Research Methods in Teacher Education (3) A basis in theory, findings from research, research design, and methodologies related to teacher education.

### **Research Methods in Teacher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 597A** Data Analysis Workshop (3) This course is designed for students with a desire to increase their conceptual understanding of basic statistics and their proficiency with analytical techniques. This course will be held in a computer lab and the primary statistical analysis package used will be SPSS.

### **Data Analysis Workshop (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of Educational Psychology classes under senior faculty supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDPSY 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Educational Technology (EDTEC)**

**EDTEC 400** Introduction to Instructional Technology for Educators (1-3) Use of microcomputers, video, and other media in education; models use technologies including video, audio, print, computer, and telephone.

**EDTEC 400 Introduction to Instructional Technology for Educators (1-3)**

This course introduces classroom teachers to the computer and its educational applications. It is an introductory level course and instruction is based on the premise that participants are novices. Participants first learn how to work in an online environment. They then work in that environment to develop the skills and perspectives needed for the effective application of microcomputers in education, which involves becoming familiar with a wide range of additional educational computing applications and issues.

Although it is important for students to develop technology skills, technology must be viewed as more than simply a new subject in the curriculum. Teaching students to use technologies well is a means to a much more important set of ends. Today's technologies offer teachers and their students a powerful means for addressing learning-related issues, and potentially redefining teaching and learning.

The potential of technology is most effectively realized when considered in combination with views about how individuals

think and learn. The goal of this course, then, is not for participants to become experts in "technology," but to become more experts in using technologies to promote teaching and learning.

Upon completion of this course participants will be able to: successfully operate available computer hardware and associated peripherals including (but not limited to) keyboards, mice, and printers; demonstrate competency in using information technologies, including electronic mail, the Internet, and the World Wide Web; demonstrate competency in creating multimedia presentations and instruction; demonstrate competency in using word processing programs, basic graphics packages, and desktop publishing applications; demonstrate skills in creating spreadsheets and/or databases; integrate thoughtful applications of technology to address everyday teaching/learning problems; identify problems for which use of varied technologies offer productive alternatives for teachers, students, parents, and communities.

Students will demonstrate competence in these areas by developing three unit projects which will use technology to solve a classroom problem of their choosing. The projects address use of computers as communications tools, including the World Wide Web; information processing tools, such as spreadsheets and databases; and interactive multimedia using presentation software or Web-based materials. Each project will include a description of the problem, how the selected technology addresses the problem, a lesson plan demonstrating how the technology would be used, and an artifact which demonstrates the EDTEC 400 student's competency with the technology being used. Students will use Internet tools to share and provide peer reviews of classmates' projects.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 440** Educational Technology Integration (3) Technology integration in educational settings.

### **EDTEC 440 Educational Technology Integration (3)**

This course introduces educators to broad-based educational computing applications. This course introduces ideas, skills, concepts and strategies for integrating computers into classroom teaching. The focus of the course is on models for integration, but specific applications and how they can be used in the classroom will also be explored. This course is part of a graduate program of study for a Master's of Education (M.Ed.) in Instructional Systems or an M.Ed. in Educational Technology.

Within educational settings, technology is not simply an independent curriculum -- i.e., teaching about how to use technology. Rather it is a powerful means for addressing, and potentially redefining, everyday teaching and learning issues. The potential of technology is most effectively realized when considered in combination with views about how individuals think and learn best. The goal of this course, then, is not for you to become an expert in "technology," but to become more of an expert in teaching and learning. Technology can be used as a vehicle to help you to further develop this expertise.

This course is divided into five units which are based on the following areas of educational computing: (1) Technology Integration Concepts; (2) Productivity Tools; (3) Communication tools; (4) Interactive multimedia; and (5) emerging technologies.

Each of these units is designed not only to provide you with the information you need in order to understand what the technology is about and how it functions, but more importantly to stimulate serious reflection upon how you as a teacher can make use of this resource and how using this resource relates to student learning.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 448** Using the Internet in the Classroom (3) This course introduces students to methods and models of using the Internet effectively in their classroom.

### **EDTEC 448 Using the Internet in the Classroom (3)**

This course introduces participants to systematic instructional methods and models for using the Internet effectively in their classrooms. The Internet offers many resources to help educators plan, develop and teach lessons. When guided by a systematic instructional design model, educators can create lessons that are current, highly motivating, mentally engaging, and effective.

Participants will use the Internet to provide background information to support discussions of four issues related to Internet use in educational settings and will then use Internet discussion tools to evaluate examples and arguments related to each issue. Each participant will organize and moderate at least one discussion.

In this course, educators will determine the essential components of a lesson and then design and create web-enhanced lessons and web-based learning objects for the components. As participants search resources they will identify deep

principles to develop a classification system for Web resources that can be used in their professional context.

The course is organized around four roles a teacher assumes: Internet miner, Internet policy advisor, integrator of existing Internet resources, and producer of new Internet resources. The main focus of the course is examining and reflecting on the Internet's pedagogical usefulness in the classroom.

**Course Goals** - Participants in this course will be able to: use a systematic Instructional Design (ID) model to plan educational activities that harness resources from the Internet; integrate Web resources in their classrooms; publish relevant learning objects on the Web; and identify and respond to critical issues regarding Web/Internet uses in the classroom.

**Course Objectives** - As *Internet Policy Advisor*, participants in this course will be able to: identify and respond to critical issues regarding Internet use in educational settings, including: access, the "digital divide," and special populations; copyright accuracy and validity of information, and privacy and security; moderate a discussion; participate in on-line discussions and conversations appropriately; and write an administrative policy brief.

As *Internet Integrator*: use a systematic instructional design model to integrate web-resources into educational activities that apply the First Principles of Instruction, Gagne's Nine Events of Instruction, Web-Enhanced Learning Environment Strategies, and Madeline Hunter Lesson Plan Components.

As *Effective Internet Miner*: classify, and create an organizational system for the types of resources that will be useful.

As *Producer*: create three types of web-based learning objects useful for their educational setting; publish learning objects on the Internet.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 449 Using Video in the Classroom (3)** Skills and knowledge needed to direct the use of video technologies in educational settings.

### **EDTEC 449 Using Video in the Classroom (3)**

This course introduces video and multimedia production for educators based on the premise that participants are novices. The course is intended for teachers and trainers who would like to acquire fundamental theory and skills in designing and producing video and multimedia to support teaching and learning. It introduces the tools of media production (video, audio, and lighting), and develops basic skills, including production and editing techniques, storyboarding and project planning.

Participants in this course will demonstrate: a basic proficiency in the operation and handling of media production tools, including video and audio editing; an understanding of appropriate media use for classroom use; a basic knowledge of the production processes, including conceptualization, storyboarding, scripting, and project management; a basic proficiency in producing effective educational videos. Furthermore, students will facilitate learning by engaging actively in class activities and discussions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 461 Designing Computer Networks for Education (3)** Applying fundamental concepts of computer networking to design effective networks for educational purposes.

### **EDTEC 461 Designing Computer Networks for Education (3)**

In this course, participants will learn how to assess the technology needs of an educational institution, how to predict how those needs might grow in the near future, and how to design an effective, cost-efficient, upgradeable computer network to meet those needs.

Participants will: learn about the hardware and software involved in Ethernet networking, and why Ethernet is the preferred technology for today's schools; experience putting together the basic cabling components for an Ethernet network; work as a member of a team to solve case studies by designing effective school networks; and work independently to design a school network and to connect that network to a network in another school.

Participants are also required to participate in a cabling activity, during which they use the materials provided in the course packet to create a working segment of network cable (including the wall plate connection).

Another important activity involves the design of a wiring diagram for "Paterno Middle School," review of the design

diagrams with a group of your classmates, followed by the submission of an individual network design complete with parts list and budget.

The course concludes with an individual project in which participants scour the Internet for that latest information on networks (wired and wireless) in order to answer some assigned research questions and to design a network that connects multiple schools and the district administrative office.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 462** Coordinating Technology Use in Education (3) Skills and knowledge needed to direct the use of learning technologies in educational settings.

### **EDTEC 462 Coordinating Technology Use in Education (3)**

Technology coordinators are asked to identify, plan for, and meet technology needs, to advise and develop technology-related policy, and to help lead the district in important new directions. Technology coordinators: determine which technologies will meet learning and administrative needs; acquire and install them; educate and train district personnel in the use of these technologies; and evaluate the effectiveness of the district's use of technologies.

This course deals with the most daunting aspects of the technology coordinator's role -- the activities that require study and reflection and for which interaction with others enhances the learning experiences. Most would-be technology coordinators are drawn to this new role because of their interest in and knowledge of new and exciting learning technologies, but they lack experience in the tough issues collected as the content of this course: leadership; diversity; laws and regulations; management and administration; professional development; technology planning and budgeting.

The course involves students in on-line activities related to these topics, including reading, email conversations, chats, development of papers and projects, and peer review of papers and projects.

In addition to ongoing conversations and a series of smaller assignments, there are three major "deliverables" for this course: a position paper on leadership and diversity; a comprehensive technology plan; and an effective inservice training program on a technology-related topic.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 467** Emerging Web Technologies and Learning (3) This course examines emerging Web technologies and explores their application to learning and education.

### **Emerging Web Technologies and Learning (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 561** Measuring the Impact of Technology on Learning (3) Prepares teachers to evaluate the effects of technology use.

**EDTEC 561 Measuring the Impact of Technology on Learning (3)**

This course which will be offered online through Penn State's "World Campus," is designed to prepare teachers and other educators to use basic quantitative methods to assess the effects of a variety of technology-related innovations in their own classrooms and schools. It begins with a focus on the various types of learning outcomes, then prepares students to develop the effective tests and scoring tools required to assess them. The course then introduces the basic statistical concepts and methods, reviews exemplary technology-related quantitative research, and prepares students to design quantitative research studies to be implemented in their own classrooms and schools.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 566 Computers as Learning Tools (3)** Amplifying thinking or organizing mental functions with computers.

**EDTEC 566 Computers as Learning Tools (3)**

This course will be offered online and is intended to prepare teachers to design computer based learning activities that provide unique learning opportunities. The activities are organized around the concept of computer based mindtools, and using current understanding of psychological processes and assessment to describe and measure the effects of mindtools on learners. Students in this class will use Internet based tools to collaborate with peers and the instructor as they define their personal positions on the uses and effects of these tools. They will continue their collaborations as they design mindtools and assessments of learning for learners in their professional context and implement at least one mindtool project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 594 Research Topics (1-9)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 595 Internship (1-9)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships.

**Internship (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTEC 596 Independent Studies (1-9)** Creative projects, including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

## Educational Theory and Policy (EDTHP)

**EDTHP 401 (IL)** (CI ED 401) Introduction to Comparative Education (3) Origins, nature, scope, basic literature, and methodology of comparative education. Study of sample topics.

### **EDTHP (CI ED) 401 Introduction to Comparative and International Education (3) (IL)**

The course introduces undergraduate students to global issues in education and provides a survey of schooling practices used in various educational systems around the world. Students will have the chance to create an individual research project that will allow them to explore one country and one global educational issues in depth. Students are required to attend all classes, participate in the discussion sections, and take notes on the films shown. These films play an integral part in the course and provide students with views into classrooms and schools around the world. Students will also have access to international databases and be expected to make use of these databases in developing their projects. Finally, in-class discussions will focus on how comparative educational studies have been used by politicians to influence educational reform around the world.

In this course, we will survey the state of public education in the world today. Each student will focus on one nation and provide a synopsis of educational practice in that nation. We will then move on to focus on global or cross-national issues such as how competition between "core" nations like Singapore and the U.S. drives reform (GOALS 2000 or No Child Left Behind). Other issues will include power differences between north and south, education for democracy, barriers to girls and women's education in developing nations, as well as education and national identity.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 411 (US)** Ethnic Minorities and Schools in the United States (3) Analysis of the social and cultural factors which affect educational outcomes among minority pupils, especially Blacks, Hispanics, and Indians.

### **Ethnic Minorities and Schools in the United States (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 412 (WMNST 412)** Education and the Status of Women (3) An examination of the relationship of education to the status of women in American society.

### **Education and the Status of Women (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 416 (US)** (SOC 416) Sociology of Education (3) The theoretical, conceptual, and descriptive contributions of sociology to education.

### **Sociology of Education (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 420** Education and Public Policy (3) Focus on the development and analysis of education policy, and policy's

influence on schools.

### **EDTHP 420 Education and Public Policy (3)**

This course examines the inherently political process in which educational policies are developed and implemented. It also considers how these formal policies interact with the practice of teaching and learning in U.S. schools. In this course, students will be expected to actively participate in classroom discusses and activities as we examine the development of policies and their implementation, with a focus on understanding pressing policy dilemmas in education today. Course evaluation includes quizzes, a midterm paper analyzing a policy issue, and a series of final exam essays.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 427 Intelligence and Educational Policy (3)** This course explores the concept of intelligence and its assessment from historical, psychological, educational and policy perspectives.

### **EDTHP 427 Intelligence and Education Policy (3)**

In this course, we will focus on two main content areas. First, we'll explore the concept of intelligence and its assessment from historical, psychological, educational, and policy perspectives: What does intelligence look like in different cultures and at different points in history? What forces help to shape conceptions of intelligence? Second, we will consider the ways in which conceptions of intelligence influence students' opportunities to learn. For example, how are students assigned to higher-level or remedial classes and on what bases should admission to elite educational programs be allocated? What policies govern such decisions?

The study of intelligence has been a controversial one. This course will touch on several controversies associated with the topic, including the "nature/nurture" debate and the "merit/affirmative action" debate. Readings and discussion will draw on opposing sides of these issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 430 History of Education in the United States (3)** American educational ideas and practice critically examined in terms of their historical development and contemporary significance.

### **History of Education in the United States (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 434H Honors Teaching Experience in Leadership Jumpstart (1)** Guided instruction and practical experience for teaching assistants to the Honors Leadership Jumpstart course (EDTHP 234H).

### **EDTHP 434H Honors Teaching Experience in Leadership Jumpstart (1)**

This course trains and supports the teaching assistants (TAs) who work with the first-year students in the Leadership Jumpstart course (EDTHP 234H). The TAs help guide the first-year students through their course by assisting in the design, implementation, and evaluation of the course and the student projects, providing feedback for what worked and what did not work, and providing important perspective from when they were first-year students. The TAs are expected to be a role model, assist in the instruction of the course, assist in the functional elements of the course, be a confidant/mentor to new students, and occasionally serve as an evaluator of students' work. The TAs' grades will be based on attendance at all class sessions and interactive assistance and leadership during the EDTHP 234H course and on the TA's reflections on the course, its effectiveness to achieve the objectives, and possible improvements.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 440** (CI ED 440) Introduction to Philosophy of Education (3) Introduction to the examination of educational theory and practice from philosophical perspectives, classical and contemporary.

### **EDTHP (CI ED) 440 Introduction to Philosophy of Education (3)**

The major objective of EDTHP (CI ED) 440, Introduction to Philosophy of Education, is to broaden and deepen the students' understanding of the nature of education. Such a study involves exploring the ends as well as the means of education. It includes both an examination of some of the distinctive or defining characteristics of "educated persons" as well as the different elements of the learning experience (including curricula, pedagogies, and evaluative processes) that encourage the development of such persons. As part of developing an understanding of the educational enterprise, this course will introduce students to some of the important ideas and theories that comprise the rich tradition of educational philosophy. In the design of a course of this nature with constraints established by space, time, and the background of the student, it is necessary to confront the task of making judicious selections from the vast literary wealth accumulated over the centuries. In doing so, the decision made has been to focus primarily on the literary contributions of western philosophers of education. In the interest of making the sample varied and interesting, however, an effort has been made to include writings of some philosophers of education from different cultural contexts. The educational thoughts of A.S. Neill, John Dewey, Eliot Wigginton, Maxine Greene, Paolo Freire, Mohandas Karamchand Ganddhi, David Orr, Ivan Illich, and Wendell Berry, among others, will be explored in this class. The exposure to diverse, rich, and provocative ideas of the educators included for study here will, it is hoped, stimulate students to re-examine and further develop their own philosophy of education into a more comprehensive, coherent, and consistent one.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 441** Education, Schooling, and Values (3) Studies in education and schooling as problems in value; axiological problems and positions; examination of practical applications, including moral education.

### **Education, Schooling, and Values (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 496** Individual Studies (1-18) Creative projects supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 497** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 497A** Gender Issues in Education and Family (3) Education Theory and Policy 497A helps students explore the relationship between gender, education, and families. Students examine issues such as gender role development and

families, gay, lesbian, and transgender children and families, educational access, gender bias, sexual harassment, gender and children's literature, the impact of the media on gender role development, and strategies for teaching boys and girls in elementary classrooms.

### **Gender Issues in Education and Family (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 497A** Gender Issues in Education and Family (3) Education Theory and Policy 497A helps students explore the relationship between gender, education, and families. Students examine issues such as gender role development and families, gay, lesbian, and transgender children and families, educational access, gender bias, sexual harassment, gender and children's literature, the impact of the media on gender role development, and strategies for teaching boys and girls in elementary classrooms.

### **Gender Issues in Education and Family (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 498** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 500** Proseminar in Educational Theory and Policy (3) An introduction to disciplinary and interdisciplinary studies in educational theory and policy.

### **Proseminar in Educational Theory and Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 507** (CI ED 503, HI ED 503) Ethnicity, National Identity, and Education (3) Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.

### **Ethnicity, National Identity, and Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 516** (CI ED 516) Education and Demographic Change in the United State and Abroad (3) Interrelationship between schooling and employment, marriage, fertility, and migration. Focus comparatively on the United States and developing countries.

### **Education and Demographic Change in the United State and Abroad (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 518** Analysis of U. S. Educational Policy (3) The interaction between educational theory and social structure, focusing on the role of practicing intellectuals in contemporary institutional settings.

### **Analysis of U. S. Educational Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 520** Perspectives on Contemporary School Reform (3) Examination of contemporary U.S. school reform, with a focus on contrasting theoretical perspectives and the application of policy analysis principles.

### **EDTHP 520 Perspectives on Contemporary School Reform (3)**

This course examines contemporary U.S. school reform, with several purposes, with a focus on contrasting theoretical perspectives and the application of policy analysis principles. It consists of the following objectives:

1. To gain an appreciation of how school reforms develop, including the rationale behind them and how visions of school change become mediated by social and political contexts as they become policy.
2. To analyze what produces continuity and change in schools and classrooms, including why some reforms persist, why some fade, and why some recur.
3. To gain an understanding that the implementation of school reform is a product of the interaction between the larger context (social, economic, political, ideological, and environmental factors), the character of schools as institutions, and the actions of groups and individuals.
4. To gain and strengthen skills in analyzing a policy argument, its assumptions, and use of evidence in order to construct a coherent and compelling policy analysis of a school reform on your own.

The course is an advanced seminar with approximately 15 students enrolled. The course will be offered once in every two-year (4 semester) cycle. Course evaluation includes policy analysis exercises, weekly written responses to readings, responsibility for leading the seminar, and a cumulative research paper examining and analyzing a school reform. Attendance and participation also are part of the course evaluation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 523** Interpreting and Analyzing Quantitative Studies in Education Policy (3) Effective reading of academic articles in educational policy based on quantitative methods.

### **Interpreting and Analyzing Quantitative Studies in Education Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 525** Alternative Assessment of National Educational and Health Policies (3) Overview of alternative research strategies in education, nursing and health education studies used to study impact of national policies.

### **EDTHP 525 Alternative Assessment of National Educational and Health Policies (3)**

This course provides alternative methods of qualitative research methods in education, nursing and health education studies, and serves as an advanced research course for degree programs in the Department of Education Policy Studies. Students will study specific techniques and methods that relate to research and evaluation currently being carried out in the fields of education, health policy in national and international settings. The grade of this course depends on in-class presentation and quality of drafts and the final product, with the final project counting for 30% of the grade. In prior to or the early weeks of the course, students must pass "Office for Regulatory Compliance Human Subject Basic Training

Seminar," and also must submit a proof that they have passed it. In addition, students must commit to presenting some of the reading materials during one class session.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 527 Testing and Educational Equity (3)** This course considers testing, the reasons that policymakers have widely adopted testing, and implications of testing for educational equity.

**EDTHP 527 Testing and Educational Equity (3)**

Results from standardized testing reveal that there are large disparities in test scores that parallel racial and ethnic lines in the U.S. For almost two decades, American policymakers have embraced increased testing in K-12 education as a means of reducing these disparities.

The objectives of this course are to help you to understand why testing policies have proliferated, to explore how such policies might or might not affect academic achievement, and to think critically with regard to the policies' impact on students from diverse racial and ethnic backgrounds.

In essence, the course's central question is this: In what ways might testing policies ameliorate or increase disparities across racial and ethnic groups?

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 533 Social History and Education Policy (3)** Historical study of social dimensions in the formation of education policy.

**Social History and Education Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 534 (CI ED 534, SOC 534) Childhood and Education in Sociological and International Comparative Perspective (3)** The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.

**Childhood and Education in Sociological and International Comparative Perspective (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 536 Studies in Educational Thought (3)** Studies in the historical development of educational theory.

**Studies in Educational Thought (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 538** (SOC 538) Sociology of Education (3) Provides students with an overview of dominant sociological theoretical perspectives on schools, schooling, and education in modern society.

**EDTHP (SOC) 538 Sociology of Education (3)**

This graduate course in the Sociology of Education covers the major sociological theories and empirical research on the role of formal education in society. The object of the course is to have the student become conversant with the main lines of sociological research applied to education and social development at the individual, community, and societal levels. Since sociology of education has had considerable impact on educational policy over the past 50 years, a second goal of the course is to understand this relationship and avenues for future research and policy analysis from a sociological perspective. This course is a central topic in the general study of social stratification and hence in pursuit of the Ph.D. in the Educational Theory and Policy and the Sociology program. The format of the course is a didactic seminar with extensive written assignments as the usual form of evaluation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 541** (CI ED 541) Contemporary Philosophies of Education (3) Educational theory and practice in relation to contemporary movements in philosophy.

**EDTHP (CI ED) 541 Contemporary Philosophies of Education (3)**

This graduate seminar explores a range of contemporary philosophies of education viewed from the perspective of different varieties of postmodernism. The study of modern and postmodern western thought is combined with explorations of eastern thought including viewpoints that are emerging today in both the northern and southern hemispheres. While focusing on contemporary educational ideas, it traces their roots in classical and non-modern philosophical sources. This look at the present in terms of the past reveals the paradigm shift presented by contemporary postmodern educational thought. In doing so, considerations for the issues of race, class, gender, ecology, multiculturalism and the regeneration of diverse incommensurable cosmologies, severed or overlooked by some educational philosophers, are explored in their reintegration by contemporary postmodern philosophers of education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 553** (CI ED 553, HI ED 553, SOC 553) Educational Mobility in Comparative Perspective (3) Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America.

**EDTHP 553. (SOC 553, CI ED 553, HI ED 553) Educational Mobility in Comparative Perspective (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 557** (HI ED 557, SOC 557) Sociology of Higher Education (3) Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis.

**EDTHP (HI ED, SOC) 557 Sociology of Higher Education (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the

classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 580** Improving Educational Writing (3) Focus on components of high quality academic writing for educational research, with a special emphasis on improving the writing process.

### **Improving Educational Writing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 585** (EDLDR 585, HI ED 585) Research Design: Implications for Decisions in Higher Education (3) A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.

### **EDTHP (EDLDR, HI ED) 585 Research Design: Implications for Decisions in Higher Education (3)**

By the end of this course you should be able to: (1) Define and explain the following concepts/tools of social science research: The scientific method-Theory and its role, Constructs and variables, Hypotheses and relations, Experimental designs, Quasi-experimental designs and Ex post facto designs. Sampling theory and designs-Survey designs and methods, Approaches to data collection, Measurement reliability and validity, Quantitative analytical designs, and Ethical practices. (2) Apply these concepts/tools in designing a study relating to educational research. (3) Effectively critique both the theoretical bases and methods of a journal article or report of research or policy analysis. (4) Prepare a sound research proposal.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 586** (EDLDR 586, HI ED 586) Qualitative Methods in Educational Research (3) Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques.

### **EDTHP (EDLDR, HI ED) 586 Qualitative Methods in Educational Research (3)**

This course is the introductory course in the EPS qualitative research methods sequence. This is the first course in a three-course sequence departmental sequence intended to take students from basic knowledge of qualitative methods through mastery of advanced topics. This course was designed specifically to 1) orient students to the various types of qualitative methods most widely used in educational policy research and their theoretical underpinnings; 2) provide training in basic qualitative research techniques; 3) introduce students to basic research design; 4) provide systematic practice (and feedback) in evaluating qualitative research that would allow students to become sophisticated consumers of qualitative studies; 5) prepare students for the Level 11 course. The course will begin with a brief review the development of qualitative methods in related fields (anthropology, sociology, linguistics) and quickly move on to an overview of qualitative methods in education. Students must have read the material prior to class in order to take part in in-class exercises and discussions. We will focus on key issues such as validity, interpretation and representation. Students will be asked to read studies, assess the general quality of the work, and provide a critical evaluation. Students will study specific methods of qualitative field research, and most weeks we will practice and discuss a particular research technique (e.g. participant observation, focus group interviews). These practice sessions will be informed by relevant readings. Students will practice developing coding schemas as well as get a quick overview of qualitative data analysis (QDA) packages. Finally, in small groups, students will design a basic qualitative study to be presented as a final product in the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None



Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 587** (EDLDR 587, HI ED 587) Education Policy and Politics (3) The political economy and bureaucratic politics of educational organizations, with special attention to the policy-making, implementation, and evaluation process.

**Education Policy and Politics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 588** (EDLDR 588, HI ED 588) Qualitative Methods in Educational Research II (3) Advanced study of methods involved in executing and analyzing qualitative research in education.

**EDTHP (EDLDR, HI ED) 588 Qualitative Methods in Educational Research II (3)**

The course will provide practical experience with methods of qualitative data collection, data management, and preliminary data analysis that extends and deepens students' understanding of qualitative research in education. The class, limited to 15 students, will take as the focus with inquiry a common "site" around which projects of individual and group interest will be designed. Sessions will take place in "workshop" blocks during which students will present and critique the work of the project. Readings will be interspersed with the practicing of methods. The final project for the course will be the compilation of a synthesized data set that could serve as the basis of further analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 596** Individual Studies (1-9) Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597A** Quantitative Studies in Education (3) Reviews existing quantitative studies in education with the emphasis on methods used, theoretical and practical implications.

**Quantitative Studies in Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597A** Quantitative Studies in Education (3) Reviews existing quantitative studies in education with the emphasis on methods used, theoretical and practical implications.

**Quantitative Studies in Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597B** (CI ED 597B) Research in Comparative Education (3) This course introduces large-scale international assessment databases and demonstrates how to use these data to conduct comparative education research.

**Research in Comparative Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597C** (HI ED 597C, EDLDR 597C) Foundations of Research (3) This course is designed to begin a reading of the history and philosophies of education research.

**Foundations of Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597D** (HI ED 597D) Data Analysis for Education Research (3) This course bridges theoretical statistics coursework and practical research with real, large-scale datasets.

**Data Analysis for Education Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597E** Civil Rights and Education (3) This course will examine civil rights policies and educational equity in the United States from the perspectives of law, social science, and testing policy.

**Civil Rights and Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597E** Civil Rights and Education (3) This course will examine civil rights policies and educational equity in the United States from the perspectives of law, social science, and testing policy.

**Civil Rights and Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 597F** (HI ED 597F, EDLDR 597F) Race, Law and Education: Six U.S. Supreme Court Cases (3) This class is designed to introduce students to the legal standards used to examine "race-conscious" policies intended to address racial/ethnic inequities in K-12 and higher education. We will consider the justifications educators have presented to support these policies, which justifications have been convincing to the Court, and how these justifications intersect across K-12 and higher education. We will also focus on how social science research has informed the legal developments in these cases. Over the course, we will cover six landmark U.S. Supreme Court cases on race and education, including *Brown v. Board of Education* (1954), the Court's most recent decision on K-12 voluntary desegregation policies, *Parents Involved in Community Schools v. Seattle School District No 1* (2007), and the Court's forthcoming opinion on affirmative action in higher education, *Fisher v. University of Texas* (2013).

**Race, Law and Education: Six U.S. Supreme Court Cases (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) This class enables doctoral students to gain experience in college teaching under the supervision of a course instructor.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**EDTHP 603. Foreign Academic Experience (1-12)**

This course will be offered to students who are enrolled at a foreign university or otherwise engaged in foreign study and/or research approved by their graduate program and constituting progress towards the degree.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDTHP 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Electrical Engineering (E E)

**E E 400** Engineering Design Concepts (3) Engineering design and modelling, engineering economy, project planning, capstone project selection, and technical communication skills.

**E E 400 Engineering Design Concepts (3)**

This course prepares senior electrical engineering students for industrial engineering design and project management. It covers the engineering design process, project planning and evaluation, engineering ethics, and engineering economy. . In addition, students select, specify, and start their capstone design project which is completed in the follow-up course, EE BD 481. Students are expected to carry out a group design project that is on par with industrial expectations. Upon completion of this course a student should have a solid understanding of the engineering design process, a clear capstone project description, should have completed some preliminary design work, and be adequately prepared to complete the project in E E 401.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 401** Electrical Design Projects (3) Group design projects in the areas of electronics and electrical/computer systems.

**E E 401 Electrical Design Projects (3)**

In this course students complete their senior design project started in E E 400. Design groups meet regularly with a faculty advisor to report progress and resolve design issues. Oral and written progress reports are expected at selected times. The class culminates with a final technical defense of the project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 403M** Senior Project Design (3) Project designs of electrical engineering systems, encompassing various subdisciplines within Electrical Engineering, with an emphasis on technical communications skills.

**Senior Project Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:  
Concurrent: ENGL 202C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 403M Senior Project Design (3)** Project designs of electrical engineering systems, encompassing various subdisciplines within Electrical Engineering, with an emphasis on technical communications skills.

### Senior Project Design (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: ENGL 202C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 403W Senior Project Design (3)** Project designs of electrical engineering systems, encompassing various subdisciplines within Electrical Engineering, with an emphasis on technical communications skills.

### E E 403W Senior Project Design (3)

E E 403W is intended to give senior-year electrical engineering students a "real-world simulation" of a total design experience. This is accomplished through both lectures and a laboratory component. One period each week is devoted to general lectures concerning professional engineering topics. The subjects of these lectures vary but generally are concerned with "life as an engineer" topics that are not purely technical in nature. Topics typically include laboratory safety, quality control, reliability, entrepreneurship, job interviewing, deciding to go to graduate school, ethics, etc.

The focus of the weekly three-period lab varies according to the particular section number. In some sections, the first seven weeks of the semester are devoted to three predefined laboratory assignments. These assignments are often focused on interfacing techniques, such as interfacing between multistage analog systems or between analog and digital systems. In the second half of the course, the student teams work on a major design project chosen by each team, with approval of the instructor.

In other sections of the course, the student teams begin work on a major design project at the beginning of the semester. The projects for these "industrial strength" sections are sponsored by industrial companies through Penn State's Learning Factory.

Multidisciplinary teams are formed by students from E E, M E, I E, and/or Aerospace Engineering.

All sections of E E 403W have a small, section-by-section weekly lecture that is concerned with "life on a project" issues. Some of these lectures may be devoted to design issues directly related to the student projects, but many are still general in nature. Small lecture topics can include the following: what's going on with teaming, engineering economics, TQM/CQI, preparing effective presentations, project management, mechanical packaging, preparations for requests for quotes, preliminary and critical design reviews.

About one third of the course is devoted to technical communication issues. The students must develop good laboratory documentation techniques. They must also prepare a detailed project proposal. Engineering reports are required either upon the completion of each assigned task or, in the "industrial strength" sections periodically to the corporate sponsor. Oral presentations are required for the preliminary and critical design reviews. The students must also submit a final written report. A final oral presentation is made by each team for the student-chosen projects, while the industrial projects are presented in poster format at an end-of-semester product showcase.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:  
Concurrent: ENGL 202C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 405 Capstone Proposal Preparation (1)** Performing the initial research needed for the capstone course, and the preparation of the written project proposal.

### E E 405 Capstone Proposal Preparation (1)

The capstone design course will incorporate engineering standards and realistic constraints including most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political. While engineering constraints are included in the earlier courses, the senior capstone design requires integration of the appropriate engineering constraints into the capstone design course. This course will mimic the problems encountered by an engineer working in commercial, industrial, and governmental entities. This basically requires that students in the Electrical Engineering BS program select a topic prior to starting the semester of their capstone design course, do the initial research for the topic, prepare a timeline, and prepare a well written proposal that would make a suitable capstone project. The time devoted to the careful topic selection, research, timeline, and proposal preparation,

makes for a much better capstone design experience.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 406W Electrical Engineering Capstone Design (3)** Project designs of analog and digital systems, interfacing, and relevant electronic circuits, with an emphasis on technical communications skills.

### **E E 406W Electrical Engineering Capstone Design (3)**

E E 406W is designed with the following goals and objectives:

- \* The students will enter the course with a well-defined capstone design proposal and a timeline for which the first task will be to write the specifications. Upon the specifications' approval, the student teams will begin designing and building the projects.
- \* Each student will maintain a laboratory notebook that documents the day-to-day activities of the project in a style that could be used for patent documentation.
- \* Team members will provide short oral and written reports every week for the first five to six weeks, and then, every two weeks until the end of the semester.
- \* The students will incorporate engineering standards and constraints, i.e., consideration of economic, environmental, sustainability, manufacturability, ethical, safety, etc., in their project and final report.
- \* A draft copy of the final report will be collected, critiqued, and returned to students with comments and suggestions for changes.
- \* A final project oral report (20 - 25 minutes) will be given by the project team during the last week of the semester.
- \* An extensive well-written report describing the project that has been designed and built, is the major outcome of the capstone design course.

This course is a required course in the Electrical Engineering BS curriculum and is intended to be taken by seniors as the capstone course for the major. As such, the course integrates materials from many of the undergraduate electrical courses in addition to related math, engineering, and science courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 410 Linear Electronic Design (3)** Linear circuit design via integrated circuit processes; A/D converters, switched capacitor filters, phase lock loops, multipliers, and voltage- controlled oscillators.

### **E E 410 Linear Electronic Design (3)**

E E 410 is a technical elective intended for electrical engineering students who wish to specialize in semiconductor circuits, especially in linear circuit design. The course emphasizes integrated circuit process-compatible circuit design techniques in recognition of the amazing synergy that has characterized the relationship between modern circuits and integrated circuit processing technology. This course is the third in a series of three courses dealing with the analysis and design of electronics circuits, following E E 310 and E E 311. E E 410 includes three lectures and a two-hour laboratory each week.

E E 410 begins with a deeper look into several key concepts previously considered in earlier course work, such as node voltage and mesh current methods for solving circuits, which are emphasized throughout the course. The small-signal method is revisited and thoroughly examined. The more advanced Ebers-Moll bipolar junction transistor model is introduced and the metal oxide semiconductor field effect transistor device model is reviewed.

The next phase of the course introduces the vertical geometries of integrated circuit devices commonly used in linear circuits. Unwanted parasitic devices that are introduced as a result of the integrated circuit processes are revealed and their effects on circuit sign techniques operation are discussed. Both the limitations and the opportunities provided by integrated circuit technology are examined, particularly in the light of de used to minimize the problems and to take advantage of the features.

The last half of the course is devoted to applications of linear circuits, especially those which students have not previously encountered. The first topics in this series are analog-to-digital and digital-to-analog conversion. Various methods of accomplishing each of these functions are examined. The inverse relationship between speed and accuracy is emphasized. These topics are followed by studies of switched capacitor filters, phase lock loops, analog multipliers, and voltage-controlled oscillators.

The emphasis of the laboratory component of the course is to successfully accomplish a student-chosen linear circuit design project. Students work in two- or three-person teams to select their project and do the design and evaluation. A three-way methodology is emphasized; mathematical analysis by hand, computer simulation, and laboratory breadboarding and measurement. At the end of the project students give an oral presentation and submit a formal

engineering report.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 413 Power Electronics (3)** Switch-mode electrical power converters. Electrical characteristics and thermal limits of semiconductor switches.

### **E E 413 Power Electronics (3)**

E E 413 is an elective course taken by undergraduate and graduate electrical engineering students. The objective of E E 413 is to introduce techniques for the analysis, design, and application of the switch-mode power converters that are used in power supplies, motor and actuator drives, and the interface between power distribution systems and emerging energy sources such as fuel cells, photovoltaics, and superconducting magnetic energy storage systems. Several laboratory experiments provide an opportunity to characterize the switching behavior of semiconductor devices, build and test various dc/dc and ac/dc converters, and consider alternatives for gate/base drive and feedback isolation circuits required to build practical converters.

This course draws upon the students' background in time-domain circuit analysis, electronic devices and circuits, Fourier analysis, and use of software such as PSPICE and MATLAB. It does not require a background in power or electric machinery, although students with such a background will be able to appreciate many of the applications more fully.

The course is divided into four major areas: rectifiers and phase-controlled converters, dc-to-dc converters, inverters, and design considerations for practical converters. The focus in each of the first three areas is to determine the relationship between the magnitude of the fundamental frequency component and/or average value of the voltages and currents at the two ports of the particular converter. Additional harmonic or ripple components are then considered and design guidelines for the switching and reactive components are derived. The fourth area encompasses the study of power device characteristics, the design of gate drive and feedback circuits, and the analysis/design of elementary controllers.

As the name implies, students interested in either electronics or power will find this course worthwhile. Electronics students will gain a new perspective on the operation and analysis of electronic circuits as well as an opportunity to discover what has powered the circuits that they have studied up until this course. Power students will see how and why power electronics are revolutionizing motor control and power distribution as well as the power quality issues associated with electronic power conversion.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 416 (CMPEN 416) Digital Integrated Circuits (3)** Analyses and design of digital integrated circuit building blocks, including logic gates, flip-flops, memory elements, analog switches, multiplexers, and converters.

### **E E 416 Digital Integrated Circuits (3)**

E E 416 is a technical elective available to electrical and computer engineering students. It is intended for students who wish to specialize in the field of digital circuits. This course introduces the basic concepts involved in the design of digital circuits, which find practical application as logic and memory circuits in computers and other digital processing systems. The course emphasizes integrated circuit process-compatible circuit design techniques in recognition of the amazing synergy that has characterized the relationship between computer circuits and integrated circuit processing technology. This course includes three lectures and a two-hour laboratory each week. The only prerequisite is E E 310, a basic circuits course required for both electrical engineering and computer engineering students.

E E 416 begins with a review of the bipolar junction transistor (BJT) device and proceeds into the more advanced Ebers-Moll device model. This is followed by an examination of a series of BJT-based saturating and non-saturating digital circuits of ever increasing complexity illustrating the evolution of the modern bipolar logic circuit families. The next phase of the course reviews the metal oxide semiconductor field effect transistor (MOSFET) and proceeds along the same path taken for the bipolar transistor circuits. Various MOSFET logic circuit families are introduced and analyzed. Computer semiconductor memory circuits are considered next. Both BJT and MOSFET versions of both static and dynamic read-write and read-only memories are considered. The cell array, memory addressing circuits, and sense amplifier designs are all examined in detail. This is followed by the related subject of programmable logic arrays, the final topic.

The emphasis of the laboratory component of the course is to compare the performance of representatives of each class of circuits to computer simulations of the same circuits. Parameters such as input-output voltage transfer characteristics, noise margins, and propagation delays are evaluated by building and measuring laboratory models. Most of the laboratory exercises require the student to evaluate a specified circuit, but the final exercise requires the student to design a circuit to meet a predefined set of specifications, then to prove that the design meets the requirements by measuring the circuit performance. Students are required to write a formal engineering report detailing the results of each laboratory exercise.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 417** (CMPEN 417) Digital Design Using Field Programmable Devices (3) Field programmable device architectures and technologies; rapid prototyping using top down design techniques; quick response systems.

**E E (CMPEN) 417 Digital Design Using Field Programmable Devices (3)**

Field Programmable Devices, such as Field Programmable Gate Arrays (FPGAs) and Complex Programmable Logic Devices (CPLDs) are widely used for rapid prototyping and quick response-time designs. The objective of this course is to introduce the student to digital design using Field Programmable ICs, and to provide an understanding of the underlying technologies and architectures of these Integrated Circuits.

The course begins by introducing design alternatives for modern electronic systems identifying and classifying alternative system solutions, and evaluating when particular design solutions are optimal. These alternatives include microprocessors, microcontrollers, off-the-shelf digital ICs, Programmable logic ICs (FPGAs and CPLDs), and various forms of Application Specific Integrated Circuit (ASIC) designs. A homework assignment requires the student to quantitatively evaluate the cost, complexity, packaging, and time-to-market issues for a complex system design specification.

Next, the underlying Field Programmable Logic IC architectures and technologies are studied in detail. Following a broad survey of available programmable IC vendors and on-chip programming technologies (and their cost/performance trade-offs), several specific case studies are presented in the class. The first is the Xilinx XC4000xl line, because of the target boards used in the CAD laboratory component for this class. The initial lab portions of the class help the students to specify their design using various forms of design entry tools and also allows them to see how their design map on to the underlying FPGA architecture. The students also learn the underlying algorithms used by the design software they use in their Labs.

Next, the systematic top-down method for specifying complex designs using VHDL is introduced. Students are given a supporting homework assignment to develop high-level behavioral models for a simple digital system to reinforce this segment of the course. VHDL behavioral synthesis is now introduced as a preferred path to go from high-level system behavior to actual implementation on the FPGA. The strengths and weaknesses of synthesis are discussed, as are the emerging CAD tool trends. Additional VHDL-based homework assignments reinforce behavioral design and synthesis using commercial CAD tools.

The final segment of the class covers special topics that identify current trends in digital system architecture and programmable logic design. These include such topics as partially reconfigurable architectures and dynamic reconfiguration techniques, system design for testability, and field programmable analog arrays. Applications of FPGAs in special purpose computing environments such as signal processing, Java acceleration and image processing are also introduced. In the laboratory, student design project assignments explore larger and more complete system specifications of such things as controllers, CPU and memory design, and signal processing blocks. These assignments reinforce the lecture content as the students model, synthesize and implement their digital designs on the target Xilinx FPGA boards.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 420** Electro-optics: Principles and Devices (3) Spatially linear system and transform; diffraction theory, partial coherence theory, optical image detection, storage and display, holography.

**Electro-optics: Principles and Devices (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 421** Optical Fiber Communications (3) Operational principles of optical components, including sources, fibers and detectors, and the whole systems in optical fiber communications.

**E E 421 Optical Fiber Communications (3)**

E E 421 is an introduction course to fiber optic communications. This course is designed as an elective course for both the E E senior undergraduate students and E E graduate students. Students are expected to have a general knowledge on fiber optic communications after taking this course. The content of this course focuses on the engineering aspects of fiber



optic communications. This course is offered once a year.

This course basically consists of four major parts:

The first part introduces the motivations of using fiber optic communication systems, which include the huge bandwidth, low attenuation, immune from the electromagnetic field interference, et al. (1 week)

The second part of this course deals with light propagation in the optical waveguides. Both the simple geometrical approach and wave optics approach are used to calculate the light propagation in the optical fiber. The geometrical approach (i.e., total internal reflection) provides an intuitive feeling about light propagation in the fiber while the wave optics approach (i.e., Maxwell" equations) provides more accurate solutions. In particular, it can explain important concepts such as the conditions for single mode fiber and intramodal dispersions in single mode optical fiber. With the help of popular calculation software (e.g., Matlab, Mathcad), students are required to solve waveguide equations for single shape optical fibers (such as step index fiber). (5 weeks)

The third part of this course introduces some critical components that are needed in fiber optic communication systems. This includes the optical transmitter (laser diode), optical receiver (i.e., photodetector), modulators and demodulators (such as driving current approach and optical waveguide modulators), optical coupler (how to connect more than two fibers together), optical amplifier (including the basic principle of erbium doped fiber optic amplifiers), fiber optic gratings (a critical component for the multiple wavelengths fiber optic network systems), dispersion compensation device (such as chirped fiber optic grating based device) et al. (6 weeks)

The fourth part of this course talks about fiber optic networks. The major contents include fiber optic network architectures (such as star connect), multiplexing techniques in fiber optic networks (such as wavelength division multiplexing and time division multiplexing), connection fiber optic networks with non-fiber optic networks (such as copper wire based networks), current trends in fiber optic networks, et al. (2 weeks).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 421 Optical Fiber Communications (3)** Operational principles of optical components, including sources, fibers and detectors, and the whole systems in optical fiber communications.

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This course basically consists of four major parts:

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The third part of this course introduces some critical components that are needed in fiber optic communication systems. This includes the optical transmitter (laser diode), optical receiver (i.e., photodetector), modulators and demodulators (such as driving current approach and optical waveguide modulators), optical coupler (how to connect more than two fibers together), optical amplifier (including the basic principle of erbium doped fiber optic amplifiers), fiber optic gratings (a critical component for the multiple wavelengths fiber optic network systems), dispersion compensation device (such as chirped fiber optic grating based device) et al. (6 weeks)

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General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 422** Optical Engineering Laboratory (3) Hands-on experience covering areas of optical transforms, electro-optics devices, signal processing, fiber optics transmission, and holography.

**Optical Engineering Laboratory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 424** Principles and Applications of Lasers (3) Principles of lasers--generation, propagation, detection and modulation; applications in fiber optics communication, remote sensing, holography, optical switching and processing.

**Principles and Applications of Lasers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 430** Principles of Electromagnetic Fields (3) Laws of electrodynamics, boundary value problems, relativistic effects, waves in dielectrics and ferrites, diffraction and equivalence theorems.

**Principles of Electromagnetic Fields (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 432** RF and Microwave Engineering (3) Transmission line and waveguide characteristics and components; design of RF and microwave amplifiers, oscillators, and filters; measurement techniques; design projects.

**RF and Microwave Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 432** RF and Microwave Engineering (3) Transmission line and waveguide characteristics and components; design of RF and microwave amplifiers, oscillators, and filters; measurement techniques; design projects.

**RF and Microwave Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 438** Antenna Engineering (3) Radiation from small antennas, linear antenna characteristics, arrays of antennas, impedance concepts and measurements, multifrequency antennas, and aperture antennas.

**E E 438 Antenna Engineering (3)**

E E 438 is an electrical engineering technical elective course intended for students with a specialization in electromagnetics. This course presents antenna engineering concepts including in-depth studies of various antennas and arrays and computer modeling of antennas for analysis and design. The course has three lectures each week as well as an additional period for demonstrations and discussions of outside lab and computer projects. This course requires E E 330, the undergraduate electromagnetics course, as a prerequisite.

E E 438 begins with a review of electromagnetics which leads into an introduction of antennas. A lecture is given which

shows how the evolution of a guided wave on a transmission line eventually leads into a device that can act as a wave launcher or antenna. A series of lectures are then given introducing the various classes and types of antennas. Performance parameters such as input impedance, radiation patterns, directivity, gain, polarization, and efficiency are then discussed. Examples and pictures of many antennas and their respective patterns are shown as part of these lectures.

Next, extensive lectures are given which describe definitions and antenna parameters in detail. Much time is spent on how to visualize radiation patterns and beamwidth. Derivations are carried out for directivity and gain adhering to IEEE standard definitions.

Theorems are discussed on the subject of reciprocity and how it can be related to practical measurements of patterns. Another lecture deals with the subject of antenna polarization and cross-polarization. Link analysis is discussed for communication systems and real-world examples are given for its use.

The second half of the course involves extensive study of various types of antennas including center-fed dipoles, monopoles, loops, phased arrays, broadband antennas, Yagi antennas, traveling wave antennas, frequency antennas, and aperture antennas.

Throughout the course, students are introduced to and utilize an advanced antenna computer modeling software package for carrying out assigned projects and use in homework problems. They are also assigned a group design project during the last third of the course where extensive use of the software package is required. Each group gives an oral presentation of the project and the results during the last week of class and turns in a final report.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 439 Radiowave Propagation in Communications (3)** Radiowave propagation in mobile, terrestrial, and satellite communications; applications at microwave and lower frequencies.

#### **Radiowave Propagation in Communications (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 441 Semiconductor Integrated Circuit Technology (3)** An overview of fundamentals of processes involved in silicon integrated circuit fabrication through class lectures and hands-on laboratory.

#### **E E 441 Semiconductor Integrated Circuit Technology (3)**

E E 441 is an elective electrical engineering course typically taken by seniors and graduate students from various majors including electrical engineering, materials engineering, engineering science, physics, and chemistry. Its objective is to introduce students to the processes and procedures involved in the manufacture of advanced silicon integrated circuits (IC) using tools and methods of semiconductor nanotechnology. In the sequence corresponding to the order of IC fabrication steps, the lecture portion of the course covers fundamentals of the formation of single-crystal silicon wafers, epitaxial deposition of thin silicon layers, fundamentals of thin film semiconductors, dielectric and metal deposition techniques, pattern definition by photolithography and etching, dopant introduction, and finally, contact and interconnect metallization. In selected cases theoretical considerations regarding manufacturing steps discussed are supported by process simulation using dedicated software.

Besides the specific objectives listed above this course has a more general goal. Manufacturing methods and tools used to process nanochips represent the most advanced technology across a broad range of engineering domains. Experiences gained in this course advance student's knowledge and understanding of state-of-the-art manufacturing technology that is applicable in several other domains such as nanomaterials, including nanowires, nanotubes, and nanodots, MEMS fabrication, as well as in bioelectronics, molecular electronics, spintronics and others.

In addition to lectures, EE 441 has a laboratory portion that gives students an opportunity to gain hands-on experience with key processes used to manufacture advanced silicon integrated circuits. The laboratory experience helps students appreciate the intricacies of the integrated circuit fabrication procedures as well as establish connection between theoretical concepts and the outcome of the real-life manufacturing process. In the course of ten laboratory sessions students first process from scratch a simple MOS integrated circuit and then test its performance by carrying out a set of electrical tests.

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 441 Semiconductor Integrated Circuit Technology (3)** An overview of fundamentals of processes involved in silicon integrated circuit fabrication through class lectures and hands-on laboratory.

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General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 442 Solid State Devices (3)** The physics of semiconductors as related to the characteristics and design of solid state electronic devices.

### **E E 442 Solid State Devices (3)**

The objective of E E 442, an electrical engineering elective course taken by seniors and graduate students, is to develop a rigorous introduction to the relevant concepts in quantum mechanics and statistical mechanics pertaining to understanding the key physical mechanisms that govern the electrical, optical and even mechanical behavior of semiconductor materials and devices.

This course explicitly deals with the physics of operation of electronic and optoelectronic devices, and expounds on the practical aspects of device design given the inherently non-ideal nature of semiconductor devices in real life.

The course typically features a couple of invited guest lectures from leading experts involved in the state-of-the-art research on semiconductor materials and devices so that seniors and first year graduate students learn about the recent advances in electronic and optoelectronic devices which reside outside the scope of the recent text books.

Nanoelectronics today is a very broad discipline that extends the traditional solid-state devices such as transistors, diodes, resistors, capacitors, photodetectors, laser diodes commonly found in electronic and optoelectronic integrated circuits to a variety of emerging technologies such as large area flexible electronics, energy conversion devices, chemical and biological sensors, microelectromechanical devices. A continuous trend of fundamental breakthroughs at the materials and device architecture level keeps this field exciting and opens up new application space hitherto unexplored. The opportunity exists for the students taking this course to get introduced at a broad level to each of these areas. This course will serve as a cornerstone of the students' electronics education should they join the 275 billion dollar global semiconductor industry or should they decide to pursue graduate education in the area of advanced materials and devices.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 442 Solid State Devices (3)** The physics of semiconductors as related to the characteristics and design of solid state electronic devices.

### **E E 442 Solid State Devices (3)**

The objective of E E 442, an electrical engineering elective course taken by seniors and graduate students, is to develop a rigorous introduction to the relevant concepts in quantum mechanics and statistical mechanics pertaining to understanding the key physical mechanisms that govern the electrical, optical and even mechanical behavior of semiconductor materials and devices.

This course explicitly deals with the physics of operation of electronic and optoelectronic devices, and expounds on the practical aspects of device design given the inherently non-ideal nature of semiconductor devices in real life.

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General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 450 Signal and Image Processing (3)** Linear system analysis in one-dimension and two-dimensions, emphasis on filtering; multi-dimensional signal analysis; image enhancement and reconstruction; computer simulation applications.

### **Signal and Image Processing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 453 Fundamentals of Digital Signal Processing (3)** Design of FIR and IIR filters; DFT and its computation via FFT; applications of DFT; filter implementation; finite arithmetic effects.

### **E E 453 Fundamentals of Digital Signal Processing (3)**

The objective of E E 453, an electrical engineering elective course taken by seniors and graduate students, is to develop a rigorous, yet elementary, introduction to the fundamentals of one-dimensional discrete-time (digital) signal processing. The main topics in the course are the analysis and design of finite impulse response (FIR) and infinite impulse response (IIR) digital filters, the discrete Fourier transform (DFT) and its computation via the fast Fourier transform (FFT), and error analysis due to the constraints of finite arithmetic.

The emphasis on the analysis and design of linear time-invariant discrete-time filters rests on the background acquired in the time as well as transform domain analysis of continuous-time and discrete-time signals and systems interfaced via the Shannon sampling theory.

The students are alerted about topics outside the main thrust of the course mentioned above and these peripheral issues (that lead to more advanced subject matter pursued in depth in subsequent signal processing courses) include interpolation, decimation, and multirate digital signal processing.

There is also a laboratory portion of E E 453 that exposes students to the use of digital signal processing workstations -- a collection of hardware and software that is used to acquire, digitize, filter, analyze, and display a variety of real-life

signals. This hands-on experience helps the student appreciate and understand theoretical concepts covered in class like the sampling and reconstruction of continuous-time signals, IIR and FIR filter design, and error analysis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 454 (CMPEN 454) Fundamentals of Computer Vision (3)** Introduction to topics such as image formation, segmentation, feature extraction, shape recovery, object recognition, and dynamic scene analysis.

**E E 454 Fundamentals of Computer Vision (3)**

E E 454 is an introduction to computer vision. The goal of computer vision is to make computers understand and interpret visual information. Computer vision systems bring together imaging devices, computers, and sophisticated algorithms for solving problems in areas such as industrial inspection, medicine, document analysis, autonomous navigation, and remote sensing. The course involves both pedagogical written assignments and computer projects.

The beginning of the course gives an overview of computer vision and introduces low level image analysis techniques for binary images. Binary vision systems are useful when the silhouette of imaged objects convey enough information to recognize them. Examples can be found in optical character recognition, chromosome analysis and recognition of industrial parts. Moreover, many techniques developed for binary systems can be applied to gray level or color images. Next, the course covers image segmentation and contours. These topics are the foundation of most computer vision techniques. For an image to be correctly interpreted, it must be partitioned into regions that correspond to distinct objects or parts of objects. First, region based techniques such as thresholding, split and merge, region growing and texture analysis are introduced. Next, edge based techniques using gradient and Laplacian operators are discussed. Finally, contour representations and curve approximations linking edges into region boundaries are studied.

Next, depth from vision, with emphasis in stereo vision, is considered. Calculating distances to and among various points in the scene is important in many computer vision tasks such as inspection, robot manipulation, and autonomous navigation. In this part of the course the geometry of stereo systems and how to obtain depth maps from stereo image pairs is studied. Also, alternative 3D imaging sensors such as laser based range finders and radars are discussed.

Following stereo, the topic of computer vision is broadened to understand sequences of images over time. In this section techniques using information on spatial and temporal changes are used to design computer vision systems capable of coping with moving and changing objects, changing illumination and changing viewpoints. Visual motion is important primarily for two reasons. First, motion is a very important cue to understand the scene structure. Second, biological systems do use motion to infer properties of the surrounding world with very little a priori knowledge.

Finally, the topic of 3D object recognition is discussed. Object recognition entails two main issues: object identification and object localization. Identification determines the objects being imaged while localization determines their position in the world and with respect to the sensors. This topic builds upon all the different techniques discussed until this point.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 455 (CMPEN 455) An Introduction to Digital Image Processing (3)** Overview of digital image processing techniques and their applications; image sampling, enhancement, restoration, and analysis; computer projects.

**E E (CMPEN) 455 An Introduction to Digital Image Processing (3)**

E E/CMPEN 455, a technical elective available to both electrical and computer engineering seniors and graduate students, discusses many current techniques for processing and manipulating digital images. The course involves both pedagogical written assignments and computer projects.

The beginning of the course gives an overview of digital image processing systems and digital image fundamentals. During this unit, important elements of human visual perception are reviewed; these ideas help motivate many of the computer-based techniques described in subsequent units. Also, the standard model for a digital image, in addition to the concepts of sampling and quantization, are described. Finally, basic topological concepts between digital image pixel are discussed.

The next unit considers image transform analysis, with a primary focus on Fourier-based techniques. The one-dimensional Fourier transform is reviewed, and then two-dimensional Fourier transform analysis is discussed. To bridge the gap from the continuous world to the digital world, the sampling theorem is introduced. Next, the Discrete Fourier Transform and its properties are described. Fourier-based filtering techniques, such as the ideal low-pass and Butterworth filters are then introduced. The Fast Fourier Transform is also discussed. Finally, the Discrete Cosine Transform, used later in JPEG and MPEG, is introduced.

The next unit discusses techniques for image enhancement and segmentation. These techniques include point-based

techniques based on histogram analysis. They also involve linear and nonlinear mask-based methods for noise reduction and region sharpening. Further, techniques of mathematical morphology, which involve an application of set-theoretic concepts to image processing, are described. Finally, image segmentation methods, based on edge detection and thresholding, are described.

The final unit considers the concept of image compression. Techniques for image encoding and decoding are discussed. A brief model of the encoding-decoding process is described. Next, compression techniques, such as run-length encoding and Huffman coding, are described. Finally, the multimedia image-compression methodologies, JPEG and MPEG, are discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 456** (E SC 456, EGEE 456) Introduction to Neural Networks (3) Artificial Neural Networks as a solving tool for difficult problems for which conventional methods are not applicable.

**E E (E SC/EGEE) 456 Introduction to Neural Networks (3)**

This course is in response to students needs to learn Artificial Neural Networks (ANN) as a solving tool for difficult problems for which conventional methods are not available. The objective of this course is to give students hands-on experiences in identifying the best types of ANN, plus developing and applying ANN to solve difficult problems. Students will be introduced to a variety of ANN and will use their training skills to solve their own applications. During this course the students will develop a final project, in which they will apply ANN to widely varied problems.

Examples:

- I) students from E E may be interested in applying ANN to solve control problems;
- II ) students from Material Sciences may be interested in applying ANN to predict the pitting corrosion of components;
- III) students from Petroleum Engineering may be interested in applying ANN to characterize the life of a reservoir;
- IV ) students from Agricultural Engineering may be interested in applying ANN to sort apples automatically, etc.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 458** Digital Image Processing and Computer Vision (3) Principles of DSP and computer vision, including sensing preprocessing, segmentation, description, recognition, and interpretation.

**E E (CSE) 458 Communication Networks (3)**

E E (CSE) 458 is an elective course in both the electrical and computer engineering curricula which provides an overview of the broad field of data and computer communications. First, a general model of the communication task is presented, including the layered concept by which each layer provides services for the layer above. Next, the lowest (physical) layer is studied. This involves signal design, Fourier analysis representations, bandwidth concepts, transmission impairments and communication media properties. Then the next higher (link) layer is considered which involves organizing bits into frames, data link and error control methods (including frame sequence numbering and error detection principles). Multiplexing to share a link is studied, including frequency division multiplexing, dedicated time division multiplexing, and statistical time multiplexing.

At the network layer level, there are two categories: broadcast (usually local area) and switching networks. Broadcast and local area network studies include bus, tree and star topologies, Ethernet, optical fiber bus networks, ring networks, and medium access control protocols.

Switching, and routine, concepts for networks are explained, including both circuit and packet switching, datagrams and virtual circuits. Properties of frame relay and asynchronous transfer mode (ATM) networks are described. Internetworking, frame structures, routing and protocols are studied. Also, bridge routing for local networks is described.

At the still higher transport (network end-to-end control) layer, transport protocols, including TCP/IP, are described.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 460** Communication Systems II (3) Probability fundamentals, digital/analog modulation/demodulation, system noise analysis, SNR and BER calculations, optimal receiver design concepts, introductory information theory.

**E E 460 Communication Systems Performance Analysis (3)**

E E 460 is an elective course in the electrical engineering curricula that provides detailed performance analysis of communications systems studied in E E 360.

First a review of axiomatic approach to probability theory is presented, including review of random variables, their statistics, central-limit theorem and correlation function. This is followed by a review of the theory of random processes including power spectral density, multiple random processes, their transmission through linear systems and band-pass random processes.

Then, behavior of analog systems in the presence of additive white Gaussian noise (AWGN) is analyzed. As a benchmark, signal-to-noise ratio is derived for a base band system. This is followed by a performance assessment of amplitude modulated and frequency modulated systems and comparison is made to the base band system performance. Concepts of optimum pre-and de-emphasis systems are explained.

Behavior of digital communication systems in AWGN is studied. This includes optimum threshold detection and general analysis of optimum binary receivers. Performance of carrier modulation systems ASK, FSK, PSK and DPSK is derived in terms of average bit error rate (BER) as a function of bit-energy-to-noise density height. M-ary communications systems are analyzed. Synchronization issues are discussed.

This is followed by the theory of optimum signal detection; geometrical representation of signals and signal spaces, Gaussian processes, optimum receiver and equivalent signal sets are illustrated by several examples. BER performance analysis of complex digital modulated systems is demonstrated, using the developed signal space concepts.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 461** Communications I (4) Element of analog and digital communication systems, AM, FM, and digital modulation techniques, receivers, transmitters, and transmission systems, noise.

**Communications I (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 471** (AERSP 490, NUC E 490) Introduction to Plasmas (3) Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

**Introduction to Plasmas (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 472** (AERSP 492) Space Astronomy and Introduction to Space Science (3) The physical nature of the objects in the solar system; the earth's atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

**Space Astronomy and Introduction to Space Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 474** Satellite Communications Systems (3) Overview of satellite communications systems, principles, space platforms, orbital mechanics, up/down links and link budgets, modulation techniques.



**E E 474 Satellite Communications Systems (3)**

This course is designed to give seniors and graduate students an overview of the principles of satellite communications systems. Building on junior-level courses in electromagnetics and communications, it shows how complex satellite systems operate and provide services that we depend on, such as telephone, television, weather forecasting, and global positioning. Specific topics include: historical background on how satellite systems came to be, present uses of satellite systems, and future trends in satellite systems design, construction, and uses; orbital mechanics and launch systems and vehicles; earth stations; radio propagation and link analysis; signals and satellite access methods. Student performance is evaluated via exams, homework assignments, and projects. Hands-on experience in the design of satellite communications links is gained through the use of industry-standard satellite system analysis software. In their design, the student must achieve specific goals of satellite accessibility, earth coverage footprint, orbital launch and stability, and communications link budget.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 477 (METEO 477) Fundamentals of Remote Sensing Systems (3)** The review of fundamental physical properties leads into discussions of various techniques, including imaging, spectroscopy, radiometry, and active sensing.

**Fundamentals of Remote Sensing Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 480 Linear Systems: Time Domain and Transform Analysis (3)** Signals and systems representations, classifications, and analysis using; Difference and Differential equations, Laplace transform, z-transform, Fourier series, FT, FFT, DFT.

**E E 480 Linear Systems: Time Domain and Transform Analysis (3)**

Linear Systems: Time Domain and Transform Analysis, is a recommended graduate level course for the Master of Engineering in Electrical Engineering at Capital College, since it is a prerequisite for most of the E E prefixed courses offered at this location. The major topics covered in this course include; Signals and Systems representations, classifications, and analysis using; Difference and Differential Equations, Laplace Transform, z-transform, Fourier series, Fourier Transform, Fast Fourier Transform (FFT), Discrete-Time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT). The objective of this course is to develop intuitive and practical understanding of the essentials in signals and systems. The stress is on fundamentals of representation, and analysis of signals and their applications to systems in both discrete and continuous time and frequency domains. This course is designed to prepare the graduate students for more advanced work in broad range areas including communications, control systems, power systems, computer engineering, signal processing and image processing. The quality of students' performances and therefore their course grades are determined via their performance in a midterm exam, a comprehensive final exam, homework assignments, and a course project in accordance with the university's grading policy.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 481 Control Systems (4)** Classical/modern approaches to system analysis/design; time/frequency domain modeling, stability, response, optimization, and compensation.

**E E 481 Control Systems (4)**

This course is designed to provide students with strong foundation in introduction to control systems analysis and design both in the classroom and laboratory settings. This course is a required course in the Electrical Engineering BS curriculum and is intended to be taken by students who have completed their circuits, signals, and systems course requirements as well as having background in mechanics. As such, the course integrates materials from the above undergraduate courses in addition to related math, engineering, and science courses. No special facilities are required for this course other than laboratories available to the Electrical Engineering Program.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 482** Introduction to Digital Control Systems (3) Sampling and hold operations; A/D and D/A conversions; modeling of digital systems; response evaluation; stability; basis of digital control; examples.

### **E E 482 Introduction to Digital Control Systems (3)**

E E 482 introduces fundamental concepts that will enable the student to analyze, design, and synthesize closed-loop systems that contain a digital computer. In order to successfully complete this course the student must have a foundation in classical control (E E 380 or equivalent) and discrete-time system concepts (E E 351 or equivalent). Problem solving is emphasized. Concepts introduced in lecture are reinforced by a series of laboratory projects and weekly problem sets. Through these exercises the student will acquire competence in analytical and computer aided analysis techniques.

The course covers several topic areas including modeling of sampled-data systems, system identification using the batch least squares method, time response characteristics, stability analysis techniques, discrete-time approximation of continuous-time controllers, classical design methods based on root locus and frequency response, and modern design methods including state and observer feedback design.

Laboratory projects include system identification and control design based on the root locus, frequency response, and state-feedback methods. Each project involves the use of either a servomechanism or a fluid testbed. Laboratory projects and problem sets will develop the student's appreciation for computer aided control system analysis and design techniques. Student performance is assessed using homework, laboratory projects, hour exams, and a final exam.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 483** Introduction to Automation and Robotics Systems (3) Introduction to robotics systems with emphasis on robotic motion and control, and robotic components such as actuators and sensors.

### **Introduction to Automation and Robotics Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 484** Control System Design (3) Analysis and design of automatic control systems using time, frequency domain and state variable methods.

### **Control System Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 485** Energy Systems and Conversion (3) Overview of energy alternatives available, and study of theory of operation and models of major energy conversion devices.

### **E E 485 Energy Systems and Conversion (3)**

The course is designed to give students an overview of available energy alternatives, and to study the fundamental theory of operation and system models for major energy conversion devices. The topics covered give students the tools to assess the viability of various energy options, their applications, and their impact on the environment. Various forms of raw energy sources used in powering conventional electric generating plants such as coal, natural gas, oil, and uranium will be studied, along with worldwide distribution and reserves. The analytical tools for determining quantities of energy that could be extracted from the wind, water falls, and solar energy sources using practical devices will be presented in the course as well as various case studies. The state of the art in energy storage technology and its impact on electrical vehicle range will be presented in the first half of the semester. The second half of the semester 's devoted to studying the theoretical fundamentals and applications of major energy conversion devices. Magnetic circuits covers the electrical circuit

model and analog for studying energy transfer involving magnetic systems. The link to a direct application - power transformers is established, and then to rotating magnetic machines in general. The poly-phase AC induction motor circuit model, energy flow, and selection for various load types will be covered. Modern speed control techniques using inverters will also be covered. The principles of operation of the synchronous energy converter will be explored and its unique features. The power angle characteristics and its relationship to stability of a power system will be covered. Presentation on theory and applications of classical DC motors and generators, and the newer permanent magnet (PM) machines with their superior performance characteristics and energy density will conclude the semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 487 Electric Machinery and Drives (3)** Analysis of variable-speed drives comprised of AC electric machines, power converters, and control systems.

### **E E 487 Electric Machinery and Drives (3)**

This course is a technical elective intended for seniors and graduate students interested in electromechanical systems. The first part of the course (approximately two thirds) is devoted to fundamental theory in the modeling and analysis of power converters and AC electric machines. The second part is devoted to the theory and implementation of two specific control schemes: simple volts-per-hertz control applied to the induction machine and high-performance field-oriented control applied to the induction machine and to the permanent magnet machine. The course includes a significant laboratory component consisting of hands-on experience with DSP-based control of drives. Each station in the Electric Machinery and Drives Laboratory is comprised of a dynamometer, an induction machine, a permanent magnet machine, a 3-phase inverter with built-in diode rectifier, a 3-phase power supply, and a DSP-based controller. The DSP-based controller is programmed in the MATLAB/Simulink graphical environment, allowing a student to modify control algorithms easily. Separate computer software allows easy access to controller variables for modification and display. This course builds upon basic knowledge of continuous-time linear systems theory and electric machine modeling. The materials in this course has applications in hybrid/electric vehicles and other transportation systems, industrial processes and automation, and power generation/energy storage systems.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 488 Power Systems Analysis I (3)** Fundamentals, power transformers, transmission lines, power flow, fault calculations, power system controls.

### **Power Systems Analysis I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 489 Power Systems Analysis II (3)** Symmetrical components, unbalanced networks, unsymmetrical faults, unbalanced operation of rotating machines, transient transmission line modeling, system protection.

### **Power Systems Analysis II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 494 Senior Thesis (1-9)** Students must have approval of a thesis adviser before scheduling this course.

### **Senior Thesis (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 494H** Senior Thesis (1-9) Students must have approval of a thesis adviser before scheduling this course.

#### **Senior Thesis (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 497A** Introduction to Signal Integrity for Interconnects (3) Transmission lines and reflections, lossy lines, rise time, material properties, cross talk in transmission lines. Time and frequency domain measurements, jitter.

#### **Introduction to Signal Integrity for Interconnects (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 497B** Probability and Random Processes for Electrical Engineers (3) Probability elective for EE students with applications in information theory, signal detection, control systems, and circuit analysis.

#### **Probability and Random Processes for Electrical Engineers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 497B** Probability and Random Processes for Electrical Engineers (3) Probability elective for EE students with applications in information theory, signal detection, control systems, and circuit analysis.

**Probability and Random Processes for Electrical Engineers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 497E** Software-Defined Radio (3) Software-defined Radio (SDR) combines elements of communication systems and digital signal processing to create a software-based communication system.

**Software-Defined Radio (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 497E** Software-Defined Radio (3) Software-defined Radio (SDR) combines elements of communication systems and digital signal processing to create a software-based communication system.

**Software-Defined Radio (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 500** Colloquium (1) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 510** Linear Integrated Circuits (3) Design of monolithic, thin-film, and hybrid linear integrated circuits; D.C., video, tuned, r.f., and microwave applications. Emphasis on reliability.

**Linear Integrated Circuits (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 520** Electro Optics--Systems and Computing (3) Synthetic aperture radar, spatial light modulators, optical interconnection, optical computing, neural networks, and medical optics imaging.

### **Electro Optics--Systems and Computing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 521** Fiber Optics and Integrated Optics (3) Theories and applications of linear and nonlinear optical phenomena in optical fibers and integrated optical devices.

### **Fiber Optics and Integrated Optics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 522** Electro-Optics Laboratory (3) Basic concepts and fundamentals of light diffraction, optical signal processing, and holography.

### **Electro-Optics Laboratory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 524** Lasers and Optical Electronics (3) Study of several advanced nonlinear optical phenomena, laser propagation, optical and optoelectronic devices, principles, and applications.

### **Lasers and Optical Electronics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 526** Nonlinear Optical Materials (3) Mechanisms of polarization nonlinearity, nonlinear optical processes and analyses, optoelectronic materials and their device application.

### **E E (MATSE) 526 Nonlinear Optical Materials (3)**

Nonlinear Optical Materials is a course that will generally be offered in spring semesters. It is designed for students who are interested in the materials science-related interdisciplinary electronics/electro-optic engineering areas to provide an essential understanding of the mechanisms of the polarization nonlinearity in electronic materials as well as the principles of operation of these materials in various photonic and optoelectronic applications (e.g., frequency conversion, optical control/communication, and information storage). Analytical methods utilizing the electromagnetic wave theories and tensor operations will be covered in this course to treat anisotropic nonlinear optical materials for their wave-matter interaction processes and to enable device designs. Technological issues in research and development of advanced optoelectronic devices using nonlinear optical materials are discussed with students' participation.

Students wishing to take this course should be familiar with optical properties of materials and basic tensor notations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 531 Engineering Electromagnetics (3)** Electromagnetic field theory fundamentals with application to transmission lines, waveguides, cavities, antennas, radar, and radio propagation.

### **Engineering Electromagnetics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 534 Conformal Antennas (3)** Introduction to advanced analysis and design techniques as well as applications for conformal antennas mounted on planar and curved surfaces.

### **E E 534 Conformal Antennas (3)**

E E 534 provides an introduction to the rapidly growing field of conformal antennas. Analysis and design techniques are presented for conformal antennas mounted on planar as well as curved surfaces. Important applications of conformal antennas are also discussed with emphasis on their recent popularity as wireless PCS, GPS, and body-born antennas. Microstrip antenna design projects will be assigned, where students will gain valuable experience using one or more commercially available industry-standards modeling codes.

E E 534 is the third and most advanced course in a three-course sequence of antenna engineering courses: E E 438 (Antenna Engineering), E E 538 (Antenna Engineering) and E E 534.

E E 534 will be taught every other fall semester, with an anticipated enrollment of 20-30 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 535 Boundary Value Methods of Electromagnetics (3)** Theory and application of boundary value problems in engineering electromagnetics; topics include microwave and optical waveguides, radiation, and scattering.

### **Boundary Value Methods of Electromagnetics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 537 Numerical and Asymptotic Methods of Electromagnetics (3)** Finite difference time domain, geometric theory of diffraction and method of moments applied to antennas and scattering.

### **Numerical and Asymptotic Methods of Electromagnetics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 538 Antenna Engineering (3)** In-depth studies of synthesis methods, aperture sources, broadband antennas, and signal-processing arrays.

**Antenna Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 541** Manufacturing Methods in Microelectronics (3) Methods, tools, and materials used to process advanced silicon integrated circuits.

**Manufacturing Methods in Microelectronics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 542** Semiconductor Devices (3) Characteristics and limitations of bipolar transistors, diodes, transit time, and bulk-effect devices.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 543** Ferroelectric Devices (3) Theoretical background of ferroelectric devices, practical materials, device designs, drive/control techniques, and typical applications.

**Ferroelectric Devices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 544** Micromechatronics (3) Theoretical background of solid state actuators, practical materials, device designs, drive/control techniques and typical applications.

**Micromechatronics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 546** Field-Effect Devices (3) The physical background, characteristics, and limitations of surface field-effect and junction field-effect devices and related structures.

**Field-Effect Devices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**E E 547 Dielectric Devices (3)** Applications of insulator physics and devices based on insulator properties.

**Dielectric Devices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 549 Acoustic Wave Devices (3)** Examines materials commonly used for acoustic wave devices, fundamentals of acoustic waves and resonance modes, and characteristics of these devices.

**E E 549 Acoustic Wave Devices (3)**

E E 549 is an elective in the field of electronic and photonic materials. Solid state acoustic wave devices based on piezoelectric, ferroelectric, and microelectromechanical systems (MEMS) have a broad range of applications including chemical and biological sensors, electromechanical sensing and transduction, resonators and wave guides for material characterization and health monitoring, filters in telecommunication systems, and optic communications. The course will cover commonly used materials and phenomena for acoustic wave devices, characteristics of different waves and vibration modes, device configurations, their main characteristics and applications, as well as design considerations.

Students will learn the key features and materials commonly used for acoustic wave devices, main acoustic mode and their characteristics, important device configurations, the equivalent circuits for acoustic wave modes and devices, and examples of the device applications. Students will also acquire basic skills in selecting acoustic wave devices for specific applications, in designing and characterizing acoustic wave devices for different applications, and in finding suitable available materials and/or phenomena for the acoustic wave device.

This course will count as an elective for electrical engineering students in the electronics and photonics sub-discipline. Students wishing to take this course should be familiar with electronic circuit design and solid state devices.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 550 (M E 550) Foundations of Engineering Systems Analysis (3)** Analytical methods are developed using the vector space approach for solving control and estimation problems; examples from different engineering applications.

**E E (M E) 550 Foundations of Engineering Systems Analysis (3)**

This 3-credit course is offered at the first-year graduate level and provides a systems-theoretic background for more advanced graduate courses in the disciplines of engineering and science. The course uses the vector space approach to develop the analytical foundations for solutions of science and engineering problems in diverse application areas such as optimal control, estimation, and signal processing. First, the theoretical foundation of vector spaces, function spaces, and Hilbert spaces are developed. Linear transformations are then introduced, followed by the Reisz-Frechet theorem and Hahn-Banach theorem, with applications to optimization problems. Spectral analysis is then covered. Finally, diverse applications of these various techniques are presented throughout this course to illustrate the wide range of engineering problems that can be solved using the vector space approach.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 551 Wavelets, Filter Banks, and Multi-resolution Analysis (3)** Gram-Schmidt orthogonalization and orthonormal bases, filter banks, orthogonal wavelets and multiresolution analysis, fast wavelet tranforms, various applications.

**Wavelets, Filter Banks, and Multi-resolution Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 552** (CSE 583) Pattern Recognition--Principles and Applications (3) Principles and applications decision-theoretic classification, discriminant functions, pattern processing and feature selection, syntactic pattern recognition, shape analysis and recognition.

**Pattern Recognition--Principles and Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 553** Topics in Digital Signal Processing (3) Parametric modeling, spectral estimation, efficient transforms and convolution algorithms, multirate processing, and selected applications involving non-linear and time-variant filters.

**Topics in Digital Signal Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 554** (CSE 586) Topics in Computer Vision (3) Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications.

**Topics in Computer Vision (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 555** (CSE 585) Digital Image Processing II (3) Advanced treatment of image processing techniques; image restoration, image segmentation, texture, and mathematical morphology.

**Digital Image Processing II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 556** Graphs, Algorithms, and Neural Networks (3) Examine neural networks by exploiting graph theory for offering alternate solutions to classical problems in signal processing and control.

**Graphs, Algorithms, and Neural Networks (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 557** Multidimensional Signal Processing (3) Multidimensional sampling, weak causality, recursibility, multidimensional transforms, stability, global and local state-space models, multidimensional filters, and multidimensional spectrum estimation.

**Multidimensional Signal Processing (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 560** Probability, Random Variables, and Stochastic Processes (3) Review of probability theory and random variables; mathematical description of random signals; linear system response; Wiener, Kalman, and other filtering.

### **Probability, Random Variables, and Stochastic Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 561** Information Theory (3) Mathematical measurement of information; information transfer in discrete systems; redundancy, efficiency, and channel capacity; encoding systems.

### **Information Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 562** Detection and Estimation Theory (3) Detection decision theory, Bayes and Neyman-Pearson criteria, optimal receivers, classical estimation theory, signal-noise representations, optimum linear signal parameters estimation.

### **Detection and Estimation Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 564** (CSE 554) Error Correcting Codes for Computers and Communication (3) Block, cyclic and convolutional codes; circuits and algorithms for decoding; application to reliable communication and fault-tolerant computing.

### **Error Correcting Codes for Computers and Communication (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 565** (CSE 515) Reliable Data Communications (3) Discussion of problems and solutions for ensuring reliable and efficient communication over wired and wireless links and data networks.

### **Reliable Data Communications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 567** Wireless and Mobile Communications (3) Development of key wireless networks systems analysis and design tools utilizing telecommunications principles; current and emerging mobile wireless techniques.

**E E 567 Wireless and Mobile Communications (3)**

E E 567, Wireless and Mobile Communications, extends basic principles of communications systems and their associated performance into the world of wireless and mobile communications. This course has been designed primarily to provide a good understanding of fundamental problems and counter-measure techniques in digital communications over dispersive wireless mobile channels. It starts with a review of material necessary for advanced study in wireless communications: current wireless mobile systems and standards, frequency reuse and the cellular concept, co-channel interference and noise, receiver sensitivity and link budget calculations, coverage, and spectral efficiency and capacity.

Next, various types of propagation modeling are presented, such as large-scale fading, small-scale fading, and multiple scattering (multi-path) phenomena. Examples of Rayleigh, Rician, and Nakagami fading channels are discussed, and level crossing rates and fade durations are determined. This is followed by methods for developing laboratory fading channel simulators for both single- and multiple-paths channel models, including the laboratory simulation of shadowing. Conventional path-loss models in macro-cells such as Okumura-Hata and outdoors micro-cells, COST231-Hata, and Walfish-Ikegami models as well as path loss for indoor micro-cells are then detailed.

The next part of the course covers fundamental limits introduced by co-channel interference, as multiple lognormal interferers are introduced. Specifically, Fenton-Wilkinson, Schwartz and Yeh, Farley's methods and a numerical comparison are presented. Outage probability evaluation is detailed. Modulation techniques used in wireless mobile applications and associated performance over fading channels are reviewed next, followed by a detailed investigation of diversity and combining techniques.

TDMA and CDMA Cellular systems are presented next. Topics covered here include: Spread spectrum systems including direct sequence, frequency hopping, fading channel applications, RAKE receiver concepts, multi-input-multi-output (MIMO) systems using antenna arrays, space-time coding and BLAST systems. As examples of mobile cellular architectures, TDMA (GSM) and CDMA cellular systems are covered.

Finally, in order to initiate hard or soft handoffs, link quality measurement techniques are discussed. Optimal resource allocation in terms of channel assignment techniques are presented and analyzed.

Students will be evaluated by means of assignments (25%), a mid-semester examination (35%), and a final examination (40%). The course will be offered every other spring, with an anticipated enrollment of 15-30 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 568 Digital Communications I (3)** Linear and nonlinear digital modulation techniques; performance in additive Gaussian noise channel; continuous phase modulation; carrier acquisition and recovery.

**Digital Communications I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:  
Concurrent: E E 560

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 569 Digital Communications II (3)** Baseband pulse transmission; baseband systems optimization; bandlimited channels performance in ISI; equalization; MLSE and ISI; fading channels; diversity; CDMA.

**Digital Communications II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 573 Constitution of the Ionosphere (3)** Properties of neutral and ionized atmosphere above 60 km; photochemical processes; solar, meteoric perturbations of the ionosphere; large-scale movements in ionization.

**Constitution of the Ionosphere (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 574** Propagation Through Random Media (3) RF/optical wave propagation through turbulent, turbid, and heterogeneous media (atmosphere/ionosphere/sea). Impacts and mitigation discussed for various scenarios.

### **Propagation Through Random Media (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 576** Inversion Techniques in Remote Sensing (3) Introduce skills to address a wide variety of inverse problems such as found in atmospheric sensing, geosciences, and acoustics.

### **Inversion Techniques in Remote Sensing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 579** Microwave Radar Remote Sensing (3) Scientific and engineering principles of microwave radar remote sensing of land, sea, and the atmosphere.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 580** Linear Control Systems (3) Continuous and discrete-time linear control systems; state variable models; analytical design for deterministic and random inputs; time-varying systems stability.

### **Linear Control Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 581** Optimal Control (3) Variational methods in control system design; classical calculus of variations, dynamic programming, maximum principle; optimal digital control systems; state estimation.

### **Optimal Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 582** Adaptive and Learning Systems (3) Adaptive and learning control systems; system identification; performance indices; gradient, stochastic approximation, controlled random search methods; introduction to pattern recognition.

### **Adaptive and Learning Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 584** (M E 558) Robust Control Theory (3) Fundamentals of Robust Control Theory with emphasis on stability, performance analysis, and design.

**Robust Control Theory (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 587** (M E 559) Nonlinear Control and Stability (3) Design of nonlinear automatic control systems; phase-plane methods; describing functions; optimum switched systems; Liapunov stability; special topics in stability.

**Nonlinear Control and Stability (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 588** Power System Control and Operation (3) Steady-state and dynamic model of synchronous machines, excitation systems, unit commitment, control of generation, optimal power flow.

**Power System Control and Operation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 594** Research Projects (1-3) Supervision of individual research projects leading to M.S. or M.Eng. papers. Written and oral reports are required.

**Research Projects (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 596** Individual Studies (1-9) Creative projects including non-thesis research which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597A** Compound Semiconductors (3) III-V and SiGe compound semiconductor devices with emphasis on HBTs and HEMTs.

**Compound Semiconductors (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597A** Compound Semiconductors (3) III-V and SiGe compound semiconductor devices with emphasis on HBTs and HEMTs.

**Compound Semiconductors (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597B** Current Issues in Geophysical Radar Scattering (3) Current issues in geophysical radar scattering.

**Current Issues in Geophysical Radar Scattering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597B** Current Issues in Geophysical Radar Scattering (3) Current issues in geophysical radar scattering.

**Current Issues in Geophysical Radar Scattering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597C** Emerging Topics in Networked Systems (3) Social networking; wireless energy harvesting networks; information security; network information theory.

**Emerging Topics in Networked Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597D** Smart Grid System Evaluation and Modeling (3) The Smart Grid System Evaluation and Modeling course will examine the emerging architecture of the grid with the goal of understanding the role of communication systems and information technology. The limits of long established analysis tools such as power flow, voltage stability, congestion management, contingency analysis, economic dispatch, angle-based stability, security assessment, etc. will be studied. The course will discuss new ideas for adapting these computation tools to the smart grid environment.

**Smart Grid System Evaluation and Modeling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 597E** Processing and Characterization of Semiconductor Surfaces (3) Processing and characterization of semiconductor surfaces and interfaces that form a foundation of semiconductor electronic and photonic devices.

**Processing and Characterization of Semiconductor Surfaces (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 602** Supervised Experience in College Teaching (3 per semester/maximum of 6) College Teaching Experience

**Supervised Experience in College Teaching (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E E 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Elements Of Clin Res (ELCLR)**

**ELCLR 700** Elements of Clinical Research (3) This interactive course covers the fundamentals of clinical research, logistic and ethical issues, manuscript and grant writing, and presentation training.

#### **Elements of Clinical Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Emergency Med-Hy (EMED)**

**EMED 740** Emergency Medicine Ultrasound (5) This course provides hands-on exposure to bedside ultrasound image acquisition and interpretation in the Emergency Department.

#### **Emergency Medicine Ultrasound (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EMED 752** Emergency Medicine Acting Internship (5) Supervised experience in the management of acute medical and surgical conditions in the emergency care unit.

#### **Emergency Medicine Acting Internship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EMED 754** Toxicology Elective (5) Toxicology admissions and consults; weekly two-hour conferences; poison center sign-out rounds; exposure to the most common toxicologic poisonings; research opportunities.

#### **Toxicology Elective (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EMED 756** Emergency Medicine Elective for Third Year Students (2.5) Introduction for the 3rd year medical student to various aspects of Emergency Medicine.

### **Emergency Medicine Elective for Third Year Students (2.5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EMED 796** Emergency Medicine Independent Studies (5) Emergency Medicine Independent Studies

### **Emergency Medicine Independent Studies (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EMED 797** Emergency Medicine Special Topics (5) Emergency Medicine Special Topics

### **Emergency Medicine Special Topics (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Endocrinology-Hy (END)**

**END 731** Endocrinology (3) These areas will be studied: Pituitary Disease; Thyroid Disease; Hyper- thyroidism; Sexual Development; disorders of Calcium and Phosphorous; Adrenal Disease; Diabetes Mellitus; Hypoglycemia; and Normal and Abnormal Growth.

### **Endocrinology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Energy and Geo-Environmental Engineering (EGEE)**

**EGEE 401** Energy in a Changing World (3) Energy is in transition, with increased international energy demand and increasing environmental pressures. Energy transitions, approaches, and outcomes are addressed.

### **EGEE 401 Energy in a Changing World (3)**

The role of energy is increasingly important with increasing environmental constraints, transitioning energy policies, supply disruption, international pressure on climate change compliance and competition for energy. This course evaluates the existing energy infrastructure and energy/fuel use, both domestic and international, along with evolving technologies, implementation and challenges in meeting energy demands. The class provides a holistic view and serves all students interested in an energy or energy-related career. Students will understand the interrelationship between legislative, technology, environmental, and international factors associated with energy production, processing, distribution and

utilization.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 411 Energy Science and Engineering Lab (3)** A comprehensive introduction to classic and modern laboratory skills and experimentation of relevance to energy science and engineering practice.

### **EGEE 411 Energy Science and Engineering Lab (3)**

The role of energy in society is increasingly important with increasing environmental constraints, transitioning energy policies, supply disruption, and international pressure on climate change compliance and competition for energy. Both conventional (fossil fuels) and renewable energy sources are being explored. This course will provide hands on laboratory exposure to the techniques, tools, and analytical methods used in addressing energy science and engineering problems. Students will be exposed to probability, statistical and experimental design methods. Students will perform a variety of lab experiments, analyze the data and write reports on each experiment. Statistical analysis of the data is required where applicable. For the final lab assignment, each student will be given a "mystery" hydrocarbon-based fuel and will be required to characterize or identify the unknown fuel using the practical knowledge of the instrumentation they have learned during the semester. This is one of the required laboratory-based courses in the Energy Engineering Major and the Energy and Fuels Option in Chemical Engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 412 Green Engineering & Environmental Compliance (3)** Material and energy flows as they relate to industrial systems, environmental concerns, pollution prevention, and the development of clean technologies.

### **EGEE 412 Green Engineering & Environmental Compliance (3)**

The primary objective of EGEE 412 is to introduce students to how engineering and industrial decisions affect the environment and how clean technologies can reduce environmental impact. Students will also be exposed to global mass and energy flows from an environmental perspective that relate to both industrial and natural systems. Students will be exposed to environmental concepts, principles, and evaluation techniques within the framework of green engineering, pollution prevention, and environmental sustainability. The course is for students with a general science or engineering background.

By examining mass and energy flows on the unit operation, plant-wide, local and regional scale, students will understand the interaction of anthropogenic flows with natural cycles of materials and energy. Students will understand how environmental concerns and regulations provide the motivation and incentive behind reducing pollution during the design phase rather than as an "add-on" or "end of pipe" treatment technology. Students will evaluate plant flow sheets to identify engineering means by which to reduce plant-wide environmental impact.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 420 Hydrogen and Fuel Cells (3)** Course will cover the fundamental principles of electrochemical engineering, hydrogen production and storage, and the design and application of the main types of fuel cells.

### **EGEE 420 Hydrogen and Fuel Cells (3)**

The primary objective of the course is to help students understand the fundamental principles of electrochemistry, the production and storage of hydrogen from biomass and fossil fuels, and the design and operation of different types of fuel cells. Students will begin with electrochemistry and electrochemical engineering systems including fuel cells. The chemical and biochemical methods used for producing hydrogen for fuel cells applications and the current technologies available for hydrogen storage will follow next. Students are expected to be able to apply their knowledge and understanding in the analysis of fuel cell systems. Students are also expected to be able to distinguish between the design, operation, and advantages and disadvantages of the different types of fuel cells available. This is an elective course for the energy engineering major. It complements the required course on electrochemical energy conversion in the energy engineering

curriculum.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 430 (M E 430) Introduction to Combustion (3)** Concepts related to laminar and turbulent premixed and nonpremixed combustion with applications to propulsion and stationary systems.

### **EGEE (M E) 430 Introduction to Combustion (3)**

This course provides an introductory treatment of combustion science. The objectives of the course are to develop in the students an understanding of combustion kinetics, combustion thermochemistry, flame dynamics, flame stability, and pollutant formation. Coverage includes laminar and turbulent flames, premixed and diffusion flames, and detonations. Emphasis is placed on the role that Kinetics, heat transfer, mass transfer, and fluid dynamics have on flame structure and flame stability. The course includes some laboratory demonstrations of flat flame and diffusion flame burners, and incorporates numerical calculations of thermodynamic and kinetic combustion phenomena. The course begins with a review of transport phenomena, physical gas dynamics, and thermochemistry. Then, the concept of the laminar flame speed is introduced in the context of a one-dimensional flame and a propagating chemical wave. Issues of premixed flame structure and stability are presented along with a discussion of flammability limits. Next, laminar diffusion flames are presented via the Burke-Schumann analysis. From laminar flames, the emphasis shifts to turbulent premixed and diffusion flames, and the concepts of flame stretch and strain. Detonations are considered, with emphasis on thermodynamic analysis of the detonation and the structure of the detonation wave. Details of chemical kinetics for the hydrogen-oxygen and hydrocarbon-air reaction systems are presented, with linkage back to earlier topics such as flame stabilization and flammability limits. After kinetic phenomena, the course then considers pollutant formation focusing on soot and NO<sub>x</sub>. The fundamental aspects of combustion are applied to analysis of the combustion process and pollutant formation in international combustion engines and catalytic combustors. The course wraps up with discussion of atmospheric chemistry, the fate of pollutants, and the formation of secondary pollutants.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 433 Physical Processes in Energy Engineering (3)** Introduces fluid flow, heat transfer, phase equilibrium and mass transport phenomena in energy separation processes.

### **EGEE 433 Physical Processes in Energy Engineering (3)**

The objective of the course is to expose students to the physical flow and separation processes that occur in energy engineering systems. Students will be exposed to gas, liquid and solid phase separation processes. The heat, mass and momentum phenomena involved will be discussed. In particular, phase equilibria and mass transfer in the behavior and performance of gas, liquid and solid fuels will be emphasized. Students will be exposed in the class to the operation and design of absorption, adsorption, fluidization, size reduction, filtration, dissolution, entrainment, and heat exchange units. Students will understand the differences between chemical processes that involve chemical reactions and transformations and physical processes that involve mainly phase changes and separation. This is an elective course for the energy engineering major. It will be offered once per year in the spring semester with an estimated enrollment of 40. Assessment of student performance will be based on homework, student projects, mid-term exams, class participation, and final exam.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 436 Modern Thermodynamics for Energy Systems (3)** Thermodynamics of external fields, theory of stability and fluctuations, irreversible and non-linear thermodynamics, and bifurcation theory and their applications in energy and environmental processes are discussed.

### **EGEE 436 Modern Thermodynamics for Energy Systems (3)**

This course will be an advanced thermodynamics class that will expose students to the thermodynamics of irreversible processes and the thermodynamic analysis of dynamic systems. Students will learn to analyze the thermodynamics of conductivity, diffusion, gravitation, electrochemical systems, stability, fluctuations and critical phenomena. Students are expected to be able to understand and apply their knowledge to analyze problems involving fuel cells, membrane

potential in electrolysis systems for hydrogen production, and other energy and environmental processes. This is an elective course in the energy engineering major and will be offered once a year in the spring semester to about 40 students. Student performance will be evaluated based on homework, mid term exams, class participation, project, and final exams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 437 Design of Solar Energy Conversion Systems (3)** A review of fundamental concepts in solar energy conversion including photovoltaic (PV) and solar thermal conversion systems.

### **EGEE 437 Design of Solar Energy Conversion Systems (3)**

The course examines the principles of solar energy conversion to build a foundation for explaining the basic concepts and implementation of conversion processes. It reviews the properties and availability of solar radiation and geometric relationship of sun/collector, principles of photovoltaic conversion and properties of materials used in PV systems, designing PV systems, procedures for solar thermal engineering calculations, and thermal power plants for electricity generation. This course will complement the existing courses on fossil fuels and other renewable energy sources. Students will be engaged to actively participate in learning through team projects, semester papers, class presentations, and field trips.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 438 Wind and Hydropower Energy Conversion (3)** Principles of sustainability and renewable energy conversion with emphasis on wind and hydrokinetic energy resources.

### **EGEE 438 Wind and Hydropower Energy Conversion (3)**

This course examines the principles of sustainability and renewable energy conversion with emphasis on wind and hydrokinetic energy resources. Concentration is placed on the relationships between the renewable resources, conversion technology and economic feasibility along with consideration of the associated risks and environmental impacts. It will complement existing energy engineering courses on fossil fuel and solar energy conversion. Students will actively participate in learning through team projects, semester papers, class presentations, and field trips. This is a required course in the energy engineering major. The course will be offered every spring with an expected enrollment of 60 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 441 Electrochemical Engineering Fundamentals (3)** Course covers fundamental principles of electrochemistry, including electrochemical thermodynamics, kinetics, catalysis, and corrosion and focuses on applications such as fuel cells, batteries, and photovoltaics. Each application covers: principles of method, criteria determining performance, present state of development, and advantages/disadvantages. Laboratory demonstration of the performance (current-voltage) measurements of an electrochemical converter is scheduled in this course.

### **EGEE 441 Electrochemical Engineering Fundamentals (3)**

The course will cover the fundamental principles of electrochemistry, including electrochemical thermodynamics, kinetics, catalysis, and corrosion. Students will be exposed to the application of these principles in fuel cells, batteries, and photovoltaics. Students will be able to perform efficiency analysis in these systems. They will also be able to understand the differences between types of fuel cells and distinguish between electrochemical and chemical energy systems. For each of the above application areas students will learn the criteria used to determine their performance, their current state of development, and their advantages/disadvantages. Laboratory demonstration will help to enhance student knowledge and

understanding. Student performance will be evaluated through problem sets, quizzes, midterm, project papers, class participation, and final examination. This is a required course in the energy engineering major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 451 Energy Conversion Processes (3)** Emphasizes processes for conversion of fossil fuels, nuclear and biomass to other fuel forms as transportation fuels and electricity.

### **EGEE 451 Energy Conversion Processes (3)**

The primary objective of this course is to expose students to the principles of chemical and nuclear reactions that underlie most major energy conversion processes, particularly with reference to the conversion of energy resources such as fossil and nuclear energy to fuels and electric power. The emphasis of the first major unit of the course is on fundamental reaction chemistry including nuclear. The second objective is to connect chemical and nuclear principles to practical energy conversion processes by an analysis of case studies used as examples of such processes as ethanol via fermentation, biodiesel via transesterification, formation of light liquids by pyrolysis, coal gasification and Fischer-Tropsch synthesis, direct coal liquefaction, fissionable and fertile isotopes chain reactions, breeding cycles and reactors, and electric power from nuclear reactions. This is a required course for the energy engineering major and will be offered in fall semester with an enrollment of about 50. Student performance will be assessed through weekly homework, mid-term tests, student projects and final exam.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 455 Materials for Energy Applications (3)** Overview of key principles and technologies for materials relevant to energy applications, including membranes, catalysis, supercapacitors, adsorbents, and semi-conductors.

### **EGEE 455 Materials for Energy Applications (3)**

The primary objective of this course is to introduce engineers and scientists to key principles in the design of materials relevant to energy applications. Application areas will include separations, catalysis, adsorption, semi-conductors, and photovoltaics. Students will be able to understand and apply principles in solid state chemistry/physics, material science and engineering, adsorption, surface science, and catalysis in analyzing materials for energy applications. Introductory information will be followed by case studies, state of the art review of current materials, and research needs for development. Students will be evaluated on their ability to understand and apply basic concepts in material science, solid state chemistry, and surface chemistry; report on an in depth study of one surface characterization technique; perform literature search and understand basic technical concepts in one application area. Term projects will provide an opportunity to apply concepts and skills to real world applications, and require students to report on current 'state of the art' technology and research needs. Groups of three or four students will be asked to choose from a variety of applications and then asked to present their findings. This is an elective course for energy engineering majors with particular interest in materials for energy applications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 456 (E E 456, E SC 456) Introduction to Neural Networks (3)** Artificial Neural Networks as a solving tool for difficult problems for which conventional methods are not applicable.

### **EGEE (E E/E SC) 456 Introduction to Neural Networks (3)**

This course is in response to students' needs to learn Artificial Neural Networks (ANN) as a solving tool for difficult problems for which conventional methods are not available. The objective of this course is to give students hands-on experiences in identifying the best types of ANN, plus developing and applying ANN to solve difficult problems. Students will be introduced to a variety of ANN and will use their training skills to solve their own applications. During this course the students will develop a final project, in which they will apply ANN to widely varied problems.

Examples:

- I ) students from E E may be interested in applying ANN to solve control problems
- II) students from Material Sciences may be interested in applying ANN to predict the pitting corrosion of components
- III ) students from Petroleum Engineering may be interested in applying ANN to characterize the life of a reservoir
- IV ) students from Agricultural Engineering may be interested in applying ANN to sort apples automatically, etc.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 464W** Energy Design Project (3) A team and capstone design project on an industrial energy-related problem.

### **Energy Design Project (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 470** Air Pollutants from Combustion Sources (3) Generation of pollutants in combustion chambers; reduction by combustion control; pre- and post-combustion treatment of fuels and effluents.

### **Air Pollutants from Combustion Sources (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 494A** Research Project (2) Supervised research on a selected topic of energy science and engineering and preparation of written and oral presentation of the research results.

### **EGEE 494A Research Project (2)**

The primary objective of the course is to expose students to supervised independent research and presentation of results. Students will embark on an independent research project under a faculty member. The research topic will depend on the student's interest and may cover topics ranging from the production, processing, and utilization of different forms of energy and the associated environmental, health and safety, and policy and economics issues. Students will be expected to undertake the literature review, design and experiments, conduct the study and perform a detailed analysis of the results. The work will be presented in a final report and presentation. Students will also be expected to explore the implications of their data and conclusions and outline further research opportunities. In particular, the societal impact of their work should be emphasized. This is a required class in the energy engineering major and will be offered each semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 496A** Independent Study (3) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 500** Engineering Physics of Energy and Geo-Environmental Systems (3) Momentum, heat and mass transport phenomena in fluids and solids, including phase equilibria.

**Engineering Physics of Energy and Geo-Environmental Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 510** Engineering Chemistry of Energy and Geo-Environmental Systems (3) Chemical and electrochemical equilibria, surface and interfacial phenomena and chemical kinetics, in natural and engineered systems.

**Engineering Chemistry of Energy and Geo-Environmental Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 520** Mathematical Modeling of Energy and Geo-Environmental Systems (3) Physical and reactive chemical modeling, model formulation and solution, validation and verification.

**Mathematical Modeling of Energy and Geo-Environmental Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 597A** Advanced Electrochemical Engineering (3) This course is for graduate students who would like to improve their skills and knowledge in electrochemical engineering and methods.

**Advanced Electrochemical Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 597C (MATSE 597C)** Nanoscale Energy and Environmental Engineering (3) The course will cover the synthesis, characterization and applications of nanomaterials to energy generation, storage, conversion, conservation, control and environmental engineering. Selected topics in nanomaterial toxicity and production/process/product economics will be included.

**Nanoscale Energy and Environmental Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 599 (IL)** Foreign Studies (1-2 per semester, maximum of 24) Full-time graduate-level foreign study at overseas.

**Foreign Studies (1-2 per semester, maximum of 24)**

General Education: None

Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

### **Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EGEE 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Energy and Mineral Engineering (EME)**

**EME 407** Electrochemical Energy Storage (3) Electrochemical concepts in energy storage devices, cell construction and materials involved in batteries and capacitors, electrochemical testing methods and applications.

### **Electrochemical Energy Storage (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 432** (GEOG 432) Energy Policy (3) Analysis, formulation, implementation, and impacts of energy-related policies, regulations, and initiatives.

### **Energy Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 444** Global Energy Enterprise (3) Industry perspective on the resources, technologies, engineering approaches and externalities involved in satisfying worldwide energy demand profitably and sustainably.

**Global Energy Enterprise (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 460** Geo-resource Evaluation and Investment Analysis (3) The course covers engineering evaluation of geo-resources, present value and rate of return analysis, mineral property and reserve estimation, and cost estimation and engineering economy concepts applied to geo-resources including energy and minerals.

**Geo-resource Evaluation and Investment Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 466** Energy and Sustainability in Society (3) Capstone course in energy technology and policy options for reduced-carbon communities. Covering agent/stakeholder relations, sustainability, communication and public engagement.

**Energy and Sustainability in Society (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 500** Energy and Mineral Project Investment Evaluation (3) Emphasizes enterprise level cost review, estimation, and prediction methodology and investment evaluation as a means for project engineering management.

**Energy and Mineral Project Investment Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 504** Foundations in Sustainability Systems (3) Theoretical background of sustainability issues and studies of sustainability systems.

**Foundations in Sustainability Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 510** Health and Safety Engineering (3) Develop the ability to use scientific and engineering principles to evaluate and control health and safety hazards in the workplace.

**Health and Safety Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 525** Theory and Practice of Policy Analysis for Engineers (3) The course provides a broad introduction to analytical methods commonly used in science, technology, and energy policy analysis.

### **Theory and Practice of Policy Analysis for Engineers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 570** (MATSE 570) Catalytic Materials (3) Preparation and characterization of solid catalytic materials and the relationships between their surface, defect, and electronic properties and catalytic activity.

### **Catalytic Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 580** Interdisciplinary Team Project in EME Systems (3) Problem-based, integrative, and collaborative learning to solve interdisciplinary problems on energy and mineral systems based on engineering and business principles.

### **EME 580 Integrative Design of EME Systems (3)**

The role of energy and minerals in society is increasingly important with increasing environmental constraints, transitioning energy policies, supply disruption, and international pressure on climate change compliance and competition for energy. Both conventional (fossil fuels) and renewable energy sources are being explored. This course will enable energy and mineral engineering students to collaboratively integrate their knowledge and experiences in addressing common problems. The typical problems will address issues with the production, processing and utilization of fossil and renewable energy and the associated environmental, health and safety, and business management issues. Students will utilize their engineering and business principles to optimally recover, process and utilize conventional and unconventional energy in an environmentally friendly, safe and economical manner. Complete problem solutions must include a synthesis of methods to identify, recover, transport, and utilize the energy source. A quantitative approach, including mechanistic, thermodynamic, fluid flow, and kinetic analysis of proposed options must be considered, together with a preliminary economic analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 581** Research and Geostatistics Methods (3) Presents methods essential for the conduct and analysis of scientific research and spatial characterization in energy and mineral engineering disciplines.

### **Research and Geostatistics Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 590** (F SC 590, MNG 590, P N G 590) Colloquium (1-3) Continuing seminars that consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

### **Colloquium (1-3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 600** Thesis Research (1-12) Thesis research culminating into the doctoral degree in Energy and Mineral Engineering.

**Thesis Research (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 601** Thesis Preparation (0) Thesis research after successful comprehensive exam culminating into the doctoral degree in Energy and Mineral Engineering.

**Thesis Preparation (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 801** Energy Markets, Policy, and Regulation (3) Structure and function of energy markets; existing and emerging environmental regulations; decision-making by energy companies.

**Energy Markets, Policy, and Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 802** Renewable and Sustainable Energy Systems (3) An overview of renewable energy technologies and sustainable energy system analysis.

**Renewable and Sustainable Energy Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 803** Applied Energy Policy (3) Provides in-depth exploration of energy policy development, implementation, and assessment at multiple governmental and corporate scales with emphasis on energy markets.

**Applied Energy Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 805** Renewable Energy and Nonmarket Enterprise (3) Industry perspective on the resources, technologies, engineering approaches and externalities involved in deploying renewable energy businesses profitably and sustainably.

**Renewable Energy and Nonmarket Enterprise (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 807 Technologies for Sustainability Systems (3)** This course examines strategies and applications of sustainable technologies in manufacturing, energy, water, transportation, food, and building systems.

### **Technologies for Sustainability Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 810 Solar Resource Assessment and Economics (3)** Methods, economic criteria, and meteorological background for assessing the solar resource with respect to solar energy conversion technologies.

### **Solar Resource Assessment and Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 811 Solar Thermal Energy for Utilities and Industry (3)** Applications of solar thermal energy (STE) including district heating/cooling (buildings), industrial process heating, fuel synthesis, desalination, and materials processing.

### **Solar Thermal Energy for Utilities and Industry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EME 812 Utility Solar Power and Concentration (3)** Technical and theoretical background for utility scale solar energy conversion technologies to generate electric power.

### **Utility Solar Power and Concentration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Energy, Environmental, and Mineral Economics (ENNEC)**

**ENNEC 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 499** (IL) Foreign Study--Mineral Industries (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Study--Mineral Industries (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 540** Economic Analysis of Energy Markets (3) This course uses economic analysis to explain the history of world energy and its regulation since 1945.

**Economic Analysis of Energy Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 541** Economics of Energy and the Environment (3) Economic analysis of topics such as global warming, alternative energy sources and new technologies, and resources and sustainable development.

**Economics of Energy and the Environment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 560** Mineral and Energy Finance I (3) Introduction to theory of finance and application of financial tools to commodity market analysis. Emphasis on mineral and energy markets.

**Mineral and Energy Finance I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 590 (I H S 590) Colloquium (1-3)** Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

**ENNEC (I H S) 590 Colloquium (1-3)**

The objective of the course is to expose students through a seminar format to a wide range of topics on energy and mineral engineering. The lectures would be presented by faculty, students and guest speakers. Students would be required to write a short summary of each presentation and provide a critique of the presentation. Seminar topics will cover aspects of energy production, processing, utilization, and conservation, and the associated environmental, health and safety, and policy, economics, and management issues. Students are expected to keep up with current developments on each topic and to actively participate in the discussions. Students will be evaluated based on their class participation, and written summary and critique of each presentation. This is a required course in the energy and mineral engineering graduate program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 596 Individual Studies (1-9)** Creative projects, including nonthesis research which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 600 Thesis Research (1-15)** No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 601 Ph.D. Dissertation Full-Time (0)** No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised and graded teaching experience.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENNEC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Engineering (ENGR)

**ENGR 407** Technology-Based Entrepreneurship (3) Technology innovation coupled with business planning and development.

**Technology-Based Entrepreneurship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 408** (US) Leadership Principles (2) An introduction to an exploration of theories and principles of leadership, supplemented by presentations given by industry and government leaders.

**Leadership Principles (2)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 409** (US) Leadership in Organizations (3) Development of leadership skills essential for engineers to guide colleagues or an organization in a productive direction.

**Leadership in Organizations (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 411 Entrepreneurship Business Basics (3)** Three critical entrepreneurship skills are covered for non-business majors: business finance, intellectual property, and marketing.

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### **ENGR 411 Entrepreneurial Business Basic (3)**

ENGR 411 covers three critical skill areas of non-business students: business finance, intellectual property, and marketing. These business areas are covered in three sequential 5-week modules over the semester. This course emphasizes problem-based learning (PBL), in which students engage in real-world problem-solving exercises each and every class period. With this learning approach, students develop and use skills sets in financial management, intellectual property management, and both business-to-consumer marketing (B2C) and business-to-business marketing (B2B). Each student is responsible for all course material and completing all PBL exercises covered in class, whether present or not. Student presence and preparation in every class period is expected.

To encourage active learning of ENGR 411 course material, students are divided into small discussion and working teams. Discussion teams will be responsible for : 1) developing questions for class interaction; 2) highlighting the important points of the readings/case studies; and 3) solving problems and presenting solutions to the class.

Up to three technology businesses or events of current interest will be analyzed during the semester. These case studies bring out the interdependence of finance, intellectual property, and marketing decisions in product creation. Example business case studies include Napster and the Bridgestone/Firestone litigation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 415 Technology Launch for Entrepreneurs (3)** Development of a technology-based product or service that includes creative ideation, concept evaluation, market and sales analysis, prototyping, and manufacturing with potential for commercialization.

### **Technology Launch for Entrepreneurs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 421 Materials Properties Measurements II (4)** Materials powder characterization, compaction and densification techniques, density measurements, micro structural evaluation, thermal and electrical properties of materials.

### **ENGR 421 Materials Properties Measurement II (4)**

Materials property measurement II introduces students to experimental procedures in the determination of thermal properties (heat transfer/conduction and thermal expansion) and electrical properties (resistance and dielectric measurements) of materials through demonstrations and experiments. Lectures provide a theoretical understanding of the characterization techniques and provide information for the design and interpretation of experimental results. This laboratory complements lectures in materials characterization, materials processing and materials design courses allowing students to apply theoretical knowledge to experimental processes. Students gain hands-on knowledge of testing equipment and experience in data acquisition and interpretation. Students gain experience in the processing of material (powder characterization, consolidation, and densification), the analysis of material microstructures and investigations of structure property relationships.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 425 (IST 425, MGMT 425) New Venture Creation (3)** Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors.

ENGR 425

**ENGR (MGMT/IST/ENTR) 425 Introduction to Entrepreneurship (3)**

The goal of ENGR (MGMT/IST/ENTR) 425 is to better prepare undergraduate students to be business leaders in adaptive, globally-minded, technology-savvy companies. The course is structured so students develop skills that are of high value in any workplace: they develop improved leadership skills, higher self-efficacy, creativity and the ability to deal with ambiguity. On course completion, students will have a working knowledge of traditional and non-traditional ways for identifying a new product or business opportunity, quantifying the potential, understanding the key competitive factors, researching the audience and producing a convincing executive summary for internal or external financing and launch. Students who want to augment the skills and knowledge from their major with the ability to refine a new product/service process in an interdisciplinary team will find ENGR (MGMT/IST/ENTR) 425 a valuable course.

This is a novel problem-based learning (PBL) course, where the learning is student-centered, with faculty acting primarily in the role of facilitators. Active learning happens in this course because students develop ownership in their new business venture concept and are fully responsible for the genesis of the idea. The course leverages the on-line course management system (ANGEL) to define weekly learning objectives, support electronic delivery of assignments, robust video content with entrepreneurs is provided on CD-ROM or via ANGEL, providing additional insights into entrepreneurship. The technology or business segment focus of the class is easily adapted by using different case studies and course mentors.

This will be one of two courses in the new two-course sequence for business students in entrepreneurship. This course will be accepted as a supporting course in the Engineering Entrepreneurship Minor (E-SHIP) and in the Engineering Leadership Development Minor (ELDM). ENGR (MGMT/IST/ENTR) 425 can be used as a technical elective in many of the engineering departments. It will be accepted as a Support of Option course for the Information Sciences and Technology (IST) major.

This course will be offered each Fall and Spring semester with two sections each semester. Class enrollment per section will be set at 60 total.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 426** (IST 426, MGMT 426) Invention Commercialization (3) Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology.

ENGR 426

**ENGR (MGMT/IST/ENTR) 426 Invention Commercialization (3)**

The goal of ENGR (MGMT/IST/ENTR) 426 is to have students understand why invention commercialization is complicated and difficult by participating in the process. For example, the inventor rarely has insights into the markets for his/her invention, is often not interested in the details of commercialization, and can be secretive. In addition, the business and financial communities often do not take the time, or have the resources, to understand new technologies and perform complex due diligence. Thus lack of due diligence often leads to rejection of innovation because existing companies often discount new technologies from outside the company as NIH - "not invented here".

Effective transfer of new invention or innovation to a commercial product requires at least three different functional communities to interface: technical, legal and business. Each uses a different language, comes from different educational and cultural backgrounds, and may have an inherent distrust of the others. These functional barriers are difficult to overcome.

This course teaches how these barriers can be broken down as student teams help bridge the perceived chasm between key players in the invention commercialization process. In these teams, students bring the skills and knowledge from their major to develop an invention commercialization recommendation for the Technology Transfer Office and the inventor. For example, business students focus on finance and market opportunity assessment; engineering and IST students focus on design refinements, prototyping support, and (if appropriate) making technology suggestions to the inventor.

Upon completing the course, the students will have a working knowledge of different university and corporate technology or invention commercialization processes, important intellectual property management tools for inventions (patents, license agreements, option agreements) source of funding to move inventions toward product development, and delivering top quality presentations which outline the recommended commercialization path. Students who enjoy open-ended projects which involve the interplay of business and invention of who wants to work on interdisciplinary teams with the newest inventions will find this course a valuable course. NOTE: Because the inventions/products are based on Penn State faculty intellectual property, students must sign the Penn State Special Intellectual Property Agreement For Students - For Use When Assigning Intellectual Property to The Pennsylvania State University. The form can be viewed at <http://guru.psu.edu/policies/RAG13.html>

The course will be offered both Spring and Fall semesters with an enrollment of 40 students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 450 Materials Design and Applications (3)** Engineering design considerations for materials selection, organization of property trends of materials families, materials design strategies and property compatibility.

**ENGR 450 Materials Design and Applications (3)**

ENGR 450 introduces students to the process of materials organization and selection for application needs. Students select materials for applications based on desired properties, materials compatibility, and economic factors and learn how to design materials (composites) to fulfill critical materials requirement of an engineering application. The course facilitates students with the understanding of the engineering design process to make educated decisions on the materials selection and/or design for industry application needs. Students learn to understand trends in property characteristics associated within given families of materials, i.e. metals, ceramics and polymers, and to balance engineering needs and economic considerations with the application design process.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 451 Social Entrepreneurship (3)** Students develop business models and implementation strategies for social ventures in diverse world regions.

**ENGR 451 Social Entrepreneurship (3)**

Social Entrepreneurship is about pursuing direct action to address a social problem in a manner that leads to a truly sustainable solution. A similar perspective on social entrepreneurship is based on Jean-Baptiste's definition of entrepreneurs as permanent value creators. If the primary objective of value creation is positive social change, then the entrepreneur can be categorized as a social entrepreneur. Sustainability and scalability of the venture to create social change on a larger scale is essential. Metaphorically, while conventional entrepreneurs might pursue the creation of multi-million dollar enterprises, social entrepreneurs strive to create multi-million smile enterprises, while understanding that their ability to expand their social returns bears a dynamic interdependence with their economic bottom line. The mission of the venture must be strongly aligned with the measured outcomes, and this emphasis on measuring social and economic impact is crucial to the efficacy and success of social enterprises.

The theory and praxis of social entrepreneurship is constantly evolving within the complex framework of political, economic and social changes occurring at the global, national and local levels in the US and other countries. Students study the dynamics of social challenges, approaches to address them, and the conceptual framework of social innovation and social entrepreneurship from theoretical and practical perspectives. Students explore technology solutions to addressing global social problems with a systems thinking approach. Case studies of successful and failed social ventures from diverse world regions and fields like healthcare, energy, food and agriculture, education, income generation, and access to capital are employed. There is an emphasis on the opportunities and challenges to multi-sectoral collaboration to address social challenges.

Students learn how to develop appropriate business models and implementation strategies for a "sustainable" social venture. Sustainability, in this regards, refers to ventures that are technologically appropriate, environmentally benign, socially acceptable and economically sustainable. There is a specific emphasis on understanding the customers and their context and economic sustainability of the ventures. The course draws heavily from cases to understand the diverse business structures and execution strategies used by social entrepreneurs and the varied challenges faced by them. Students work in multidisciplinary cross-functional teams to develop a business/implementation model for a social venture in diverse world regions. These are real ventures that are connected to other Humanitarian Engineering and Social Entrepreneurship (HESE) course offerings.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 455 Humanitarian Engineering and Social Entrepreneurship Reflection and Research Dissemination (3)** This post-fieldwork course focuses on reflection on ethical issues and grassroots diplomacy challenges, and workshops on research dissemination.

**ENGR 455 Humanitarian Engineering and Social Entrepreneurship Reflection and Research Dissemination (3)**

The HESE Reflection and Research Dissemination course provides students an opportunity to reflect and build upon their experiences following the EDSGN 454 class involving travel to the partnering community to advance their HESE venture. There are three intertwined themes. One theme explores the ethical intricacies of conducting research and advancing entrepreneurial ventures in developing communities. The grassroots diplomacy theme delves into the complicated and delicate challenges of working in developing communities in a harmonious and effective manner. The research dissemination theme provides students with just-in-time information and skill-sets necessary for developing their research manuscripts into refereed publications.

Post-travel reflection on ethical issues: This theme explores the ethical intricacies of conducting research and advancing entrepreneurial ventures in the context of developing communities. The ethics-related discussions help students reflect on their experience and develop a mindset where they want to make better ethical decisions because they are emotionally engaged and can effectively assess the implications of their actions.

Grassroots Diplomacy: During their field experience, HESE students interact with diverse parties including local communities, non-governmental organizations, governmental and UN agencies, religious organizations, political groups, bureaucrats, local industry, US corporations, tourists, etc. Students observe and experience ego and community tensions and dynamics. They might get asked for grease payments or be propositioned for dowry. They might experience conflict or observe other groups, or their own group, compromise the core concept of self-determination. Workshops in the grassroots diplomacy theme delve into the complicated and delicate challenges of working in developing communities in a harmonious and effective manner to catalyze social change with their technology-based ventures.

Research Dissemination: HESE students are engaged in an IRB-approved research study related to their venture, for which they gather data during the summer field experience. This workshop series provides students with just-in-time information and skill-sets necessary for developing their research manuscripts. The workshops lower the barriers to the scholarly dissemination of their work. Sharing designs, business/implementation strategies, and lessons learned is extremely important for the praxis of HESE worldwide. For examples, published designs for low-cost greenhouse can help people in many world regions. A paper on the non-technical challenges to the growth of the small-scale wind power industry in Kenya served as a starting point for a windmill venture.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 490W Senior Design I (1)** Analysis of environmental impacts on a design, designing products for the global environment and discussion on engineering ethics and professionalism.

### **ENGR 490W Senior Design I (1)**

Senior design I provides students with experience in solving engineering problems independently and/or working in groups on an open-ended design problems. Students refine skills in information gathering, analysis of market and technical considerations, critical thinking of project/design scope and effective communication of project/design objectives. This course builds on previous knowledge and applies it to a global consideration of design criteria to a specific projects provided by relevant faculty. The course is the first installment of a senior capstone program in which students start to understand the global aspects of the engineering design process with respect to individual/group projects. Students gain perspective on project selection and research expectations from faculty and gather the relevant technical knowledge required to initiate the project. Projects are appropriately scoped for undergraduate research and are faculty initiated sponsored by regionally based industry (similar to The Learning Factory Experience at UP). Faculty provides research opportunities and external industry collaborations to students for selection based on common interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 491W Senior Design II (3)** Capstone of research projects from conception to prototype through industry sponsored collaboration on common technical interests between faculty and student.

### **ENGR 491W Senior Design II (3)**

Senior design I provides students with experience in solving engineering problems independently and/or working in groups on an open-ended design problems. Students refine skills in information gathering, analysis of market and technical considerations, critical thinking of project/design scope and effective communication of project/design objectives. This course builds on previous knowledge and applies it to a global consideration of design criteria to a

specific projects provided by relevant faculty. The course is the first installment of a senior capstone program in which students start to understand the global aspects of the engineering design process with respect to individual/group projects. Students gain perspective on project selection and research expectations from faculty and gather the relevant technical knowledge required to initiate the project. Projects are appropriately scoped for undergraduate research and are faculty initiated sponsored by regionally based industry (similar to The Learning Factory Experience at UP). Faculty provides research opportunities and external industry collaborations to students for selection based on common interest.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 493** Individual Leadership Experience (1) Approved individual project or internship for students to practice the leadership skills developed in the Engineering Leadership Development Minor.

#### **Individual Leadership Experience (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 494** Research Project Courses (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 494H** Research Project Courses (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project Courses (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 495** Engineering Co-Op Work Experience III (1-3) A supervised work experience where the student is employed in an engineering position in industry or government. (To be offered only for SA/Un grading.)

#### **Engineering Co-Op Work Experience III (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 495A** Engineering Cooperative Education (1-3 per semester) A supervised work experience in research, industry or government relevant to a student's major.

ENGR 495A

#### **ENGR 495A Engineering Cooperative Education (1-3)**

This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major

classes in a professional laboratory, industry, or government agency setting in the United States. This course is the third of three courses that provide progressive, multiple, alternating semesters of career-related experience in the Cooperative Education Program. The final grade (SAFUN) will be based on the final report submitted by the student and a mid-term and final evaluation submitted by the employer. This course will be offered fall, spring, and summer semesters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 495I (IL) Engineering International Cooperative Education (1-3 per semester)** A supervised work experience in research, industry or government relevant to a student's major.

ENGR 495I

**ENGR 495I Engineering International Cooperative Education (1-3) (IL)**

This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting outside of the United States. This course is the third of three courses that provide progressive, multiple, alternating semesters of career-related experience in the Cooperative Education Program. The final grade (SA/UN) will be based on the final report submitted by the student and a mid-term and final evaluation submitted by the employer. This course will be offered fall, spring, and summer semesters.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 496 Independent Studies (1-18)** Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 496A International Experience-Hungary (0.5)** Independent study in Engineering Leadership Topics.

**International Experience-Hungary (0.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 497A Global Trends: Strategic Analysis and Systems Thinking for Leadership (3)** The course will use a systems thinking approach to understand the strategic implications of global trends for leadership.



**Global Trends: Strategic Analysis and Systems Thinking for Leadership (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 497C** Global Engineering Teams Seminar (1) Preparation for a career in international engineering enterprise. Prerequisite for students traveling internationally with the Engineering Leadership Development Program. Students must earn a B or better in this class to qualify for travel.

**Global Engineering Teams Seminar (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 497F (SCIED 497F)** Fundamentals of Science, Technology, and Engineering (3) A course focusing on physics content, engineering design principles, and elementary science education pedagogy.

**Fundamentals of Science, Technology, and Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 497G** Project Management for Professionals (3) This practical course for professionals covers essential concepts and skills needed to make effective contributions and have an impact on the successful accomplishment of projects.

**Project Management for Professionals (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 497I** Seminar for Teaching Interns (0.5) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Seminar for Teaching Interns (0.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 499 (IL)** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 594** Master's Paper Research (1-3) Investigation of a specific engineering problem and development of a scholarly written report in partial fulfillment of requirements for a master's degree in engineering.

**Master's Paper Research (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1985

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 595** Engineering Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Engineering Internship (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 595A** Engineering Internship (1 per semester/maximum of 4) A supervised work experience in a professionally relevant position in research, industry, or government.

ENGR 595A

**ENGR 595A Engineering Internship (1 per semester/maximum of 4)**

This course will provide students with an opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting within the United States. The final grade (Pass/Fail) will be based on the final report submitted by the student, and by mid-point and final evaluations submitted by the employer. This course will be offered fall, spring, and summer, and may be repeated.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 595I** International Engineering Internship (0.5 per semester/maximum of 4) A supervised work experience in a professionally relevant position in research, industry, government or service sector.

ENGR 595I

**ENGR 595I International Engineering Internship (1 per semester/maximum of 4)**

This course will provide students with an opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting *outside of the United States*. The final grade (Pass/Fail) will be based on the final report submitted by the student, and by mid-point and final evaluations submitted by the employer. This course will be offered fall, spring, and summer, and may be repeated.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 596** Independent Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Opportunity for supervised and graded experience for graduate students in the College of Engineering.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 888** Seminar for Engineering Teaching Assistants (1) Study of recently established knowledge and methodologies as applied to practice. Significant interaction among students and with instructor is expected.

#### **Seminar for Engineering Teaching Assistants (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGR 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Engineering Design (EDSGN)**

**EDSGN 401** Engineering Systems Design (3) Design requirements for complex systems; trade-offs between market opportunities and technology; translation of priorities and needs into an operational concept.

#### **EDSGN 401 Engineering Systems Design (3)**

This course provides the knowledge and skills necessary to translate needs and priorities into system requirements, and develop derived requirements, which together form the starting point for engineering of complex systems. Students will develop an understanding of the larger context in which requirements for a system are developed, and learn about trade-offs between developing mission needs or market opportunities first versus assessing available technology first. Techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements will be presented. Students will assess and improve the usefulness of requirements, including such aspects as correctness, completeness, consistency, measurability, testability, and clarity of documentation. The course explores the role of techniques such as decision analysis, cost-benefit analysis, and risk assessment. Students will understand the limitations of the way that current systems engineering is practiced in terms of dealing with complexity, lifecycle uncertainty and other factors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 410** Robotics Design and Applications (4) Introduction to robotics, with emphasis on the design of robotics systems through multidisciplinary integration of electrical, mechanical, and software components.

#### **EDSGN 410 Robotics Design and Applications (4)**

The objective of this course is to apply the basic concepts of electrical, mechanical, and software technologies to analyze, design and test a robotics system. This course will draw from skills in prior coursework in electricity and electronics, statics and dynamics, and software design. The course includes a discussion of present applications and future directions of robotics in such areas as manufacturing, science, transportation, military, healthcare, and entertainment. Students will be introduced to mechanical systems analysis, sensors, software development, electrical systems, control algorithms, testing, prototyping, design, modeling, and simulation of robot systems. Students will work in teams to design and prototype a robot to perform a task and to satisfy a set of design requirements. Professional communication and documentation will be included in the course experience. This course is a multi-disciplinary, project-based course and will have a substantial laboratory component supporting team-based design, integration and testing of a robot system.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 452** Projects in Humanitarian Engineering (2) Multidisciplinary student teams engage in integrated design of real-world humanitarian ventures.

### **EDSGN 452 Projects in Humanitarian Engineering (2)**

EDSGN 452 is intended to promote civic responsibility and enhance the student's abilities to engage in research and design, project management, communications, professional conduct and the understanding of user needs. This is accomplished by students undertaking team-based engineering projects in community service with partner community organizations. The projects offer real-world engineering design experience, from problem formulation through performance assessment. The project offerings will include a mix of local and international offerings. Students work on multidisciplinary teams with a project supervisor (i.e., faculty or practicing engineer) and a representative from the partner community organization. Projects are selected based on academic content, potential significance to the partner community, commitment of the partner community organization, and student safety.

Students also examine the politics of technology, the relationship between engineering and communities (either domestic or international), and ethics in engineering practice. This includes the ways that engineering can be used positively and negatively in development. In the course of their work, the students will examine the ways that economic, social, cultural, political, and other contextual considerations are implicated in engineering design. Students are challenged to think critically about how engineering can be done most effectively to support community goals, and how engineering can weaken community efforts if done insensitively. These issues are explored through discussions of the relevant scholarly theory and through their manifestation in the course projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: EDSGN 453

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 452** Projects in Humanitarian Engineering (2) Multidisciplinary student teams engage in integrated design of real-world humanitarian ventures.

### **EDSGN 452 Projects in Humanitarian Engineering (2)**

EDSGN 452 is intended to promote civic responsibility and enhance the student's abilities to engage in research and design, project management, communications, professional conduct and the understanding of user needs. This is accomplished by students undertaking team-based engineering projects in community service with partner community organizations. The projects offer real-world engineering design experience, from problem formulation through performance assessment. The project offerings will include a mix of local and international offerings. Students work on multidisciplinary teams with a project supervisor (i.e., faculty or practicing engineer) and a representative from the partner community organization. Projects are selected based on academic content, potential significance to the partner community, commitment of the partner community organization, and student safety.

Students also examine the politics of technology, the relationship between engineering and communities (either domestic or international), and ethics in engineering practice. This includes the ways that engineering can be used positively and negatively in development. In the course of their work, the students will examine the ways that economic, social, cultural, political, and other contextual considerations are implicated in engineering design. Students are challenged to think critically about how engineering can be done most effectively to support community goals, and how engineering can weaken community efforts if done insensitively. These issues are explored through discussions of the relevant scholarly theory and through their manifestation in the course projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: EDSGN 453

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 453** Design for Developing Communities (1) A seminar series related to the context and integrated design of Humanitarian Engineering and Social Entrepreneurship ventures in developing communities.

**EDSGN 453 Design for Developing Communities (1)**

The Design for Developing Communities seminar course grounds students in EDSGN 452, BIOE 401, and other related courses in the basics of user-centered / context-driven design, extreme affordability, systems thinking, research ethics, privilege systems, travel and fieldwork, and related issues for technology-based social ventures in developing communities. These seminars directly help students across various classes and professional programs with their Humanitarian Engineering and Social Entrepreneurship (HESE)-related ventures. Typically, three sections of this course are offered: one focusing on international ventures, one on local ventures and an honors section focusing on international ventures.

Designing appropriate products for customers inherently requires a thorough understanding of their needs. However, what happens when your target customers live in a developing country and have radically different needs than what you are accustomed to? Similarly, what happens when your audience lives in the United States, but in an unfamiliar environment? How do you know your product will be used by your intended customers? What pre-existing systems must your product work in harmony with?

Open to students of all majors, the seminar class prepares students working on HESE ventures to create sustainable enterprises in resource-constrained environments. Students are introduced to the contextual factors that must be taken into consideration throughout their design process. Relevant philosophies and methodologies that relate to the integrated design, business and implementation strategy development of social enterprises are introduced to the students in the seminar class. The objective is to light a fire and not fill a pail. The relevant methodologies and philosophies are then reinforced in an experiential manner in the concurrent design classes (like EDSGN 452, BIOE 401, etc.) where students work on their ventures.

Through the use of open discussion, videos, pictures, stories, and lectures, the course covers concepts such as systems-thinking, user-centered design, value creation, and effective communication. The seminar is highly interactive; students are encouraged to ask questions and provide examples of real-world situations that relate to the topics of conversation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 454 Humanitarian Engineering and Social Entrepreneurship Field Experience (0.5)** A hands-on integrated learning research and entrepreneurial engagement experience for students working on various humanitarian projects.

**EDSGN 454 Humanitarian Engineering and Social Entrepreneurship Field Experience (0.5)**

The Humanitarian Engineering and Social Entrepreneurship (HESE) Field Experience is a hands-on integrated learning, research and entrepreneurial engagement experience for students engaged in HESE ventures in the EDSGN 452 and allied courses (e.g. BIOE 401, ME 440W). Students travel to project site(s) for three weeks to advance their ventures by conducting field-testing of their technologies, testing their preliminary business models, and gathering data for research projects. They work closely with community members and various partnering agencies during the course. The partnering agencies range from community members to non-profits, community-based organizations, and governmental and United Nations agencies. Students work in cross-national cross-functional teams and make several presentations to community members, potential partners and investors. In the past, HESE students have worked in Kenya, Tanzania, Rwanda, India, El Salvador, Jamaica, Ecuador and other countries.

There is no set schedule for the three weeks in the partnering community. A (two-hour long) debriefing meeting is held every evening to discuss progress made by all the teams on that day and decide the action plan for the next day. Administrative issues, technological challenges, ethical or diplomatic issues are also discussed in this meeting and solutions are developed by consensus. The field experience is also a rich environment for students to explore the ethical intricacies of engaging in projects in international contexts. Students engage in debates on ethical issues related to science, technology and society in an applied setting – the people are real, the ethical dilemma is real and most importantly, a consensus is required to address the ethical issue and decide on the further course of action.

A collaborative and integrated approach of system design, business strategy, and implementation strategy development is employed. The process of operationalizing the design and the business / implementation strategies is as important as the product itself. This integrated design and implementation process encompasses conceptualization, validation, design, field-testing, implementation, and evaluation, all done in an iterative fashion. Several tools, from literature, industry (like the IDEO Human-Centered Design toolkit) and those developed by our teams (like the E-Spot Canvas) are employed during fieldwork. Student evaluation is by a reflective essay written 3-4 weeks after the completion of the trip.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 460W** Multidisciplinary Capstone Design Project (3 per semester/maximum of 6) Course provides multidisciplinary industry-sponsored and service-based senior design projects in conjunction with the Learning Factory.

**Multidisciplinary Capstone Design Project (3 per semester/maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 479 (I E 479)** Human Centered Product Design and Innovation (3) Consumer product design for a global market, incorporating human factors principles and user desires in a multicultural perspective.

**EDSGN (I E) 479 Human Centered Product Design and Innovation (3)**

This course will focus on consumer product design for a global market, incorporating human factors and ergonomics principles as well as user needs and emotional desires. The students will be led through product design process, various product design strategies, product planning, managing the development process, product evaluation, decision making tools, and market entry. Special emphasis will be placed on user centered design, incorporating user characteristics, user needs and emotional desires (including Kansei engineering approaches), survey methodology, and usability testing. To emphasize the multicultural perspectives in today's global product design, interdisciplinary teams from two universities on opposite sides of the globe will apply these principles on actual industrial product designs for leading consumer product manufacturers.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practice, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 497B** Solidworks Fundamentals (3) Fundamentals of solidworks.

**Solidworks Fundamentals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 497B** Solidworks Fundamentals (3) Fundamentals of solidworks.

**Solidworks Fundamentals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 497G** Current CAD Applications (3) Students will use the latest version of AutoCAD as a design tool for 2D and 3D applications in a variety of disciplines.

**Current CAD Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 497G** Current CAD Applications (3) Students will use the latest version of AutoCAD as a design tool for 2D and 3D applications in a variety of disciplines.

**Current CAD Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 497J** Open Source 3-D Printing (3) Students build, test, and redesign open-source 3D printers, design models, and run a 3D printing service.

**Open Source 3-D Printing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 547** (M E 547) Designing for Human Variability (3) Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.

**Designing for Human Variability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 549** (I E 549) Design Decision Making (3) Complexity of design-making; state-of-the-art methods and tools.

**EDSGN (I E) 549 Design Decision Making (3)**

Students in this course will internalize the importance of information and decision-making in design; understand the complexities due to uncertain information, multi-person decision making, technology obsolescence, competitive priorities; become familiar with state-of-the-art methods and tools for design decision-making; and, demonstrate the application of this knowledge in the context of a collaborative design project. Learning in this course will be facilitated in an "apply what you have learned" fashion with ample opportunities for students to demonstrate their learning through in-class participation, discussion of solved problems, hands-on design projects. Strategies, methods, and means of the design process will be discussed and practiced to include such things as understanding client needs, generating design concepts, and evaluating design ideas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 594** Research Topics (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 595** Internship (1-9) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 597A** Engineering Design Studio I (3) Students examine engineering design from a broad perspective, including design thinking, systems design, and societal contexts. Students bring together many disparate aspects of their previous engineering and non-engineering experiences and investigate new aspects. The material will be presented through a variety of hands-on activities including design projects. Current and best industry practices will also be examined. This course provides a unique opportunity to explore material from many engineering fields and other disciplines within the context of design. The course will be taught using a studio model. Student evaluations will be based upon the quality of written reports, prototypes, and team performance.

**Engineering Design Studio I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EDSGN 599** (IL) Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Engineering Mechanics (E MCH)**

**E MCH 400** Advanced Strength of Materials and Design (3) Combined stresses; energy methods; special problems in bending and torsion; plates; thin-walled structures; buckling and stability; design projects.

### **Advanced Strength of Materials and Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 402** Applied and Experimental Stress Analysis (3) Experimental design of structural and machine components; photoelasticity, electrical resistance strain gauge techniques, Moire techniques, interferometry, holography.

### **Applied and Experimental Stress Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 403** Strength Design in Materials and Structures (4) Determination, interpretation, significance, and application of mechanical properties such as plastic flow, fatigue strength, creep resistance, and dynamic properties.

### **Strength Design in Materials and Structures (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**E MCH 407** Computer Methods in Engineering Design (3) Computer methods in mechanical design: solid modeling, graphics, surface smoothing/interpolation and underlying numerics: simultaneous equations, quadrature, eigen problems, discrete models.

**E MCH 407 Computer Methods in Engineering Design (3)**

E MCH 407 teaches computer methods and the use of modeling tools for doing mechanical design and the underlying numerical methods necessary to design, design analysis and development of design-related computer tools. The programming tool used in the course is MATLAB. E MCH 407 provides preparation for study of finite element analysis and professional practice. It is well suited to students who expect to work in design, manufacturing and/or project engineering. E MCH 407 is not a typical numerical methods course; for example, it treats solution of differential equations using finite differences only as minor application. Nonetheless the mathematics is at times rather abstract.

Course Objectives (labels for ABET criterion met are appended to each objective). Students will be able to:

- Apply methods prerequisite to finite element analysis to solve well-defined problems (a, e, f, g, i, k)
- Generate splines and curves for the smoothing of surfaces (a, b, e, f, g, h, i, j, k)
- Write computer code to do computer graphics and object manipulation (a, c)
- Do solid modeling, create rapid-prototypes, generate meshes using a commercial package (c, e, h, j, k)
- Calculate eigenvalues/eigenvectors and plot mode shapes (a, e, j, k)

2. Evaluation Methods include homework, mini-project submittals, midterm and final exams.

3. Special Facilities: E MCH 407 is taught in classrooms with computers.

4. Frequency of Offering/Enrollment: E MCH 407 is offered every spring semester. Enrollment is limited to the number of computers in the classroom.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 409** Advanced Mechanics (3) Continuation of E MCH 012; Euler's equations for the rotation of a rigid body, gyroscopic motion, impulsive motion, Lagrangian mechanics.

**Advanced Mechanics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 416H** Failure and Failure Analysis of Solids (3) Examination and analysis of the various modes of failure of solid materials.

**Failure and Failure Analysis of Solids (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 440** (MATSE 440) Nondestructive Evaluation of Flaws (3) Methods and limitations of nondestructive evaluation of mechanical flaws; optical, acoustical, electromagnetic, x-ray, radiography, thermography, and dye techniques.

**Nondestructive Evaluation of Flaws (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 446** Mechanics of Viscoelastic Materials (3) Nature of viscoelastic materials, constitutive relations, thermorheological materials, viscoelastic stress analysis, rubber elasticity, viscoelastic liquids, experimental techniques for material characterization.

**Mechanics of Viscoelastic Materials (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 461 (M E 461) Finite Elements in Engineering (3)** Computer modeling and fundamental analysis of solid, fluid, and heat flow problems using existing computer codes.

**E MCH (M E) 461 Finite Elements in Engineering (3)**

This is an introductory course in the Finite Element Method. Through this course, students gain knowledge in finite element theory and problem modeling. The mathematical formulation of the method is presented and then applied to problems in elasticity and heat transfer. Projects are assigned to demonstrate the finite element method in simplified problems using hand- calculations and computer programs such as Matlab. The use of commercial FEA programs is introduced and problems of increased complexity are assigned to demonstrate their use in a computer lab. Finally, problems of realistic complexity are assigned such that students can practice solving, documenting and presenting their use of commercial FEA programs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 470 (M E 470) Analysis and Design in Vibration Engineering (3)** Application of Lagrange's equations to mechanical system modeling, multiple- degree-of-freedom systems, experimental and computer methods; some emphasis on design applications.

**Analysis and Design in Vibration Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 471 Engineering Composite Materials (3)** Properties, manufacture, forms of composites; micromechanics; orthotropic lamina properties; laminate analysis; theories; failure analysis; thermal, environmental effects.

**Engineering Composite Materials (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 473 (AERSP 473) Composites Processing (3)** An introduction to the principles of mechanics governing manufacturing, computer-aided design, and testing of composite materials and structures.

**Composites Processing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1988  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 500** (M E 560) Solid Mechanics (3) Introduction to continuum mechanics, variational methods, and finite element formulations; application to bars, beams, cylinders, disks, and plates.

### **E MCH (M E 560) 500 Solid Mechanics (3)**

This course introduces students to the fundamental principles and basic methods used in solid mechanics. Using indicial notation and integral formulations provides a foundation for more advanced study in continuum mechanics (E MCH 540) and finite element analysis (E MCH 560) specifically and in mechanics in general. The materials behavior is restricted to linear elastic and the emphasis is on stress analysis. Students are expected to have an understanding of elementary mechanics of materials (such as E MCH 013).

The course objectives are to:

- 1) provide students with a firm foundation in solid mechanics.
- 2) introduce continuum mechanics concepts, variational methods, and the formulation used in finite element analysis.
- 3) enable students to formulate and solve the boundary value problems commonly encountered in the analysis of structures.

The study of solid mechanics starts with the definition of stress and strain and how the two are related by material law. Field equations that relate strain to displacement, ensure a single valued displacement field, and the balance momentum are formulated. These are partial differential equations that can only be solved subject to known boundary and initial conditions. The field equations and boundary conditions comprise a boundary value problem that is usually difficult to solve exactly. Variational methods are used to bound or approximate the solution. The finite element method employs variational methods to formulate generic elements and is a computational tool for solving boundary value problems for complex geometries.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 506** Experimental Stress Analysis (3) Experimental methods of stress determination, including photoelasticity, stress coat, and electric strain gauge techniques; stress analogies; strain rosettes for combined stress determinations.

### **Experimental Stress Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 507** Theory of Elasticity and Applications (3) Equations of equilibrium and compatibility; stresses and strains in beams, curved members, rotating discs, thick cylinders, torsion and structural members.

### **Theory of Elasticity and Applications (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 509** Theory of Plates and Shells (3) Bending and buckling of plates; elastic foundations; deformation of shells, multilayer shells, stress and stability analysis, weight optimization, application problems.

### **Theory of Plates and Shells (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 514** (E SC 514) Engineering Science and Mechanics Seminar (1 per semester) Current literature and special problems in engineering mechanics.

### **Engineering Science and Mechanics Seminar (1 per semester)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 516** Mathematical Theory of Elasticity (3) Fundamental equations and problems of elasticity theory; uniqueness theorems and variational principles; methods of stress functions and displacement potential; applications.

### **Mathematical Theory of Elasticity (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 520** Advanced Dynamics (3) Dynamics of a particle and of rigid bodies; Newtonian equations in moving coordinate systems; Lagrange's and Hamilton's equations of motion; special problems in vibrations and dynamics.

### **Advanced Dynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 521** (ACS 521) Stress Waves in Solids (3) Recent advances in Ultrasonic Nondestructive Evaluation: waves; reflection and refraction; horizontal shear; multi-layer structures; stress; viscoelastic media; testing principles.

### **Stress Waves in Solids (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 523** Ultrasonic Nondestructive Evaluation (3) Methods, techniques, applications of Ultrasonic Nondestructive Evaluation wave propagation; signal processing and pattern recognition applied to UNDE; practical laboratory demonstrations.

### **Ultrasonic Nondestructive Evaluation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 524A** Mathematical Methods in Engineering (3) Special functions, boundary value problems, eigenfunctions and eigenvalue problems; applications to engineering systems in mechanics, vibrations, and other fields.

**Mathematical Methods in Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 524B** Mathematical Methods in Engineering (3) Boundary-value problems in curvilinear coordinates, integral transforms; application to diffusion, vibration, Laplace and Helmholtz equations in engineering systems.

**Mathematical Methods in Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 524C** Mathematical Methods in Engineering (3) Green's functions applied to problems in potentials, vibration, wave propagation and diffusion with special emphasis on asymptotic methods.

**Mathematical Methods in Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 527** Structural Dynamics (3) Dynamic behavior of structural systems; normal modes; input spectra; finite element representation of frameworks, plates, and shells; impedance; elastic- plastic response.

**Structural Dynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 528** Experimental Methods in Vibrations (3) Investigation of one or more degrees of freedom, free and forced mechanical vibrations, vibration properties of materials, nondestructive testing.

**Experimental Methods in Vibrations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 530** Mechanical Behavior of Materials (3) Engineering materials mechanical responses; stress/strain in service



context of temperature, time, chemical environment; mechanical testing characterization; design applications.

### **Mechanical Behavior of Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 531** Theory of Plasticity and Applications (3) Yield condition; plastic stress-strain relations; theory of slip-line fields; applications to bending, torsion, axially symmetric bodies, metal processing.

### **Theory of Plasticity and Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 532** Fracture Mechanics (3) Stress analysis of cracks; stable and unstable crack growth in structures and materials; materials fracture resistance.

### **Fracture Mechanics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 533** Scanned Image Microscopy (3) Imaging principles, quantitative data acquisition techniques, and applications for scanned image microscopy are discussed.

### **E MCH 533 Scanned Image Microscopy (3)**

Scanned Image Microscopy comprises advanced techniques yielding new information in the form of highly resolved micro- and nano-scale images of surfaces and sub-surfaces of materials. The objectives of the course are (1) to endow students with a basic understanding of the principles behind scanned image microscopy, (2) to impart them skills to operate the high-resolution equipment, and (3) to train them to interpret the images obtained. Thus the course includes presentation of imaging principles (i.e. basic physics and design of instruments including the sensors), quantitative data acquisition techniques (including error analysis) and applications of scanned image microscopy. The course not only emphasizes scanning acoustic microscopy and ultrasonic atomic force microscopy, but it also includes environmental scanning electron microscopy and scanning laser confocal microscopy. These four microscopy techniques are too advanced to be routine and are intended for advanced characterization on the nano- and micrometer scales.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 534** (MATSE 563) Micromechanisms of Fracture (3) Mechanisms of fracture and their relationship to loading conditions, environment, flow behavior, processing history, and microstructure.

### **Micromechanisms of Fracture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 535** (MATSE 564) Deformation Mechanisms in Materials (3) Deformation of crystalline/amorphous solids and

relationship to structure; elastic, viscoelastic and plastic response over a range of temperatures and strain rates.

### **E MCH 535 (MATSE 564) Deformation Mechanisms in Materials (3)**

The course will study the relationship between the deformation mechanisms in materials and their structure. The types of deformation behavior considered in the course are linear elasticity (isotropic or anisotropic), viscoelasticity and plastic deformation. For the elastic behavior, the emphasis will be on the way elastic behavior is controlled by atomic structure and microstructure. The constitutive laws that describe this behavior and the assumptions on which they are based will be introduced. The next phase of the course considers the range of deformation behavior from purely viscous (linear or non-linear) to viscoelastic. Initially, the emphasis will be on the effects of temperature and strain history and the way this behavior is described by mechanical analogs. The effect of structure on creep and stress relaxation will be described. The use of linear viscoelasticity in describing the sintering process will also be included. In ductile crystalline materials, deformation is associated with the movement of dislocations. The types of dislocations, their stress fields and energies will be described. These aspects will then be combined with structural features by including considerations of slip geometry and obstacles to dislocation motion. This approach will allow strengthening methods to be identified and quantified. Finally, creep mechanisms in crystalline materials at high temperature will be discussed and quantified.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 536 Thermal Stress Analysis (3)** Thermoelasticity, thermal shock, and design.

### **Thermal Stress Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 540 Introduction to Continuum Mechanics (3)** Algebra and analysis of tensors; balance equations of classical physics; the linear theories of continuum mechanics.

### **Introduction to Continuum Mechanics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 546 Theory of Viscoelasticity and Applications (3)** Linear and nonlinear viscoelastic theories; generalized isotropic and anisotropic viscoelastic stress-strain relations.

### **Theory of Viscoelasticity and Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 550 Variational and Energy Methods in Engineering (3)** Application of variational calculus and Hamilton's principle to various conservative and nonconservative systems; closed form and approximate technique.

### **Variational and Energy Methods in Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 560** Finite Element Analysis (3) General theory; application to statics and dynamics of solids, structures, fluids, and heat flow; use of existing computer codes.

**Finite Element Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 562** (A B E 562) Boundary Element Analysis (3) Numerical solution of boundary value problems using fundamental solutions; application to problems in potential theory, diffusion, and elastostatics.

**Boundary Element Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 563** (M E 563) Nonlinear Finite Elements (3) Advanced theory of semidiscrete formulations for continua and structures; emphasizes dynamic and nonlinear problems.

**Nonlinear Finite Elements (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 571** (AERSP 571, M E 571) Foundations of Structural Dynamics and Vibration (3) Modeling approaches and analysis methods of structural dynamics and vibration.

**Foundations of Structural Dynamics and Vibration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 581** Micromechanics of Composites (3) A rigorous application of mechanics to the understanding of relationships between microstructure and thermomechanical properties of composites.

**Micromechanics of Composites (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 582** Metal Matrix Composites (3) Processing and properties of metal matrix composites, with emphasis on fabrication techniques, interfaces, fatigue, fracture, and micromechanics.

**Metal Matrix Composites (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 597A** Physical Principles in Biomedical Ultrasonics (3) Physical principles of advanced ultrasonic imaging and quantitative data acquisition techniques in the field of biology and medicine.

**Physical Principles in Biomedical Ultrasonics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 602** (E SC 602) Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E MCH 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Engineering Mgmt (ENGMT)

**ENGMT 501** Engineering Management Science (3) Mathematical models involving optimization, simulation and forecasting to provide quantitative solutions to engineering management problems; scheduling, distribution, inventory control.

**Engineering Management Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGMT 510** Economics and Financial Studies for Engineers (3) Economic feasibility of projects, systems and products. Project budgets, estimation, return on investment, supply and demand, and earned value management.

**Economics and Financial Studies for Engineers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGMT 511** Engineering for Energy and the Environment (3) Engineering analysis of new technologies with environmental consideration leading to alternative energy sources and sustainable development.

**Engineering for Energy and the Environment (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGMT 530** Engineering Law (3) Overview of the legal system and legal issues applied to engineering: contracts, bidding, proposals, torts, professional liability, the intellectual property.

### **Engineering Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGMT 539** Engineering Management Strategy (3) Project- and discussion-based capstone to the engineering management program.

### **Engineering Management Strategy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGMT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGMT 597A** Special Topics: Engineering for Energy and the Environment (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics: Engineering for Energy and the Environment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Engineering Science (E SC)**

**E SC 400H** Electromagnetic Fields (3) Irrotational and solenoidal fields, potentials, vector and scalar field and wave equations, harmonic and wave functions in various coordinates, radiation.

### **E SC 400H Electromagnetic Fields (3)**

E SC 400H is a required senior-level course for students pursuing a bachelor's of Engineering Science. At the conclusion of this course, students will be able to:

1. Apply the basic principles of electrostatics, such as Coulomb's Law, electric field intensity, electric flux density, Gauss's Law, the concepts of divergence and gradient, and potential functions to solve basic and applied problems.
2. To compute resistance and capacitance for a variety of geometric configurations.
3. They will apply the basic principles of steady magnetic fields, such as the Biot-Savart Law, Amper6s Circuital Law, magnetic flux and flux density, Stoke's Theorem and the concept of the curl and Maxwell's equations for static electric and steady magnetic fields to solve basic and applied problems.

4. Compute self and mutual inductance for a variety of geometric configurations.
5. Understand the necessary modifications of Maxwell's equations for time varying fields including Faraday's Law and the concept of displacement current and apply these to solve basic and applied problems.
6. Understand the solutions of the reduced wave equation, for time-harmonic excitations, for plane wave propagation in both perfect and lossy dielectrics, the concepts of skip depth and wave polarization, plane wave reflection at planar boundaries, Snell's Law, Brewster's angle, and the concept of standing wave ratio and apply these to solve basic and applied problems.
7. Understand the basic principles of waves on transmission lines and apply these to solve basic and applied problems.

Topics include: Vector Analysis; Coulomb's Law and Electric Field Intensity; Electric Flux Density, Gauss's Law, and Divergence; Energy and Potential; Conductors, Dielectrics, and Capacitance; Poisson's and Laplace's Equations; the Steady Magnetic Field; Magnetic Forces, Materials, and Inductance; time-Varying Fields and Maxwell's Equations; the Uniform Plane Wave; Waves at Boundaries and in Dispersive Media. A typical course assessment includes homework assignments, mid-semester examinations and a final examination. The course is offered, in a lecture format, each spring at the University Park Campus. A typical enrollment is 25-30 students. This course is not a prerequisite for other courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 404H** Analysis in Engineering Science (3) Unified application of coordinate transformations; Laplace's, heat, and wave equations to boundary value problems and problems of continua in engineering.

### **Analysis in Engineering Science (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 406H** Analysis in Engineering Science II, Honors (3) Application of complex variable theory, integral equations, and the calculus of variations to engineering problems.

### **Analysis in Engineering Science II, Honors (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 407H** Computer Methods in Engineering Science, Honors (3) Numerical solution of differential equations including fundamentals: roots of single nonlinear and simultaneous (Matrix) equations, least squares fitting and statistical goodness, interpolation, finite differences, differentiation, integration, eigensolutions.

### **E SC 407H Computer Methods in Engineering Science, Honors (3)**

The overall objective of this course is the creation of mathematical continuum models in the form of differential equations and the application of numerical methods to solve them. To reach this goal, fundamental methods dealing with numerical approximation, specifically starting with Taylor's series, are covered: differentiation, integration, and root search of single nonlinear equations. Mathematical models are transformed into discrete models using the finite difference method, hence the solution of simultaneous algebraic equations in matrix and iterative forms is also covered. In addition, eigenvalue problems are also covered in order to characterize models, both continuous and discrete. The concept of vector-variable and vector-valued functions are used to form algorithms, cast them into computer code, in a language of student choice, usually Mathematica or MATLAB because graphical output is required in doing assignments. This course relates to programs of study in most engineering disciplines based upon the physics of solids and fluids. Evaluation methods include assessment of written reports, at least one midterm examination and either a final examination or a final report.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:  
 Concurrent: MATH 220

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 410H** Senior Design Project, Honors (3) Design and synthesis in the context of a specific design project undertaken during the senior year.

### **Senior Design Project, Honors (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 411H** Senior Research and Design Project II, Honors (3) Design and synthesis in the context of a specific design project undertaken during the senior year.

### **E SC 411H Senior Research and Design Project II, Honors (3)**

E SC 411H is the continuation of E SC 410H. Both courses are required of Engineering Science majors and together they comprise the capstone research and design project, which integrates the scientific principles of research, design, and analysis and applies them to a particular field of engineering. In-class lectures and discussions on engineering ethics, engineering management, safety, government and public policy, workforce preparation and graduate school occur in tandem with the students' development of their individual topics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 414M** Elements of Material Engineering (3) Structure and imperfections in engineered materials; their influence on properties, behavior, and processing. Applications of metals, ceramics, polymers, and composites.

### **E SC 414M Elements of Material Engineering (3)**

This course is a junior-level, writing-intensive engineering science course designed to introduce students to the fundamentals of materials science and engineering. In the early part of this honors course, structure property relationships in materials are explored. The student will examine how atomic structure and bonding influence engineering properties such as strength and electrical properties. Next, solidification, strengthening mechanisms, and phase diagrams for some common engineering materials are discussed to further examine structure property relationships and to provide the basis for the study of more complex materials. The second half of the course introduces properties and attributes of each of the major classes of materials (metals, ceramics, polymers, and composites) to acquaint the student with the wide array of material properties and choices available for design. Next, electrical, optical, and thermal properties of the various classes of materials are introduced. Finally, the course closes with an introduction to the topics of materials selection and design. Throughout the course, integrated writing assignments allow the student to explore the properties of a specific material or materials process in detail and gain insight the design process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 417 (MATSE 417)** Electrical and Magnetic Properties (3) Electrical conductivity, dielectric properties, piezoelectric and ferroelectric phenomena; magnetic properties of ceramics.

### **E SC (MATSE) 417 Electrical and Magnetic Properties (3)**

E SC 417 is designed to provide students with a fundamental understanding of the different responses a material can have to applied electrical or magnetic fields. Important properties are introduced and correlated with knowledge of material chemistry, crystal structure, and microstructure to provide an understanding of the mechanisms responsible for controlling the observed properties, as well as the ways in which properties can be engineered. Electronic and magnetic properties encompass dielectric, ferroelectric, conductor, superconductor, and ferromagnetic materials. Material properties and structures are related to sensors, energy storage and conversion devices, biomedical devices and electronic components in telecommunications.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 419** Electronic Properties and Applications of Materials (3) The course covers the electrical, optoelectronic, dielectric, and other electron-based properties of solids, semiconductors in particular, and their engineering/ device applications.

### **E SC 419 Electronic Properties and Applications of Materials (3)**

This course is designed primarily as a Foundation Elective for Engineering Science majors. It covers the electron-based properties of materials and their engineering applications. Building upon the strong foundation of wave, particle and ensemble concepts covered in the prerequisite course (E SC 312), it will offer an advanced introduction to the behavior of electrons in crystalline as well as non-crystalline solids, and its impact on properties. A comprehensive treatment of electrons in solids is essential to understand the electronic, optical, thermal, magnetic and other properties of materials and their incorporation in functional devices. The topics will address many facets of electrons in solids, their interaction with fields, cooperative phenomena and low-dimensional effects, and lead up to a broad range of elementary device applications. It will draw upon the results of quantum mechanics and band theory of solids that will provide the broad umbrella needed for understanding the properties of materials and designing them into practical devices and nanosystems. The importance of structure on material properties will be emphasized, so as to bring forth the importance of artificially synthesized structures and emergence of new phenomena. Along with a detailed coverage of semiconductors due to their widespread applications and their dominance in modern micro- and optoelectronics, dielectric, magnetic and superconducting materials will also be discussed in the course. The role of defects, impurities and interfaces on electrical, optical, dielectric and other properties will be discussed, along with corresponding applications in device structures. The broad topical coverage will prepare students for advanced studies in a variety of fields including micro- and optoelectronics, functional nanosystems and synthesized nanostructures. The course will provide a solid background for senior technical electives such as E SC 481 (Elements of Nano/Micro-electromechanical Systems Processing and Design) E SC 445 (Semiconductor Optoelectronic Devices) offered in ESM, as well as Electrical Engineering and Materials Science and Engineering Courses. It will also complement (and be independent of) E SC 414M that encompasses atomic structure and mechanical properties of materials.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 433H** Engineering Science Research Laboratory Experience (1) Hands-on lab experience and exposure to campus-wide interdisciplinary experimental research. Experimental probability and statistics. Applications across all Engineering Science disciplines.

### **E SC 433H Engineering Science Research Laboratory Experience (1)**

This course provides an introduction to experimental research, including hands-on laboratory experience. In addition, students take part in campus-wide laboratory tours that illustrate the variety of experimental practice, as well as the strongly interdisciplinary nature of contemporary experimental research in Engineer Science. Lab tours involve laboratories in a variety of disciplines, both within the Department of Engineering Science and Mechanics, and in other departments with related interdisciplinary activities. The classroom content focuses on the fundamentals of experimental probability and statistics, including: the experimental process; probability distributions and error; statistical estimators; least squares; and confidence limits and hypothesis testing. Applications of the statistical analysis of experimental data are drawn from across all Engineering Science disciplines and illustrated in the labs and lab tours. There will be three hands-on laboratories. Each lab will include additional introductory lecture material, specific handouts, and readings. A report will be required for each lab that represents a significant writing component to the class, and includes both descriptive and analytical components. Assessment for the course is based on the laboratory reports, which include analytical and descriptive components, as well as exercises involving the material discussed in lectures.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 445** Semiconductor Optoelectronic Devices (3) The course will present the basic engineering science and technology involved in modern semiconductor optoelectronic devices.

### **E SC 445 Semiconductor Optoelectronic Devices (3)**

This course deals with the optoelectronic properties of semiconductors and their application in functional devices for detection, emission, amplification and conversion of optical and electrical signals. A comprehensive introduction to the various optical absorption and emission processes in semiconductors is followed by an outline of specific properties of important optoelectronic semiconductors. The physical basis of detectors operating in the visible and near-visible regions is covered with an exploration of various photon detection phenomena present in solids. The devices discussed at length include intrinsic and extrinsic photoconductive detectors, p-n and Schottky detectors, p-i-n and heterojunction devices, avalanche photodiodes and photoemissive detectors, and light emitting and laser diodes. Novel structures based on variable gap and superlattice structures are also considered. The topical coverage includes basic operating principles, design considerations and performance assessment of each of these devices. The course will enable students to apply the physics of optoelectronic devices to applications such as displays, fiber optic communications, imaging, and integrated optoelectronics.

The course is offered once every year, and complements related courses on semiconductor device offered by the departments of Engineering Science and Mechanics, and Electrical Engineering. Student assessment is from homework, exams and a writing assignment involving a device application note.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 450 (MATSE 450) Synthesis and Processing of Electronic and Photonic Materials (3)** The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

### **Synthesis and Processing of Electronic and Photonic Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 455 Electrochemical Methods Engineering and Corrosion Science (3)** The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials.

### **E SC 455 Electrochemical Methods in Corrosion Science and Engineering (3)**

The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials. Students will be introduced to a variety of experimental electrochemical methods and will use their training to evaluate corrosion of steel, stainless steel, and aluminum. Techniques that will be used in this laboratory-intensive course include potentiodynamic and potentiostatic polarization, galvanic corrosion measurements, localized corrosion measurements (scratch, critical pitting temperature, and metastable pitting experiments), evaluation of sensitization (double-loop electrochemical potentiokinetic reactivation), cyclic voltammetry, and electrochemical impedance spectroscopy of painted and unpainted specimens.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 455 Electrochemical Methods Engineering and Corrosion Science (3)** The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials.

### **E SC 455 Electrochemical Methods in Corrosion Science and Engineering (3)**

The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials. Students will be introduced to a variety of experimental electrochemical methods and will use their training to evaluate corrosion of steel, stainless steel, and aluminum. Techniques that will be used in this laboratory-intensive course include potentiodynamic and potentiostatic polarization, galvanic corrosion measurements, localized corrosion measurements (scratch, critical pitting temperature, and metastable pitting experiments), evaluation of sensitization (double-loop electrochemical potentiokinetic reactivation), cyclic voltammetry, and electrochemical impedance spectroscopy of painted and unpainted specimens.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 456** (E E 456, EGEE 456) Introduction to Neural Networks (3) Artificial Neural Networks as a solving tool for difficult problems for which conventional methods are not available.

**E SC (E E/EGEE) 456 Introduction to Neural Networks (3)**

This course is in response to students' needs to learn Artificial Neural Networks (ANN) as a solving tool for difficult problems for which conventional methods are not available. The objective of this course is to give students hands-on experiences in identifying the best types of ANN, plus developing and applying ANN to solve difficult problems. Students will be introduced to a variety of ANN and will use their training skills to solve their own applications. During this course the students will develop a final project, in which they will apply ANN to widely varied problems.

Examples:

I ) students from E E may be interested in applying ANN to solve control problems

II ) students from Material Sciences may be interested in applying ANN to predict the pitting corrosion of components

III ) students from Petroleum Engineering may be interested in applying ANN to characterize the life of a reservoir

IV ) students from Agricultural Engineering may be interested in applying ANN to sort apples automatically, etc

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 475** (MATSE 475) Particulate Materials Processing (3) Fundamentals of processing particulate materials including production, characterization, handling, compaction, and sintering of metal, carbide, intermetallic, and composite powders.

**Particulate Materials Processing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 481** Elements of Nano/Micro-electromechanical Systems Processing and Design (3) Interdisciplinary fundamentals of nano/microelectromechanical systems (NEMS/ MEMS), including design, fabrication and machining of miniature systems. Draws from mechanics, science and materials.

**E SC 481 Elements of Nano/Micro-electromechanical Systems Processing and Design (3)**

The objective of the course is to introduce students to the theory and technology of nanofabrication. This objective is realized via the study of materials and devices for NEMS as well as nano-system's design, manufacture and packaging. Emphasis on the interrelationships between material properties and processing, device/system structure, and the mechanical, electrical, optical, or (bio)chemical behavior of devices/systems. As taught, the course is multidisciplinary and requires adequate background in materials science, mechanics, and device physics. The course comprises lecture presentations and laboratory demonstrations. Students attending this course come from different engineering majors, physics, and materials science. The students are assessed using a combination of homework assignments, class presentations, group projects, and written quizzes and exams.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 482** Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics (3) Principles and applications of Micro-Optoelectromechanical and Nanophotonic devices and systems.

**E SC 482 Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics (3)**

E SC 482 provides the engineering student with a unifying and multifaceted description of MOEMS and nanophotonics. Students will learn the fundamental principles behind many novel micro- and nanophotonic devices and systems and their practical applications in the fields of communication, sensor and image technology.

The course starts with an overview of the fundamental physics of semiconductors with emphases on silicon, III-V and II-V compound semiconductors due to their important applications in MOEMS and active nanooptoelectronic devices. Semiconductor nanostructures, such as epitaxial grown quantum wells and quantum dots, and chemically synthesized nanowires and colloidal nanocrystals will be introduced through discussions on their unique electronic structures carrier transport and excitonic dynamics. In addition to inorganic materials, the structures and critical characteristics of electro-optic and light emitting polymers will also be reviewed for their fast-growing applications in display technology, sensory and information processing systems.

The general principles for the design and operation of MOEMS and nanooptoelectronic devices will be discussed in the frame of geometrical optics, electromagnetic theory, and semiconductor physics. The reflection of light at dielectric interfaces will be reviewed to reveal the critical features of optical waveguide structures and to introduce the concept of surface plasma waves. In-depth descriptions will be given for the interband-and intraband- electron transition and exciton emission process in semiconductor quantum structures. Important instances of applying the "quantum confinement" in nanostructures to tailor their optical and optoelectronic properties will be underscored during the mechanism-analysis of laser diodes, detectors and modulators. The new concept of "photonic crystals" will be introduced through the analysis of parallelism between electron transport in semiconductor lattices and light propagation in periodic dielectric media.

Following a brief survey of the state-of-the-art technologies for the fabrication of MOEMs and nanophotonic devices, the course topics will move to their application examples in the fields of communication, sensor and image technology. For each application example, analysis will be carried out on the design, fabrication, and characterization issues of the involved systems/devices. Their merit-of-performance will be linked to the application practice to illustrate how the introduction of MOEMs/nanophotonic devices advances the technology in each specific field. Important topics to be covered in this part include micromachined lightwave systems, microcavity light emitting devices, fiber based biological nanosensors, nanoparticle enhanced surface plasma resonance sensors, microspectrometers, and digital micromirror device (DMD)-based projection display engine.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 483 (MATSE 483) Simulation and Design of Nanostructures (3)** Introduction to computer simulation techniques and their applications at the physical/life sciences interface.

### **E SC (MATSE) 483 Simulation and Design of Nanostructures (3)**

Students will learn the simulation techniques and the design rules of nanostructures. Basic concepts of computer modeling will be introduced using quantum and classical approaches. Fundamental physical phenomena encountered in the molecular fields of computational physics, chemistry, and biology will be studied. Applications are drawn from a broad range of fields including soft and condensed matter to build an understanding of nanostructures.

The course will assume knowledge and skill developed in the prerequisite courses of PHYS 214 and MATH 230. Students are expected to combine knowledge from other courses with information presented here to develop sophisticated interpretations and understanding of physical and chemical principles of nanostructures and their design rules.

Evaluation methods to be used in this course will be two in-class examinations and one final period examination. The course contains a computer code generation and implementation component. Students will use commercial or educational computer codes (e.g. Matlab, Mathematica, AMBER, CHARMM, VASP, etc.) which are available at our high performance computing clusters (<http://gears.aset.psu.edu/hpc/>) Students will use the computing clusters to perform simulations which are accessible from any classroom or laboratory at Penn State.

The principal objectives of the course is to learn the fundamental physics of nanostructures and to design them with computer simulations. This approach starts from classical molecular dynamics that apply on the large scale biological and synthetic assemblies and encompasses quantum mechanics for the molecular and atomic sizes. This course will give a broad scientific picture of simulation techniques in the area of nano-science and technology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 484 Biologically Inspired Nanomaterials (3)** Advances in biomolecular-based Science and technology at the physical/life sciences interface.

### **E SC 484 Biologically Inspired Nanomaterials (3)**

Students will learn the concepts of molecular engineering and the advances in biomolecular-based science and technology at the physical/life sciences interface. Basic concepts of protein structure and function will be introduced.

Applications from a broad range of fields, including condensed and living matter to build an understanding of device applications including biologically-inspired molecular-scale devices will be introduced.

The course will assume knowledge and skill developed in the prerequisite courses of PHYS 214 and MATH 230. Students are expected to combine knowledge from other courses with information presented here to develop sophisticated interpretations and understanding of physical and chemical principles of molecular structures and their design rules.

Evaluation methods to be used in this course will be two in-class examinations and one final period examination. The course contains a substantial writing component. Students will prepare bio-science and technology reports.

The principal objective of the course is to learn and analyze molecular engineering technologies at the bio and nano interface. This course will give a broad technological picture of emerging protein technologies in the area of biomolecular materials.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 494** Senior Thesis (1-9) Students must have approval of a thesis adviser before scheduling this course.

#### **Senior Thesis (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 494H** Senior Thesis (1-9) Students must have approval of a thesis adviser before scheduling this course.

#### **Senior Thesis (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 496A** Business Opportunities in Engineering Independent Study (1) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

#### **Business Opportunities in Engineering Independent Study (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497A** Business Opportunities in Engineering (2) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

**Business Opportunities in Engineering (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497A** Business Opportunities in Engineering (2) The principal goal of this course is to inform engineering students of business opportunities in Engineering.

**Business Opportunities in Engineering (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497B** Multidisciplinary Design Project (3) Multidisciplinary teams engage students from other departments to provide a broad perspective typical of real-live experiences.

**Multidisciplinary Design Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497B** Multidisciplinary Design Project (3) Multidisciplinary teams engage students from other departments to provide a broad perspective typical of real-live experiences.

**Multidisciplinary Design Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497C** Business Opportunities in Engineering and Individual Business Plan (3) The principal goal of this course is to inform engineering students of business opportunities in Engineering and to create a Business Plan.

**Business Opportunities in Engineering and Individual Business Plan (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 497D** Business Opportunities in Engineering (2) The principal goal of this course is to inform engineering students

of business opportunities in Engineering.

### **Business Opportunities in Engineering (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 501 Solar Cell Devices (3)** Principles of photovoltaic energy conversion and their utilization in engineering devices. Emphasis on current solar cell research and development efforts.

### **E SC 501 Solar Cell Devices (3)**

Photovoltaic energy conversion using organic and inorganic absorbers and liquid and solid materials is examined in depth. The emphasis is on photovoltaic energy conversion using sun light and covers solar cell device physics, materials, and design as well as all four types of photovoltaic structures; i.e., homojunctions, heterojunctions, surface barrier cells, and dye sensitized cells. Basic topics covered in the course include: solar spectra and industry standards; material properties and physics key to photovoltaic structures; and the role of scale in photovoltaics including the use of nano-structures. Computer modeling topics include an introduction to the AMPS code for transport analysis and an introduction to Maxwell's equations solvers for light trapping analysis. The use of such codes in the design of solar cells for light, carrier collection, and efficiency optimization is explored. Solar cell industry developments and research advancements are discussed throughout the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 501 Solar Cell Devices (3)** Principles of photovoltaic energy conversion and their utilization in engineering devices. Emphasis on current solar cell research and development efforts.

### **E SC 501 Solar Cell Devices (3)**

Photovoltaic energy conversion using organic and inorganic absorbers and liquid and solid materials is examined in depth. The emphasis is on photovoltaic energy conversion using sun light and covers solar cell device physics, materials, and design as well as all four types of photovoltaic structures; i.e., homojunctions, heterojunctions, surface barrier cells, and dye sensitized cells. Basic topics covered in the course include: solar spectra and industry standards; material properties and physics key to photovoltaic structures; and the role of scale in photovoltaics including the use of nano-structures. Computer modeling topics include an introduction to the AMPS code for transport analysis and an introduction to Maxwell's equations solvers for light trapping analysis. The use of such codes in the design of solar cells for light, carrier collection, and efficiency optimization is explored. Solar cell industry developments and research advancements are discussed throughout the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 502 Semiconductor Heterojunctions and Applications (3)** Theory, fabrication techniques, and electronic applications of semiconductor heterojunctions, including metal-semiconductor and electrolyte-semiconductor junctions.

### **Semiconductor Heterojunctions and Applications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 511** Engineering Materials for Energy Conversion and Storage (3) This course treats engineering materials and systems employed in conventional and unconventional direct energy conversion and energy storage.

**Engineering Materials for Energy Conversion and Storage (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 514** (E MCH 514) Engineering Science and Mechanics Seminar (1 per semester) Current literature and special problems in engineering mechanics.

**Engineering Science and Mechanics Seminar (1 per semester)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 536** Wave Propagation and Scattering (4) Survey of analytical and numerical methods for solving acoustic, electromagnetic and elastic wave propagation and scattering problems.

**Wave Propagation and Scattering (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 537** Multiple Scattering Theories and Dynamic Properties of Composite Materials (3) Acoustic, dielectric, elastic dynamic properties; periodic, random composites; wave propagation and scattering; attenuation, dispersion; super-viscous absorption; sonar, optical, ultrasonic applications.

**Multiple Scattering Theories and Dynamic Properties of Composite Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 540** Laser Optics Fundamentals (3) Selected topics in optics and laser physics, and their application in laser-materials processing.

**E SC 540 Laser Optics Fundamentals (3)**

Over the past two decades, new technologies such as laser-materials processing have moved from laboratory research to commercial applications. Engineers must now understand and apply many concepts of physics that in the past lay outside the boundaries of engineering. This course is intended for graduate students and practicing engineers whose exposure to physics has been limited to two or three undergraduate courses. It summarizes theories of geometric optics, physical optics, quantum optics and laser physics relevant to laser-materials processing, and it is designed to bridge the gap between abstract concepts and applications. Upon completion of this course, students will have developed sufficient proficiency in these theories to understand the intricacies of their use and application in laser-materials processing as described in the current technical literature. The student's accomplishment will be evaluated by mid-semester and final examinations.

E SC 540 will be offered each fall semester. Classes will meet twice a per week; each class will be 75 minutes long. The enrollment for this course is anticipated to be 15 to 30 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 541 Laser-Materials Interactions (3)** Laser beam interactions with metallic, ceramic, polymeric and biological materials; effects of wavelength, power, spatial and temporal distributions of intensity.

### **E SC 541 Laser-Materials Interactions (3)**

This course covers laser beam interactions with metals, insulators, semiconductors, polymers and biological materials relevant to laser-materials processing, and is designed to bridge the gap between abstract concepts and applications. Interactions such as heat flow, thermal stresses, melting, material removal, property changes and plasma effects are related to laser characteristics such as wavelength, power and the spatial and temporal distribution of intensity. Upon completion of this course the student will have developed sufficient knowledge of laser-materials interactions to understand their application in the current technical literature on laser-materials processing. The student's accomplishments will be evaluated by mid-semester and final examinations.

This course will be offered each year in the spring semester. The class will meet once a week; each class period will be 150 minutes long. The enrollment for the course is anticipated to be 15-30.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 542 Laser-Integrated Manufacturing (3)** Integration of lasers into manufacturing processes: laser-assisted surface modifications; laser joining; laser-based material shaping processes.

### **E SC 542 Laser-Integrated Manufacturing (3)**

E SC 542 is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It utilizes classroom lectures to provide a basis for students to develop an understanding of the integration of laser systems into manufacturing processes. Various lasers applicable to macro-processing, optical systems and manipulation components are discussed in terms of integration for industrial processing of materials, which include laser-assisted surface modification, laser joining and laser-based material removal processes. The unique characteristics and attributes of laser processing are discussed and contrasted with other contemporary manufacturing processes. Students will participate in a group project to develop and design an integrated system for selected laser manufacturing processes. Upon completion of this course, the student will understand the system requirements for laser-based manufacturing processes in terms of processing capabilities, equipment capabilities, safety requirements and economic considerations.

This course will be offered each year in the fall semester. Classes will meet once per week; each meeting period will be 150 minutes long.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 542 Laser-Integrated Manufacturing (3)** Integration of lasers into manufacturing processes: laser-assisted surface modifications; laser joining; laser-based material shaping processes.

### **E SC 542 Laser-Integrated Manufacturing (3)**

E SC 542 is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It utilizes classroom lectures to provide a basis for students to develop an understanding of the integration of laser systems into manufacturing processes. Various lasers applicable to macro-processing, optical systems and manipulation components are discussed in terms of integration for industrial processing of materials, which include laser-assisted surface modification, laser joining and laser-based material removal processes. The unique characteristics and attributes of laser processing are discussed and contrasted with other contemporary manufacturing processes. Students will participate in a group project to develop and design an integrated system for selected laser manufacturing processes. Upon completion of this course, the student will understand the system requirements for laser-based manufacturing processes in terms of processing capabilities, equipment capabilities, safety requirements and economic considerations.

This course will be offered each year in the fall semester. Classes will meet once per week; each meeting period will be 150 minutes long.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 543 Laser Microprocessing (3)** Laser microprocessing of engineered and biological materials for electronic, opto-electronic, MEMS and medical/therapeutic applications.

### **E SC 543 Laser Microprocessing (3)**

This course is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It covers laser processing to produce features and modify properties in metals, organic polymers, inorganic insulators, superconductors, semiconductors and biological materials on the meso, micro and nano scales. The lectures comprise analysis and discussion of selected technical papers on the use of laser microprocessing in electronic, opto-electronic, MEMS and medical-therapeutic applications. Upon completion of this course, the student will have developed sufficient knowledge of laser microprocessing to understand its applications as described in the current technical literature.

This course will be offered each year in the spring semester. Classes will meet once per week; each class period will be 150 minutes long.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 543 Laser Microprocessing (3)** Laser microprocessing of engineered and biological materials for electronic, opto-electronic, MEMS and medical/therapeutic applications.

### **E SC 543 Laser Microprocessing (3)**

This course is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It covers laser processing to produce features and modify properties in metals, organic polymers, inorganic insulators, superconductors, semiconductors and biological materials on the meso, micro and nano scales. The lectures comprise analysis and discussion of selected technical papers on the use of laser microprocessing in electronic, opto-electronic, MEMS and medical-therapeutic applications. Upon completion of this course, the student will have developed sufficient knowledge of laser microprocessing to understand its applications as described in the current technical literature.

This course will be offered each year in the spring semester. Classes will meet once per week; each class period will be 150 minutes long.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 544 Laser Laboratory (3)** Laser systems for materials processing, safety, critical processing parameters, diagnostic measurements, automation, sensing and control.

### **E SC 544 Laser Laboratory (3)**

This course is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It covers laser systems for materials processing such as carbon dioxide, neodymium-YAG and ultraviolet laser systems; safety; identification of critical process parameters; measurement of spatial and temporal distributions of intensity, power, polarization, absorptivity and reflectivity; beam and work piece manipulators; automation' methods of sensing and process control. Students will attend lectures, observe demonstrations and perform hands-on measurements. Upon completion of this course, the student will have developed sufficient proficiency in laser techniques to perform them safely in a laboratory setting and to understand the intricacies of their use as described in the current technical literature on laser-materials processing. The student's accomplishment is evaluated by laboratory reports and a final examination.

This course will be offered each summer.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 544 Laser Laboratory (3)** Laser systems for materials processing, safety, critical processing parameters, diagnostic measurements, automation, sensing and control.

### **E SC 544 Laser Laboratory (3)**

This course is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It covers laser systems for materials processing such as carbon dioxide, neodymium-YAG and ultraviolet laser systems; safety; identification of critical process parameters; measurement of spatial and temporal distributions of intensity, power, polarization, absorptivity and reflectivity; beam and work piece manipulators; automation' methods of sensing and process control. Students will attend lectures, observe demonstrations and perform hands-on measurements. Upon completion of this course, the student will have developed sufficient proficiency in laser techniques to perform them safely in a laboratory setting and to understand the intricacies of their use as described in the current technical literature on laser-materials processing. The student's accomplishment is evaluated by laboratory reports and a final examination.

This course will be offered each summer.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 577 Engineered Thin Films (3)** Broad overview of the preparation-characterization-property relations for thin films used in a wide range of industrial applications.

### **Engineered Thin Films (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1993

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 581 Microelectromechanical Systems/Smart Structures (3)** Methods of micromachining, smart structure fabrication. Design, modeling for physical, chemical, biomedical microsensors/actuators. Smart structures and microsystems packaging/integration.

### **Microelectromechanical Systems/Smart Structures (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 597A** Bio-Architecture (3) Biological architecture observed in nature; emphasis of symmetry and topology with several examples from recent literature.

**Bio-Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 597F** Applications of Soft Lithography in Bionanotechnology (3) Soft lithography techniques and applications in biological sciences with an emphasis on studies of mechanobiology, tissue engineering, and biochemical pathways.

**Applications of Soft Lithography in Bionanotechnology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 602** (E MCH 602) Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E SC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## English (ENGL)

**ENGL 400** Authors, Texts, Contexts (3 per semester, maximum of 6) Styles, cultural milieus, critical perspectives toward particular English- language authors and/or movements they represent, and the idea of authorship. (Section subtitles may appear in the Schedule of Courses.)

**Authors, Texts, Contexts (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 401** Studies in Genre (3 per semester, maximum of 6) English-language texts exemplifying particular genres, with attention to critical theories, historical development, rhetorical strategies, and social, cultural, and aesthetic values. (Section subtitles may appear in the Schedule of Courses.)

**Studies in Genre (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 401W** Creative Writing Theory (3) Theories of art and creativity which inform the making of literary works.

**Creative Writing Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 402** Literature and Society (3 per semester, maximum of 6) Texts confronting social, political, technological, or other issues in the English-speaking world. (Section subtitles may appear in the Schedule of Courses.)

**ENGL 402 Literature and Society (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

One variation will focus on Literature and Censorship by first considering general arguments for and against censorship and then by examining texts by writers who sought publication in their own country but whose books were censored or banned. The course will consider such questions as, Are there ever legitimate grounds for censorship? How do standards of censorship differ between countries? What is the relation between censorship on political and on moral grounds? What does artistic merit have to do with concern about moral or political subversion? Works from England, South Africa and the United States will be read and discussed, and where available, excerpts from trial transcripts will be read in order to examine arguments for and against publication. Readings will include works by Milton, D. H. Lawrence, Alan Paton, Nadine Gordimer, Athol Fugard, Eugene O'Neill, Henry Miller, and Alan Ginsberg.

Another variation will focus on war and gender in 20th century American literature by examining the ways male and female authors write about war. Texts will vary from battlefield experiences to repercussions of war to the symbolic implications of war. Questions will be raised about literary authority: Does one need to be combatant to write about war? If not, how does one find the authority to speak, particularly as a woman? How does race and/or ethnicity complicate one's perceptions of American participation in war? Readings will include works by Ernest Hemingway, William Faulkner, Joseph Heller, Cynthia Ozick, Leslie Marmon Silko, Norman Mailer, Bobbie Mason, Tim O'Brien, and Toni Morrison.

Another variation will focus specifically on the writings which emerged from the postwar African-American struggle for civil rights. The course will include not only fiction and poetry but also those speeches, sermons, editorials, and other forms of discourse to have emerged from the era. The emphasis will be both traditional literary concerns as well as on the various rhetorical strategies involved in each work. Ideally, the course would make visible to students the difficulties attendant upon any attempt to separate the concerns of rhetoric and persuasion too firmly from the concerns of literature. The course could conclude with a look at some of the various biographies, autobiographies, and histories written over the last twenty-five years, which attempt to shape our national memory.

Other variations include literature as a response to Newtonian science or to Darwinism or to the American Depression or to postwar technology or to new dystopias or to AIDS or, as in the sample outline, the Civil Rights movement.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 403** Literature and Culture (3 per semester, maximum of 6) Historical, theoretical, and practical issues within cultural studies in relation to English-speaking texts. (Section subtitles may appear in the Schedule of Courses.)

**ENGL 403 Literature and Cultural Studies (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

Topics covered in this course will vary from semester to semester, but a broad framework will be to introduce students to literary and other texts read in relation to cultural studies. Individual instructors may take up different historical periods, while other versions may suggest ways cultural studies draws on different theoretical discourses such as rhetoric, deconstruction, feminism, or the New Historicism for its problems. All Reading Culture courses should serve as an introduction to cultural studies, moving from theoretical to practical readings of literature and culture. In any case, a common goal would involve examining cultural studies as constituted by plural theories and ends.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 404** Mapping Identity, Difference, and Place (3 per semester, maximum of 6) Ethnicity, gender, class, race with reference to theoretical inquiry into identity, difference, and place in English-language literatures. (Section subtitles may appear in the Schedule of Courses.)

**Mapping Identity, Difference, and Place (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 405** Taking Shakespeare From Page to Stage (3) Students experience a Shakespeare play as a text to be explicated and as a script to be performed.

**Taking Shakespeare From Page to Stage (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 407** History of the English Language (3) Historical and structural study of developments in English sounds, forms, inflections, syntax, derivations, and meanings.

**History of the English Language (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 409** Composition Theory and Practice for Teachers (3) An overview of the theory and practice of writing for teachers, with emphasis on the writing process.

**ENGL 409 Composition Theory and Practice for Teachers (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL 409 is intended to help teachers improve their writing instruction by immersing them in composition theory and providing them with the opportunity to learn the writing process through personal experience. On completion of the course, participants will be able to:

- Articulate and test composition theory in written works
- Work through each phase of the writing process in assigned essays
- Develop strategies for writing effectively in various genres and styles, including journal writing
- Produce written works which demonstrate an awareness of audience
- Implement recommendations for effective revisions
- Provide responsive feedback to peers' written work
- Develop a precis for a model lesson

Evaluation: Students will be evaluated on their knowledge and understanding of instructional objectives, demonstrated in written assignments, class discussions and other projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2000  
 Prerequisite:  
 Concurrent: EDUC 452

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 412** Advanced Fiction Writing (3 per semester/maximum of 6) Advanced study of the techniques of fiction writing; regular practice in writing the short story; group discussion of student work.

**Advanced Fiction Writing (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 413** Advanced Poetry Writing (3 per semester/maximum of 6) Advanced study of the techniques of poetic composition; regular practice in writing poetry; group discussion of student work.

**ENGL 413 Advanced Poetry Writing (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Students enrolled in the Advanced Poetry Workshop will have successfully completed ENGL 213, Introduction to Poetry Writing. In the advanced course, they continue their study of prosody through the close reading of published poems,

including entire volumes of poetry by a single author. Students will also study articles and books that discuss various elements of craft. They can expect to prepare written reading responses and formal classroom presentations on the assigned readings. They will also draft approximately one new poem or revision each week, in addition to completing various writing exercises in or outside of class. All students will prepare for and engage in the workshop critiques; participation in these conversations is essential and subject to assessment. The writing, revision, and workshop process prepare the student to compile a portfolio of 8-10 poems, which they will submit as a final project for the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 413** Advanced Poetry Writing (3 per semester/maximum of 6) Advanced study of the techniques of poetic composition; regular practice in writing poetry; group discussion of student work.

**ENGL 413 Advanced Poetry Writing (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Students enrolled in the Advanced Poetry Workshop will have successfully completed ENGL 213, Introduction to Poetry Writing. In the advanced course, they continue their study of prosody through the close reading of published poems, including entire volumes of poetry by a single author. Students will also study articles and books that discuss various elements of craft. They can expect to prepare written reading responses and formal classroom presentations on the assigned readings. They will also draft approximately one new poem or revision each week, in addition to completing various writing exercises in or outside of class. All students will prepare for and engage in the workshop critiques; participation in these conversations is essential and subject to assessment. The writing, revision, and workshop process prepare the student to compile a portfolio of 8-10 poems, which they will submit as a final project for the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 414** Biographical Writing (3) Writing of biography and autobiography, character sketches, "profiles," and literary portraits; analysis and interpretations of source materials.

**Biographical Writing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 415** Advanced Nonfiction Writing (3 per semester/maximum of 6) Advanced study of the principles of nonfiction; substantial practice in writing and submitting magazine articles for publication.

**Advanced Nonfiction Writing (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 416** Science Writing (3 per semester/maximum of 6) Prepares scientists and writers to gather, interpret, and present scientific information to the layman with clarity and accuracy.

**Science Writing (3 per semester/maximum of 6)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 417** The Editorial Process (3) The process of editing from typescript through final proof.

**The Editorial Process (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 418** Advanced Technical Writing and Editing (3 per semester/maximum of 6) Preparing and editing professional papers for subject specialists and for others interested in careers as writers or editors.

**Advanced Technical Writing and Editing (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 419** Advanced Business Writing (3) Preparing and editing reports and presentations common to business, industry, and government.

**Advanced Business Writing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 420** Writing for the Web (3) Analysis and composition of informative, persuasive, and "creative" Web texts, based on rhetorical principles; no prior Web writing experience required.

**ENGL 420 Writing for the Web (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course, designed for writers and potential writers, will explore the unique opportunities and constraints of writing for the Web. As a writing course, it should appeal to students in the Humanities; however, because of the growing importance of Web texts in fields such as business and the social sciences and given the opportunity to compose/construct a variety of fictional and non-fictional "creative" and informative/persuasive Web texts, this course should be of value to students across the college.

In this course, students will survey a wide variety of Web texts--webs, electronic journals and books, learning to analyze these as to their efficacy in light of each text's rhetorical situation. As students learn to compose and construct such texts themselves, rhetorically based principles of audience awareness and persuasive appeal will be emphasized. Rather than focusing on writing html codes and java scripts, this course will build on the rhetorical principles taught in first-year writing courses, teaching students how to apply those principles to more sophisticated, multi-sensory, multi-media hyper textual writing.

The course will be taught primarily in a hands-on workshop environment-in a PC computer lab or laptop-equipped classroom. Although no prior Web writing experience is required, some experience with Web navigation and computer word processing will be helpful. Students will be evaluated on the basis of their participation/attendance in the course's workshop environment, written web analyses, and constructed web texts.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 421** Advanced Expository Writing (3) Develops skill in writing expository essays, with particular attention to style. Intended for liberal arts majors.

**Advanced Expository Writing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 422** Fiction Workshop (3 per semester/maximum of 6) Practice and criticism in the composition of the short story and the novel.

**Fiction Workshop (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 423** Poetry Writing Workshop (3 per semester/maximum of 6) Extensive practice in writing poetry; consideration of contemporary poetic forms; selected readings.

**Poetry Writing Workshop (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 424 (ENVST 424)** Creative Writing and the Natural World (3) Creative writing workshop focused on the environment and related issues.

**ENGL (ENVST) 424 Creative Writing and the Natural World (3)**

American literature includes a long and rich tradition of writing that focuses on the natural world. From the oral stories of indigenous people to the journals of the first European settlers, many have looked for a way to understand their own place in the world based upon their relationship to the earth and its creatures. While Puritans often discerned the pleasure or wrath of God in the environmental changes they experienced, Transcendentalists like Henry David Thoreau and Ralph Waldo Emerson sought out moments of spiritual enlightenment by immersing themselves in the natural order. More recently, such poets as Galway Kinnell, James Wright, and Robert Bly have attempted to connect with the depths of collective unconsciousness by exploring the natural world, while others, like Mary Oliver, Dan Gerber, Jim Harrison, Gary Snyder and Wendell Berry, have used transcendental thought and melded it with Christian and Buddhist insights. Still others, like Gary Paul Nabhan, Rachel Carson, and Alison Hawthorne Deming have brought science to bear upon the riches that nature, art, and scientific exploration may offer when joined in the pursuit of a deeper understanding of, and relationship with, the natural world. This course will acquaint students with the tradition of American nature writing, as well as contemporary nature writing, in the genres of nonfiction, poetry and fiction. Students will be introduced to issues of style, philosophy, and content, as they produce their own essays, poems, and stories. The course culminates in the production of a portfolio of nature writing. Much of this work will begin in class with specific assignments, which will include field work, and feedback from other students in the class. As a workshop course in creative writing, the emphasis will be upon the production of literary texts that interact with the natural world and upon the revision of those texts.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 425** Nonfiction Workshop (3 per semester/maximum of 6) Extensive writing of nonfiction for publication; an

introduction to the principles of writing the nonfiction book.

**Nonfiction Workshop (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1985  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 426 (US) (LTNST 426) Chicana and Chicano Cultural Production: Literature, Film, Music (3)** An in-depth study of Chicana/Chicano literature, film, and music from the inception of the Chicano Movement (1965-1975) to the present.

**ENGL 426 Chicana and Chicano Cultural Production: Literature, Film, and Music (3) (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL 426 will constitute an in-depth study of Chicano/a literature, film, and music from the inception of the Chicano movement (1965-1975) to the present. In addition to primary aesthetic texts, students will read historical, political, and theoretical essays designed to situate the Chicano/a cultural texts in historical and political context.

The aim of the course is to give students a better understanding of Chicano/a cultural production by situating these works of art against other U. S. artistic traditions and within wider historical and political movements. Authors and artists under consideration in this class will vary, but will likely include Luis Valdez, Tomas Rivera, Estella Portillo Trambley, Oscar Zeta Acosta, Corky Gonzales, Gloria Anzaldua, Norma Alarcon, Cherrie Moraga, Richard Rodriguez, Dagoberto Gilb, Rolando Hinojosa, Alfredo Vea, Charlie Trujillo, Diego Vasquez Jr., Joe Rodriguez, Tomas Almaguer, Jose Esteban Munoz, Manuel Ramos, Lucha Corpi, Rudolfo Anaya, Michael Nave. This class will prepare students for advanced courses in Latin/a literatures as well as other academic courses that engage in the verbal and written analysis of complex texts. Students will be evaluated by means of essays written in and out of class, essay exams, group projects, term-long journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as ENGL major elective credit or as credit towards the ENGL minor and will be offered once a year with 40 seats per offering.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 427 (J ST 427) Topics in Jewish American Literature (3 per semester/maximum of 9)** An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.

**ENGL (J ST) 427 Topics in Jewish American Literature (3)**

This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider the constitution, origin, and development of Jewish America's wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and -literature.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 427 (J ST 427) Topics in Jewish American Literature (3 per semester/maximum of 9)** An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.

**ENGL (J ST) 427 Topics in Jewish American Literature (3)**

This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider the constitution, origin, and development of Jewish America's wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and -literature.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 428 (US) (AAS 428) Asian American Literatures (3 per semester/maximum of 6)** A seminar on the literatures and cultures of Asian America, with attention to forms of geographic, historical, and ethnic diversity.

**AAS (ENGL) 428 Asian American Literatures (3 per semester/maximum of 6) (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course selectively examines the contemporary major works, authors, and themes of twentieth-century Asian American literature, with particular emphasis on post-1965 literary production. The course aims to give students a sense of the historical development of Asian American literary studies in addition to introducing them to some significant thematic and theoretical issues--of panethnicity and resistance; of memory, desire, and perception; of trauma and diaspora, to name a few possibilities. We will focus primarily on Asian American literatures and cultures within the contexts afforded by the histories of Asians in the United States although there will also be some attention to issues of neocolonialism, globalization, transnationalism, and militarization. Ultimately, this course proposes that the aesthetics of Asian American literature are inseparable from the politics of Asian American experiences. Issues to be discussed will include the rise of the Asian American movement in the 1960s; the emergence of diaspora; strategies for contesting canonicity and cultural authority; different versions of what it means to be an "American;" the intersections of race, class, and conflict; and the relationships between gender, sexuality, and stereotype.

The course introduces students to the diversity of Asian American literary and cultural production. It teaches them how to approach and analyze literature and other kinds of cultural formations as well as how to critically engage with texts through formal written analysis and through oral presentations.

This is an upper-level seminar course with enrollments between 15-35 students. A typical grading breakdown would look something like this:

Essay 1--20%

Attendance/Participation (which includes weekly quizzes and a group book presentation)--20%

Critical Responses--20%

Essay 2--20%

Final Exam/Project--20%

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 429 (CMLIT 429) New Media and Literature (3)** New media literary genres; critical discussion of creative works in digital media.

**ENGL (CMLIT) 429 New Media and Literature (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is an introduction to new media literary genres. It includes reflection on the concept of mediation (electronic and otherwise); on genre in both print culture and electronic publishing; and on literariness itself. It introduces students

to critical discussion of creative works in digital media, including hypertext and hypermedia fiction and nonfiction, code poetry and codework, cybertext and ergodic literature, net art and Web art, and software and electronic installation art. Students will learn about major debates in North American and European new media theory, understood as a distinct current of influence in twentieth century literary and cultural theory. They will acquire a critical vocabulary and an interpretive methodology for literary artifacts created and/or published in screen media. Finally, they will acquire a basic familiarity with the range of creative works in digital media and the critical debates animating their reception. Students will write both short written exercises (30 percent) and longer essays (40 percent), as well as give an in-class presentation (10 percent). 20 percent of the course grade may be determined by class participation or quizzes. This course is an advanced-level course, for students who have already acquired the prerequisite basic skills in interpretive reading and writing. It expands elective and post-1800 offerings at the 400 level for the English major and minor, and expands the topical range of the English studies curriculum, which currently includes no course dedicated to new media. Special facilities needed: ITEC classroom.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 430** The American Renaissance (3) Studies in the works and the interrelationships of writers such as Emerson, Hawthorne, Poe, Thoreau, Whitman, Melville, and Dickinson.

### **The American Renaissance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 431 (US) (AM ST 475)** Black American Writers (3 per semester, maximum of 6) A particular genre or historical period in the development of Black American literature.

### **ENGL 431 (AM ST 475) Black American Writers (3) (US)**

A study of a particular genre or historical period in the development of Black American literature. This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in African-American literature. The flexibility of the course will allow faculty a forum in which to share current scholarship or to relate issues in African-American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the "area" requirement in culture for American Studies majors.

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 432** The American Novel to 1900 (3) Such writers as Hawthorne, Melville, Stowe, Mark Twain, James, Crane, Chopin, and others.

### **The American Novel to 1900 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 433** The American Novel: 1900-1945 (3) Such writers as Wharton, Dreiser, Cather, Fitzgerald, Faulkner, Hemingway, Hurston, Wright, and others.

### **The American Novel: 1900-1945 (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 434 (AM ST 472) Topics in American Literature (3 per semester)** Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.)

**ENGL 434 (AM ST 472) Topics in American Literature (3)**

This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in American literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the "area" requirement in culture for American Studies majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 435 The American Short Story (3)** Development of the short story as a recognized art form, with emphasis on major writers.

**The American Short Story (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 436 American Fiction Since 1945 (3)** Representative fiction by such writers as Barth, Bellow, Ellison, Heller, Mailer, Morrison, Nabokov, Oates, O'Connor, Pynchon, Updike, Walker.

**American Fiction Since 1945 (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 437 The Poet in America (3)** American poets such as Bradstreet, Taylor, Poe, Emerson, Whitman, Dickinson, Frost, Eliot, Stevens, Hughes, Brooks, Moore, Williams, Plath, Rich, Lowell.

**The Poet in America (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 438 American Drama (3)** Development from the colonial period to playwrights such as O'Neill, Wilder, Hellman, Miller, Williams, Albee, Shepard, Norman, Wilson, and others.

**American Drama (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 439 American Nonfiction Prose (3)** Major prose writers such as Franklin, Emerson, Thoreau, Fuller, Henry Adams, Mailer, Baldwin, McCarthy, Dillard, Didion, Angelou, and others.

**American Nonfiction Prose (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 440 Studies in Shakespeare (3)** Intensive study of a single genre, topic, or critical approach to selected plays.

**Studies in Shakespeare (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 441 Chaucer (3)** The principal narrative poems and their background.

**Chaucer (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 442 Medieval English Literature (3)** Study of major works and genres of medieval English literature, exclusive of Chaucer.

**Medieval English Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 443 The English Renaissance (3)** Such writers as More, Sidney, Spenser, Shakespeare, Donne, Jonson, Bacon, and Marvell.

**The English Renaissance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 444 Shakespeare (3)** Selected tragedies, comedies, and histories.

**Shakespeare (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 445** Shakespeare's Contemporaries (3) Selected plays by Shakespeare's major predecessors and contemporaries: Kyd, Marlowe, Jonson, Webster, Marston, Middleton, and others.

### **Shakespeare's Contemporaries (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 446** Milton (3) Analysis of principal poems and their background.

### **Milton (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 447** The Restoration and the Eighteenth Century (3) The neoclassical age (1660-1776). Such writers as Dryden, Congreve, Swift, Pope, Fielding, Goldsmith, Sheridan, Boswell, Johnson.

### **The Restoration and the Eighteenth Century (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 448** The English Novel to Jane Austen (3) Novelists such as Defoe, Richardson, Fielding, Smollett, Sterne, and Austen.

### **The English Novel to Jane Austen (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 450** The Romantics (3) Poets such as Blake, Wordsworth, Coleridge, Keats, Shelley, and Byron; also prose by writers such as Hazlitt, Lamb, and DeQuincey.

### **The Romantics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 451** Literary Modernism in English (3) Survey of literary modernism in English and English translation in a variety of genres, including poetry, fiction, and drama.

### **Literary Modernism in English (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 452** The Victorians (3) Poets such as Tennyson, Browning, Arnold, and Hopkins; also prose by writers such as Carlyle, Mill, Ruskin, and Arnold.

### **The Victorians (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 453** Victorian Novel (3) Novelists such as the Brontes, Thackeray, Dickens, George Eliot, Meredith, and Hardy.

### **Victorian Novel (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 454** Modern British and Irish Drama (3) From Wilde and Shaw to the present season.

### **ENGL 454 Modern British and Irish Drama (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL 454 will introduce students to some of the most exciting playwrights and important trends in modern British and Irish drama from the late nineteenth century to the present. The course will examine a number of plays, exploring not only how they work formally, but also how changing cultural and historical contexts helped to shape the plays and British and Irish drama more generally. Authors under consideration will vary from class to class, but may include writers such as Oscar Wilde, George Bernard Shaw, John Synge, Lady Gregory, William Butler Yeats, Sean O'Casey, Samuel Becket, Denis Johnston, Brendan Behan, Brian Friel, Tom Murphy, Martin McDonagh, Noel Coward, John Osborne, T. S. Eliot, Robert Bolt, Harold Pinter, Caryl Churchill, and Tom Stoppard. The course will explore such topics as the role of drama in the Irish Revival, nationalism, and the revolution, the use of myth and folklore in drama, the emergence of realism, the function of Wilde and Shaw's humor in their plays, drama's response to the decline of the British empire, the modernist verse drama, post-modernism in drama, issues of stagecraft and performance, and the political function of such theaters as the Abbey Theatre or the Field Day Company. Students will write at least two papers on particular plays, and can expect to take a mid-term exam and a final exam. The course may be used as English Major elective credit or as credit towards the English minor, and will be offered once a year with 40 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 455** Topics in British Literature (3) Focused study of a particular genre, theme, or problem in British literature. (May be repeated for credit.)

### **ENGL 455 Topics in British Literature (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in British literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in British literature to larger School-wide themes in a classroom environment. Offering such focused studies under a British literature umbrella will allow majors to apply these offerings to their upper-level British literature requirement. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus.

This course will be offered once every two years, with an expected enrollment of 20-25 students.

General Education: None

Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 456** British Fiction, 1900-1945 (3) Major writers such as Conrad, Lawrence, Mansfield, Forster, Joyce, Woolf, Waugh, Greene, Bowen, Beckett, and others.

**British Fiction, 1900-1945 (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 457** British Fiction Since 1945 (3) Readings in British fiction since World War II.

**British Fiction Since 1945 (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 458** Twentieth-Century Poetry (3) Poets writing in English such as Yeats, Pound, Eliot, Frost, Auden, Stevens, Plath, Bishop, Brooks, H.D., and others.

**Twentieth-Century Poetry (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 461** (US) The Vernacular Roots of African American Literature (3) The relationship between oral tradition and literary texts and the double consciousness of African American voice in "print."

**The Vernacular Roots of African American Literature (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 462** (US) (WMNST 462) Reading Black, Reading Feminist (3) Female identity and its construction in textual representations of gender, class, color, and cultural difference in English-language literatures.

**ENGL (WMNST) 462 Reading Black, Reading Feminist (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL/WMNST 462 provides two important learning opportunities for undergraduate students. The first is to examine the construction of female identity in the textual representations of gender, class, color, and cultural differences by black American women. The second is to identify, explore, and analyze the major issues concerning the discovery and development of a black feminist literary tradition. Authors under consideration will vary from class to class, but may include writers such as Hortense Spillers, Harriet Jacobs, Harriet Wilson, E. Genovese, Hazel Carby, Francis Harper, J. Fauset, Nella Larsen, Zora Neale Hurston, Gwendolyn Brooks, Margaret Walker, Nikki Giovanni, Sonia Sanchez, Maya Angelou, Lorraine Hansberry, Adrienne Kennedy, E. Brown-Guillory, Toni Morrison, S. A. Williams, Alice Walker, Paula Marshall, and Octavia Butler. The course will focus on the complex relationship of slavery and post-slavery black experience to the literary imagination of African American women, and of issues of gender in black identity in America. Topics covered will vary, but will include issues of the legacy of slavery, the development of black feminist thought,

nineteenth-century conceptions of black womanhood, women's roles in the Harlem Renaissance, representations of black womanhood by male writers, and self-representation by female writers, women "Black Power" poets, black female playwrights, neo-slave narratives, the aesthetics of contemporary black feminism, and post-modernism and the challenge to understandings of canonicity posed by black women's writing, and the like. This class will prepare students for advanced courses in African American and feminist literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms. Students will be evaluated by class participation, a group oral presentation, small group problem solving exercises, three out-of-class essays (of 5-8 pages each), and an in-class final examination consisting of essays and short answers. In addition to satisfying requirements for students emphasizing in African American literature within the English major, this course will be important in the offerings of African/African American Studies, American Studies, Women's Studies, and History. The course may be used as English Major elective credit or as credit towards the English minor, and will be offered once every other year, with 40 seats per offering. The course can be used to complete the major and minor in Women's Studies Arts and Humanities area and it also satisfies the Women of Color (WOC) sub-requirement.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 463 (US) African American Autobiography (3)** The African American literary quest for identity and its adaptation to Euro-American culture and autobiographies.

**ENGL 463 African American Autobiography (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Starting with the slave narratives which initiate the literary quest of African Americans for identity, this upper-division course will examine the trope of writing (the "talking" book) as the (w)rite of passage into the dominant Euro-American culture. The course will identify, describe, and analyze how the major elements of the "quest" found in the slave autobiographies have been adapted as textual strategies by many contemporary African American writers of autobiography, semi-autobiography, and fictional autobiography. Authors under consideration will vary from class to class, but may include writers such as Frederick Douglass, Harriet Jacobs, W. E. B. Du Bois, Ida B. Wells, Richard Wright, Zora Neale Hurston, Maya Angelou, Martin Luther King, Alex Haley, Harriet E. Wilson, James Weldon Johnson, and Ernest Gaines. Topics explored will vary from class to class, but will likely consider slave narratives, the role of autobiography in the fashioning of identity and self, gender issues, genre questions, and the historical development of the genre and its shifting preoccupation from slave times through the early twentieth-century, the pre-Civil Rights era, the Civil Rights Movement, the Black Power Movement, and the present. The course will prepare students for other courses that engage in the verbal and written analysis of complex written texts, and will also prepare students to consider the social and cultural issues involved in the role of race in American history. Students will be evaluated by means of essays written out of class, essay and short answer exams, a term-long reading journal reflecting upon issues of the student's own "autobiography," an oral class presentation, and class participation. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year, with 40 seats per offering.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 466 (US) African American Novel I (3)** Thematic, structural, and stylistic characteristics of the African American novel from residually oral forms to satiric realism.

**African American Novel I (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 467 (US) African American Novel II (3)** Thematic, stylistic, and structural characteristics of the African American novel from naturalism to modernism and postmodernism.

**African American Novel II (3)**

General Education: None

Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 468 (US) African American Poetry (3)** African American poetry within the contexts of the black oral tradition and transformed European literary tradition.

**African American Poetry (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 469 (US) (AF AM 469) Slavery and the Literary Imagination (3)** The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans.

**ENGL (AAA S) 469 Slavery and the Literary Imagination (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL/AAA S 469 provides an opportunity for undergraduate students to examine African American petitions, poetry, slave narratives, autobiographies, and novels as literary reconstructions of the economics, politics, ethics, and poetics of slavery. Authors under consideration will vary from class to class, but may include writers such as Paul Laurence Dunbar, Phillis Wheatley, F. Harper, James Weldon Johnson, Langston Hughes, Claude McKay, Sterling Brown, Booker T. Washington, Harriet Jacobs, W. W. Brown, Harriet Wilson, Margaret Walker, Arna Bontemps, D. Bradley, S. A. Williams, Toni Morrison, Ishmael Reed, and Charles Johnson. The course will focus on the complex relationship of slavery to the literary imagination of Americans of African descent as they increasingly discovered the limitations and possibilities of reading and writing themselves into freedom, literacy, and wholeness as human beings and American citizens. Topics covered will vary, but will include issues of the legacy of slavery in the west; the political aims and rhetorical conventions of African-American autobiography; the myths and realities of slavery; economic, political, ethical, and aesthetic issues of the representation of slavery; understandings of black consciousness and black culture on the road from slavery to freedom; the rise of African American realism as a response to the legacy of slavery; Black Feminism and issues of slavery; the role of history and memory in the construction of slavery; post-modern configurations of slavery; and the like. This class will prepare students for advanced courses in African American literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms. Students will be evaluated by class participation, a group oral presentation, small group problem solving exercises, three out-of-class essays (of 5-8 pages each), and an in-class final examination consisting of essays and short answers. AAA S/ENGL 469 will satisfy one of the six 300H-400 level courses required for the major in English and the required 400 level course for the emphasis in African American literature within the major. It can also satisfy one of the six courses required for a minor in English. The course may be used as English Major elective credit or as credit towards the English minor. It will also be important in the offerings of African and African American Studies, American Studies, and American History. This course can be used to fulfill major requirements on the African and African American Studies major. It will be offered once every other year, with 40 seats per offering.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 470 Rhetorical Theory and Practice (3)** Application of certain rhetorical principles to problems in composition. Writing exercise. Designed as preparation for the teaching of composition.

**Rhetorical Theory and Practice (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 471 Rhetorical Traditions (3 per semester, maximum of 6)** Introduces major traditions of rhetorical inquiry and their relevance for English studies. (Section subtitles may appear in the Schedule of Courses.)

**Rhetorical Traditions (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 472** Current Theories of Writing and Reading (3 per semester, maximum of 6) Investigates models of textual production and reception current within English studies. (Section subtitles may appear in the Schedule of Courses.)

**Current Theories of Writing and Reading (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 473** Rhetorical Approaches to Discourse (3 per semester, maximum of 6) Practices the criticism of written texts from selected rhetorical perspectives. (Section subtitles may appear in the Schedule of Courses.)

**Rhetorical Approaches to Discourse (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 474** Issues in Rhetoric and Composition (3 per semester, maximum of 6) Examines selected topics in the field of rhetoric and composition. (Section subtitles may appear in the Schedule of Courses.)

**Issues in Rhetoric and Composition (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 477** Teaching Children's Literature (3) Teaching Children's Literature in light of recent literary pedagogy, the history of childhood, and critical approaches to Children's Literature.

**ENGL 477 Teaching Children's Literature (3)**

This course explores the teaching of Children's Literature. Beginning with students' own interpretations of the children's books we read, we develop critical concepts through which to understand and teach children's literature. The course presumes that books written for children have an intrinsic importance as literary and cultural artifacts and so demand serious consideration. Because this course is offered as an English course, we will concentrate on such things as the formal characteristics of the works we study, the kinds of audiences they seem to solicit, their implied authors, their ideologies, and so forth. The emphasis of the course is on teaching Children's Literature as literature; the course assumes that teaching literature is teaching reading and writing. Students are evaluated according to their participation in class discussion and three required papers—one on the teaching of a particular work of Children's Literature, one on some aspect of the history of childhood, and one that analyzes a children's book.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 479** Business or Technical Writing Practicum (1-3) Practical experience applying business or technical writing principles, working with advanced business, science, or engineering students on classroom projects.

**ENGL 479 Business or Technical Writing Practicum (1-3)**

English 493 enables students to bring their skills as writers and their knowledge of the requirements and conventions of business or technical writing to bear on a team project assigned in an advanced business, technical, or science course. The course requires students to work with the other members of the team on all aspects of the project where they are expected to contribute their skills to writing the final report that will constitute the primary means of communicating the results of the project to an appropriate audience. The major objective of the course is to provide students with opportunities to apply the writing skills they have mastered in previous or concurrent courses to projects of the kind that they would encounter in a professional writing situation. Thus, they will learn to work effectively in a team, to contribute to the overall objectives of the project, to serve as writing "consultants" to the group, and to work with others in perfecting the final written product. Their skills in organizing, editing, assessing the audience's needs, and finding the most effective ways to meet these needs will be tested in "real life" situations. Evaluation of the student's contributions and effectiveness will be made by the instructor in charge of ELISH 493 and the cooperating instructor in the business, technical, or scientific course. Evaluation methods could include (but not be restricted to) a journal kept by the student during the course project, observations by one or both instructors of the team in operation, peer evaluations by other student members of the project, and evaluation of the final written product by one or both of the cooperating instructors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 480 Communication Design for Writers (3)** This course explores visual design, non-verbal communication, and software packages used in professional settings to most effectively present written communications.

**ENGL 480 Communication Design for Writers (3)**

ENGL 480 is a course designed to familiarize students with an integrated theory of the roles that visual, verbal, and non-verbal communication play in the production of professional documents using the technologies and software applications most widely used in many organizational settings. To this end, the course will focus on employing non-verbal design elements (color, photographs, graphics, page layout, typography, paper) to develop effective communications tailored to a variety of media, audiences, and purposes using software packages such as Quark XPress, Photoshop, Illustrator, InDesign, Excel. Emphasis will be placed on producing clear, insightful, polished, professional documents, both individually and as part of a team.

As part of the course, students can expect to

- a.) Understand the theories, elements, and principles of visual and non-verbal communication.
- b.) Appreciate the roles of the audience, purpose, and context in planning and composing documents.
- c.) Value the role of ethos, pathos, and logos when planning and composing documents.
- d.) Learn basic skills in a variety of software packages most widely used in the professional world.
- e.) Design and compose a variety of documents for a variety of audiences that display their writing and design skills.
- f.) Demonstrate through their documents an understanding of the theories of visual, verbal, and non-verbal communication.
- g.) Assess their own strengths and weaknesses as writers and designers.
- h.) Demonstrate the ability to reflect critically on their own and others' discourse practices.
- i.) Gain an understanding of the role and scope of other professionals and other disciplines in creating professional communications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 481 Literary Theory: Historical Perspectives (3)** Selected topics in the history of literary criticism and theory within the English-language tradition.

**Literary Theory: Historical Perspectives (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 482 Contemporary Literary Theory and Practice (3 per semester, maximum of 6)** Contemporary literary theories and

their implication for critical practice as applied to British, American, and other English-language literary works.

### **Contemporary Literary Theory and Practice (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 482W** Contemporary Literary and Cultural Theory (3) Contemporary literary and cultural theories and their implication for critical practice as applied to a variety of texts, e.g. literary, linguistic, visual, multimedia, and/or popular.

### **Contemporary Literary and Cultural Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 483** Problems in Critical Theory and Practice (3) Intensive study of one or more recent theoretical approaches as applied to British, American, and other English-language literary works.

### **Problems in Critical Theory and Practice (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 484** James Joyce (3) Analysis of principal works and their background.

### **James Joyce (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 485** Australian and New Zealand Literature and Culture (3) Questions of nationality, identity, gender, race, class, colonialism, and postcolonialism in these literatures.

### **Australian and New Zealand Literature and Culture (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 486 (IL)** The World Novel in English (3) Studies in the novel, written in English, by writers outside of the United States and Great Britain.

### **ENGL 486 The World Novel in English (3) (IL)**

This course examines the nature of the novel as written in English by writers outside of the United States and Great Britain. Such a study necessarily involves both an aesthetic and a political perspective, in that the tradition of the novel in these landscapes so often involves the aesthetic and political suppression of native literary forms and voices. Thus, this course looks at the novel as written both by the colonizer and by the colonized. It considers the politics of the aboriginal author writing in an adopted language, and the ways in which such an adoption bears upon related ethnic and gender matters; it also considers the sorts of artistic and political tensions that emerge in the work of writers who write in what might be called the dominant English tradition. This course also studies the work of what might be called the multi-cultural writer,

or the writer perforce extracted from a native, non-English-speaking culture and placed within a larger, colonial, English-speaking culture. Matters of novelistic form, as they are related to ethnic and cultural identity, are also discussed. One intent of the course is to reveal the cultural, racial, and gender diversity that naturally adheres to these particular literary traditions.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 487W** Senior Seminar (3) Issues, themes, periods, critical theories, etc., that invite students to use prior English studies, limited to seniors majoring in English.

### **Senior Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 488** (IL) (CMLIT 488) Modern Continental Drama (3) From Ibsen to the drama of today: Strindberg, Chekhov, Hauptmann, Pirandello, Ionesco, Beckett, Genet, and others.

### **Modern Continental Drama (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 489** (WMNST 489) British Women Writers (3) A study of selected British women writers.

### **ENGL (WMNST) 489 British Women Writers (3)**

This course provides the opportunity to study writing by British Women from a historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will address the question of the role gender plays in the selection of literary forms and the development of character, theme, symbols, and rhetorical strategies. It will also explore what particular dimensions British women writers have brought to the British literary tradition.

Students will be active learners through keeping reading journals, presenting background reports on the history of women in England, participating in small-group discussions about the texts, and writing 2 shorter essays and one longer research essay for the class. This course focuses on an area of British literature, which more traditionally structured courses tend to obscure. The course will be attractive to students from a variety of programs, including English majors, Women's Studies minors, and Interdisciplinary Humanities students. The course will be offered once every two years. Estimated class size 20.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 490** (US;IL) (WMNST 490) Women Writers and Their Worlds (3) American and British literature written from the perspective of women.

### **ENGL (WMNST) 490 Women Writers and Their Worlds (3) (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL/WMNST 490 covers particular aspects of American and British literature written from the perspective of women. The courses stress the diversity of women's authorial worlds, both through time and/or space. The readings and specific focus vary from semester to semester. ENGL/WMNST 490 seeks to make students aware of the extensive body of literature written by women, but, unlike ENGL 194, which is a survey course of women's literature, ENGL/WMNST 490 can be a more intensive course, focusing on selected themes and topics of particular concern to women as reflected in the poetry and



fiction of twentieth-century American and British women writers. The class can also be taught in relationship to earlier periods, dealing, for instance, with English women novelists from 1775-1865. In such a class, readings would include fiction by Fanny Burney, Mary Wollstonecraft, Ann Radcliffe, Jane Austen, Mary Shelley, Emily Bronte, Elizabeth Gaskell, and George Eliot. The course would then place each novel in its historical, social, intellectual, and literary context, and explore the various ways in which some of England's best writers transformed their female experience of the world into fiction that extended the range and influenced the development of the novel. Regardless of the particular focus, all sections of the course pose the following questions throughout: Do women use the same myths, archetypes, and literary conventions as male writers? Or do they sometimes have to modify the myths, archetypes, and literary conventions originated by their male precursors in order to adapt them to female experience? Is there such a thing as a distinctively female imagination, with a symbolic language of its own? Is there such a thing as a chain of literary influence linking women writers to each other? What are the strategies for coping with the anxieties of authorship? What is the interaction between gender and genre? In what ways are creativity and procreativity modes of defying prevailing ideologies? Does a woman's psychological development have an effect on the plots a woman novelist conceives? How does women's literature reflect the realities of women's lives? As a course in women's literature, ENGL/WMNST 490 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women's literature in the context of men's literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. Students should expect to complete a minimum of three written assignments in the course, two course papers, and an essay final exam in class. The papers each will ask students to choose a text to analyze in relationship to one of the thematic modules the course has chosen, for instance, to discuss how Virginia Woolf's *Mrs. Dalloway* analyzes the position of upper-middle class women in a particular moment in history when women had achieved the vote, but were still largely constrained by patriarchal social norms. In addition to written assignments, students will be evaluated on class discussion and general participation. The course not only prepares students for taking up literary and cultural analysis in English classes, but also in any other class that engages in the verbal and written analysis of complex written texts, and in other classes in Women's Studies or in other Penn State departments that address the social, cultural, or ethical issues of gender. The course may be used as English Major elective credit or as credit towards the English Minor; it may also be used in the Women's Studies major and minor. It will be offered once a year with 40 seats per offering.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 491** The Capstone Course in Professional Writing (3) This culminating course for Professional Writing majors concentrates on reflective analyses, design, and presentation of documents in the development of professional portfolios.

#### **ENGL 494 The Capstone Course in Professional Writing (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

English 494 is the capstone writing course for the Professional Writing degree program. Its overall purpose is to provide students with the opportunity to reflect on and integrate academic coursework, co-curricular activities, and internship experiences through the design and development of print and electronic professional portfolios. To this end, students will analyze and evaluate their own professional texts as well as the texts of their peers, focusing on rhetorical analysis, content, organization, and expression. Emphasis will be placed on producing clear, insightful, polished, professional documents for inclusion in both paper and digital portfolios.

As part of the course, students can expect to:

- a) demonstrate the ability to reflect critically on their own and others' discourse practices
- b) assess their own strengths and weaknesses as writers and evaluate their writings for inclusion in the portfolios
- c) compile both paper and electronic portfolios that integrate relevant material from academic courses, internships, and other co-curricular learning experiences
- d) demonstrate the ability to employ technology in the development of the portfolios
- e) design materials that display their writing skills and rhetorical knowledge for a professional audience
- f) develop a finished professional resume and application letter
- g) discuss and demonstrate a variety of strategies for securing a professional writing position

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 492 (AM ST 476, WMNST 491) American Women Writers (3)** A study of selected American women writers.

#### **ENGL 492 (AM ST 476, WOMST 492) American Women Writers (3)**

A study of selected women writers, this course provides the opportunity to study writing by American women from an historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on

a careful reading of works by a variety of authors. It will raise the question of the role that gender--as well as other differences such as race, class, and ethnicity--play in the selection of literary forms and the development of character, theme, symbol, and rhetorical strategy. It will also explore the dimensions American women have brought to the American literary tradition. The course satisfies the area requirement in culture for American Studies majors and is open to all majors meeting the prerequisite requirements. The course will be offered once every two years and enrollment is 25.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 493 (AM ST 493) The Folktale in American Literature (3)** A survey of the literary uses of the folktale and legendary materials, with particular concentration on the literature of America.

### **The Folktale in American Literature (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 494 Senior Thesis in English (1-6)** Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.

### **ENGL 494 The Capstone Course in Professional Writing (3)**

English 494 is the capstone writing course for the Professional Writing degree program. Its overall purpose is to provide students with the opportunity to reflect on and integrate academic coursework, co-curricular activities, and internship experiences through the design and development of print and electronic professional portfolios. To this end, students will analyze and evaluate their own professional texts as well as the texts of their peers, focusing on rhetorical analysis, content, organization, and expression. Emphasis will be placed on producing clear, insightful, polished, professional documents for inclusion in both paper and digital portfolios.

As part of the course, students can expect to:

- a) demonstrate the ability to reflect critically on their own and others' discourse practices
- b) assess their own strengths and weaknesses as writers and evaluate their writings for inclusion in the portfolios
- c) compile both paper and electronic portfolios that integrate relevant material from academic courses, internships, and other co-curricular learning experiences
- d) demonstrate the ability to employ technology in the development of the portfolios
- e) design materials that display their writing skills and rhetorical knowledge for a professional audience
- f) develop a finished professional resume and application letter
- g) discuss and demonstrate a variety of strategies for securing a professional writing position

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 494H Senior Thesis in English (1-6)** Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.

### **Senior Thesis in English (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 495 Internship (3-12)** Supervised practicum in fields appropriate to the English major.

### **Internship (3-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 496** Independent Studies (1-18) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 496A** Literature of and About the Middle East (3) Examins representative texts of and about middle eastern culture, political and socio-economic conditions.

**Literature of and About the Middle East (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 496B** Advanced Studies in Memoir (1-6) Read six classic memoirs and write and revise two memoirs that experiment with voice and style.

**Advanced Studies in Memoir (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2013 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 497A** Mont Alto Film Project - III (3) Practicum in filmmaking. Part III of IV covers principle photography and production for a full-length feature film.

**Mont Alto Film Project - III (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 499** (IL) Foreign Study--English (3-6) Studies abroad in English language and/or literature.

**Foreign Study--English (3-6)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 501** Materials and Methods of Research (3) Materials and techniques of research in English and American literary history; form and content of these. Required of all graduate students with an English major.

**Materials and Methods of Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 502** Theory and Teaching of Composition (3) Study of grammar, logic, rhetoric, and style in their applicability to teaching composition.

**Theory and Teaching of Composition (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 503** (LL ED 503) Research Methods in Composition (3) Introduction to the issues and methods of empirical research in composition.

**Research Methods in Composition (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 504** Rhetoric and Poetics (3) Historical relations between rhetorical theory and poetics; approaches to rhetorical criticism of poetic discourse.

**Rhetoric and Poetics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 506** The English Language (3) A problem-centered approach to literary and oral forms of English, utilizing historical

and analytic perspectives.

### **The English Language (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 507** English Composition Studies (3) An overview of composition studies, with particular attention to the schools of writing pedagogy.

### **English Composition Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 510** Scholarly Editing: Theory and Practice (3) Study of editorial theory from McKerrow and Greg to the present; experience in scholarly editing and manuscript study.

### **Scholarly Editing: Theory and Practice (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 511** Thesis Workshop and Professional Writing (3) Professional writing for graduate students.

### **ENGL 511 Thesis Workshop and Professional Writing (3)**

This course helps graduate students in all fields develop a clear, professional, prose style. Every week they give the instructor five or so pages of their writing and get detailed feedback. Several times during the semester, their week's assignment is read and commented on by the whole class in workshop. By learning how to suggest improvements to their classmates, members learn how to see and fix their own writing problems as well. In addition to style, classes discuss organization, mechanics, formats, and any special problems pertaining to the students' projects and to writing in their specialties. Students must have approximately 30 pages of professional-level writing on hand to revise for this course. Evaluation is based on weekly assignments, on a test, and on a case study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 512** The Writing of Fiction (3 per semester/maximum of 15) Supervised workshop in advanced techniques of writing fiction.

### **The Writing of Fiction (3 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 513** The Writing of Poetry (3 per semester/maximum of 15) For the student with considerable experience in writing poetry; a workshop devoted to advanced poetic technique.

### **The Writing of Poetry (3 per semester/maximum of 15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 515** The Writing of Nonfiction (3 per semester/maximum of 15) Supervised workshop in advanced nonfiction techniques.

**The Writing of Nonfiction (3 per semester/maximum of 15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 521** Old English Language (3) An introduction to the main features of the Old English language; readings in simple Old English prose and poetry.

**Old English Language (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 522** Beowulf (3) Reading and critical analysis.

**Beowulf (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 530** The Literature of Biography and Autobiography (1-3 per semester, maximum of 6) Study of biographical and autobiographical theory and practice through analysis of major English and American works in each genre.

**The Literature of Biography and Autobiography (1-3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 540** Studies in Elizabethan Prose and Poetry (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include figures such as Spenser and Sidney.

**Studies in Elizabethan Prose and Poetry (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 541** Medieval Studies (1-3 per semester, maximum of 12) Studies in medieval English literature. Topics studied might include medieval romances, drama, or major figures aside from Chaucer.

**Medieval Studies (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 543** Studies in Early Seventeenth-Century Literature (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Donne, Herbert, Jonson, Bacon.

**Studies in Early Seventeenth-Century Literature (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 545** Chaucer (1-3 per semester, maximum of 12) Major and minor works of Geoffrey Chaucer. The works studied will vary from year to year.

**Chaucer (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 546** Milton (3) The poetry and prose of John Milton.

**Milton (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 548** Elizabethan and Jacobean Drama (1-3 per semester, maximum of 12) English drama from 1558 to 1642, exclusive of Shakespeare.

**Elizabethan and Jacobean Drama (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 549** Shakespeare (1-3 per semester, maximum of 12) Special problems of sources, chronology, text, characterization, and motivation in the drama.

**Shakespeare (1-3 per semester, maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 550** English Literature 1660-1800 (1-3 per semester, maximum of 12) Major figures studied will vary from year to

year. Writers studied might include Dryden, Swift, Pope, Johnson, Fielding, Gibbon.

**English Literature 1660-1800 (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 553 Literacy Studies (3)** An overview of current research on literacy, with particular attention to language, thought, and learning and their applications to writing.

**ENGL 553 Literacy Studies (3)**

ENGL 553 will present current research on literacy, with an emphasis on language acquisition, learning theory, and their applications for writing pedagogy.

1. Instructional, Educational, and Course Objectives:

As a result of having completed the course, students will be able to:

Demonstrate a clear understanding of current theories of literacy, including the reciprocity of writing and thinking, speaking and reading.

Articulate and discuss various approaches to instruction, including uses of writing in the classroom and writing to learn. Compare and contrast traditional and current approaches to teaching writing. Demonstrate and apply the concepts of the curriculum models for teaching writing.

Utilize practical methods for identifying goals and applying theory to instructional plans.

2. Students' evaluation will be based on their knowledge and understanding of instructional objectives, demonstrated in written assignments, class discussions, and other assignments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 554 Studies in Early American Literature (1-3 per semester, maximum of 12)** Major figures studied will vary from year to year. Writers studied might include Bradstreet, Taylor, Mather, Franklin, Edwards, Paine.

**Studies in Early American Literature (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 558 Nineteenth-Century British Fiction (1-3 per semester, maximum of 12)** Major figures studied will vary from year to year. Writers studied might include Dickens, Thackeray, the Brontes, George Eliot, Hardy.

**Nineteenth-Century British Fiction (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 560 American Romanticism (1-3 per semester, maximum of 12)** Major figures studied will vary from year to year. Writers studied might include Hawthorne, Melville, Emerson, Thoreau, Whitman.

**American Romanticism (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 561** Studies in the Romantic Movement (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Blake, Wordsworth, Coleridge, Byron, Shelley, Keats.

**Studies in the Romantic Movement (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 562** Studies in the Literature of Victorian England (1-3 per semester, maximum of 12) Figures will vary from year to year. Writers studied might include Tennyson, Browning, Arnold, Newman, Ruskin, Trollope.

**Studies in the Literature of Victorian England (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 564** Studies in Nineteenth-Century American Literature (1-3 per semester, maximum of 12) Writers will vary from year to year. Writers studied might include Cooper, Poe, Dickinson, Twain, James.

**Studies in Nineteenth-Century American Literature (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 565** Period Studies in African-American Literature (3 per semester/maximum of 9) Studies of periods in African-American literature. Periods might include the Harlem Renaissance or the Black Arts Movement.

**Period Studies in African-American Literature (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 566** Genre Studies in African-American Literature (3 per semester/maximum of 9) Genre will vary from year to year, but will include categories such as poetry, fiction, essays, sermons, autobiographies, short stories.

**Genre Studies in African-American Literature (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 567** Thematic Studies in African-American Literature (3 per semester/maximum of 9) Exploration of key concepts in African-American culture as manifested in various literary discourses.

**Thematic Studies in African-American Literature (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 568** Gender Issues in African-American Literature (3 per semester/maximum of 9) Gender issues in African-American literature and culture. Issues may include the Black woman writer or Gay and Lesbian writers.

**Gender Issues in African-American Literature (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 570** The Writer as Critic: Reviewing Contemporary Poetry, Fiction, and Non-Fiction (3) Students will write and revise book reviews of poetry, fiction, and non-fiction for a variety of newspapers and literary magazines.

**ENGL 570. The Writer as Critic: Reviewing Contemporary Poetry, Fiction, and Non-Fiction (3)**

In this class, students will read books and write reviews of those books, following a detailed schedule of readings and assignments established in the syllabus. Success in this class depends upon the student's ability to set priorities, organize materials, followup on initial contacts with presses and editors, and revise all reviews to publishable standards.

Students begin by reading published book reviews and two texts (one poetry, one fiction) assigned by the instructor. Analyzing the structure of the published reviews, students draft model 200- and 550-word reviews, using the published reviews as guides. As the course progresses, students contact publishing houses and presses to request review copies, while simultaneously writing to editors with project proposals. With longer reviews--700 and 1,000 words--students engage complex issues about the economics and politics of publishing.

Readings from the course Sampler (provided by instructor) inspire students to position themselves as literary citizens in the national conversation about contemporary writing. "The Writer as Critic" supplements the MFA course offerings in non-fiction. Students in all genres may practice advanced expository prose while gaining a practical skill. For students in the MFA program, this course fulfills a literature seminar requirement.

Students will be evaluated on the quality of final reviews, the timely completion of all drafts, participation in editing teams, and final portfolio of correspondence. This course, for which MFA students have first priority, will be offered approximately every other year with a maximum of 12 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 571** Writer in the Community (3) Students study the theory and practice of creative writing pedagogy in non-university settings.

**Writer in the Community (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 573** Studies in Twentieth-Century British Literature (1-3 per semester, maximum of 12) Major figures studied will vary from year to year. Writers studied might include Yeats, Conrad, Joyce, Shaw, Lawrence, Auden.

**Studies in Twentieth-Century British Literature (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 574** Studies in Twentieth-Century American Literature (1-3 per semester, maximum of 12) Figures studied will vary from year to year. Writers studied might include Dreiser, Wharton, Eliot, Hemingway, Fitzgerald, Faulkner, O'Neill, Williams.

**Studies in Twentieth-Century American Literature (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 575** Experimentation and Modernism in Twentieth-Century British and American Fiction (1-3 per semester, maximum of 12) Figures studied will be drawn from the era of Joyce and Virginia Woolf to the present.

**Experimentation and Modernism in Twentieth-Century British and American Fiction (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 576** Studies in Twentieth-Century American Fiction (1-3 per semester, maximum of 12) Concentrated study in such major American writers as Hemingway, Faulkner, and Fitzgerald.

**Studies in Twentieth-Century American Fiction (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 577** Contemporary Fiction (1-3 per semester, maximum of 12) Exploration of contemporary English language fiction.

**Contemporary Fiction (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 582** Survey of Contemporary Literary Theory (3) Exploration of the dimensions of discourse as reflected in recent theories of rhetoric, poetics, and literary criticism.

**Survey of Contemporary Literary Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 583** Studies in Critical Theory (1-3 per semester/maximum of 12) Study of specific contemporary critical approaches to literature and application to English and/or American literary works.

**Studies in Critical Theory (1-3 per semester/maximum of 12)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 584** Studies in Rhetoric (1-3 per semester/maximum of 12) Specific rhetorical problems, issues, or figures; topics will change from year to year.

**Studies in Rhetoric (1-3 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 585** Studies in British Fiction (1-3 per semester, maximum of 6) No description.

**Studies in British Fiction (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 586** Readings in Literature (1-12) Programs of readings designed to meet specific needs of individual students.

**Readings in Literature (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 588** Studies in American Fiction (1-3 per semester, maximum of 12) No description.

**Studies in American Fiction (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 589** Studies in American Poetry (1-3 per semester, maximum of 12) No description.

**Studies in American Poetry (1-3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 596** Individual Studies (1-12) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597A** The History of the Book in America to 1900 (3) Introduction to material text studies/book history, featuring American literary works through 1900 in a variety of genres and media.

**The History of the Book in America to 1900 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597A** The History of the Book in America to 1900 (3) Introduction to material text studies/book history, featuring American literary works through 1900 in a variety of genres and media.

**The History of the Book in America to 1900 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597B** Interdisciplinary Perspectives on Writing Research (3) This course introduces methods collectively labeled empirical qualitative in writing research, including ethnography, teacher research, narrative analysis, and grounded theory.

**Interdisciplinary Perspectives on Writing Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597B** Interdisciplinary Perspectives on Writing Research (3) This course introduces methods collectively labeled empirical qualitative in writing research, including ethnography, teacher research, narrative analysis, and grounded theory.

**Interdisciplinary Perspectives on Writing Research (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597C** Modernism and the Muysterries of Sociability (3) Explores the aesthetic and political work of sociability (salons, parties, art groups, seances) in modernism's critical engagement with modernity.

**Modernism and the Muysterries of Sociability (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597C** Modernism and the Muysterries of Sociability (3) Explores the aesthetic and political work of sociability (salons, parties, art groups, seances) in modernism's critical engagement with modernity.

**Modernism and the Muysterries of Sociability (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597D** Visual Culture (3) Foundational and recent theories of visual and their application to "things," texts, new media, and exhibitions.

**Visual Culture (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597E** Digital Humanities (3) This seminar will investigate the theoretical and material landscape of the Digital Humanities.

**Digital Humanities (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 597F** "The Muse Is Music": Modernism and Postmodernism in Words and Music (3) Music as subject and form in the literatures of modernism and postmodernism.

**"The Muse Is Music": Modernism and Postmodernism in Words and Music (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENGL 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Enterprise Architecture (EA)**

**EA 870** Applied Research Methods for Enterprise Architecture (3) Foundations, methods and conduct for EA Research

Methodologies.

**Applied Research Methods for Enterprise Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EA 871** Enterprise Architecture Foundations I (3) Theoretical foundations and practice of enterprise architecture.

**Enterprise Architecture Foundations I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EA 872** Enterprise Architecture Foundations II (3) Develops additional capabilities for justifying Enterprise Architecture decision making.

**Enterprise Architecture Foundations II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EA 873** Enterprise Modeling (3) Theoretical foundations and practice of enterprise modeling.

**Enterprise Modeling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EA 874** Enterprise Information Technology Architecture (3) Theoretical foundations and practice of the enterprise information technology architecture.

**Enterprise Information Technology Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EA 875** Enterprise Architecture Leadership (3) Develops additional capabilities for leading, communicating, and implementing Enterprise Architecture.

**Enterprise Architecture Leadership (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



## Entomology (ENT)

**ENT 402W** (VB SC 402W) Biology of Animal Parasites (3) An introduction to animal parasitology. Emphasizes placed on host/parasite interactions, parasites of zoonotic importance, control programs and taxonomy.

### Biology of Animal Parasites (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 410** Insect Structure and Function (3) Integrated physiology and anatomy of insects; emphasis on unique adaptations, genetic regulation of development, insects as model systems, environmental physiology.

### Insect Structure and Function (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 420** Introduction to Population Dynamics (3) Principles of population regulation, demographic analysis, modeling of dynamic processes are discussed; laboratories involve the exploration of population growth models.

### Introduction to Population Dynamics (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 425** Freshwater Entomology (3) Collection and identification of insects and other arthropods in freshwater ecosystems; field study of habitats.

### Freshwater Entomology (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 430** (B M B 430, BIOL 430) Developmental Biology (3) Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

### Developmental Biology (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 445** Evolution of Insect Societies (3) Basic principles of Darwinian theory and their application to understanding the evolution of complex social behavior in insects are addressed.

### ENT 445 Evolution and Insect Societies (3)

This course addresses basic principles of Darwinian theory and their application to understanding the ultimate and

proximate mechanisms underlying the evolution of complex social behavior in insects, especially bees, ants and wasps. This course will highlight the remarkable diversity of social organization across these groups. Topics will include the role of cooperative behavior, mating systems, parental care, natural history, communication, and molecular groundplans in the evolution of higher-level biological organization.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 497A** Pollination Biology (3) Flowering plants and their animal pollinators serve as key components for both natural ecosystems and agrosystems, and abound with interesting examples of ecology and evolution in action. Knowledge of pollination biology is thus broadly relevant, with applications in the fields of ecology, evolutionary biology, conservation, entomology, and horticulture. This course will provide students with a fundamental understanding of animal-mediated pollination, focusing on (1) plant and pollinator diversity, biology, and natural history, (2) the ecology and evolution of plant-pollinator relationships including pollination syndromes, mutualisms, and evolutionary strategies of generalists and specialists, (3) foraging economics and learning behavior (4) the important contributions pollinators make to natural ecosystems and agriculture, and (5) the factors that contribute to pollinator declines and possible conservation strategies.

### **Pollination Biology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 497B** Sensory Biology of Insects (3) This course provides students an understanding of insect sensory systems including contributing to behaviors performed for survival and reproduction.

### **Sensory Biology of Insects (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 497C** Medical Entomology (3) This course will present principles of transmission of human and animal pathogens by insects, mites, and ticks, and will discuss other non-transmission based aspects of medically important arthropods such as envenomization and forensic entomology. We will discuss basic arthropod biology with special attention to biological properties of vectors and their interactions with pathogens. We will cover basic components of arthropod-borne disease cycles and principles of pathogen transmission dynamics. We will discuss the major groups of arthropod-borne

pathogens and vectors. Special topics will include emergent pathogens, vector genetics, traditional and modern disease control strategies and venomous arthropods.

### **Medical Entomology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 518 Insect Natural History (2)** Experiential learning in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic systems.

### **ENT 518 Insect Natural History (2)**

This is an experiential learning course in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic habitats. On site sessions will introduce ecological processes and natural history from a variety of habitats. Students will gain experience in field sampling and collection techniques, field notebook documentation, GPS use, and specimen databasing. Course is designed for those with limited field experience with insects. The course is intended for new graduate students in Entomology and Ecology.

Insect adaptations across multiple habitats are observed in natural, agricultural, and forestry settings and the underlying ecological processes, anthropogenic interactions, and agro/forestry ecosystem management approaches are introduced. A team of faculty and staff from Entomology, and various outside instructors accompany students to various field sites to characterize the attributes, problems, and solutions relative to insect abundance and diversity in each setting. Students learn a wide variety of field sampling and collection methods, sight and key identification to order and major family levels, and standard curation and databasing techniques for arthropods collected for scientific purposes. Methods taught include a variety of light and pheromone trapping, pit traps, sticky traps, malaise traps, sweep netting, and sequential sampling. Curation methods including spreading and pinning, and alcohol and other preservation liquids and drying for immature insects are covered. Community diversity and Shannon Index and advanced statistical characterization of community complexity methods are applied to differing community data that are gathered by teams of students during their chosen mini projects as well as the aquatic community sampling results for Spring Creek vs. Cherry Run. A student collection is required, and at the end of the week each collection is evaluated and graded. Student field notebooks are kept throughout the course and these too are evaluated on the last day and then returned to the students for their continued use.

The course is offered over a 5-day period at the end of the insect 'active season' with collection and sampling activities requiring natural light or darkness for a variety of the species studied. For example, aquatic insect stream sampling must be done in daylight and collecting for mosquitoes and other insects must be done at dusk or at night with specialized traps. It is essential that this course be completed prior to night temperatures in the 50's and before the first killing frost.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 520 Frontiers in Insect Science (4)** This graduate course is designed to provide an overview of the diversity of subjects that fall within the subject of entomology.

### **Frontiers in Insect Science (4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 522 Critical Thinking and Professional Development in Entomology (6)** This is a required course for Entomology graduate students focusing on developing the professional skills needed for a successful career in basic or applied research.

### **ENT 522 Critical Thinking and Professional Development in Entomology (6)**

This required course for Entomology graduate students focuses on developing the professional skills needed for a successful career in basic or applied research. Major topics addressed include (i) effective scientific communication, (ii) the mechanisms of research funding and peer review, (iii) critical evaluation of scientific evidence and arguments, (iv) basic principles of study design, and (v) research ethics and effective collaboration. Students engage in a variety of classroom activities—including lectures, discussions, and peer review of written assignments—and interact with instructors possessing expertise in each of the particular subject areas addressed, as well as with guest instructors working on cutting-edge topics in insect science and related fields. The course emphasizes practical application of the

material presented to students' own research. Over the course of the semester, each student reviews relevant literature and develops and refines a research proposal based on their own scientific interests.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 530 Seminar in Insect Science (1 per semester/maximum of 4)** Seminar in insect science. Topics range from insect phys & immunology to chemical ecology & epidemiology.

**ENT 530 Seminar in Insect Science (1 per semester/maximum of 4)**

This class will examine current issues in insect science. Topics for a semester will range from insect physiology, immunology and disease to population ecology, agroecology, and biodiversity. The intent is to generate useful discussions that will help participants advance their own understanding of the broader debate about various research topics in insect science. Specific topics will change each semester allowing students to choose those topics of the greatest interest. Topics will be proposed by faculty with expertise in specific areas. Seminal articles, peer-reviewed literature, government and industry reports, webpages and government regulatory documents will be selected by the faculty member proposing the topic to broaden and deepen student understanding of the topic area. Class participation is expected during discussions and oral presentations of topic areas will be expected.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 535 Statistical Techniques in Entomology (3)** Research methods course covering experimental design and analysis in entomology, ecology, and the agricultural science.

**ENT 535 Statistical Techniques in Entomology (3)**

This natural sciences study design, analysis and interpretation course is for graduate students in ecological and agricultural sciences. The goal of this course is to provide students with the tools needed to conduct quantitative studies. The course focuses on study design and methodology by covering topics such as the relationship between study design and data types and data collection, and interpretation of results.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 539 Chemical Ecology of Insects (3)** Interactions of insects with environmental chemicals, including natural and synthetic compounds; host finding and other behavior modifying cues.

**Chemical Ecology of Insects (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 595** Internship (10-12) Supervised field experience and study related to the student's major professional interest. Written and oral critique of activity required. Limited to Master of Agriculture degree in entomology.

**Internship (10-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in Entomology courses (1-599).

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

#### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENT 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Entrepreneuership (ENTR)**

**ENTR 400** Financing Entrepreneurial Ventures (3) Overview of alternative forms of financing including seed capital, valuing a company, going public, partnerships, and acquisitions.

#### **Financing Entrepreneurial Ventures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 410** Entrepreneurial Marketing (3) Principles of Internet marketing and strategies for marketing new ventures on the Web.

#### **Entrepreneurial Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 420** Leadership and Growth of New Ventures (3) Leadership of an entrepreneurial organization, including organizational effectiveness, stages of entrepreneurial growth, strategies for the future, and developing people.

**Leadership and Growth of New Ventures (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 430** Entrepreneurship and New Product Development (3) Examines the process of designing, testing and launching new products, and developing a strategy for commercialization of the technology.

**Entrepreneurship and New Product Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 440** Entrepreneurship and Franchising (3) Overview of the entire franchising process with a focus on licensing and distributorship, trade marks, strategy, and growing the enterprise.

**Entrepreneurship and Franchising (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 497A** Sheetz Fellow Program (1) This course is an introduction to the Sheetz Fellows Program. It prepares students with an entrepreneurial mindset for leadership roles by providing them with mentoring opportunities, academic challenges, and resources. Topic areas include; servant leadership, business networking, social networking, study abroad exploration, and resume development. The Sheetz Fellows experience offers "an education for leadership" in the best tradition of the Business program. It molds well-grounded students who are ready for the world and prepares students for citizenship and for life-long learning.

**Sheetz Fellow Program (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 497A** Sheetz Fellow Program (1) This course is an introduction to the Sheetz Fellows Program. It prepares students with an entrepreneurial mindset for leadership roles by providing them with mentoring opportunities, academic challenges, and resources. Topic areas include; servant leadership, business networking, social networking, study abroad exploration, and resume development. The Sheetz Fellows experience offers "an education for leadership" in the best tradition of the Business program. It molds well-grounded students who are ready for the world and prepares students for citizenship and for life-long learning.

**Sheetz Fellow Program (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 500** Innovation and Entrepreneurship (1-3) Practical and theoretical insights into analyzing a new business opportunity that you have created.

**ENTR 500 Innovation and Entrepreneurship (1-3)**

In this course, you will explore the individual, group, organizational, and inter-organizational levels of analysis. You will gain both practical and theoretical insights from the course as well as creativity, innovation, and entrepreneurship by focusing on the initial identification and quantification of an innovative opportunity and presentation to stakeholders.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 501** Opportunity Creation and Launch (2) Identify a new opportunity, quantify its potential, understand key competitive factors, and develop presentations to secure venture financing.

**Opportunity Creation and Launch (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 502** Starting and Growing a New Business (2) An overview of traditional entrepreneurship considerations including competition, management teams, financing, and exit plans.

**Starting and Growing a New Business (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 503** Garber Venture Capital Practicum (1-2) Structure investment opportunities, conduct due diligence, and potentially invest funds from the Smeal College of Business Garber Venture Capital Fund.

**Garber Venture Capital Practicum (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**ENTR 504** Essentials of Business Planning (2) Create a concise and coherent business plan for a start-up or a new corporate initiative.

**Essentials of Business Planning (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 571** Strategic Innovation in Corporate Networks (2) Capstone course integrating themes related to innovation by exploring entrepreneurship as strategic force throughout a full range of corporate entities.

**Strategic Innovation in Corporate Networks (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 597C** Technology Commercialization (2) The course will use prototypes to set up problem-based learning projects on how to commercialize technology both within corporations and as spin offs/ startups.

**Technology Commercialization (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 597E** Creating Value Through Social Entrepreneurship (2) Gain a toolkit of social-entrepreneur tactics for creating change; apply this toolkit to startup contexts as well as traditional managerial roles.

**Creating Value Through Social Entrepreneurship (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 597E** Creating Value Through Social Entrepreneurship (2) Gain a toolkit of social-entrepreneur tactics for creating change; apply this toolkit to startup contexts as well as traditional managerial roles.

### **Creating Value Through Social Entrepreneurship (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENTR 597F** Entrepreneurial Finance (2) Students will learn by examining real cases including bootstrapping, grants, corporate partnering, etc. This course is suitable to students wishing to start their own companies or wishing to learn more about private equity models.

### **Entrepreneurial Finance (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Envirn Poll Control (E P C)**

**E P C 590** Colloquium (1) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E P C 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**E P C 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Environmental Engineering (ENVE)**

**ENVE 401** Occupational Safety and Environmental Health (1) Regulations, management practices, hazard identification, exposure assessment, monitoring, employee protection, and program management for occupational safety and health.

ENVE 401

### **ENVE 401 Occupational Safety and Environmental Health (1)**

The passage of the Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA), a federal agency, to protect employee safety and health. In 1983 OSHA established hazard communication requirements. By May of 1988, all employees, regardless of size, were required to comply with the Right-To-Know Standards. These regulations established the need for employee training on potential occupational hazards and safe work practices. This training includes safety equipment training, management procedures to address workplace hazards, and accidental emergency response planning. Companies established safety and health managers for their facilities along with employee training. The goal of this course is to introduce students preparing for work in the environmental field to important topics, issues, and training needs for addressing environmental-occupational safety and health. Course topics include: regulations, management practices, hazard identification, exposure assessment, monitoring, employee protection, and program management.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 411** Water Supply and Pollution Control (3) Water supply, wastewater characteristics, design of unit processes for water and wastewater treatment, sludge processing, and related new technologies.

### **ENVE 411 Water Supply and Pollution Control (3)**

Providing safe drinking water to the public and decontamination of wastewater before discharge are the two main functions of municipal water system. Properly designing and operating municipal water and wastewater systems allows safe and sustainable use of this limited resource. This course introduces students to design concepts used in water and wastewater treatment processes. Concepts will be categorized into physical, chemical, and biological processes, and presented through a series of lectures, readings, and problem solving. Subjects covered include: water and wastewater characteristics and flows; unit processes for drinking water treatments, including coagulation, flocculation, sedimentation, water softening, filtration, and disinfection; and unit processes for wastewater treatments, including preliminary headwork, primary sedimentation, secondary treatment, tertiary nutrient removal, final clarifier, and residual digestion and management. After completion of this course, students should have the basic knowledge necessary to select and design water and wastewater treatment processes.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 413W** Operation and Control of Treatment Systems (3) Wastewater treatment, water treatment, solids handling, hazardous waste site control and operations, operator certification, report writing.

### **ENVE 413W ENVE 413W Operation and Control of Treatment Systems (3)**

This course provides students with knowledge and experience related to water treatment, wastewater treatment, solids handling, hazardous waste management, operator certification, and safety, through a combination of lectures, lab

experiments, pilot studies, and field trips. The focus of the course is on operation and control of water and wastewater treatment plants. There is also an emphasis on technical report writing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:  
Concurrent: ENVE 416

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 415** Hydrology (3) Watershed response to rainfall events; hydrologic systems; ground water flow.

### **ENVE 415 Hydrology (3)**

Hydrology is the study of water's movement over the earth and in the atmosphere, with a particular focus in the class on the processes of precipitation, infiltration and runoff. The general public focuses on hydrology when there either is too much water (flooding) or too little water (drought). Engineers working in the hydrology arena focus on evaluating the timing and location of potential floods, designing structures and sites to minimize the impacts of the site on the hydrologic behavior of an area, and evaluating potential sources of water supply during drought times so that the public impact of a drought is minimal. This course builds on concepts learned in the hydraulic design course in terms of conveyance system design. Course topics include determination of the safe yield of a water supply, calculation of hydrographs in ungaged watersheds, the hydraulics of groundwater wells, and the design of stormwater management structures to minimize flooding. The students use currently available models from the U.S. Department of Agriculture, the U.S. EPA and the U.S. Army Corps of Engineers in their watershed evaluations and design of stormwater control practices.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 416** Treatment Plant Design (3) Design of treatment facilities for water and waste water based on regulatory requirements and standards.

### **ENVE 416 Treatment Plant Design (3)**

This capstone design course will teach students how to integrate various design concepts they have learned from other environmental engineering courses, including ENVE 411 Water Supply and Pollution Control, ENVE 415 Hydrology, ENVE 417 Hydraulic Design, and ENVE 425 Hazardous Waste Management. Additional design and design related concepts will be introduced through a series of lecturer, seminars, tours, case studies, and design projects. Subjects covered include unit processes for water and wastewater treatment, hydraulic design, sludge handling and disposal,

chemical storage and safety, project bidding and management, plant design and retrofitting, and engineering ethics and society impacts. After completion of this capstone design course, students should have basic knowledge in selection and design of conventional and modern environmental systems, especially water and wastewater treatment processes and application of knowledge they learned from various environmental engineering courses in solving real world engineering problems.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:  
 Concurrent: ENVE 417

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 417** Hydraulic Design (3) Design of water and waste water conveyance systems and storage facilities.

### **ENVE 417 Hydraulic Design (3)**

The delivery of clean drinking water and the collection of wastewater are two of the fundamental activities of municipal or regional governments. Installing new systems or rehabilitating old ones are expensive, large-scale infrastructure projects. Therefore, it is important that these projects be designed correctly and address both current population needs and growth projections for the design life of the project, typically 25 or more years. This course builds on the concepts learned in fluid mechanics and applies them to the design of municipal water conveyance systems. Students learn to apply the appropriate pipe flow equation (Darcy-Weisbach, Hazen-Williams, or Chezy-Manning) to the design of the conveyance system, e.g., drinking water supply, sanitary sewer collection and storm sewer collection systems. Their projects focus on the design of small conveyance systems and use currently available EPA models for water supply, sanitary sewer, and stormwater piping design. Students also learn to perform basic population projections, design water storage towers and design appurtenances such as manholes and storm sewer inlets. Culvert, weir and orifice design also are covered in the class.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 424** Solid Waste Management (3) Solid waste collection and disposal techniques; recycling and design optimization; including content analysis, legislation, and planning.

### **Solid Waste Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**ENVE 425 Hazardous Waste Management (3)** Overview of regulations, risk assessment, waste minimization and pollution prevention, treatment of hazardous waste, and remediation of contaminated sites.

### **ENVE 425 Hazardous Waste Management (3)**

This course covers concepts and techniques for managing hazardous wastes. Subjects covered include hazardous waste fundamentals (hazardous waste characteristics, regulations, fate and transport, and toxicology), current management practices (environmental audits, and pollution prevention), treatment and disposal methods (physicochemical processes, biological methods, stabilization and solidification, thermal methods, and land disposal) and site remediation (site characterization, and remedial technologies). Additional hazardous waste management related concepts will be introduced through a series of lectures, tours, case studies, and design projects. After completion of this course, students should have basic knowledge in identifying hazardous wastes, understand physical, chemical, and biological factors governing the fate of a compound in the environment, know the fundamental physical, chemical, and biological processes used to treat hazardous wastes.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 430 Sustainable Engineering (3)** A course on engineering which uses ecological principles to minimize waste and maximally use input materials.

ENVE 430

### **ENVE 430 Sustainable Engineering (3)**

This course is for upper-level and graduate students in engineering science, environmental engineering, engineering technology, or environmental pollution control. Sustainable engineering is a term that describes engineering which maximizes the use of all input materials and minimizes waste using principles of ecology. The course is designed to train engineers to use the principles of sustainable engineering in their practice. Engineers responsible for the design and operation of industrial systems have a social responsibility for not harming the environment. The topics include pollution prevention, waste minimization, process economics and resource management. Evaluation is based on both examinations and a project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 460 Environmental Law (3)** This course provides a survey of Federal and State environmental laws, including statutory, common and administrative law. May not be taken for graduate credit by Dickinson School of Law students in the concurrent J.D./EPC programs.

ENVE 460

### **ENVE 460 Environmental Law (3)**

This class is a survey of Federal and State environmental laws, including aspects of common (court-established) law, statutory (legislative) law, and administrative law. Students will become familiar with legal concepts and language; how to read and understand statutes, regulations and court decisions; how the administrative process works; and what clients and consultants need to know in order to operate within the administrative framework of environmental law. Evaluation includes examinations and briefs to be presented in class discussion.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 470** Air Quality (3) Overview of air quality issues with regard to the sources, measurements, effects, transport and control of potential air contaminants.

**Air Quality (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 540** Biodegradation and Bioremediation (3) Microbial degradation and transformation of organic and inorganic

contaminants. Principles of current bioremediation technologies for soil and groundwater contaminants.

### **Biodegradation and Bioremediation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 550 Chemical Fate and Transport (3)** Chemical fate and transport modeling of environmental systems as applied to ecological systems, treatment technologies, and human health exposure assessments.

ENVE 550

### **ENVE 550 Chemical Fate and Transport (3)**

The primary objective is to present to graduate students an introduction to the modeling of the transport and fate of chemicals (chemodynamics) in multimedia (phases: gas, liquid, solid) systems with an emphasis on environmental systems. As an applied science it determines the pathways of chemical residues (products, by-products, and waste constituents released into the natural environment (geospheres-ecological systems) or engineering processes (chemical process technologies, waste treatment and disposal systems, etc.). The geospheres include air, water, and earthen solids (soils, sediments). Uptake and partitioning into the biosphere, which includes all living matter (plants, animals) is also addressed.

On completion of this course, students will understand the concepts behind commercially available models, which will assist them in model selection.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 569 Environmental Risk Assessment (3)** Overview of ecological and human risk, including hazard identification, dose response, exposure assessment, and risk characterization.

### **Environmental Risk Assessment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 594 Research Topics (1-18) Supervised (3)** Overview of ecological and human risk, including hazard identification, dose response, exposure assessment, and risk characterization.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**ENVE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ENVE 599** (IL) Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Evid-Based Medicine (EBM)**

**EBM 713** Evidence-based Medicine I (1) This is fundamentally a course about applying the basic principles of clinical epidemiology/biostatistics to clinical medicine. Physicians need to be knowledgeable consumers of medical literature/information whatever the source. Physicians need to be able to judge the validity of scientific evidence and apply it to patient care.

### **Evidence-based Medicine I (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**EBM 723** Evidence-based Medicine II (1) This is fundamentally a course about applying the basic principles of clinical epidemiology/biostatistics to clinical medicine. Physicians need to be knowledgeable consumers of medical literature/information whatever the source. Physicians need to be able to judge the validity of scientific evidence and apply it to patient care.

### **Evidence-based Medicine II (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Exercise/Sport Scien (EXSCI)**

**EXSCI 595** (PHSIO 595) Internship in Exercise Physiology and Cardiac Rehabilitation (1-15) Clinical and related research aspects of exercise physiology and exercise prescription with respect to cardiac and cardiovascular rehabilitation.

### **Internship in Exercise Physiology and Cardiac Rehabilitation (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Family Law/Est Plan (FMEST)

**FMEST 960** Wills, Trusts and Estates (3) This course examines the disposition of property at death by intestate succession and by will. The execution, revocation, construction, and contest of wills, as well as limits on the power to dispose of property by will, are studied. This course also examines the creation, purposes and termination of trusts, including informal trusts, and the interrelationship between trusts and wills.

### Wills, Trusts and Estates (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 960** Wills, Trusts and Estates (3) This course examines the disposition of property at death by intestate succession and by will. The execution, revocation, construction, and contest of wills, as well as limits on the power to dispose of property by will, are studied. This course also examines the creation, purposes and termination of trusts, including informal trusts, and the interrelationship between trusts and wills.

### Wills, Trusts and Estates (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 962** Family Law (3) This course studies legal problems pertaining to the organization, operation, and dissolution of the family. It includes material on privacy, alternative families, marriage and annulment, child and spousal support, termination of parental rights, adoption and care of the child, divorce, alimony, property distribution at divorce, and custody of children.

### Family Law (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 963** Elder Law (2-3) This course presents a survey of the legal issues associated with aging, including introduction to national and global demographics on population aging; comparative policies on Social Security; quality of health care, including care under Medicare and Medicaid (and alternative forms of payment systems for health care and long term care); age discrimination in employment; housing for older adults, including nursing homes, assisted living and continuing care facilities; advance health care decision making; and fiduciary duties of agents and family members.

### Elder Law (2-3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 963** Elder Law (2-3) This course presents a survey of the legal issues associated with aging, including introduction to national and global demographics on population aging; comparative policies on Social Security; quality of health care, including care under Medicare and Medicaid (and alternative forms of payment systems for health care and long term care); age discrimination in employment; housing for older adults, including nursing homes, assisted living and continuing care facilities; advance health care decision making; and fiduciary duties of agents and family members.

### Elder Law (2-3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 964 Estate Planning (3)** Studies the concepts and techniques required to develop estate plans. Topics include the initial client interview, drafting of wills and trusts, powers of attorney, living wills, disability planning and income taxation of trusts and estates. The psychological and ethical aspects of estate planning will be covered. The course will also survey the federal gift, estate and generation skipping taxes. The course is intended to be an introduction to estate planning, valuable to both the person intending to specialize in the field and the general practitioner.

### **Estate Planning (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 970 Probate Practice (2)** This course deals primarily with the handling of estates following the decedent's death. Emphasis is thus placed on accounts and distribution, the responsibilities of estate administrators and personal representatives, inheritance tax problems and will contests. Other topics include avoidance of probate and the drafting of wills.

### **Probate Practice (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FMEST 997 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Famly/Comunty Med-Hy (FCMED)**

**FCMED 722 Family Medicine Acting Internship (5)** The goal of the inpatient experience is to allow the fourth-year medical student to accept responsibility for the planning and execution of ongoing care of hospitalized patients, evaluate patients in the emergency room to determine if hospitalization is necessary and to perform the duties of an admitting physician. The student will work as a member of the family medicine inpatient service team and will remain in the hospital until the days' work is completed. The student will have one weekend free. Three weekends will be spent working with the inpatient team.

### **Family Medicine Acting Internship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCMED 730 Advanced Communications Elective - Paired Observation & Video Editing (POVE) (5)** Provides the opportunity for students working together to advance their communication skills in clinical settings.

**Advanced Communications Elective - Paired Observation & Video Editing (POVE) (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCMED 771** Family & Community Medicine Clerkship (5) Student participation in ambulatory clinical care of the patient in his own environment and in a variety of health care centers.

**Family & Community Medicine Clerkship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCMED 796** Family & Community Medicine Individual Studies (5) Creative projects including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Family & Community Medicine Individual Studies (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCMED 796A** Family & Community Medicine Individual Studies for 3rd Year (2.5) Family & Community Medicine Individual Studies for 3rd Year.

**Family & Community Medicine Individual Studies for 3rd Year (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCMED 797** Family & Community Medicine Special Topics (5) Advanced training in interpersonal communication skills, community health, rural health, ambulatory care analysis, clinical nutrition, geriatrics, and other topics.

**Family & Community Medicine Special Topics (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Field Placemnt Clini (FPC)**

**FPC 998** Special Topics (1-12) Externship Placements offer students the opportunity to work and learn in a variety of settings outside the Law School under the supervision of a full- time faculty member.

**Special Topics (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Finance (FIN)

**FIN 405** Advanced Financial Management (3) An examination of the development and application of decision rules for major long-term financial and investment problems of the firm.

### Advanced Financial Management (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 406** Security Analysis and Portfolio Management (3) Advanced valuation theory; fundamentals of security analysis; portfolio construction and management.

### Security Analysis and Portfolio Management (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 406H** Security Analysis and Portfolio Management (Honors) (3) Advanced valuation theory; fundamentals of security analysis; portfolio construction and management.

### FIN 406H - Security Analysis and Portfolio Management (Honors)(3)

Finance 406 is about how to invest money in stocks, bonds and derivative securities. The course focus is on creating portfolios of assets rather than on picking individual assets for investment. To create a portfolio of assets, the portfolio manager must have knowledge of the assets available for purchase, the markets the assets are traded in, and the statistical and mathematical techniques needed to assign weights to the assets within the portfolio. The manager must also be able to predict changes in the economy that justify changes in the portfolio, as well as be able to evaluate the performance of the portfolio relative to standard benchmark portfolios such as the S&P500.

The course begins with a review of the structure of the asset markets, basic pricing formulas, fundamental and technical analysis, and the tools from previous statistics, economics, and calculus classes needed. Different models relating risk and return such as the CAPM and arbitrage pricing model are covered. These models exemplify how investors are willing to trade-off the variance in returns from investments with the expected value of the investment. The students then learn how to choose the weights to assign to each asset available to maximize the expected return while minimizing risk of the portfolio using the portfolio theory of Markowitz. While the focus of this section of the class is on investing in equities, the portfolio theory learned is applicable to all types of assets. Because there are important differences between stocks and bonds, the next section of the class focuses on the unique characteristics of fixed income securities. Models explaining the different risk and return characteristics of bonds are examined. Because fixed income securities prices and returns are directly linked to changes in interest rates, theories of what determines interest rates are presented and applied to evaluating the performance of portfolios including fixed income securities. The course concludes with an overview of investment in options and futures contracts. The basic pricing models for these types of assets are reviewed as well as practical concepts of investing in derivatives such as margin accounts and creating synthetic returns using combinations of different types of options.

As an Honors course, the level of research and academic investigation is enhanced with outside journal readings in topics such as portfolio theory, anomalies and market efficiency, overpricing, and current topics in Portfolio Management as material is published. This material is incorporated into class discussions and course exams beyond what is covered in the standard version of the class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**FIN 407** Multinational Financial Management (3) Analysis of the international aspects of managerial finance; emphasis on the impact of the international financial environment on firm operations.

**Multinational Financial Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 408** Financial Markets and Institutions (3) Functional analysis of major credit institutions; sources and uses of funds; impact of government regulation.

**Financial Markets and Institutions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 408H** Financial Markets and Institutions (Honors) (3) Introduction to bonds, equities, derivatives, and financial institutions including insurance, pension funds and mutual funds.

**FIN 408H - Financial Markets and Institutions (Honors) (3)**

Finance 408H is about financial institutions and markets. The markets section will include approximately 9 classes on debt markets, and another nine classes on equity markets (e.g. NYSE, NASDAQ) and derivatives (options and futures). The primary institutions covered in this course include insurance companies, mutual funds, pension funds, securities firms, and investment banks. We hope to include an analysis of personal financial planning issues as well. Reading assignments at various web sites will be made. The course will include weekly spreadsheet assignments that focus on the course concepts presented in class. These assignments ought to provide a rigorous understanding of the concepts recently presented in class and they will develop and improve the students' Excel skills. The overarching objective is for each student to develop an understanding of markets and institutions that will provide lifetime enjoyment.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 409** Real Estate Finance and Investment (3) The sources and uses of credit; instruments and methods of financing; the theory and practice of real estate investment analysis.

**FIN (R EST) 409 Real Estate Finance and Investment (3)**

Real Estate financial markets are rapidly changing, with new instruments and ideas introduced every day. Therefore, the emphasis of this class will be on preparing the students to tackle any new instrument that might be introduced to the market, understanding why and how people make money in the field, and be able to understand and utilize the innovations that have been introduced and are still being developed. The course will provide a broad coverage of real estate investment, finance, and valuation. We will study different measures of investment performance, the impact of the financing decision on real estate investment risks and return, and various real estate financing techniques. Specific topics include: legal considerations in real estate finance, present value concepts, fixed rate mortgage loans, adjustable rate and variable payment mortgages, underwriting and financing residential properties, income-producing properties and valuation fundamentals, leases, projecting cash flows, investment value, investment and risk analysis, financial leverage and financing alternatives, disposition and renovation of income properties, financing corporate real estate, real estate capital markets, the secondary mortgage market and REITS.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 410** Derivative Markets (3) Functions, techniques, and impact of speculation conducted through forward markets; the nature of speculative transactions, pricing, and methods of trading.

### **Derivative Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 412** Commercial Bank Management (3) Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints.

### **Commercial Bank Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 413** Risk Management of Financial Institutions (3) Measuring and managing risk faced by financial institutions.

### **FIN 413 Risk Management of Financial Institutions (3)**

This course focuses on measurement and management of risk faced by managers of modern financial institutions. Students will be introduced to various tools and techniques used to measure and analyze risk from traditional balance sheet activities (such as credit risk, liquidity risk, insolvency risk, interest rate risk and market risk) and from off-balance sheet activities. In addition, students will learn strategies for controlling and managing the risks to achieve the best risk-return outcome. This course is designed to be an upper level, undergraduate course. Students will have opportunities to apply fundamental concepts learned in other finance classes. It is recommended for business students, especially finance majors, who wish to have careers in financial service firms or non-financial firms that use financial assets.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 414** Financial Trading and Applications (3) This course focuses on financial modeling and analysis of trading strategies. Bloomberg, Reuters, spreadsheets and trading simulations are used extensively.

### **FIN 414 Financial Trading and Applications (3)**

The focus of this course is the application of financial theory and technology to the practice of financial trading. The first half of the class examines tools for constructing and evaluating trading strategies. After a short review of probability and statistics, attention turns to the analysis of models for valuing options, credit default swaps, and other financial instruments. Emphasis is placed on the assumptions underlying these models and the application of these models in the real-world. This discussion includes approaches for estimating volatility and the use of the models when underlying assumptions do not hold. The first half of the course concludes with a discussion of value-at-risk and tools for evaluating performance. The analysis of these topics highlights commonly used measures of performance and the potential pitfalls using these measures.

The second half of the class examines trading strategies commonly used by hedge funds. Strategies discussed include merger arbitrage, relative value, momentum, index arbitrage, and other quantitative based strategies. Students also study accounting based and fundamentally based trading strategies. Application of these strategies in both the equity and fixed income markets is examined. Attention is also paid to the impact of trading on market prices and other aspects of market microstructure.

Throughout the second half of the course, students participate in a project in which they form into teams of fund managers who analyze market data with the purpose of constructing and managing a portfolio that applies various trading strategies. The fund is managed using market simulation software that allows students to execute all trades using real-time market prices and allows them to go long or short equity, commodity, fixed income, and foreign exchange instruments, as well as derivative securities. Upon completion of the project, students make a pitch to a group of potential investors (the class) in which they summarize the themes underlying their strategies, provide performance metrics for their fund, and discuss their primary trading strategies if they were to continue as fund managers.

The course pedagogy is lectures, case assignments, trading and valuation simulations, and a trading project. The class will

make extensive use of Bloomberg, Reuters, trading software, basic programming languages for financial software, and other technology available. Students are evaluated based on their performance on assignments, exams, and the portfolio project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 415 Advanced Financial Modeling (3)** Develop financial models using spreadsheets, VBA programming, and trading room applications such as Bloomberg and @Risk.

### **FIN 415 Advanced Financial Modeling (3)**

Students will develop financial models using spreadsheets, VBA programs, and trading room applications such as Bloomberg and @Risk. Students learn Excel's financial functions, shortcuts, web queries, data analysis capabilities, and optimization techniques. Students use @Risk software to define variable distributions and correlations to run Monte Carlo simulations to evaluate stochastic processes. Students access market data through the internet and proprietary providers such as Bloomberg. Students build models to construct optimal portfolios of securities and asset classes. Students estimate asset returns using CAPM, multi-factor models, and fundamental analysis. Students estimate asset volatility using exponential weighting, GARCH, and Black-Scholes implied volatility. Students model and optimize bond portfolios using portfolio duration, convexity, leverage, and income. Students value options using Monte Carlo, Black-Scholes, and binomial option pricing models. Students learn to apply Brownian motion models to asset returns and prices. Students construct and test delta-hedging strategies for option portfolios. Students use matrix algebra and Excel matrix functions to compute portfolio return and volatility. Students write VBA functions and macros using VBA code, objects, array functions, loops, matrix operations, and data types. Achievement is measured by assignments, computer-based exams, and a final assignment.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 420 Investment and Portfolio Analysis (3)** Investment and risk, types of security investments, sources of investment information, the broker, the stock market, portfolio management.

### **Investment and Portfolio Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 427 Derivative Securities (3)** Introduction to futures contracts and options, leading to a working understanding of their importance in financial management applications.

### **Derivative Securities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 430 Estate Planning (3)** Liquidity planning, titling and transfer of property, trusts, federal unified tax system, gifting, incapacity planning, legal documents.

### **FIN 430 Estate Planning (3)**

This course addresses estate planning issues for individuals as part of an overall personal financial plan. Personal financial planning encompasses budgeting, credit management, insurance, taxes, investments and retirement planning in addition to estate planning. The objective of this course is identifying and quantifying the goals of an individual regarding their final wishes and determining how best to meet those goals given the current applicable laws and the individual's situation.



The estate administration and probate process are discussed along with common estate documents. The titling and transfer of assets as well as asset valuation are covered. Methods used to provide estate liquidity are presented. Common forms of trusts that are used in estate planning are introduced along with an overview of basic methods of transferring family owned businesses. Case studies are emphasized since estate planning is unique to each individual's situation. Some legal research is commonly incorporated into the course because estate planning is based on federal and state law. Student evaluation generally consists of examinations, individual and group assignments, quizzes, and case studies. Students desiring a career in financial services, law, or tax accounting should consider incorporating this course into their program of study. Currently the course is offered once per year with a class enrollment of 40.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 450 Retirement Planning (3)** Retirement planning: qualified and non-qualified plans, characteristics, provisions, regulations administration, application approach with case studies.

### **FIN 450 Retirement Planning (3)**

This course presents retirement planning from the perspective of a financial services practitioner. Students will develop a working knowledge of both qualified and non-qualified company retirement plans including plan characteristics, provisions, applications, and qualifications. Individual retirement plans will also be covered. Exposure to the regulatory and legal basis for plans will be provided. Application case studies will be integrated throughout the course. Emphasis will be placed on designing an appropriate plan given either an individual or a company situation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 451 Intermediate Financial Management (3)** Case studies are used to develop skills in solving a variety of financial management problems.

### **FIN 451 Intermediate Financial Management (3)**

This course is designed to reinforce and extend the principles from its prerequisite, FIN 301, Corporation Finance. It is a required course for the Finance major. It will also serve as a business supporting course for students in other School of Business majors.

Students will develop skills necessary to solve a variety of complex financial problems by applying statistical and analytical techniques and utilizing electronic spreadsheets. The course will enable students to develop a firm foundation in the principles of financial management and an understanding of how concepts in financial management are used in the valuation process. The topics are consistent with the knowledge required to prepare students for the relevant portions of Level I of the Chartered Financial Analysts (CFA) Exam.

The course will address important financial management topics, including the methods of analyzing capital budgeting decisions and the unique problems they pose, long-term capital structure and dividend policy decisions, corporate financial analysis and forecasting, working capital management, and additional special topics in financial management.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 456 (IL) International Capital Markets (3)** This course develops understanding of international capital markets by striking a balance between institutional details, theoretical foundation and practical application.

### **FIN 456 International Capital Markets (3) (IL)**

This course extends the issues of international finance into a framework for international investing. It is designed for students aspiring to be money managers and investors operating across national boundaries.

Foreign travel enables students to contrast the micro-structure of financial markets in the United States. with those in other centers that play important roles in our global financial system.

Students are also given an opportunity to learn about business, cultural, and political aspects of international investment. Besides class meetings on campus, students are assigned readings, videos, and research projects to be completed before the foreign experience component of the course. While abroad, students visit specific sites and attend specific lectures that will enable them to complete further course work upon their return to the United States. Topics include the case for international asset diversification, international asset pricing, international stock, fixed-income, and derivative markets, and the process of international investing. Other materials will be specific to the foreign business center visited during the course.

(The initial offering of this course included a visit to London where students toured the stock exchange and financial firms, attended lectures, and met with financial executives; this gave students exposure to a major international financial institution and the largest currency market in the world.) The travel portion requires additional costs to the student beyond tuition.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 460** (R M 460) Real Estate Financial Analysis (3) Debt and equity financing, capital structure, "creative financing," risk analysis, corporate asset management.

**FIN (R M) 460 Real Estate Financial Analysis (3)**

The objective of this course is to provide in-depth coverage of real estate investment and financing decisions. The focus is on the private market, including corporate asset management. Investment analysis moves from the basics of forecasting cash flows, through advanced topics including the impact of real option value on investment and development decisions. Risk measurement is given particular attention with a focus on sensitivity and simulation analysis. There is some coverage of asset pricing models like the Capital Asset Pricing Model, which is critically analyzed with respect to its applicability in real estate markets. The impact of illiquidity, management costs, and the suspicion of non-normally distributed returns are explored, as are the implications of relative market inefficiency. The financing module begins with the basics of mortgage debt mathematics, which is then extended to include comparisons of various repayment programs. Included are interest-only, balloon, shared appreciation, growing equity, graduated payment and reverse annuity loans, as well as various creative financing of commercial properties.

The latter include participating mortgages, convertible mortgages, and mezzanine debt. Featured in the corporate asset management section is the lease/buy decision. Other topics may be addresses based on current events. It is anticipated that guest speakers will be invited where appropriate.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 461** Portfolio Management and Analysis (3) Investment policy and process, modern portfolio theory, portfolio construction, and portfolio performance measurement and evaluation.

**FIN 461 Portfolio Management and Analysis (3)**

The course provides a mix between theories and applications of portfolio management. The content is divided into five sections: (1) implications of the efficient market hypothesis and behavior finance in portfolio management, (2) investment policy and process, (3) diversification and modern portfolio theory, (4) portfolio performance measurement and evaluation and (5) bond portfolio management.

After completing the course, students are expected to (1) demonstrate the importance of portfolio management under the efficient market hypothesis and behavior finance, (2) write an investment policy statement, (3) create an optimal portfolio, (4) manage bond and equity portfolios, and (5) measure and evaluate portfolio performance.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 470** (R M 470) Real Estate and Capital Markets (3) Analysis of publicly-traded real estate of both the equity, (REITs) and debt (MBSs) sides. The course also provides international perspectives.

**FIN (R M) 470 Real Estate and Capital Markets (3)**

The objectives of this course are to expose the student and explore the issues associated with the analysis of "public" ("Wall Street") real estate, including both equities (such as Real Estate Investment Trusts or REITs) and debt vehicles (such as Mortgage-Backed Securities or MBSs). In addition, the course will focus on the increasingly globalization of real estate capital markets as the real estate sector becomes integrated into the global financial system. The differences between private and public real estate analysis will also be explored, including the suitability of traditional asset pricing models for real estate analysis. Topics include the growing impact of institutional real estate forces on the real estate sector, the use of modern financial economics methods to real estate including the concept of market efficiency, modern portfolio theory applications, market measures of risk and return, the use of option-based models, and other advances. The rise of Wall Street's interest in real estate securities is an important institutional development and serves as the underlying background for the analysis of MBSs using fixed-income security techniques.

As globalization has spread, the real estate sector has moved with these changes and prospects for a global real estate market are examined and evaluated.

This course serves as a compliment to FIN 460, which emphasizes traditional financial analyses of individual real estate projects. In FIN 470, real estate securities are viewed as a natural extension towards the complete integration of real estate and capital markets. In this sense, these courses will enable traditional and modern analyses of the real estate sector for years to come.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 471 International Finance (3)** Financial decision making in an international environment. Emphasis on topics relevant to small businesses and entrepreneurs.

**FIN 471 International Finance (3)**

This course provides an understanding of the basic terminology, structure, and importance of international finance for corporations. It will also help enhance analytical and critical thinking skills. Topics of study include foreign exchange (FX), FX markets, FX instruments, FX risk, hedging of these risks, international debt and equity markets, etc.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 475 Financial Decision Making (3)** Problems and cases in financial decision making for non-financial corporations and financial institutions.

**FIN 475 Financial Decision Making (3)**

The objective of this course is to tie together the various topics in finance such as corporate finance, investments, and financial institutions & markets. Using the variety of different analytical tools and techniques that students have been exposed to, they will

- Evaluate the relationship between profitability and solvency of a firm.
- Project the need for short term and long term financing.
- Evaluate the various sources of financing and recommend the optimal.
- Budget the capital that is raised to identify the profitable projects that capital should be invested in.
- Evaluate different dividend policies to maximize value of a firm.
- Carefully examine the risk-return tradeoff that portfolio managers face.
- Study the relationship between assets and liabilities of financial institutions.
- Critically evaluate synergies that are created in mergers and acquisitions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 481 Advanced Financial Analysis (3)** Capstone course integrating financial analysis coursework. This course is based

on the case study method which provides a challenging setting in which to apply business concepts.

### **FIN 481 Advanced Financial Analysis (3)**

It is a required course for the Finance major. Students are expected to develop a working knowledge of several advanced topics in financial analysis sufficient to help prepare them for the relevant portions of Level I of the Chartered Financial Analysts (CFA) Exam. They also are expected to demonstrate their ability to integrate the tools and knowledge developed in their previous coursework by completing cases. Each class is devoted to discussion of firms in various situations. Class participants are challenged to apply financial concepts and concepts from other disciplines. This course requires extensive, detailed pre-class prep for each class. Use of spreadsheets is required. The course objectives include the following:

- \*Application of financial concepts and related tools.
- \*Further develop decision making skills.
- \*Enhance critical thinking skills.
- \*Augment written and oral communication skills.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 489 Seminar in Finance (3)** In-depth study of new trends, concepts, and practices in financial or portfolio management.

### **FIN 489 Seminar in Finance (3)**

New financial institutions or practices are created to address the needs of financial managers and investors as a result of changes in economic conditions, government legislation and regulation, geopolitical events, or financial markets. Examples of changes during the past decade that affect financial managers are elimination of the Glass-Steagall Act that separated commercial and investment banking activities, evolution of nation-wide branch banking, development of financial derivatives markets that can be used to manage financial risk exposure, creation of the European Monetary Union and the Euro currency, and growth of private (defined contribution) pension plans. The Seminar will give students the opportunity to rigorously examine one of these current developments before they are included in textbooks and regular courses. As such, the Seminar will rely primarily on recent publications in academic and practitioner journals.

The Seminar will start by studying the problems that motivated financial innovation.

Students will consider the economic difficulties that existed, or would have existed, in the absence of the financial innovation(s) covered by the Seminar. This will be followed by comparing methods of financial management before and after the financial innovation.

In examining innovative practices in financial management, Seminar participants will study the strengths and weaknesses of the specific financial institutions that facilitate the innovations they examine, such as the organized exchanges where financial derivatives are traded.

Participants will also learn the nature of related government regulation and judge the effectiveness of this regulation. In the case of financial derivatives a federal regulatory agency oversees the operation of financial derivatives markets.

An important component of the Seminar is the study of specific practices for utilizing financial innovations. Business firms have developed sophisticated methods for using financial derivatives. These practices will be carefully assessed from the standpoint of the practitioner.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 491 Financial Planning Capstone (3)** Critical thinking and decision-making about personal financial planning topics in the context of the financial planning process.

### **FIN 491 Financial Planning Capstone (3)**

This capstone course is designed to reinforce and extend the principles from each of its prerequisite courses. The CFP Board of Directors are requiring the addition of this financial plan course as a requirement to CFP Board's educational standards to enhance the knowledge, skills and abilities of individuals seeking to attain the CFP® certification to deliver professional and competent financial planning services to the public.

This course will engage the student in critical thinking and decision-making about personal financial planning topics in the context of the financial planning process. The purpose of this course is to both refine and develop the skills needed to become successful financial planners when working with individuals, families, and business owners in helping them to

meet their financial needs and goals. This course will address the important financial planning topics listed in the previous section.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 494** Research Projects (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Projects (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 494H** Research Projects (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Projects (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 495A** Nittany Lion Fund -- Lead Fund Manager Practicum (3 per semester/maximum of 6) Advanced work with the Nittany Lion Fund. Lead Fund Managers are accountable for sector and stock performance as well as reports. Students delegate work to Associate Fund Managers while focusing a great amount of attention to all aspects of stock pitches, weekly and quarterly reports, along with conducting weekly training session for new analysts.

#### **FIN 495A Nittany Lion Fund -- Lead Fund Manager Practicum (3 per semester/maximum of 6)**

A Lead Fund Manager is accountable for sector performance as well as sector output. This means that while the Lead Fund Manager has to be an effective delegator of work to his or her Associate(s), the manager must also have great attention to detail when reviewing all aspects of pitches, weekly reports, and earnings reports. A Lead Fund Manager focuses more on knowing the big trends in his or her overall sector and in each subsector. The Lead is the strategist for the sector. He or she has the responsibility of choosing what stocks to pitch in class and at PSIA meetings. This means that the Leads must constantly reevaluate not only their current portfolio, but the sector as a whole, in order to find where to best allocate their respective funds. Another major responsibility that a Lead Fund Manager has is to lead a group of anywhere from 10-50 PSIA members. While there are weekly educations for the PSIA analysts, it is one of the most important responsibilities of a Lead Fund Manager to provide support for the PSIA analysts to help them with their PSIA certification assignments. In addition to helping the analysts understand their weekly assignments, the Lead Fund Managers are also responsible for holding weekly sector meetings to give sector-specific educations to a smaller group of PSIA analysts.

The goal for any Lead should be to get as many PSIA analysts as involved and interested as possible in PSIA. The interest generated should draw PSIA analysts to apply for entrance into the Nittany Lion Fund. PSIA is the feeder system for the NLF and making sure there are intelligent and motivated applicants each semester ensures that the investment group will continue to have a strong class going forward. Consequently, once the Lead Manager has developed analysts' interest in applying for the NLF, it is an unwritten responsibility of the Lead to help the applicants to become as best prepared as possible for the interviews (Associates are encouraged to help new applicants as well). In total, the role that the Lead plays

is not just that of a figurehead, the Lead must be well informed of current events and trends within their sector, and they must be able to speak eloquently of their investment strategy when speaking in class, at PSIA meetings, or to investors at the yearly investment meeting.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 495B** Nittany Lion Fund - Executive Board Practicum (3 per semester/maximum of 6) Oversight of the Nittany Lion Fund (NLF) and its overall performance. Executive Board members and Directors are accountable for all aspects of the Nittany Lion Fund. Students interact with investors and are responsible for delivering professionally developed performance reports, weekly information updates, and annual shareholder meetings. Executive Board members assume specific duties within the NLF associated with their position, along with a shared responsibility for being a spokesperson for the fund.

**FIN 495B - Nittany Lion Fund - Executive Board Practicum (3 per semester/maximum of 6)**

The Executive Board practicum affords students with intense practical experience in oversight and performance of the Nittany Lion Fund (NLF). Executive Board members and Directors are accountable for all aspects of the NLF. An Associate Fund Manager is responsible for all work that is presented to his or her Lead Fund Manager and in turn, a Lead Fund Manager is responsible for all work that is submitted for the Nittany Lion Fund (NLF) to view. While those are certainly tremendous responsibilities, an Executive Board Member is ultimately responsible for any and every document that leaves the Nittany Lion Fund, most of which are delivered to investors. It is the responsibility of the Executive Board to make sure that both the weekly news, and quarterly performance releases are flawless. Additionally, although the Lead Fund Managers are responsible for their individual sector's performance, the Executive Board is held responsible for the overall performance of the Nittany Lion Fund. This means that the Executive Board must do a number of things to keep performance awareness and accountability at high levels.

Students in these executive positions are expected to ask excellent questions during stock pitches and be, in a sense, a devil's advocate for each pitch, making sure that there was proper due diligence and thought put into the strategy of the pitch. With regard to being accountable to investors, the Executive Board is responsible for conducting weekly conference calls with the NLF's investment committee as well as leading the yearly investor meeting. As for the PSIA, the Executive Board is responsible for booking locations for meetings, handling the funds for all club transactions, and developing and implementing the education for the analysts to become PSIA certified.

Education is a very large part of the Nittany Lion Fund. An Executive Board Member is expected to utilize their past experience to provide helpful influence to other members of the Nittany Lion Fund as well as the large group of PSIA members. While the members of the Executive Board all have different responsibilities, in aggregate the group is responsible for the performance of Nittany Lion Fund as a whole, as well as being individual figureheads and spokesmen for the NLF.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 504** Problems in Finance (3-6) Planned individual projects involving library, laboratory, or field work.

### **Problems in Finance (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 505** Multinational Managerial Finance (3) Analysis of the international aspects of managerial finance. Emphasis on the environmental and institutional factors influencing capital acquisition and allocation.

### **Multinational Managerial Finance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 506** Portfolio Theory and Policy (3) Rigorous examination and analysis of asset-holder behavior under conditions of risk and uncertainty.

### **Portfolio Theory and Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 508** Analysis of Financial Markets (3) Analysis of factors affecting price determination in financial markets.

### **Analysis of Financial Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 513** Speculative Markets (3) Analysis of derivative securities covering options, forwards, futures, OTC derivatives; topics include valuation, trading, hedging. Involves computer analysis.

**Speculative Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 515** Nittany Lion Fund Manager (3) Focuses on applied issues and topics in the management of investments.

**FIN 515 Nittany Lion Fund Manager (3)**

FIN 515 is not a lecture course. Rather it is a "hands-on" investing course. Students enrolled in the course will help manage the Nittany Lion Fund, which is a student run fund with approximately \$5 million under management as of December, 2007. With the help of the faculty advisor (Randall Woolridge), the Advisory Board, and outside experts students are responsible for all aspects of managing the fund, from making buy and sell decisions to fulfilling the legal reporting requirements.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 531** Financial Management (3) An intensive examination of techniques available to aid the financial manager in decision making.

**Financial Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 532** Financial Decision Processes (3) Financial decision making under uncertainty; positive and normative models and current issues in financial management.

**Financial Decision Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 541** Security Analysis (3) Discussion and application of analytical techniques in security valuation, including use of computers.

**Security Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**FIN 550** Financial Analysis and Valuation (2) Builds upon and reinforces the theoretical and institutional finance frameworks learned in introductory business finance.

**Financial Analysis and Valuation (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 555** (I B 555) Global Finance (1-3) Analyze international business finance problems, impact of evolving international payment systems on business, financial management in modern multinational enterprise.

**Global Finance (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 563** Financial Management Simulation and Corporate Interaction (2) An immersion experience in financial decision-making through a simulation exercise and interaction with senior financial officers.

**Financial Management Simulation and Corporate Interaction (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 565** Investment Management Portfolio Analysis Immersion (2) An intensive familiarization with the Smeal College Trading Room in combination with a visit to Wall Street trading rooms.

**Investment Management Portfolio Analysis Immersion (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 570** Financial Modeling (2) Introduces and applies equity, debt, derivative models and computational techniques using Excel and Visual Basic for Applications.

**FIN 570 Financial Modeling (2)**

This course focuses on developing models, making calculations, solving real-world problems, and applying theories. Nearly all the theories applied in this course are from the area of investment management (not corporate finance). However, the concepts, tools, and skills are immediately applicable to corporate finance (such as real option valuation, treasury and cash management, capital budgeting and cost of capital calculation, analysis of M&A and financial restructuring, financial statement and logistical simulations, and programming of routine corporate finance problems).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 571** Strategic Financial Management (2) Comprehensive course in corporate finance and the strategic implications of various financial decisions.

**Strategic Financial Management (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 577** Financial Engineering and Corporate Strategy (2) Study and application of derivative strategies, financial innovation, and modern financial techniques to re-engineer risk exposure and enhance strategic opportunities.

#### **Financial Engineering and Corporate Strategy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 581** Fundamentals of Financial Markets (2) Operation, structure of money, bond markets and concepts; and techniques used in evaluating and managing fixed income portfolios.

#### **Fundamentals of Financial Markets (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 583** Modern Portfolio Management: Theory and Practice (2) Theoretical foundations and tools needed for structuring, managing, and monitoring the performance of an investment portfolio.

#### **Modern Portfolio Management: Theory and Practice (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 585** Financial Innovation and Portfolio Risk Management (2) Introduction to fundamental derivatives, standard valuation models, and practical applications to portfolio management; recognition, measurement, and management of portfolio risk.

#### **Financial Innovation and Portfolio Risk Management (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 587** Investment Management I (1) Applied issues and topics in the management of investments.

#### **Investment Management I (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 588** Investment Management II (1) Complex applied issues and topics in the management of investments.

**Investment Management II (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 596A** Financial Management (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Financial Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 596B** Globalization Strategies (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Globalization Strategies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 597A** Asset Pricing Theory (3) This course develops the theory of financial markets; topics include intertemporal portfolio choice, asset and option pricing models and determinants of cross-sectional stock returns.

**Asset Pricing Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 597C** Research Methods (3) The class focuses on the empirical research methods, data, and econometrics used in the asset pricing subfields of financial economics.

**Research Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 599 (IL) FOREIGN STUDY--FINANCE (1-12)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**FOREIGN STUDY--FINANCE (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 601** PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION FULL-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Graduate students will be assigned on a selective basis teaching responsibilities in FIN 301, 305, and 306.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FIN 611** PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION PART-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Finance - Behrend (FNC)

**FNC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FNC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year of semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Financial Analysis (FINAN)

**FINAN 518** Financial Markets and the Economy (3) Operation, regulation, use, and evaluation of principal financial markets and institutions; monetary policy, asset pricing, and their effects on business.

**FINAN 518 Financial Markets and the Economy (3)**

This course will give students a thorough understanding of the major components and operation of our financial system. This system is used to finance businesses and consumer spending as well as for the management of money (payments and investments). FINAN 518 is a graduate course that adds to both your breadth (variety of topics) and depth (rigor, sophistication) of understanding of financial markets and institutions. The course consists of six inter-related major topics:

- Over-view of the financial system
- Survey and analysis of financial institutions that are used by businesses and by consumers and investors
- A rigorous analysis of interest rates and asset prices, including an introduction to asset pricing models
- An explanation and evaluation of our most important financial markets
- Study of important financial assets (chapters 16-25) that are used by businesses to raise funds and are used by investors to increase their wealth and income
- An introduction to the relatively new, and growing, markets for financial derivatives, covering the pricing of derivatives (principally futures and options contracts and their use for hedging price risk and for speculation)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 521** Corporate Finance (3) An in-depth analysis of concepts and techniques of corporate financial management.

**Corporate Finance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 522** Investment and Portfolio Management (3) Investment analysis and portfolio management theory and applications.

**Investment and Portfolio Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 523** Risk Management of Modern Financial Institutions (3) Evaluating and managing risks faced by modern financial institutions in a dynamic financial market.

**Risk Management of Modern Financial Institutions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 526** International Finance (3) Basics of corporate finance extended to the international environment through a special consideration of exchange rate behavior and its management.

**International Finance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 527** Derivative Securities (3) Use of financial futures, options, and swaps for risk management and investment; pricing models, trading strategies hedging price risk.

**Derivative Securities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 531** Managing Financial Operations (3) A course for financial managers: working capital management, financial planning, financial controls, reporting, financial strategies; theory and practice.

**Managing Financial Operations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1991  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 575 Seminar in Current Issues in Finance (3)** In depth analysis of current issues in financial management; topics will be rotated to reflect the current needs of managers.

**FINAN 575 Seminar in Current Issues in Finance (3)**

This course explores some of the current issues in financial management. The topics to be covered in the current offering will include the mutual fund business and the market for corporate control. Both areas have seen considerable growth in past years. However, they have not received in-depth analysis in existing courses. The focus of this course will include such areas as the mutual fund business and market for the control of a corporation. Particular emphasis will be placed on understanding such topics as the operation and regulation of mutual funds, evaluation of fund performance, diversification among mutual funds, valuation of mergers and takeover defenses, style investing, asset allocation, pension planning, operations of financial intermediaries, etc. Most of the class time will be spent reading, analyzing, and discussing recent academic papers covering the listed topics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FINAN 597 Special topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Fld Plcmnt Int Just (FPIJP)**

**FPIJP 995** International Justice Externship Program (10) The International Justice Externship Program will provide students with the opportunity to spend a semester at the Hague in the Netherlands earning 10 hours of academic credit for approximately 30 hours of supervised work. Students will work in the Office of the Special Prosecutor at the Hague. The externship will enable students to pursue advanced practical training and research opportunities in international criminal law beyond our curricular offerings. Students will have the opportunity to analyze sophisticated areas of international law in a real world context. Each student participating in the Hague semester is required to enroll in a concurrent two-credit seminar. The seminar component will address international trial investigative techniques, tribunal jurisdiction and procedure, and areas of international civil and criminal law that are most relevant to legal practice before international tribunals.

#### **International Justice Externship Program (10)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

### **Fld Plcmt Harrisburg (FPHBG)**

**FPHBG 995** Field Placement Harrisburg Program (8) Program will provide experiential learning opportunities for law students relating to legislative and administrative law practice and the formulation of public policy at the state government level.

#### **Field Placement Harrisburg Program (8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010

Concurrent: GOVMT 987 and FPHBG 996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPHBG 996** Field Placement Harrisburg Program (1) Guided reflection component of the Harrisburg Externship Program.

#### **Field Placement Harrisburg Program (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010

Concurrent: GOVMT 987 and FPHBG 995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

### **Food Science (FD SC)**

**FD SC 400** Food Chemistry (4) Chemical properties of food constituents as influenced by processing and storage.

#### **FD SC 400 Food Chemistry (4)**

Students successfully completing this class will be able to describe the properties of food in terms of the underlying chemistry. They will be able to conduct simple laboratory investigations of the major reactions and report the results in an acceptable scientific format. Achievement of these goals requires both an accumulation of facts and the development of an analytical approach to food.

In the context of a degree in Food Science this course builds upon core science courses to allow students to apply chemical principles to food. By understanding the important underlying chemistry of foods, students will be able to study food processing in terms of the science as well as technology involved. While the course is primarily designed as a requirement of the Food Science major, it is also expected to be useful for non-food science students as a practical application of chemical principles. The course prerequisites are B M B 211 and B M B 212 and students are expected to be familiar with the structures of the key biomolecules (i.e., proteins, lipids, carbohydrates).

General Education: None  
 Diversity: None



Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 404 Sensory Evaluation of Foods (3)** Sensory evaluation of food, methods of test analyses, panel selection and training, taste sensation theory, consumer testing methods.

### **FD SC 404 Sensory Evaluation of Foods (2)**

This course is designed to demonstrate how the senses function in the perception of tastes, flavors, and textures of foods and how sensory tests are used to measure human perceptions. Students will have the opportunity to design sensory tests and apply statistical methods when interpreting sensory test results. The overall objective of this course is to learn the theories and practical applications of sensory evaluation that will enable students to conduct valid sensory tests and use the test results in the decision making process in food product development.

Evaluation will be based on written essay exams, group reports, and written lab reports in which they will be expected to demonstrate their understanding of theoretical issues regarding sensory testing and how to use statistical procedures to effectively interpret the test results. This course is a support course for the Food Science major.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 405 Food Engineering Principles (3)** Engineering principles of importance to food manufacturing, including units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, and psychrometrics.

### **FD SC 405 Food Engineering Principles (3)**

Food engineering will discuss the principles of the various unit operations used in the food processing and manufacturing industry. Topics covered will include: units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, psychrometrics. Through lectures, the student will learn the principles of fluid flow, heat transfer and mass transfer as applied to food processing and manufacturing operations. Through practicum sessions, the student will be exposed to practical applications in the above three areas. Additionally, they will learn to analyze experimental data, organize and communicate thoughts in a logical fashion through cooperative and collaborative learning strategies, and to write effective lab reports. Through practicum sessions, they will also learn numerical problem solving and to size and select equipment for fluid flow, heat transfer and drying operations within the food industry.

Student evaluation within this course will be conducted through weekly quizzes, home works, lab write-ups and three exams. This is a required course for the food science major. This course serves as a prerequisite for several 4th year required courses within the food science major.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 406 Physiology of Nutrition (3)** Physiological mechanisms involved in thirst and appetite, digestion, absorption, utilization of nutrients, respiration, and body temperature regulation.

### **Physiology of Nutrition (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 407 Food Toxins (2)** Microbiological and chemical aspects of food poisoning; toxicological principles; case histories and prevention of problems.

### **Food Toxins (2)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 408 Food Microbiology (2)** Significance of microorganisms in food commodities, microbial spoilage, food- borne infections, and intoxication; methods of preservation, processing, and control.

### **FD SC 408 Food Microbiology (2)**

Food Microbiology focuses on the application of microbiological principles to foods and food ingredients. Topics covered include: potential for microbial growth in a particular food or food ingredient based on the following parameters - biological structure, nutrient composition, naturally occurring inhibitors, pH, water activity, oxidation reduction potential, temperature, atmosphere conditions and humidity; choice of appropriate microbial detection methods for groups of organisms and foodborne pathogens; identification of types and the consequence of growth of pathogens and non-pathogens associated with particular commodities; evaluation of the effect of different processing conditions on the destruction, survival and growth of spoilage and pathogenic microorganisms; identification of significant factors affecting the association of pathogens with food and food ingredients, events leading to infection and/or intoxication, and prevention and control of foodborne illness; comprehension of the importance of food microbiology in everyday living. Student knowledge will be evaluated through three examinations during the semester and one final exam. This is a C-required course for the Food Science major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 409W Laboratory in Food Microbiology (3)** Methods of isolation, detection of spoilage, pathogenic microorganisms in foods; effects of processing and preservation on survival of food microorganisms.

### **FD SC 409W Laboratory in Food Microbiology (3)**

Food Microbiology Laboratory is intended to demonstrate microbiological concepts through the appropriate use of equipment and laboratory procedures. The laboratory focuses on the practical application of microbiological principles to foods and food ingredients based on the following experiences: development of proficiency in using selected microbiological techniques currently employed in regulatory, quality control and research laboratories; performance of specific microbiological analyses of foods to assess numbers and kinds of spoilage organisms or foodborne pathogens; evaluation of the effects of several processing methods on growth and survival of microorganisms. In addition, this course serves as the required Writing across the Curriculum course for the Food Science Curriculum. As such, the course emphasizes problem solving and critical thinking as manifested by written and oral skills; scientific analysis of data, including statistics where applicable; demonstration of basic scientific writing and critiquing skills; usage of primary scientific sources in the food microbiology literature. Practical laboratory skills are assessed through measurement of proficiency in plating and isolation of an unknown microorganism. Writing skills are measured through development of a team project, written lab reports and journal article, and three examinations during the semester. This is a C-required course for the Food Science major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 410 Chemical Methods of Food Analysis (3)** Qualitative and quantitative determinations of food constituents.

### **Chemical Methods of Food Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 411 Managing Food Quality (2)** Principles and applications of Hazard Analysis Critical Control Points. Statistical tools for the control and improvement of food quality.

### **Managing Food Quality (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 413** Science and Technology of Plant Foods (3) Physical and chemical behavior of plant-based raw materials and ingredients, with emphasis on parameters influencing finished product quality.

#### **FD SC 413 Science and Technology of Plant Foods (3)**

This course focuses on the unique importance of foods produced from plants to human health and wellness. The influence of cultural practices, harvesting and handling methods and processing technology on quality and safety of whole, fresh and processed food products using minimal processing and fermentation to preserve food products from plant sources will be emphasized.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 414** Science and Technology of Dairy Foods (3) Physical and chemical behavior of dairy-based raw materials and ingredients, with emphasis on parameters influencing finished product specifications.

#### **FD SC 414 Science and Technology of Dairy Foods (3)**

FD SC 414 provides students with information about the composition, properties and physiochemical aspects of milk and milk products and an understanding of the changes that occur in milk during processing into a variety of dairy products. Laboratory exercises are held weekly and complement the topic being addressed in lecture. A semester-long group project is conducted during the course to help students integrate knowledge gained throughout the Food Science Curriculum. The project focuses on a "real life" product development problem and requires students to develop problem statements, design experiments, design formula and processing schemes, obtain ingredients and actually manufacture a product. Time is allotted in the laboratory schedule for some group activities; other are scheduled outside of class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 415** Science and Technology of Muscle Foods (3) Physical and chemical properties of muscle food commodities, with emphasis on muscle-based ingredients in formulated foods.

#### **FD SC 415 Science and Technology of Muscle Foods (3)**

This course applies food science and technology to the processing, storage and handling of red meat, poultry, and seafood products. The course includes two lectures and one lab session each week. The laboratory sessions are conducted in the Meat Laboratory located on Porter Road. Student performance is evaluated based on two mid-term exams, one final exam, lab reports including short summaries and full reports and homework exercises. Course objectives are set to: 1. help students understand the nature and importance of structure, compositional and quality differences among muscle food ingredients and their impact on product manufacturing, 2. inform students of the basic steps of primary processing for live stock, poultry and seafood species and their impact on meat properties, 3. give students first-hand experience with typical manufacturing steps and processes for fresh, cured, smoked, fermented, dried or cooked meats and help them understand how variations in processing will affect finished product properties, and 4. give students practice in applying the scientific method in answering questions or solving problems that may arise during the manufacture of muscle foods products. Course activities draw on the students' prior knowledge of food chemistry, food engineering, food microbiology and food analysis, applying concepts from those disciplines in the manufacture and evaluation of meat products. Course topics cover the range from meat science through technical and practical aspects of meat product manufacture including product quality, safety, profitability and regulatory issues. There is emphasis on meat industry practices including traditional and recent technology. Through laboratory exercises and independent group projects students gain experience in application of the scientific method for solving product development problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 430** Unit Operations in Food Processing (3) Thermal processing, refrigeration, freezing, dehydration, and concentration in the food industry, including effects on food quality; food packaging; waste management.

### **FD SC 430 Unit Operations in Food Processing (3)**

Unit Operations in Food Processing will discuss major unit operations used in the food processing and manufacturing industry. Topics covered will include: thermal processing, microwave heating, extrusion, food packaging and waste management. Through lectures, the student will learn the principles of selected unit operations in food manufacturing, and the effects of input and operational parameters on performance and food quality. Through practicum sessions, the student will be exposed to practical applications in the above areas. Additionally, they will learn to analyze experimental data, organize and communicate thoughts in a logical fashion through cooperative and collaborative learning strategies, and to write effective lab reports. Through practicum sessions, they will also learn numerical problem solving and to size and select equipment for food manufacturing operations.

Student evaluation within this course will be conducted through weekly quizzes, home works, lab write-ups and two exams. This is a required course for the food science major.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 497A** Food Product and Process Design for African Markets (3) A project-based, senior design course focused on the challenges of food product and process design in a cultural environment novel to U.S. students. Course topics include concept generation, prototype development, scale-up, product optimization, package design, and raw material sourcing. Students will begin with an indigenous African food from which they will develop formulae, processes and packaging for an entrepreneurial food enterprise.

**Food Product and Process Design for African Markets (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 497B** Getting Ahead in Research: Learning to Communicate Scientifically (1) Developed to enhance the undergraduate food science experience. Prepares students for graduate school and provide set of skills that are applicable to any career.

**Getting Ahead in Research: Learning to Communicate Scientifically (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 497F** Food Systems in Italy (Travel) (0.5) Further develop an understanding and appreciation of the Italian food system by traveling to Italy and touring the various food industry sights.

**Food Systems in Italy (Travel) (0.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 497G** Supervised Experience in College Teaching for Undergraduates (1-3) Supervised teaching experience for undergraduate students in the Food Science program.

**Supervised Experience in College Teaching for Undergraduates (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 499** (IL) Foreign Studies (1-12 per semester/maximum of 12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12 per semester/maximum of 12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 500A** Fundamentals of Food Science - Microbiology (1) Overview of the field of Food Science with the focus on microbiology.

**FD SC 500A Fundamentals of Food Science - Microbiology (1)**

An overview of the field of food microbiology required of all entering graduate students majoring in food science. Students will acquire knowledge of the core concepts pertaining to the general topics of food microbiology. Upon completion, the student will be familiar with the primary sources of information related to the field. The course provides background material for more advanced and specialized graduate-level courses in food science and will be offered each fall semester.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 500B** Fundamentals of Food Science - Engineering (1) Overview of the field of Food Science with the focus on engineering.

**FD SC 500B Fundamentals of Food Science - Engineering**

An overview of the field of food microbiology required of all entering graduate students majoring in food science. Students will acquire knowledge of the core concepts pertaining to the general topics of food microbiology. Upon completion, the student will be familiar with the primary sources of information related to the field. The course provides background material for more advanced and specialized graduate-level courses in food science and will be offered each fall semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 500C** Fundamentals of Food Science - Chemistry (1) Overview of the field of Food Science with the focus on chemistry.

**FD SC 500C Fundamentals of Food Science - Chemistry (1)**

An overview of the chemistry underlying the properties of food. Students will be introduced to the major chemical components of food along with the reactions occurring during manufacturing and storage that can impact food quality and safety. The material will be taught through a combination of lectures and selected readings pertaining to the field of food chemistry. Upon completion, students will be able to explore how these topics can be practically addressed as research questions through the analysis of papers from recent guided readings. The course provides background material for more advanced and specialized graduate-level courses in food science and will be offered each spring semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 500D** Fundamentals of Food Science - Nutrition (1) Overview of the applications of nutrition in the field of Food Science.

**Fundamentals of Food Science - Nutrition (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 501** Research Methods in Food Science (2) Planning and conducting research in food science including: problem definition, experimental design, collecting and recording data, and effective communication.

**FD SC 501 Research Methods in Food Science (2)**

FD SC 501 is designed to develop and improve research skills and prepare students for professional careers. The course will guide the student from problem selection to a completed research report. Along the way the student will come to appreciate the philosophical underpinnings of the research enterprise and understand how a research project is conducted in a professional and acceptable manner. The course will provide an overview of statistical techniques used for data analyses and protocols necessary to conduct research using human and animal subjects. Emphasis will be given to learning and improving written and oral communication skills. Students will learn by identifying funding sources, writing a research grant proposal and presenting the same to an audience. Subtleties of writing skills for peer-reviewed journals and corporate reports will be highlighted. Performance in the course will be evaluated based on written and oral presentations and class participation. A variety of audio-visual tools will be available to make presentations in the class. The course will be offered every spring semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 506** Flavor Chemistry (3) Formation, analysis and release of flavors in food systems.

### **Flavor Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 507** Advanced Food Microbiology (3) Roles of microorganisms in food preservation, spoilage, health and disease. Recent advances in detection, tracking and control of foodborne pathogens.

### **FD SC 507 Advanced Food Microbiology (3)**

FD SC507 is an intensive graduate course in food microbiology. Students will acquire knowledge of the core concepts pertaining to the roles of microorganisms in food preservation, spoilage, human health and disease. Special emphasis will be given to recent advances in molecular biology, genomics and bioinformatics that enhance the detection and tracking of foodborne pathogens. Upon completion of the course, students will be able to critically evaluate primary sources of information related to the field and be able to apply their knowledge to the development of effective risk assessment and risk management systems for ensuring food safety. Students will be able to critically analyze current food microbiology research publications and assess the quality of research publications in the field of food microbiology. Performance will be assessed through two exams, two quizzes, presenting and leading critical discussions of journal articles, and participating in class discussions. Resources will include an advanced-level text, other hardcopy and electronic resources and primary literature. The course will be offered every other year during the spring semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 510** Carbohydrate Hydrocolloids (3) Physicochemical behavior of edible carbohydrate hydrocolloids, with emphasis on starch and selected exudates, extracts, flours, and fermentation products.

### **Carbohydrate Hydrocolloids (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 514** Food Physical Chemistry (3) Physical principles underlying food structure and quality.

### **FD SC 514 Food Physical Chemistry (3)**

Food structure occurs over many scales ranging from the molecular to the macroscopic pieces consumed. We are interested in small scale behaviors as they determine larger scale structures and hence the bulk functionality of foods as materials (e.g., texture, physical stability). The structure of food arises from the molecular interactions of its ingredients as modified by the processing conditions applied. Food is rarely at a thermodynamic equilibrium so time-dependency and kinetics are particularly important. In this class, the students will develop an understanding of the structures occurring (e.g., crystals, gels, colloids), how they form, and how they affect the functional properties of foods.

Students will gain knowledge and understanding of the relevant principles through a variety of guided readings and lectures. They will then apply this knowledge in critical discussions of primary research articles. Finally the students will use the knowledge gained in a research project where they will be asked to explain the physics associated with a specific food product or process.

Students will be evaluated by a combination of in-class tests, a participation grade, examinations (mid-term and final) and a project.

The course will be offered alternating spring semesters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 521** (AGBIO 521) Food Defense: Prevention Planning for Food Processors (3) Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply.

### **FD SC (AGBIO) 521 Food Defense: Prevention Planning for Food Processors (3)**

This course will not only provide participants with knowledge of the domestic and international food industry, but it also provides tools for food industry and homeland security professionals to develop food defense programs to protect the food supply from terroristic activities leading to intentional contamination.

The course will introduce and apply: examples where intentional contamination has been used in the food industry; biological, chemical and physical hazards of primary concern in the food industry; methods for detecting hazards in the food supply; systems employed to monitor foodborne illness in the general public; management practices employed in food production to deal with recalls and other crises; vulnerabilities and mitigation procedures unique to food production; as well as agencies, resources, and tools needed to protect, prepare, and respond to intentional contamination incidents.

This course is a required course for the certificate program in Agricultural Biosecurity as well as the Master of Professional Studies in Homeland Security/Agricultural Biosecurity Option. These principles also will be incorporated into a food defense plan, recall plan, and emergency preparedness plan for an assigned food establishment.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on individual basis and fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**FD SC 597E** Advanced Wine Production and Analysis (3) Laboratory-based course in the processing and analysis of musts and wines. Emphasizes hands-on application and advanced problem solving in enology.

**Advanced Wine Production and Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 597G** Readings in Ingestive Behavior (1) Students lead discussion of original research in the field of ingestive behavior with a focus on food intake in particular.

**Readings in Ingestive Behavior (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 597K** (NUTR 597K) Food Addiction: Fact or Fiction? (3) Original literature using both human subjects and animal models relevant to the topic of food addiction will be discussed.

**Food Addiction: Fact or Fiction? (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 601** Ph.D. Dissertation Full Time (0) No description.

**Ph.D. Dissertation Full Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in the development of instructional materials, the organization and conduct of lectures/laboratories, the evaluation and counseling of students.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 603** Foreign Academic Experience (1-12) Foreign study and/or research approved by the food science program constituting progress toward the degree.

#### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FD SC 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Forensic Science (FRNSC)**

**FRNSC 400** Courtroom Proceedings and Testimony (1) Introduction to courtroom proceedings and testimony as they related to forensic science.

#### **FRNSC 400 Courtroom Proceedings and Testimony (1)**

Classroom discussions will focus on the structure and procedures of the courtroom, the role of its members, admissibility issues, and how testimony is presented in court. Students will read transcripts from actual forensic cases, will discuss how the evidence was presented in court, and will have an opportunity to present data in mock proceedings.

At the end of the course, students will have a strong understanding of how courts operate regarding the introduction of forensic evidence. The course is relevant to any forensic science student who has taken FRNSC 201 and 301, and should be taken either concurrent with or before FRNSC 401. Any student in the Forensic Science major who has an interest in obtaining employment in a private forensic company or a local, state or federal law enforcement agency will benefit greatly from this course.

This is a 400-level forensics course for students in the Forensic Science major. It will also satisfy a requirement for accreditation by the Forensic Science Education Programs Accreditation Commission (FEPAC).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 410** A Scientific Approach to Crime Scene Investigation (2) Principles of crime scene investigation with emphasis on scientific philosophy, concepts, and procedures.

#### **FRNSC 410 A Scientific Approach to Crime Scene Investigation (2)**

In this course, students will learn many of the essential principles and techniques of crime scene investigation. The

necessity of a rigorous scientific approach will be stressed. This course uses an intensive, problem-solving style to teach scene management and the recognition, evaluation, enhancement, documentation, control, and collection of physical evidence. Students will be introduced to:

- Scene management principles
- Search techniques
- Techniques to recognize, enhance, document, and collect various types of physical evidence
- Communication of procedures and results
- Scene reconstruction and its role in a scientific investigation

The primary aim of the course is to immerse students in the scientific philosophy, integrity, scene investigation procedures, criminalistics, and role of the criminalist as they relate to scene investigation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 411 Criminalistics: Trace and Impression Evidence (3)** Laboratory-based examination of forensic evidence; microscopy, classification and identification.

**FRNSC 411 Criminalistics: Trace and Impression Evidence (3)**

Laboratory-based examination of physical evidence typically recovered from crime scenes. Examination of physical evidence will occur according to established forensic procedures, including the location of trace evidence and performance of presumptive and confirmatory tests. Students will establish a laboratory notebook to document their findings. Since forensic testing ultimately results in testimony in a courtroom, students will prepare written reports of their findings and learn how to present their findings in a courtroom setting. The course will concentrate on microscopy (stereo, transmitted light, polarized light, and comparison), physical and chemical techniques to classify evidence, and pattern matching techniques to individualize impression evidence. The course is relevant to any student majoring in Forensic Science or who has an interest in obtaining employment in local, state, or federal law enforcement agencies and crime lab facilities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 413 Criminalistics: Biology (3)** Laboratory-based examination of forensic evidence; biological fluid identification, hair microscopy.

**FRNSC 413 Criminalistics: Biology (3)**

Laboratory-based examination of biological evidence typically recovered from crime scenes. Examination of biological evidence will occur according to established forensic procedures, including the identification of biological evidence and the performance of presumptive and confirmatory tests. Students will establish a laboratory notebook to document their findings. Since forensic testing ultimately results in testimony in a courtroom, students will prepare written reports of their findings and learn how to present their findings in a courtroom setting. The course will concentrate on the analysis of biological such as human blood, semen, saliva, urine, fecal matter and hair; including the employment of chemical, biological, and biochemical techniques to classify evidence. The course is relevant to any student majoring in Forensic Science or who has an interest in obtaining employment in local, state, or federal law enforcement agencies and crime lab facilities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 415W Laboratory in Crime Scene Investigation (2)** Laboratory course covering crime scene investigation with emphasis on scientific philosophy, concepts, procedures, problem solving, and hands-on activities.

**Laboratory in Crime Scene Investigation (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 421W Forensic Molecular Biology (4)** Concepts and application of serology of molecular biology techniques to analyze biological evidence collected at crime scenes.

#### **FRNSC 421W Forensic Molecular Biology (4)**

Classroom discussions will focus on the application of biochemistry and molecular biology techniques in forensic serology and DNA analysis. The course will start with a history of forensic biology techniques and move quickly to modern day techniques (e.g., STR analysis). Laboratory analysis will include population samples and mock evidence samples. Students will expand their knowledge of population genetics and fine tune their practical laboratory skills. Students will learn about laboratory safety, quality assurance and control, and ethics. They will evaluate results from actual forensic DNA cases, and both discuss how evidence is presented in court and have the opportunity to present their data in mock deposition proceedings. Laboratory exercises will result in the preparation of courtroom ready materials (data, documents, and demonstrations). Many of the classroom discussions will be problem solving exercises designed to emphasize specific applications of laboratory analysis.

At the end of the course, students will have a strong understanding of forensic screening techniques and STR analysis of biological evidence, and how to convey their findings in written format. In the laboratory, students will have analyzed different sample types, interpreted DNA profiles, prepared laboratory reports and case files, and presented the evidence in mock testimony proceedings. As a result, students will have the basic skills necessary to work in a forensic biology crime laboratory.

The proposed course is relevant to any science student who has taken B M B 342, 400, and 401, and any student in the Forensic Science major who has an interest in obtaining employment in a local, state or federal law enforcement agency and/or crime laboratory facility. This is a 400-level forensics course that will be required for students in the Forensic Science major who elect to complete the biology option.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 427W (CHEM 427W) Forensic Chemistry (4)** Analytical and instrumental methods used in the forensic sciences with special emphasis on the analysis and characterization of trace evidence.

#### **FRNSC (CHEM) 427W Forensic Chemistry (4)**

The purpose of this course is to provide students with a rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of trace evidence. The course thoroughly integrates lecture and laboratory activities to explore the history, controversies and current issues related to each topic. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. Students work in small groups (2-3 students) to complete each assignment. Students are required to write five research papers during the semester. Four of the reports are linked to the core course topics and the fifth is associated with the semester-long research project. All reports require students to search for and read the relevant published literature.

The course is relevant to any student majoring in Forensic Sciences or who has an interest in obtaining employment in a crime lab. The course is required for accreditation through the American Association of Forensic Sciences and is recommended by the National Institute of Justice in their published recommendations for undergraduate curricula in the forensic sciences. The proposed course and the course in Forensic Anthropology/Biology comprise the core 400-level science courses required in the Forensic Sciences major.

The course is designed to be rigorous and comprehensive in scope. Grades will be based on in-class lecture examinations (20%), problem sets (10%), laboratory notebooks (15%), laboratory write-ups (30%), and a term project (written and oral presentations; 25%). The writing component for this course includes: maintaining a proper laboratory notebook; five approximately 10-page reports; and an oral poster presentation. All writing elements are reviewed and graded by the instructor and teaching assistants. Students are allowed to correct, or rewrite, and resubmit notebook entries for three separate submissions (notebooks are graded a total of eight times throughout the semester) and the written reports excluding the final project report. Students are required to submit a preliminary poster for a ) non-graded) review prior to the oral presentation. The writing component of the course accounts for 55% of the total course grade.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 475 Forensic Science Seminar (1) (4)** Presentation and discussion of special issues in forensic science; extension and

application of background knowledge to unusual topics and cases.

### **Forensic Science Seminar (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 485W** Coalescence of Forensic Science Concepts. (4) Advanced concepts in criminalistics as they apply to criminal and civil investigations.

### **Coalescence of Forensic Science Concepts. (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:  
Concurrent: FRNSC 421W FRNSC 427W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 494** Research Projects (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Projects (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 497A** Chromatography and Electrochemistry (3) The course topics include gas, liquid, and other forms of chromatography, mass spectroscopy, and important techniques of electrochemistry. The course material is designed to increase student understanding of both the analytical instruments and used in the laboratory and the principles underlying the measurements. Evaluation of student performance is based on the level to which a student understands how an instrument operates and how particular components determine overall performance and specifications; limitations to measurements as a function instrument design; criteria by which one selects an appropriate instrument to obtain the desired measurements; and criteria by which one selects appropriate components to build an instrument for specific uses.

### **Chromatography and Electrochemistry (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 532 Drug Chemistry and Toxicology (3)** Chemical and toxicological properties of therapeutic and non-therapeutic drugs and the analytical and instrumental methods of their identification and quantification.

### **Drug Chemistry and Toxicology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 541 Forensic Seminar Series (1)** Advanced concepts in forensic science through presentation of journal articles, case studies, and research findings.

### **FRNSC 541 Forensic Seminar Series (1)**

Classroom presentations and discussions will focus on different aspects of forensic science as found in current journal articles, casework studies, and current research projects. In this way, the students will be introduced to concepts, technologies, and methodologies that can be applied in forensic crime laboratories today or in the near future. The classroom discussions will include exercises designed to develop critical thinking skills.

At the end of the course, students will have gained an understanding or better understanding of a number of different forensic science concepts.

The course is a 500-level forensics course required for the Master of Professional Studies in Forensic Science degree program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 561 Ethics in forensic Science (1)** The ethics of forensic science, including issues of evidence handling, data analysis, and courtroom testimony.

### **FRNSC 561 Ethics in Forensic Science (1)**

Classroom presentations and discussions will focus on integrity, ethical behavior, ethics standards and different examples of ethics violations and misconduct in the forensic science community. In this way, the students will be introduced to the imperative and sensitive issues surrounding professional integrity and ethics.

At the end of the course, students will have gained an understanding or better understanding of professional integrity and ethical behavior in relation to forensic science.

The course is a 500-level forensics course required for the Master of Professional Studies in Forensic Science degree program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 801 Criminalistics III (4)** Advanced CSI investigation, criminalistics, and scene reconstruction with mock courtroom testimony.

#### **FRNSC 801 Criminalistics III (4)**

Classroom discussions will expand on the analysis of commonly encountered evidence to demonstrate its usefulness in real-crime investigation. Students will be given problems to research for which there will be real-life examples in either the literature or in court records. Using a problem solving technique, students will research and examine actual analytical data, interpret it and then testify to it in mock court situations. After researching actual cases, students will demonstrate their ability to critically analyze crime scenes. Scenes will be mocked up at the university crime scene house, Spruce Cottage, selected because of their complexity. Students will analyze evidence obtained after processing a crime scene. The students' laboratory analysis will encompass a variety of physical evidence types that will test a student's ability to select an analytical scheme that makes sense in the context of the current case. Integral in this process is the understanding of the operation of criminalistics laboratories and how it relates to the quality assurance function of the laboratory.

The course is an 800-level forensics course required for the Master of Professional Studies in Forensic Science, and is the capstone course for completion of the degree.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 821 Forensic Molecular Biology II (4)** Advanced concepts and application of molecular biology techniques to the analysis of biological evidence collected at crime scenes.

#### **FRNSC 821 Forensic Molecular Biology II (4)**

Classroom discussions will expand on the application of forensic DNA analysis using all market types (STR, Y-STR, and mtDNA), including interpretation of complex profiles and mixtures, advanced understanding of instrument operation, and presentation of DNA results in the courtroom. Students will be introduced to technologies that could be applied in forensic laboratories in the near future (e.g., SNP's, micro-capillary arrays, microchips), and will gain an advanced understanding of how forensic DNA laboratories operate and are managed; i.e., quality assurance programs, facility security, proficiency testing programs, basic budgetary and financial issues, and other areas of interest. The laboratory exercises will reflect classroom discussions and students will be expected to prepare courtroom ready materials (data, documents, and demonstrations). The students will be responsible for setting up and running the laboratory in a similar manner to how a real crime laboratory is run. Many of the classroom discussions will be problem solving exercises designed to emphasize specific applications of laboratory analysis.

At the end of the course, students will have mastered advanced screening techniques and the three major forensic DNA methods for analyzing biological evidence. Additionally, they will be prepared to work in a forensic DNA crime laboratory, understanding quality assurance, accreditation, and other areas of importance. In the laboratory, students will have analyzed difficult sample types, interpreted complex DNA profiles, and prepared the evidence for advanced levels of courtroom testimony.

The proposed course is relevant to any student in the forensic sciences who has an interest in obtaining employment in a local, state or federal law enforcement agency and/or crime laboratory facility. This is an 800-level forensics course that will be required for students in the Master of Professional Studies (MPS) in Forensic Science degree program who are interested in forensic biology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 821 Forensic Molecular Biology II (4)** Advanced concepts and application of molecular biology techniques to the analysis of biological evidence collected at crime scenes.

#### **FRNSC 821 Forensic Molecular Biology II (4)**

Classroom discussions will expand on the application of forensic DNA analysis using all market types (STR, Y-STR, and mtDNA), including interpretation of complex profiles and mixtures, advanced understanding of instrument operation, and

presentation of DNA results in the courtroom. Students will be introduced to technologies that could be applied in forensic laboratories in the near future (e.g., SNP's, micro-capillary arrays, microchips), and will gain an advanced understanding of how forensic DNA laboratories operate and are managed; i.e., quality assurance programs, facility security, proficiency testing programs, basic budgetary and financial issues, and other areas of interest. The laboratory exercises will reflect classroom discussions and students will be expected to prepare courtroom ready materials (data, documents, and demonstrations). The students will be responsible for setting up and running the laboratory in a similar manner to how a real crime laboratory is run. Many of the classroom discussions will be problem solving exercises designed to emphasize specific applications of laboratory analysis.

At the end of the course, students will have mastered advanced screening techniques and the three major forensic DNA methods for analyzing biological evidence. Additionally, they will be prepared to work in a forensic DNA crime laboratory, understanding quality assurance, accreditation, and other areas of importance. In the laboratory, students will have analyzed difficult sample types, interpreted complex DNA profiles, and prepared the evidence for advanced levels of courtroom testimony.

The proposed course is relevant to any student in the forensic sciences who has an interest in obtaining employment in a local, state or federal law enforcement agency and/or crime laboratory facility. This is an 800-level forensics course that will be required for students in the Master of Professional Studies (MPS) in Forensic Science degree program who are interested in forensic biology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 831 Forensic Chemistry II (3)** Advanced chemical techniques in forensic science, including examination of complex trace evidence and advanced instrumental analysis.

### **FRNSC 831 Forensic Chemistry II (3)**

The purpose of this course is to provide students with rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of trace evidence. The course thoroughly integrates lecture and laboratory activities to explore the history, controversies and current issues related to each topic. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. The course consists of 2 three-hour laboratories per week.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 832 Forensic Drug Chemistry (3)** Advanced chemical techniques in forensic science, including analytical and instrumental methods used in the analysis and characterization of drugs.

### **FRNSC 832 Forensic Drug Chemistry (3)**

The purpose of this course is to provide students with rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of drugs of abuse and other pharmaceuticals. The course explores the history, controversies and current issues related to each topic. The course consists of 3 one-hour lectures per week.

This is an 800-level forensics course that will be an elective for students in the MPS in Forensic Science degree program who are interested in forensic chemistry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 833 Forensic Toxicology (3)** Advanced chemical techniques in forensic science, including the elements of industrial and environmental toxicology.

### **FRNSC 833 Forensic Toxicology (3)**



This course will expand on concepts encountered in Forensic Chemistry I and II, providing in-depth knowledge of pharmacology and toxicology as it pertains to commonly encountered abused and toxic substances. The course consists of 3 one-hour lectures per week.

This is an 800-level forensics course that will be an elective for the students in the MPS in Forensic Science degree program who are interested in forensic chemistry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 894** Research Projects in Forensic Science (1-12) Supervised student research projects identified on an individual or small-group basis.

### **Research Projects in Forensic Science (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 895** Internship (1-6) Supervised off-campus, non-group instruction, including field experiences, a practicum, or internships; written and oral critique of activity required.

### **Internship (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FRNSC 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Forestry (FOR)**

**FOR 400** Senior Forest Practicum (2) Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.

### **Senior Forest Practicum (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 400** Senior Forest Practicum (2) Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.

### **Senior Forest Practicum (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 401 Urban Forest Management (3)** Uses and values of urban vegetation, open space, and wildlife; planning, financing, support, management, and administration of urban forestry programs.

### **Urban Forest Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 403 Invasive Forest Plants: Identification, Ecology, and Management (3)** Survey of common nonnative ("exotic") herbs, forbs, shrubs, trees, and vines that invade forested habitats in Pennsylvania and the region. Field identification, life history traits, ecosystem-related challenges and problems, and management options and considerations are reviewed.

### **Invasive Forest Plants: Identification, Ecology, and Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 409 Tree Physiology (2)** Fundamentals of the relationship of the basic physiological functions of forest trees to form.

### **Tree Physiology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 410 Elements of Forest Ecosystem Management (3)** Fundamentals of forest ecosystem management for goods and services.

### **Elements of Forest Ecosystem Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 416 Forest Recreation (3)** The management and administration of multiple-use forest lands and wilderness for forest recreational experiences, with emphasis on public forests.

### **Forest Recreation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 418 (US;IL) Agroforestry: Science, Design, and Practice (3)** Agroforestry integrates trees in agricultural landscapes,

and/or agriculture products into forested areas for multiple benefits.

**FOR 418 Agroforestry: Science, Design, and Practice (3)  
(US;IL)**

Agroforestry is the intentional design of land use systems that combine tree crops with plants and/or animals in a manner that seeks to promote ecological and economic benefits within the landscape. Two possible arrangements for such systems are (1) the integration of trees within non-forested settings; and/or (2) the introduction of high value 'crop' species into existing forestlands. The objective of the course is to foster a practical working knowledge of agroforestry as it is experienced both in Pennsylvania and throughout the world, so that students from a variety of backgrounds can integrate agroforestry practices and thinking into their own disciplines, interests, and lives. Although agroforestry is an ancient land use approach, it is new in many places, and improvements and adaptations to traditional practices are needed to meet local circumstances. This course will provide a framework for critical assessment and implementation within this context.

One of the fundamental aspects of agroforestry is that it is a land use system that operates at a landscape or ecosystem scale. For agroforestry to succeed, many factors, including ones external to the agroforestry practice itself must be considered. Therefore the course is interdisciplinary in nature and topics in ecology, economics, sociology, and policy that are related to agroforestry practices will be discussed. In evaluating the students, the primary emphasis is on class discussion. Students will be expected to review and discuss papers and contribute to the ongoing dialogue and debate about agroforestry as a sustainable land use. Students will be required to carry out critical reviews of agroforestry papers and publications as well as design and develop an agroforestry project pertinent to their individual field of interest and expertise. The course will be offered every Spring semester.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 421 Silviculture (3)** The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands.

**Silviculture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2014 Future: Summer 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 421 Silviculture (3)** The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands.

**Silviculture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2014 Future: Summer 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 430 (W F S 430) Conservation Biology (3)** The application of biological principles to issues in the conservation of biodiversity.

**Conservation Biology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 439 Timber Sale Administration (2)** Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales.

**FOR 439 Timber Sale Administration (2)**

This course provides hands-on experience with all of the activities associated with overseeing a timber sale, including the legal aspects of arranging a sale, marking timber and calculating volume, road and sale layout, best management practices, inspections, harvesting equipment, working with contractors and loggers, and liability issues. It should be taken after completing coursework in mensuration. The objectives of the course are to 1) obtain and translate a property deed onto the ground and create a professional map of the timber sale area; 2) design a timber sale, including cutting boundaries, skid trails, haul roads, and landings such that site impact is minimized, harvesting efficiency and safety is maximized and productivity is maintained; 3) collect sufficient information for a professional timbersale prospectus, including which harvesting systems would be best suited to the situation; 4) complete an erosion and sedimentation plan, a stream crossing permit, and local harvesting ordinance requirements; 5) develop a timber sale contract and a landowner-consultant contract to protect all parties and address all possible legal scenarios; 6) work with, inspect, supervise and provide meaningful feedback to harvesting, road building and landscape contractors; 7) retire a timber sale area to prevent erosion, create habitat variety and/or recreational opportunities, and maintain aesthetic qualities. Evaluation methods include written exams, written and field projects, and participation. This course is offered every fall and class size is restricted.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Future: Summer 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 439 Timber Sale Administration (2)** Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales.

### **FOR 439 Timber Sale Administration (2)**

This course provides hands-on experience with all of the activities associated with overseeing a timber sale, including the legal aspects of arranging a sale, marking timber and calculating volume, road and sale layout, best management practices, inspections, harvesting equipment, working with contractors and loggers, and liability issues. It should be taken after completing coursework in mensuration. The objectives of the course are to 1) obtain and translate a property deed onto the ground and create a professional map of the timber sale area; 2) design a timber sale, including cutting boundaries, skid trails, haul roads, and landings such that site impact is minimized, harvesting efficiency and safety is maximized and productivity is maintained; 3) collect sufficient information for a professional timbersale prospectus, including which harvesting systems would be best suited to the situation; 4) complete an erosion and sedimentation plan, a stream crossing permit, and local harvesting ordinance requirements; 5) develop a timber sale contract and a landowner-consultant contract to protect all parties and address all possible legal scenarios; 6) work with, inspect, supervise and provide meaningful feedback to harvesting, road building and landscape contractors; 7) retire a timber sale area to prevent erosion, create habitat variety and/or recreational opportunities, and maintain aesthetic qualities. Evaluation methods include written exams, written and field projects, and participation. This course is offered every fall and class size is restricted.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Future: Summer 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 440 Forest and Conservation Economics (3)** The role and application of economics and finance to forest resource conservation and management.

### **FOR 440 Forest and Conservation Economics (3)**

Students will learn economic and financial concepts and tools used in managing forests and natural resources. Specifically, they will: a) use financial tools including cost-benefit analysis to analyze forest investments, b) recognize forest-related business operations and management issues, c) apply economic principles to forest and natural resource management decisions including environmental and nonmarket valuation methods, and d) discuss current issues in forest management and economics such as climate change, bioenergy and tropical deforestation. Students will carry out a case study of a forest-related business.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 450W Human Dimensions of Natural Resources (3)** Addresses human needs and desires, from individuals to nations,

for social, ecological, and economic benefits derived from natural resource decisions.

### **Human Dimensions of Natural Resources (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 450W** Human Dimensions of Natural Resources (3) Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions.

### **Human Dimensions of Natural Resources (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 455** Remote Sensing and Spatial Data Handling (3) Remote sensing systems, with emphasis on application to forest ecosystem analysis. Includes introduction to computer systems for spatial data handling.

### **FOR 455. Remote Sensing and spatial Data Handling (3)**

FOR 455 imparts a basic understanding of remote sensing and related spatial data technologies such as geographic information systems (GIS) and digital elevations models (DEM) in a natural resources context. Lectures cover the nature of electromagnetic radiation, electronic remote sensing systems, airphoto systems, photogrammetry, and GIS fundamentals. Laboratory work includes stereo viewing, basic photogrammetry, introductory photointerpretation, airphoto mission planning, digital image analysis, topographic analysis and landforms, GIS mapping, and some basic GIS analysis. Emphasis is on learning by doing, with one lecture and two 2-hour labs each week.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 466W** Forest Management and Planning (3) Rationale, process, and tools for forest management decision-making and planning. Developing and communicating forest plans for forested properties.

### **FOR 466W Forest Management and Planning (3)**

Students learn the rationale, processes, and tools for forest management decision-making and planning. They learn to identify and obtain information needed for management decision-making and planning. They learn to develop management alternatives and to use appropriate data and tools to evaluate those alternatives. Students learn to apply financial analysis to evaluate the financial viability of stand-level forest management activities. Students develop and write forest management plans for small ( < 250 acres) and large (> 250 acres) forested properties. Students identify how alternative forest management objectives are balanced in developing management plans. Students evaluate and critique public agency forest management plans.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 466W** Forest Management and Planning (3) Rationale, process, and tools for forest management decision-making and planning. Developing and communicating forest plans for forested properties.

### **FOR 466W Forest Management and Planning (3)**

Students learn the rationale, processes, and tools for forest management decision-making and planning. They learn to

identify and obtain information needed for management decision-making and planning. They learn to develop management alternatives and to use appropriate data and tools to evaluate those alternatives. Students learn to apply financial analysis to evaluate the financial viability of stand-level forest management activities. Students develop and write forest management plans for small ( 250 acres) and large (> 250 acres) forested properties. Students identify how alternative forest management objectives are balanced in developing management plans. Students evaluate and critique public agency forest management plans.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 470 Watershed Management (3)** Management of wild land watersheds for control of the amount and timing of water yield, water quality, erosion, and sedimentation.

### **FOR 470 Watershed Management (3)**

In FOR 470-Watershed Management students are expected to learn the fundamentals of watershed hydrology and how management of natural resources, especially forest resources, can be adapted to protect and enhance the natural flow, quantity and quality of water resources.

Emphasis is placed on acquisition of available hydrologic and climatic data over the internet, solving basic hydrologic problems using the proper units, writing short essays summarizing assigned papers or lectures, and in-class tests on managing impacts of timber harvesting, road construction, application of forest chemicals, and other land uses activities. The course is primarily, but not exclusively, intended as a course for upper-level undergraduate and graduate students in forest resources and wildlife and fisheries majors or other majors such as ERM with related natural resources backgrounds and interests.

The course is a Prescribed Course for Forest Resources undergraduates in the Forest Management and Watershed Management options and is a Water Science breadth course for students in the Graduate Option in Watershed Stewardship. A companion one-credit course FOR 471 -Watershed Management Laboratory - may be taken concurrently with or following FOR 470. This course is offered each Spring Semester and generally has an enrollment of about 80-90 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 471 Watershed Management Laboratory (1)** Introduction to hydrologic and climatic measurements and computations useful in watershed management.

### **Watershed Management Laboratory (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 475 Principles of Forest Soils Management (3)** Effect of current forest management practices on the properties and productive capacity of forest soils.

### **Principles of Forest Soils Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 480 Policy and Administration (3)** Forest resources policy objectives; criteria and goals of society; policy implementation by ownership classes; planning, administration, and evaluation of programs.

**Policy and Administration (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Future: Summer 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 480** Policy and Administration (3) Forest resources policy objectives; criteria and goals of society; policy implementation by ownership classes; planning, administration, and evaluation of programs.

**Policy and Administration (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Future: Summer 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 488Y (IL)** Global Forest Conservation (3) Ecological, economic, technological, and political aspects of forested ecosystems in a global context, emphasizing tropical and developing countries.

**FOR 488Y Global Forest Conservation (3)**

Forested ecosystems cover one third of world's land area, and about two billion people depend on forest products for their livelihood. Students in this course will learn about trends in global forest cover, human demands on forests in different parts of the world, and how national and international institutions and policies regulate forest use. Topics covered include tropical deforestation, biodiversity, climate change, poverty, forest production and trade. Students come away from the course with an understanding of the diversity of forestry practices around the globe.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 494** Forestry Research (3) Introduction to the theory, principles, and practices of forestry research; supervised research experience.

**Forestry Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 494H** Forestry Research (3) Introduction to the theory, principles, and practices of forestry research; supervised research experience.

**Forestry Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 495** Forestry Internship (1-6) Supervised field experience related to the student's major.

**Forestry Internship (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 497A** Senior Forest Practicum (2) Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.

### **Senior Forest Practicum (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 497C** Human Dimensions of Natural Resources and the Environment (3) Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions.

### **Human Dimensions of Natural Resources and the Environment (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 497F** Invasive Forest Plants (3) Survey of common nonnative ("exotic") herbs, forbs, shrubs, trees, and vines that invade forested habitats in Pennsylvania and the mid-Atlantic region.

### **Invasive Forest Plants (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL



Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 508 Forest Ecology (3)** The forest ecosystem, variations in space and time, classification, ordination techniques, dynamic aspects such as energy flow and nutrient cycling.

### **Forest Ecology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 517 Forest Microclimatology (3)** A quantitative treatment of climate near the ground, with special reference to the role of forests and terrain.

### **Forest Microclimatology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 520 Snow Hydrology (2)** Role of snow and ice in the hydrologic cycle, with special emphasis on effects of forests and land use.

### **Snow Hydrology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 521 Advanced Silviculture (3)** Specific silvicultural practices for the establishment and manipulation of forest stands with respect to recent developments and research needs.

### **Advanced Silviculture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 530 Conservation Genetics (3)** Discussion of the use of genetic principles and technologies in the conservation and management of biological diversity.

### **FOR 530 Conservation Genetics (3)**

This course will familiarize students with the roles of population genetics, phylogenetics, molecular genetics and quantitative genetics in conservation biology, and to examine in depth pertinent examples from the literature dealing with current applications of conservation genetics including genetic diversity, genetics at the landscape level, the effects of fragmentation on the genetic structure of species, and the role of modern genetics within ecosystem management. FOR 530 will provide a new and valuable component to the graduate curriculum of students interested in genetics, forestry, wildlife, fisheries, conservation, and endangered species. The current scientific literature will be critically reviewed and discussed in relation to case studies, on a range of topics. Evaluation will be based on participation, class presentations, and written papers. The course is to be offered biennially in the Spring in even numbered years.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 550** Multivariate Analysis in Forestry Research (3) Analysis and interpretation of research data involving several response variables. Includes computational considerations for large data sets.

### **Multivariate Analysis in Forestry Research (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 555** Multispectral Remote Sensing (3) Computer analysis of data from nonimaging remote sensors as applied to mapping of natural resources and land use.

### **Multispectral Remote Sensing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 565** GIS Based Socio-Ecological Landscape Analysis (3) GIS-based socio-ecological analysis of landscape context for natural resources in relations to present and prospective patterns of land use.

### **FOR 565 GIS Based Socio-Ecological Landscape Analysis (3)**

This course seeks synthesis to bridge a gap between the contemporary spatially-oriented biophysical analysis of landscape ecology and use of geospatial technologies for analysis of past, present, and prospective human influences operative at landscape scale - both of which use geographic information systems as analytical platforms. Interest is reciprocal - human influences on landscape, and landscape conditioning of human economic development. Instruction takes place in a GIS laboratory facility, and evidence of learning arises from ability to access, manipulate, and display spatial information.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 570** Watershed Stewardship Practicum I (3) Application of integrated community-based watershed planning for water resources management.

### **Watershed Stewardship Practicum I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 571** Watershed Stewardship Practicum II (3) Application of integrated community-based watershed planning for water resources management.

### **Watershed Stewardship Practicum II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 590** (W F S 590) Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 591A** Seminar in Watershed Stewardship Issues (1) Exploration of watershed stewardship issues.

**Seminar in Watershed Stewardship Issues (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 591B** Seminar in Watershed Stewardship Planning (1) Exploration of watershed stewardship planning processes.

**Seminar in Watershed Stewardship Planning (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 597A** Science - Policy Interface (2) Scientists are increasingly being called upon to provide input to the policy process and are typically averse to or intimidated by engaging in this process for numerous reasons. This course will explore the philosophical issues surrounding scientist input in the policy process. In addition, this course will move beyond philosophical discussion by providing guidance on how to effectively communicate with non-scientists.

**Science - Policy Interface (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in forestry courses.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 603** Foreign Academic Experience (1-12) Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FOR 880 Bioenergy Feedstocks (3)** This course comprehensively addresses the characteristics, production, and improvement of plants as feedstocks for conversion to energy.

### **Bioenergy Feedstocks (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Found Clinical Med (FCM)**

**FCM 713 Foundations of Clinical Medicine I (2)** Foundational course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

### **FCM 713 Foundations of Clinical Medicine I (2)**

Foundations of Clinical Medicine is a course that spans the first two years of the medical school curriculum, and consists of three components: Clinical Interviewing, Physical Diagnosis, and Clinical Skills teaching sessions. Each of these components occur in both Foundations of Clinical Medicine I and Foundations of Clinical Medicine II.

The Clinical Interviewing component in Year 1 introduces the nature and importance of the doctor-patient relationship and teaches the primary skills of clinical interviewing. During this component, students attend lecture format sessions to introduce general concepts, as well as small group sessions with their assigned facilitator to review and practice their interviewing skills with standardized patients.

The Physical Diagnosis component in Year 1 introduces the basic elements of the physical examination, and provides a setting in which students can begin to practice their exam skills. Students attend both lecture and small group sessions. A special feature of the year one curriculum is that the physical diagnosis sessions are timed so they occur soon after students have learned the anatomy of the corresponding body part.

The Clinical Skills component takes place throughout the first and second years. Students work with an assigned faculty member, who also serves as their academic advisor. A total of four sessions take place during the first year, and occur in either an inpatient or outpatient setting. During these sessions, students get their first true interaction with patients as they practice history-taking and physical examination under the direct guidance of a clinician. Their clinical skills faculty member provides pertinent feedback and directed guidance. An additional ten sessions then continue into the second year, with students continuing to work with the same faculty member to hone their clinical skills.

At the end of the Foundations of Clinical Medicine I course, students are expected to have mastered the introductory elements of clinical interaction and be confident in a patient care setting. This course will serve as the basis for further refinement of their clinical skills in the second year of medical school and throughout their clerkships.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCM 714 Foundations of Clinical Medicine I (2)** Foundational course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

### **FCM 714 Foundations of Clinical Medicine I (2)**

Foundations of Clinical Medicine is a course that spans the first two years of the medical school curriculum, and consists of three components: Clinical Interviewing, Physical Diagnosis, and Clinical Skills teaching sessions. Each of these components occur in both Foundations of Clinical Medicine I and Foundations of Clinical Medicine II.

The Clinical Interviewing component in Year 1 introduces the nature and importance of the doctor-patient relationship and teaches the primary skills of clinical interviewing. During this component, students attend lecture format sessions to introduce general concepts, as well as small group sessions with their assigned facilitator to review and practice their interviewing skills with standardized patients.

The Physical Diagnosis component in Year 1 introduces the basic elements of the physical examination, and provides a setting in which students can begin to practice their exam skills. Students attend both lecture and small group sessions. A special feature of the year one curriculum is that the physical diagnosis sessions are timed so they occur soon after students have learned the anatomy of the corresponding body part.

The Clinical Skills component takes place throughout the first and second years. Students work with an assigned faculty member, who also serves as their academic advisor. A total of four sessions take place during the first year, and occur in either an inpatient or outpatient setting. During these sessions, students get their first true interaction with patients as they practice history-taking and physical examination under the direct guidance of a clinician. Their clinical skills faculty member provides pertinent feedback and directed guidance. An additional ten sessions then continue into the second year, with students continuing to work with the same faculty member to hone their clinical skills.

At the end of the Foundations of Clinical Medicine I course, students are expected to have mastered the introductory elements of clinical interaction and be confident in a patient care setting. This course will serve as the basis for further refinement of their clinical skills in the second year of medical school and throughout their clerkships.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCM 723** Foundations of Clinical Medicine II (2) Advanced course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

### **FCM 723 Foundations of Clinical Medicine II (2)**

Foundations of Clinical Medicine is a course that spans the first two years of the medical school curriculum, and consists of three components: Clinical Interviewing, Physical Diagnosis, and Clinical Skills teaching sessions. Each of these components occurs in both Foundations of Clinical Medicine I and Foundations of Clinical Medicine II.

During Foundations of Clinical Medicine II, students continue to apply and further develop the attitudes, knowledge, and skills acquired in Foundations of Clinical Medicine I. Building upon concepts introduced in Foundations of Clinical Medicine I, the clinical interviewing portion of Foundations of Clinical Medicine II expands the doctor-patient relationship by allowing students to practice obtaining more directed and/or sensitive historical information (such as pediatric and geriatric interview and sexual history) and guiding them through complex clinical interactions (such as cultural differences). The physical diagnosis component then reviews more advanced physical diagnosis skills and provides a supervised setting for practicing performance of these skills prior to actual patient encounters. Specifically, students attend both lecture sessions and clinical modules designed to incorporate advanced examination skills, such as the neurological exam, the pediatric exam, the geriatric exam, the breast and female genitalia exams, and the male genitalia exam.

The Clinical Skills component also continues in Foundations of Clinical Medicine II, with the majority of clinical skills contact hours taking place in the second year. Students work with their previously assigned faculty member who also serves as their academic advisor. A total of ten sessions take place throughout the second year, and occur in either an inpatient or outpatient setting. Their clinical skills faculty member provides pertinent feedback and directed guidance, while developing the student's ability to interview and examine patients, orally present their findings, document the interaction in the medical record, develop a problem list, and consider the differential diagnosis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FCM 724** Foundations of Clinical Medicine II (2) Advanced course that teaches the basics of physical diagnosis, clinical interviewing and the doctor-patient relationship.

### **FCM 724 Foundations of Clinical Medicine II (2)**

Foundations of Clinical Medicine is a course that spans the first two years of the medical school curriculum, and consists of three components: Clinical Interviewing, Physical Diagnosis, and Clinical Skills teaching sessions. Each of these components occurs in both Foundations of Clinical Medicine I and Foundations of Clinical Medicine II.

During Foundations of Clinical Medicine II, students continue to apply and further develop the attitudes, knowledge, and skills acquired in Foundations of Clinical Medicine I. Building upon concepts introduced in Foundations of Clinical Medicine I, the clinical interviewing portion of Foundations of Clinical Medicine II expands the doctor-patient relationship by allowing students to practice obtaining more directed and/or sensitive historical information (such as pediatric and geriatric interview and sexual history) and guiding them through complex clinical interactions (such as cultural differences). The physical diagnosis component then reviews more advanced physical diagnosis skills and provides a supervised setting for practicing performance of these skills prior to actual patient encounters. Specifically, students attend both lecture sessions and clinical modules designed to incorporate advanced examination skills, such as the neurological exam, the pediatric exam, the geriatric exam, the breast and female genitalia exams, and the male genitalia exam.

The Clinical Skills component also continues in Foundations of Clinical Medicine II, with the majority of clinical skills

contact hours taking place in the second year. Students work with their previously assigned faculty member who also serves as their academic advisor. A total of ten sessions take place throughout the second year, and occur in either an inpatient or outpatient setting. Their clinical skills faculty member provides pertinent feedback and directed guidance, while developing the student's ability to interview and examine patients, orally present their findings, document the interaction in the medical record, develop a problem list, and consider the differential diagnosis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Founda Patient Cente (FPCC)

**FPCC 713** Foundations of Patient Centered Care - I (2) First semester of a four-part course to learn and apply clinical interviewing and examination skills at the novice level integrated with healthcare practice topics.

### Foundations of Patient Centered Care - I (2)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPCC 723** Foundations of Patient Centered Care - 3 (2) Third semester of a four-part course to learn and apply clinical interviewing and examination skills at the competent level integrated with healthcare practice topics.

### Foundations of Patient Centered Care - 3 (2)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Fp - Health Law Clin (FPHLC)

**FPHLC 995** Field-Placement Clinic: Health Law (2-3) See Student Handbook.

### Field-Placement Clinic: Health Law (2-3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Fp - Higher Educatio (FPHED)

**FPHED 995** Field Placement - Higher Education (2-3) Externships in Penn State's offices at University Park and other campuses where appropriate.

### Field Placement - Higher Education (2-3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp - Intnal Crim Tri (FPICT)**

**FPICT 995A** Field Placement - International Criminal Tribunal (7) Externship in the office of the Prosecutor of the International Criminal Tribunal for the former Yugoslavia.

### **Field Placement - International Criminal Tribunal (7)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPICT 995B** Field Placement - International Criminal Tribunal (3) Externship in the office of the Prosecutor of the International Criminal Tribunal for the former Yugoslavia.

### **Field Placement - International Criminal Tribunal (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPICT 995C** Field Placement - International Criminal Tribunal (3) Externship in the office of the Prosecutor of the International Criminal Tribunal for the former Yugoslavia.

### **Field Placement - International Criminal Tribunal (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp - Judicial Clinic (FPJUD)**

**FPJUD 995** Field-Placement Clinic: Judicial (2-3) See Student Handbook.

### **Field-Placement Clinic: Judicial (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp - Local Gvmt Clin (FPLGC)**

**FPLGC 995** Field-Placement Clinic: Local Government (2-3) See Student Handbook.

### **Field-Placement Clinic: Local Government (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp- W Dc Seminar Pro (FPWDC)**

**FPWDC 995** Washington D.C. Externship Program (10) The Washington semester externship will provide students with the opportunity to spend a semester in Washington, D.C. earning academic credit for approximately 32 hours of supervised work. Students will work in one of several selected and approved governmental or nonprofit entities.

### **Washington D.C. Externship Program (10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995A** Field-Placement Clinic: U.S. Attorneys Office for the District of Columbia (9-10) An intensive semester-long field placement with the United States Attorney's Office for the District of Columbia.

### **Field-Placement Clinic: U.S. Attorneys Office for the District of Columbia (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995B** Field-Placement Clinic: U.S. Department of the Treasury, Office of Foreign Assets Control (9-10) An intensive semester-long field placement with the Office of Foreign Assets Control of the U.S. Department of the Treasury.

### **Field-Placement Clinic: U.S. Department of the Treasury, Office of Foreign Assets Control (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995C** Field-Placement Clinic: U.S.-China Economic Review and Security Commission (9-10) An intensive semester-long field placement with the U.S.-China Economic Review and Security Commission.

### **Field-Placement Clinic: U.S.-China Economic Review and Security Commission (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995D** Field-Placement Clinic: U.S. Department of Health and Human Services, Office for Civil Rights (9-10) An intensive semester-long field placement with the Office for Civil Rights of the United States Department of Health and Human Services.

### **Field-Placement Clinic: U.S. Department of Health and Human Services, Office for Civil Rights (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995E** Field-Placement Clinic: U.S. Equal Employment Opportunity Commission, Office of Federal Operations Appellate Review Programs. (9-10) An intensive semester-long field placement with the EEOC Office of Federal Operations

Appellate Review Programs.

**Field-Placement Clinic: U.S. Equal Employment Opportunity Commission, Office of Federal Operations Appellate Review Programs. (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995F** Field-Placement Clinic: United States House of Representatives (9-10) An intensive semester-long field placement with a United States Congressman.

**Field-Placement Clinic: United States House of Representatives (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 995G** Field-Placement Clinic: United States Securities and Exchange Commission (9-10) An intensive semester-long field placement with the United States Securities and Exchange Commission.

**Field-Placement Clinic: United States Securities and Exchange Commission (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPWDC 997** Special Topics (9-10) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (9-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Admin Agency Clin (FPADM)**

**FPADM 995** Field-Placement Clinic: Administrative Law (2-3) See Student Handbook.

**Field-Placement Clinic: Administrative Law (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Cabinet Lvl Agncs (FPCLA)**

**FPCLA 995** Field-Placement Clinic: Cabinet Level Agency (2-3) See Student Handbook.

**Field-Placement Clinic: Cabinet Level Agency (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Legislation Clin (FPLEG)**

**FPLEG 995** Field-Placement Clinic: Legislation (2-3) See Student Handbook.

### **Field-Placement Clinic: Legislation (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Misc Public Servc (FPMPS)**

**FPMPS 995** Field-Placement Clinic: Miscellaneous (2-3) See Student Handbook.

### **Field-Placement Clinic: Miscellaneous (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Misc Summer Extrn (FPEXT)**

**FPEXT 995** Externship Placement (2-6 per semester/maximum of 9) Externship Placements offer students the opportunity to work and learn in a variety of settings outside the Law School under the supervision of a full-time faculty member. Placements are in public service or nonprofit offices, including local, state and federal government and judicial offices. Students work with experienced supervisors in those offices to develop skills in legislative drafting, opinion writing, client counseling, research, administrative and criminal practice, statutory analysis and interpretation, and application and enforcement of regulations. Through their work and class discussions, students are expected to develop a heightened awareness of the methods and functions of the legislative, regulatory, judicial, and public interest representation functions.

### **Externship Placement (2-6 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPEXT 995A** Field Placement Clinic--Summer Externship (2-3) See Handbook for description.

### **Field Placement Clinic--Summer Externship (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FPEXT 997** Special Topics (1-10) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Pub Prosecutr Cln (FPPPC)**

**FPPPC 995** Field-Placement Clinic: Public Prosecutor (2-3) See Student Handbook.

### **Field-Placement Clinic: Public Prosecutor (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Fp-Public Def Clinic (FPPDC)**

**FPPDC 995** Field-Placement Clinic: Public Defender (2-3) See Student Handbook.

### **Field-Placement Clinic: Public Defender (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **French (FR)**

**FR 401** (IL) Advanced Oral Communication (3) Emphasis on speaking and listening comprehension through discussion of current issues, using journalistic materials.

### **Advanced Oral Communication (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Second or Beyond 12th Level Foreign Language  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 402Y** (IL) Advanced Grammar and Writing (3) Advanced study of the structure of the French language. Intensive essay writing.

### **Advanced Grammar and Writing (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 407 (IL)** Business Writing in French (3) Common forms of business communication; writing of reports and abstracts.

**FR 407 Business Writing in French (3)  
(IL)**

**(BA)** This course meets the Bachelor of Arts degree requirements.

The objectives of this course are to: practice the basic ideas and vocabulary of business French; to acquire core knowledge about the social and economic organization of France; to improve spoken and written expression in this arena; to draft business letters; to read and understand newspaper articles dealing with economic and business problems; to understand audio and visual messages in French; and to use Francophone resources on the Web. One of several departmental offerings in the area of French Civilization, FR 407 is required for the French Business option and can also be used to fulfill a 400-level requirement for the French-Engineering and Applied French options, as well as for the French minor. The course also fulfills an "IL" requirement by developing an understanding of French economic and business cultures, values, and traditions within the context of both the European Union and global markets. Evaluation methods include several exams; a debate; a mock interview; research on and the analysis of a French or Francophone company; homework; and class participation. The course is offered once a year, usually in the fall semester.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 408 (IL)** French-American Business Translation (3) Translation from French to English of actual documents from the business world; theoretical consideration and systematic vocabulary building.

**French-American Business Translation (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 409 (IL)** Commercial and Technical Translation (3) Translation from English to French of commercial and technical materials; vocabulary building; writing of abstracts and summaries.

**Commercial and Technical Translation (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 410 (IL)** French Press (3) Extensive readings of selected french daily and weekly newspapers and magazines, along with newscast viewings.

**FR 410 French Press (3)  
(IL)**

This course, which is taught in French, is designed to introduce students to the history and current state of French press and media (including newspapers, magazines, radio and television) while introducing them to French society and culture through media coverage of current and recent events. The course is also designed to help students perfect reading, writing and oral communication in French. The course starts with a brief history of the press in France, including the creation of dailies such as Le Journal de Paris and the impact of some well-known journalists or writers upon events such as the Dreyfus Affair. It will then focus more specifically upon the origins of high-circulation, contemporary newspapers and magazines. Quickly moving to the post-WWII period, students will be introduced to radio and television in France and, as they become more familiar with French and Francophone press and media, will be given several opportunities to study current or recent events of the French and Francophone world, in fields such as sports, politics, culture and economics. Library holdings and internet sites will allow the class to regularly read daily newspapers such as Le Monde and Le Figaro and view newscasts on channels such as TF1 and FR2. Once they are familiar with the available resources, students will share research with fellow classmates through oral presentations, for example in the form of simulated newscasts. Students will also develop with the guidance of the instructor an independent, final paper which will explore some aspect of the French press and media. One of several departmental offerings in the area of French Civilization, FR 410 course can be used to fulfill a 400-level requirement for the French Business, French-Engineering, Applied French, and French Language and Culture options, as well as for the French minor. By covering the way in which the range of social identities and the cultural beliefs and values of French-speaking peoples are reflected in various media, and by

assisting students in finding and assessing information about current events in the Francophone world, the course can also fulfill an "IL" requirement. Evaluation methods include a series of short quizzes to cover historical and factual data; a short midterm paper based on primary (newspaper-based) research; a longer final paper based on primary and secondary research; other written work of a short-response nature; a group oral presentation summing up the previous week's news and events; and participation, including presence. The course is offered once a year, usually in the spring semester.

General Education: None

Diversity: IL

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 417 (IL) French Phonology (3)** A formal study of the sound pattern of French.

**FR 417 French Phonology (3)  
(IL)**

The goal of this course is to present an introduction to the linguistic analysis of the sound pattern of French as it is actually spoken by real speakers. by the end of the semester, the student should be able to:

- transcribe French phonetically;
- understand the articulatory characteristics of French and how these differ from English;
- describe the relationship between French spelling and phonology
- examine what gives us accent in French;
- discern patterns of pronunciation in different varieties of the language;
- analyze real speakers' pronunciation on your own;
- create your own teaching/learning unit about some aspect of French phonology

Evaluative Methods: Student performance in this course is generally based on a series of assignments, quizzes, transcriptions, a research project and presentation, an evaluation of other students' presentations, and preparation/participation.

General Education: None

Diversity: IL

Bachelor of Arts: Humanities

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 418 (IL) French Syntax (3)** A formal theory of word order and related issues in French grammar.

**FR 418 French Syntax (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The aim of this course is to provide the upper level undergraduate student with the background needed to understand modern generative syntactic theory, as well as to eventually enable him or her to do creative and informed research in this area. Roughly three-quarters of the semester will be devoted to an in-depth overview of the historical development of generative syntax, focusing particularly on modern Chomskyan theory - the so-called Minimalist Program. The remainder will build upon and round out this knowledge of syntax by exploring in depth a number of topics that any syntactician must be familiar with in order to do informed research in the field. This section of the course will involve lectures based on close readings of articles and book chapters exploring such topics as the syntax of negation, raising verbs, auxiliary verbs, adverbs, middle constructions, and/or verb movement. (Only a subset of these topics will be discussed, selected on the basis of student interest.)

General Education: None

Diversity: IL

Bachelor of Arts: Humanities

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 419 French Semantics (3)** The study of meaning in human language with a special focus on how it is encoded in French.

**FR 419 French Semantics (3)**

The aim of this course is to provide upper level undergraduate students in French with a relatively informal introduction to the field of semantics as it applies to the French language. Semantics is the subfield of theoretical linguistics that seeks

to make explicit the rules native speakers use to interpret stable aspects of the meaning of natural language sentences. The course will begin by comparing and contrasting semantic and pragmatic aspects of meaning – an important undertaking since only the former are assumed to be subject to invariable rules of grammar. The conclusions reached in this portion of the course will then be extended to account for a very special type of language – humor – in a particular context, France. That as, it will be shown that a more complete understanding of this linguistic behavior entails recognition of the relative contributions of pragmatics and semantics. We will then turn to a survey of the classic model-theoretic approach to lexical and compositional aspects of semantic meaning, with important (sociolinguistic) refinements to the standard approach to lexical semantics being discussed in detail. With a survey of the fundamentals of the field in place, we will then undertake an investigation of specific topics in semantics, looking first at the status of thematic roles in semantic theory (focusing on work by David Dowty). Here we will examine the important implications his work holds for the initial mapping of arguments into sentence structure, not only for primary transitive verbs, but also unaccusative and psych-verbs. We will then examine current analyses of causation in French, certain aspectual distinctions, and semantic, pragmatic, and syntactic approaches to negative and positive polarity items, n-words, and minimizers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 422 (IL) Old French Literature (3)** Medieval masterpieces in original and modern French versions.

**FR 422 Old French Literature (3)  
 (IL)**

This course investigates one or several themes through the reading and discussion of selected French texts from the twelfth through the fifteenth centuries. Readings are in Modern French translation, with one or two classes devoted to a brief introduction to Old French and to manuscript culture. Themes of the course may include Gender and Genre, chivalry and courtly love, court and castle, Arthurian legend, comedy and humor, medieval French literature and film, or others.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 426Y (IL) French Literature of the Renaissance (3)** Survey of key texts from sixteenth century France, with attention to historical and philosophical currents of French social thought.

**French Literature of the Renaissance (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 430 (IL) Contemporary France (3)** Study of contemporary French society, politics, and culture from 1870 to the present.

**Contemporary France (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 436Y (IL) Readings in Seventeenth-Century French Literature (3)** Baroque and classicism: reappraisal of major and lesser-known 17th-century texts and theories.

**FR 436Y Readings in Seventeenth-Century French Literature (3)  
 (IL)**

Following selected theoretical approaches, the course analyzes various texts from major and lesser-known authors in the

three literary genres of the French baroque era. The course examines the (de)formation of "French classicism" by taking into account the strong impact of the theories of literary baroque and concentrates on issues like theatricality and illusion, epistemology and religion, "prciosit," literary circles and acadmies, and power of theater and theater of power.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 440 (IL) Teaching of Romance Languages (3)** Theories of second language acquisition. Current classroom practices in the teaching of Romance languages.

### **Teaching of Romance Languages (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 445Y (IL) Self and Society in Eighteenth-Century France (3)** The changing relationship of the individual to society in pre-Revolutionary France will be explored in texts by major writers.

### **Self and Society in Eighteenth-Century France (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 452Y (IL) Nineteenth-Century French Literature (3)** Selected readings in romanticism, realism, and symbolism, including Balzac, Stendhal, Sand, Baudelaire, and others, with emphasis on cultural issues.

### **FR 452Y Nineteenth-Century French Literature (3) (IL)**

This course offers an overview of Nineteenth-Century French literature. It includes reading material representative of the major literary movements of the period (romanticism, realism, symbolism). It also gives students a chance to examine a great variety of literary genres (novels, plays, short stories, poems, children's narratives among others). In addition to developing close textual reading skills, emphasis is placed throughout the semester on the larger relationship between literary production, aesthetics and Nineteenth-Century history (political systems, education, social transformations, industries and technologies, etc.). Anthologies and complete texts will be used.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 453Y (IL) La Belle Epoque: Politics, Society, and Culture in France, 1880-1914 (3)** Interdisciplinary perspectives on the politics, society, and culture of France, 1880-1914.

### **FR 453Y LaBelle Epoque: Politics, Society, and Culture in France, 1880-1914 (3) (IL)**

The goal of this course is to present and analyze the period of extraordinary changes in all domains known as the "Belle Epoque." The starting point for an examination of these changes is Guy de Maupassant's novel, *Bel-Ami* (1885), which describes the social and professional ascension of an egotistical Parisian parvenu, Georges Duroy. The reading of this novel will allow us at the same time to study in detail one of the novel's protagonists: Paris. Through our discussions and through consideration of a wide range of primary and secondary texts, we will examine the complex rapport between literature (as well as art) and society at the end of the nineteenth century, and we will attempt to answer questions such as: how did the changing Parisian landscape inspire the authors, artists et musicians of this era? How did the new Parisian



space

encourage the development of new "places of pleasure" cafes, cabarets, cafes-concerts, theaters, racetracks, restaurants, etc.? How did innovations in architecture and the decorative arts, which flourished under the name of Art Nouveau, reflect both social developments and the transforming profile of Paris? What was, in fact, the new social and artistic geography of the capital?

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 458 (IL) African Literature of French Expression (3)** Genesis of Franco-African literature in the 1930s; phases of the negritude movement; colonial and national literature.

**FR 458 African Literature of French Expression (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

African literature in French is one of the most vigorous of the many new literatures in French that are emerging throughout the vast francophone world. Writers from a variety of countries, from Senegal to Djibouti, from Algeria to Congo, are producing works in French, that reflect their own very distinct cultural experiences. They must often modify both the French language and traditional Western genres such as the novel to convey African ways of speaking and narrating. In this course, students will read novels, poems and an epic that has been translated into French from an African language. The subjects range from autobiographical accounts of growing up in an African town and going off to Europe to study during the colonial era to sharp criticism of both the French colonial regime and the subsequent national governments that took over after independence, an event that occurred in 1960 in most francophone African countries. For the new wave of women writers that has emerged on the literary scene in the last two decades, more personal themes such as love, family, personal freedom, and the task of balancing traditional customs with the needs of contemporary life in large cities have marked their works. Students who take this course will discover the diversity of African literature written in French, the traits that distinguish this literature from metropolitan French literature, the links between the oral tradition and the written tradition, and the changing role of women in society today. Students will be evaluated on written essays, submission of questions in advance of classroom discussion of each work, presentation of a talk in class on some aspect of the works read, a midterm and final exam. French 458 satisfies the literature course requirements in the French major and the 400-level course requirement in the French minor. It can also satisfy the diversity requirement for General Education. FR 458 will be offered once a year with 18 seats per offering.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 460 (IL) Contemporary French Literature (3)** Major authors and movements in French novel, drama, and poetry from Proust to the present.

**FR 460 Contemporary French Literature (3)**

This course is designed for advanced undergraduate work and it is taught in French. To function well in this course, students need to have passed an intermediate introductory course to French literature. The primary goal of FR 460 is to facilitate students acquisition of a coherent view of major contemporary literary movements, from modernism in poetry and drama, through surrealism, both lay and Christian humanistic fiction, and existentialism, to the absurd theatre, the nouveau roman, and post-modernism, *écriture féminine*, anti-colonial and post-colonial literatures. Major authors are presented thru one of their works, taking into account the cultural, historical context in which they were developed. Instruction also comprises an initiation to basic theoretical notions on genres, literary techniques, and critical reading methodology. Contents will vary according to instructors choices but balance between periods, movements and genres is implied. Multi-media resources abound for the purpose of illustration and interdisciplinary considerations but the primary thrust is cultural/ literary enrichment, and the development of students reading and analytical skills in French.

Web resources, excerpts, and shorter whole texts will be incorporated to the reading materials and will supplement the required books. Students are expected to read between ten and thirty pages according to the level of difficulty of the materials. No manual or anthology has been established a satisfactory choices for this course even though such tools exist, they generally do not treat the last third of the period properly. So FR 460 instructors have relied on a variety of primary texts to achieve as comprehensive yet coherent a survey of this overflowing century as possible. Occasionally a thematic approach has been attempted to introduce more cohesiveness in the selected readings but this must be combined with traditional, diacritical approaches so as to facilitate the students ability to see linkages between literature and history as well as other arts, as they pursue their French and other Liberal Arts majors.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 470 (IL) Race and Gender Issues in Literatures in French (3)** A critical presentation, taught in French, of changing ideas and values on race and gender in French and Francophone literatures.

**FR 470 Race and Gender Issues in Literature in French (3)  
 (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In addition to presenting subject matter that fosters an appreciation of literatures written in French while exploring racial and gender-related aspects of French and Francophone cultures, this course aims at developing a sophisticated, analytical outlook on peoples of different races and cultures and on women as authors, subjects, and literary "constrictions" evolving over time. It provides a sense of the historical development of these questions and the interconnectedness of literature with society, and culture. One example of the issues and selections is the vindication of women -including Middle Eastern and Biblical figures- in Christine de Pisan's *City of the Ladies*, in the early 15th c.; it is shown to have links with the 1970 modernistic and satirical text by Monique Wittig, *Les Guilbres*. Other examples can be the famed surrealist negritude poetry of Aimé Césaire of Martinique, or a classic saga of European Jews by André Schwarz-Bart, or the humorous narrative of an African boy in contemporary Paris by Calixthe Beyala. Evaluation is based on a balance of in-class and take home exams and a final paper. Participation is expected, including electronic communication with the instructor. Attendance and participation are assigned a significant proportion of the grade (20%) as is feasible and desirable in small classes with fifteen students or less. The class is led in French, the language of most materials presented, and it is designed primarily for French majors and minors. The literature is supported and illustrated with video excerpts and films available outside class. Internet research is encouraged and expected. It is offered every three or four years, alternating with FR 471 (Francophone Women in Literature and Culture), or special topics courses and period-bound, advanced literature courses in French.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 475 Women's History in Post-Revolutionary France (3-6 per semester/maximum of 6)** Women's history and creativity in post-revolutionary France.

**Women's History in Post-Revolutionary France (3-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 487 (IL) Topics in French Film History and Theory I: 1895-1945 (3)** Provide background needed to understand the broad outlines of French film history and theory in their first fifty years (1895-1945).

**FR 487 Topics in French Film History and Theory I: 1895-1945 (3)  
 (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The aim of this course is to provide the upper level undergraduate student with the background needed to understand French film in the period up to the end of World War II. This will greatly aid the student in understanding French literature and culture of the period as well. Topics will include the invention of cinema and the early days of French film; adventure serials and commercial films; avant-garde and surrealist film of the 1920s and 30s; and finally, the period often considered the "golden age" of French film, the 1930s and 40s, and the so-called "poetic realism" movement. Films will be supplemented with readings in criticism by writers and filmmakers of the period, as well as by the scholarship of critics and theorists writing today. The course would allow upper-level undergraduate students to partially fulfill the 400-level course requirement for French majors and minors. This course may also be used to fulfill a requirement in the newly proposed Film Studies minor. A student's performance in this course will normally be evaluated through an in-class expose, two in-class essay tests, and a short research paper. The class will be offered once a year with 50 seats per offering.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 488** (IL) Topics in French Film History and Theory II: 1945-2002 (3) Provide background needed to understand the broad outlines of French film history and theory in their second half-century (1945-2002).

**FR 488 Topics in French Film History and Theory II: 1945-2002 (3)**  
**(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The aim of this course is to provide the upper level undergraduate student with the background needed to understand French film in the period from the end of World War II to the present. This will greatly aid the student in understanding French literature and culture of the period as well. Topics will include the French commercial film of the early postwar period; the ground breaking film criticism of the 1950s, and the films it spawned (the early "New Wave"); the later, more experimental films done in the later 1960s and 1970s by other critic-directors; and, finally, films made in more recent years specifically concerned with the historical memory of social trauma-the Occupation and Holocaust-and the possibility of the cultivation and preservation of this memory in and through the film medium. The analysis will include readings by critics (many of the filmmakers) writing at the time the films were made, as well as more recent scholarship and criticism. The course would allow upper-level undergraduate students to partially fulfill the 400-level course requirement for French majors and minors. It will be offered every other year. This course may also be used to fulfill a requirement in the newly proposed Film Studies minor. A student's performance in this course will normally be evaluated through an in-class expose, two in-class essay tests that will determine the student's analytical skills; and a short research paper. This course will be offered once a year with 50 seats per offering.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 499** (IL) Foreign Study--French (3-12) Advanced studies in French language and literature.

**Foreign Study--French (3-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 500** History of the French Language (3) Evolution of French from its origins to the present-day, with emphasis on Old French philology.

**History of the French Language (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 501A** Pro-Seminar in French Studies I (1.5) Professional and scholarly development in interdisciplinary French Studies.

**Pro-Seminar in French Studies I (1.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 501B** Pro-Seminar in French Studies II (1.5 per semester/maximum of 3) Professional and scholarly development in interdisciplinary French Studies.

**Pro-Seminar in French Studies II (1.5 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 502** Introduction to French Linguistics (3) An overview of the major subfields of linguistics as they apply to the French language.

**Introduction to French Linguistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 503** French Phonology (3) A theoretical approach to the sound structure of French.

**FR 503 French Phonology (3)**

The phonology of French has served as a base upon which much of the framework of standard generative phonology has been built. In this course, we will review the arguments from French that influenced much of the rule-based analyses of linear phonology. We will also see how the same facts have motivated an expanded, non-linear view of phonological theory. The ultimate goal of this course is to provide you with a strong background in the literature of French phonology and an understanding of the aims and methods of current phonological theory.

A student's performance in this course is generally based on bibliography, presentation, final paper, and participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 504** French Syntax (3) An in-depth study of sentence structure in the French language.

**FR 504 French Syntax (3)**

The aim of this course is to provide graduate students with the background needed to understand modern generative syntactic theory, as well as to eventually enable him/her to do creative and informed research in this area. Roughly three-quarters of the semester will be devoted to an in-depth overview of the historical development of generative syntax, focusing particularly on modern Chomskyan theory - the so-called Minimalist Program. The remainder will build upon and round out this knowledge of syntax by exploring in depth a number of topics that any syntactician must be familiar with in order to do informed research in the field. This section of the course will involve lectures based on close readings of articles and book chapters exploring such topics as the syntax of negation, raising verbs, auxiliary verbs, adverbs, middle constructions, and/or verb movement. (Only a subset of these topics will be discussed, selected on the basis of student interests.)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 505** Semantics of French (3) An in-depth study of how meaning is computed based on French data.

**FR 505 Semantics of French (3)**

The goal of this course is to provide the graduate student with an informal introduction to the field of formal (model-theoretic) semantics and its interface with the syntactic component of the grammar. Semantics is the subfield of theoretical linguistics which explores how speakers of a language arrive at a proper interpretation of sentences of their language. Frequently, semanticists analyze natural language meaning in terms of highly technical logical and mathematical notions, inaccessible to many. In this course, we will attempt to avoid as much of this technical material as is possible in view of arriving at a clear understanding and appreciation of the goals and issues facing the semanticist. The necessary logical notions will be introduced step by step and will be applied to French grammatical constructions of increasing interpretive complexity as the course goes on.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 510 Stylistique Avancee (3)** An introduction to literary creativity through practice of textual analysis, interpretation, and to basic concepts of contemporary poetics.

**Stylistique Avancee (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 529 Seminar in Renaissance Literature (3 per semester/maximum of 6)** Intensive study of various French Renaissance writers in relation to selected artistic issues of the period.

**Seminar in Renaissance Literature (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 530 La France Contemporaine (3)** A comprehensive cross-sectional view of French society and its institutions since World War II.

**La France Contemporaine (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1980

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 531 Francophone Culture (3 per semester/maximum of 6)** Concept of francophone; French minorities in Europe and North America; role of French language in Africa, Middle East, Far East.

**Francophone Culture (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 532 French Regions and Regionalisms (3)** Interdisciplinary perspectives on the culture, history, and geography of the French regions and their regionalist identity movements.

**French Regions and Regionalisms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 533 Baroque Aesthetics in Seventeenth-Century French Literature and Intellectual History (3)** Based on the Foucauldian notion of episteme, the course analyzes major literary texts and intellectual trends.

**Baroque Aesthetics in Seventeenth-Century French Literature and Intellectual History (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 535** Texts and Performances (3) Based upon current theories of theater, the course focuses on problematics of French drama from the Seventeenth-Century to the present.

**Texts and Performances (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 540** Eighteenth-Century French Novel (3) Examination of the rise of the genre including formal considerations of narrative technique as well as historical context.

**Eighteenth-Century French Novel (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 543** Seminar: Studies in the Enlightenment (3 per semester/maximum of 6) Discourse and thematic analysis of selected works of French Enlightenment genres: essay, drama, fiction, poetry.

**Seminar: Studies in the Enlightenment (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 545** Analysis of French Civilization (3 per semester/maximum of 6) French cultural aspects, other than language and literature, conducted in French with the collaboration of specialists outside the French department.

**Analysis of French Civilization (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 547** Modernism and Postmodernism (3-6) Interdisciplinary approaches to these concepts, with a focus on artistic and literary objects in the French context.

**Modernism and Postmodernism (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 558** African Novel in French (3) Development of novel in French from colonial era to independence; Africanization of genre with African verbal artforms.

**African Novel in French (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 559** Issues in Francophone Literatures (3) Diversity issues in Francophone literatures explored through various literary genres: variable focus may combine genre and topic.

**Issues in Francophone Literatures (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 562** French Romanticism and Realism (3) Romanticism, realism, and their variations in the context of social and political revolution.

**French Romanticism and Realism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 564** Figures of Alterity in Nineteenth-Century French Literature (3) Representations of otherness in nineteenth-century French literature examined through race, gender, religion, and class paradigms.

**Figures of Alterity in Nineteenth-Century French Literature (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 565** Seminar: Nineteenth-Century Studies (1-6) Various nineteenth-century French writers considered in relation to selected esthetic and cultural problems raised during the period.

**Seminar: Nineteenth-Century Studies (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 566** Women Writers in Nineteenth-Century France (3) Women's literary production in nineteenth-century France, including novels, poetry, travel narratives, children's literature, and essays.

**Women Writers in Nineteenth-Century France (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 569** Major Texts of Twentieth-Century French Literature (3-6) Established contemporary literary texts, figures, and



aesthetic movements in various genres from Proust to Sartre and from Genet to Conde.

**Major Texts of Twentieth-Century French Literature (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 570** Modern French Poetry (3 per semester/maximum of 6) Exploration of the poetic genre and its diversification through poetic prose, free verse, and metaphorical narrative, from Baudelaire to Cixous.

**Modern French Poetry (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 571** French Literary Theory and Criticism (3) Major trends in contemporary theory and criticism from genre debates to socio-political approaches to literature, post-structuralism, deconstruction, and reception theories.

**French Literary Theory and Criticism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 572** Seminar: Twentieth-Century French Literature (3 per semester/maximum of 6) Specialized consideration of contemporary writers; for advanced students.

**Seminar: Twentieth-Century French Literature (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 574** French Folklore and Popular Culture (3) Historical survey of French folklore and popular culture, with an emphasis on the modern period.

**French Folklore and Popular Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 580** Approaches to French Civilization (3) French interdisciplinary methods of cultural analysis and cultural history, with applications to French cultural artifacts.

**Approaches to French Civilization (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**FR 581** Theory and Techniques of Teaching French (1-6) No description.

**Theory and Techniques of Teaching French (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 589** (CMLIT 589, GER 589, SPAN 589) Technology in Foreign Language Education: An Overview (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)

**Technology in Foreign Language Education: An Overview (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**FR 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Activities to be included in the teaching assignment will be lecturing, leading discussions, conducting recitations, correcting and grading student papers and examinations.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**FR 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Fuel Science (F SC)

**F SC 401** Introduction to Fuel Technology (3) An introduction to the scientific and engineering principles of fuel technology. For non-fuel science majors; fuel science majors will not receive credit.

**Introduction to Fuel Technology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 431** The Chemistry of Fuels (3) Nature and properties of fossil and other fuels, including aerospace, in relation to use; preparation of fuels; by-products; fuel analysis.

**F SC 431 The Chemistry of Fuels (3)**

The course deals with the formation, composition and properties of the principal naturally occurring fossil hydrocarbons

(coal, petroleum, natural gas), and their refining, upgrading, and conversion chemistry. The objectives of this course are to equip students with a fundamental knowledge of the chemistry for the fossil hydrocarbon resources and their energy use for transportation and stationary fuels as well as their use as chemical feedstocks. It also helps to prepare students for the challenges, opportunities, and changes in the world of energy and resource-related enterprises. The primary emphasis is on petroleum, natural gas, coal, and liquid transportation fuels. This is a required course for the Energy Engineering Major.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 432** (CH E 432) Petroleum Processing (3) A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

### **Petroleum Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 503 Analytical Methods in Fuel Science (3)** Analytical and characterization methods used in fuel science and applied to fuel processing, combustion, and conversion are emphasized.

### **F SC 503 Analytical Methods in Fuel Science (3)**

The course will focus on the analytical methods that are used in fuel science for the characterization of fuels and their products during combustion, conversion, processing, and utilization. Students will be exposed to the theory and practical applications of such analytical methods as chromatography and spectrometry. Methods for the analysis of the data obtained with these analytical techniques will be discussed. In particular, the potential for interference and confounding results and techniques for establishing reproducibility and error bars in the experimental data and results will be explored.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 504 Problems in Fuels Engineering (3)** A problem-based, active learning course on the utilization of fossil fuels and renewable energy.

### **Problems in Fuels Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 506 Carbon Reactions (3)** Current approaches to heterogeneous reactions in combustion and gasification of carbonaceous solids, including those derived from coal and petroleum sources.

### **Carbon Reactions (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 590 (EME 590, MNG 590, P N G 590) Colloquium (1-3)** Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

### **F SC (EME/MNG/P N G) 590 Colloquium (1-3)**

The objective of the course is to expose students through a seminar format to a wide range of topics on energy and mineral engineering. The lectures would be presented by faculty, students and guest speakers. Students would be required to write a short summary of each presentation and provide a critique of the presentation. Seminar topics will cover aspects of energy production, processing, utilization, and conservation, and the associated environmental, health and safety, and policy, economics, and management issues. Students are expected to keep up with current developments on each topic and to actively participate in the discussions. Students will be evaluated based on their class participation, and written summary and critique of each presentation. This is a required course in the energy and mineral engineering graduate program.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual

basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**F SC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Gastroenterology-Hy (GI)

**GI 729** Gastroenterology (5) Some of the areas studied will be: smooth muscle physiology; peristalsis and sphincter function; neuro-homonal control of motility; psychophysiological interaction in the gut; and symptoms of altered GI motility.

### Gastroenterology (5)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Genetics (GENET)

**GENET 581** Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A (1) Examines uses of genetic studies in understanding biological processes associated with bacterial and viral pathogenesis.

GENET 581

### GENET 581 Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A (1)

This course presents the use of genetic analysis in bacteria and viruses with its application to the study and dissection of biological pathways and processes. Bacterial and viral pathogenesis will be used to develop concepts and techniques that are critical components of genetic studies. Integration of studies will be used to compare and contrast the specific methods and techniques that underlie the use of genetic approaches in bacteria and viruses.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 582** Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways: B (1) Examines uses and interrelationships of genetic studies with model systems from yeast to mice in elucidating signaling pathways.

GENET 582

### GENET 582 Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways: B (1)

This course presents the use of genetic analysis in model organisms and systems with its application to the study and dissection of biological pathways and processes. elucidation of target of rapamycin (TOR) signal transduction pathway will be used to develop concepts and techniques that are critical components of genetic studies. Integration of studies from multiple model systems will be used to compare and contrast the specific methods and techniques that underlie the use of similar genetic concepts in different organisms and systems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 583** Genetics of Model Organisms: Genetic Analysis of Cancer and Cancer-related Phenotypes: C (1) Examines uses and interrelationships of genetic studies with model eukaryotes in understanding biological processes.

GENET 583

### GENET 583 Genetics of Model Organisms: Genetic Analysis of Cancer and Cancer-related Phenotypes: C (1)

This course presents the use of genetics analysis in model eukaryotic organisms and systems with its application to the study and dissection of biological pathways and processes. Characterization of pathways involved in tumorigenesis, including cell division and cell death will be used to develop concepts and techniques that are critical components of genetic studies. Integration of studies from multiple model systems will be used to compare and contrast the specific methods and techniques that underlie the use of similar genetic concepts in different organisms and systems.

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 584 Human Genetics A: Human Chromosomes (1)** This course explores the human chromosome analysis and disease gene identification for simple mendelian disorders.

GENET 584

**GENET 584 Human Genetics A: Human Chromosomes (1)**

With the completion of the human genome project, genes underlying almost all "simple" mendelian traits have now been identified. How are chromosomes and genes analyzed? How were these disease genes located? How does the identification of the gene and specific mutations explain patient phenotypes? How does this information translate to the genetics clinic for counseling families? These questions and more will be discussed in this selective course.

This course will be offered as part of 3 one-unit courses in Human Genetics that cover (1) identification and analysis of chromosomes and disease genes, (2) the human genome and complex traits, and (3) chromosome behavior and non-mendelian inheritance. The full three unit series may be taken in its entirety although each one-unit course is completely independent of the other two courses.

Students will be evaluated by their class participation and performance on take-home assignments that require the students to solve problems, evaluate experiments, or logically address research questions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 585 Human Genetics B: Non-mendelian Genetics (1)** This course explores genetic disease mechanisms that alter chromosome behavior or show non-mendelian patterns of inheritance.

GENET 585

**GENET 585 Human Genetics B: Non-mendelian Genetics (1)**

Many genetic diseases do not show straightforward patterns of inheritance. Was Gregor Mendel wrong? How can a disorder be inherited without causing primary DNA sequence changes? What is the biological basis behind disorders that do not show simple mendelian inheritance? What are the phenotypic consequences of disorders that alter fundamental aspects of chromosome mechanics? These topics and more will be covered in this selective course.

This course will be offered as part of 3 one-unit courses in Human Genetics that cover (1) identification and analysis of chromosomes and disease genes, (2) the human genome and complex traits, and (3) chromosome behavior and non-mendelian inheritance. The full three unit series may be taken in its entirety although each one-unit course is completely independent of the other two courses.

Students will be evaluated by their class participation and performance on take-home assignments that require the students to solve problems, evaluate experiments, or logically address research questions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 586 Human Genetics C: Complex Traits (1)** This course explores the human genome landscape, how individuals vary, and gene identification for multigenic traits and disorders.

GENET 586

**GENET 586 Human Genetics C: Complex Traits (1)**

With the completion of the human genome project, genes underlying almost all "simple" mendelian traits have now been identified. A new challenge is to identify genes involved in common traits and disorders such as hypertension or obesity. This course will explore the human genome landscape, human genome variation, principals of population genetics and experimental approaches to identify genes involved in these important complex disorders.

This course will be offered as part of 3 one-unit courses in Human Genetics that cover (1) identification and analysis of chromosomes and disease genes, (2) the human genome and complex traits, and (3) chromosome behavior and non-mendelian inheritance. The full three unit series may be taken in its entirety although each one-unit course is completely independent of the other two courses.



Students will be evaluated by their class participation and performance on take-home assignments that require the students to solve problems, evaluate experiments, or logically address research questions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 587** Genetic Approaches to Biomedical Problems (3) Advanced training of students with interest in genetic approaches to problem solving.

### **Genetic Approaches to Biomedical Problems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**GENET 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 601** Ph.D. Dissertation Full Time (0) No description.

**Ph.D. Dissertation Full Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GENET 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Geo-Environmental Engineering (GEOEE)**

**GEOEE 557** Computational Geomechanics I (3) Finite element and boundary element analysis of rock mechanics, groundwater flow, and mass transport.

**Computational Geomechanics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 597** Special Topics (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 610** Thesis Research Off-Campus (1-15) No description.

**Thesis Research Off-Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOEE 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Geodesign (GEODZ)

**GEODZ 511** Geodesign History, Theory, Principles (3) Students study the theory and principles of geospatially-based design by investigating the methods and collaborative nature of the geodesign process.

### **GEODZ 511 Geodesign History, Theory, Principles (3)**

GEODZ 511 consists of lectures, readings in course literature, small group discussion forums, and individual topic investigation. In this course students will explore the questions, challenges, and the values of the geodesign framework. The course provides a comprehensive overview of the geodesign process, including designing in geographic space, issue identification, process evaluation, fast iteration and alternative scenario generation, multidisciplinary collaboration, and the role of science- and value-based decision making. The course culminates in a final project in which students independently research the physical and social characteristics, data, and teaming-expertise required to deploy a study for their topic, and report on how their proposed geodesign framework enables creative change for that location.

Students who successfully complete the course will be able to associate different types of design and planning issues and challenges to the appropriate geodesign workflow and identify possible models to use to promote creative change for a place. They will be able to prepare a description of a scenario and the team needed to perform a geodesign study, and illustrate which tools or techniques may be best suited for a scenario.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEODZ 822** GeoDesign Models I: Evaluation and Decision (3) The principles, inherent values and practical applications of Evaluation and Decision models as implemented within the Geodesign Framework.

### **GeoDesign Models I: Evaluation and Decision (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEODZ 824** GeoDesign Models II: Process and Impact (3) The principles, inherent values and practical applications of Process and Impact models as implemented within the Geodesign Framework.

### **GeoDesign Models II: Process and Impact (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEODZ 826** GeoDesign Models III: Representation and Change (3) The principles, inherent values and practical applications of Representation and Change models as implemented within the Geodesign Framework.

### **GeoDesign Models III: Representation and Change (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Geography (GEOG)

**GEOG 411** Forest Geography (3) This course studies processes that control spatial and temporal change in forests.

### Forest Geography (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 411W** Forest Geography (3) This course studies processes that control spatial and temporal change in forests.

### Forest Geography (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 412W** Climatic Change and Variability (3) Theories and observations of past, present, and future climatic change and variability; introduction to techniques used in climatic change research.

GEOG 412W

### GEOG 412W Climatic Change and Variability (3)

**(BA) This course meets the Bachelor of Arts degree requirements.**

Geography 412W introduces students to the physical dimensions of climate change and variation. Climate change topics include radiative forcing, greenhouse gases, scenarios, equilibrium models, and time-dependent models. Important Climate variation topics are teleconnections and the El Nino-Southern Oscillation phenomenon. Geography 412W would appeal to students with interests in Earth and atmospheric sciences, as well as environmental protection.

As a writing-intensive course, Geography 412W aims to help students improve their ability to communicate scientific information. The course devotes considerable class time to the mechanics of reading, writing, speaking, and especially report production. Students not only write, but also learn to edit and critique writing.

Because most professional research on climate change and variation involves collaborative science teams, Geography 412W focus on collaboration and participation. Students form teams, conduct research, and compile formal collaborative reports on climate change and variation. Students document their individual contributions by producing portfolios.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 417** Satellite Climatology (3) A discussion of the application of satellite data to current and planned large-scale climate experiments.

GEOG 417

### GEOG 417 Satellite Climatology (3)

**(BA) This course meets the Bachelor of Arts degree requirements.**

Geography 417 presents the *theory* and *practice* of satellite remote sensing as applied to the study of climate. Remote sensing refers to the acquisition of information about a target or phenomenon from a distance; climate is the low-frequency signal of weather that involves interactions among Earth's environmental systems (atmosphere, biosphere, cryosphere, hydrosphere). Combining these two disciplines into Satellite Climatology is logical because the fundamental basis of both remote sensing and climate is radiation transfer through Earth's atmosphere. The course emphasizes understanding the different techniques used to determine, from space-borne platforms, the atmospheric, oceanic and land surface conditions important to climate and its variations, and the interpretation of these remotely sensed data in the context of "climate dynamics" and "synoptic climatology." Specific topics include the following: *Satellite systems (platforms, sensors, orbits, data processing); Remote sensing clouds and cloud systems, Retrieval of atmospheric temperature, moisture, and precipitation, the Earth-atmosphere radiation and energy budgets, and Land-surface conditions and their modification by humans* . In addition, examples of the different satellite-based climatologies, and their advantages and limitations with respect to conventional observations ("ground truth"), are presented.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 420Y (US;IL) Comparative Urbanism (3)** This course investigates selected urban issues through the lens of comparative urbanism.

**GEOG 420Y Comparative Urbanism (3)  
 (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

As an upper level urban geography seminar, this course investigates selected urban issues through the lens of comparative urbanism and requires active class participation. Examination of readings from the growing literature on comparative urbanism will introduce students not only to possible ways to design an effective comparative study but also to the varying goals of such work. Other readings, drawn from a wide variety of sources, will target particular issues facing urban areas that may vary from year to year, such as economic restructuring, uneven urban redevelopment, transportation planning, historic preservation, arts districts, the social construction of race and ethnicity, aging in place, and urban poverty. Students in turn will be required to design and carry out a comparative research project focusing on a particular urban issue, highlighting both the similarities and the differences between their selected case study cities and placing them in local, regional, and global contexts. This course is reading and writing intensive and satisfies United States Cultures and International Cultures requirements, as well as the Bachelor of Arts Social and Behavioral Sciences Field.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 423Y (US) Historical Geography of North America (3)** Exploration, settlement, and changing patterns of human occupation from the seventeenth century to the 1930s.

**GEOG 432Y Historical Geography of North America (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This is an upper-division, writing-intensive course that presents an overview of current scholarship on the evolving historical geography of the continent. It does this through a set of lectures given by the instructor, through directed readings that will be the basis of class discussion, and centrally through research essays that offer students the opportunity to research, write and argue historical geographies. Research in historical geography is a process of engagement with partial evidence and with secondary material to open windows on aspects of past lives, past economies, and past places.

Since an introductory level overview of the historical geographies of the continent is presented in GEOG 122: The American Scene, this class does not offer a comprehensive survey of regions and periods. Rather, it focuses on three themes— staples and the colonial era, local transformations in agricultural and industrial communities in the nineteenth and early twentieth century, and the packaging of memory—as a way to expose students to primary evidence and current debates.

In the unit on the colonial era, the focus is on a variety of records that illuminate the development of economies based on staples such as fish, fur, tobacco, rice and iron, drawing on evidence from the Lords of Trade and Plantations in London, and from correspondence between merchants and planters, as well as scholarship on the material culture of houses, farms and settlements.

For the unit on local change, workshops illustrate how to tease out information from the manuscript census, county atlases and corporate histories; students then pursue similar material for a locale of their own choice and submit drafts of an evolving research essay. A short presentation to the class encourages the effective distillation of visual and data evidence to communicate research findings.

On the packaging of memory, the class critically examines how historic sites are presented, and how interpretations have changed in response to shifting academic and popular concerns.

Lectures are interspersed with discussions of readings, workshop demonstrations, and by student presentations. Eleven distinct writing exercises are used as the basis of allocating the overall grade.

General Education: None  
 Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 424 (US;IL)** Geography of the Global Economy (3) Focus on industrial location theory, factors in industrial location, studies of selected industries and problems of industrial development.

GEOG 424

**GEOG 424 Geography of the Global Economy (3)**

This class will conduct *research on firms and industries engaged in the global economy*. Students learn to conduct industry and firms analyses in the context of international regulation. Students learn about the competitive conditions, governmental context, and technological challenges facing selected industries.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 425 (US)** Geography of Race, Class, and Poverty in America (3) This class examines the spatial interactions of race, class and poverty in the United States.

**GEOG 425 Geography of Race, Class, and Poverty in America (3)  
(US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The terms "race," "class," and "poverty" are often discussed in the same breath in academic scholarship. Research portrays the interwoven relationships between economic status, economic security, and ethnic heritage. Despite this powerful and abundant literature, few scholars examine the spatial interactions among race, class, and poverty. The class introduces students to a range of literatures on the meaning of race, class, and poverty in the contemporary United States. We will situate these terms in their local spatial context and investigate how location influences perceptions of the meaning of race, class, and poverty. We will blend historical, contemporary, theoretical and empirical scholarship as we investigate the meaning, understanding and manifestation of race, class and poverty in the U.S. Beginning with history, we will move through the 20th century examining how economic and political cycles have influenced social understanding of these terms. There will be a particular focus on deconstructing the measurement and meaning of the terms and their use in public policy discussions based on perceptual understandings of the terms "race," "class," and "poverty." We will examine powerful historical and contemporary media images of race, class, and poverty as seen through the lens of place and identity.

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 426Y (US;IL) (WMNST 426Y)** Gender Geographies (3) Description and explanation of the links between gender relations and spatial structures.

**GEOG (WMNST) 426Y Gender and Geography (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Until the 1970s women remained invisible in the analyses of social space: human geography was indeed just that--(hu)man. Recently, feminist geography began to challenge the implicit masculinity of the subject of geography; this course will examine the evolution of the feminist challenge. The course addresses gendered geographies across multiple scales, such as the body, home, public space, community, nation and globe. Students explore each of these through readings and will produce a series of essays throughout the semester. As a point of entry to discussion of place, space and gender, this course explores the diverse ways in which feminists have seen space as central both to masculine power and to feminist resistance. In particular we will explore arguments from interdisciplinary paradigms, stemming from cultural, post colonial, subaltern, sexuality, gender studies and critical race theory, all of which have influenced current debates across the field of geography.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 426Y (US;IL) (WMNST 426Y) Gender Geographies (3)** Description and explanation of the links between gender relations and spatial structures.

**GEOG (WMNST) 426Y Gender and Geography (3)  
 (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Until the 1970s women remained invisible in the analyses of social space: human geography was indeed just that--(hu)man. Recently, feminist geography began to challenge the implicit masculinity of the subject of geography; this course will examine the evolution of the feminist challenge. The course addresses gendered geographies across multiple scales, such as the body, home, public space, community, nation and globe. Students explore each of these through readings and will produce a series of essays throughout the semester. As a point of entry to discussion of place, space and gender, this course explores the diverse ways in which feminists have seen space as central both to masculine power and to feminist resistance. In particular we will explore arguments from interdisciplinary paradigms, stemming from cultural, post colonial, subaltern, sexuality, gender studies and critical race theory, all of which have influenced current debates across the field of geography.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 427 (US;IL) Urban Historical Geography (3)** Study of the development and transformation of the historical urban built environment.

**GEOG 427 Urban Historical Geography (3)  
 (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Close up, cities can be seen as sets of buildings - some that are lived in, some that are places of work, and others that are places of cultural celebration. The streetscapes created by these sets of buildings can be decoded as a palimpsest of the past. Likewise, the patterns and names of streets, lanes and alleys between buildings contribute to morphological databases of property parcels and land uses that help in the analysis of the historical transformations of urban form. Seen at a more distant scale, cities are also nodes - centers for surrounding regional trading systems, and partners with other places in national and global trading systems - that have evolved over a set of decades or even centuries.

This course offers an investigation of such multiple frames on the urban past. Examples will be drawn from the Americas, but many will be from Europe, Africa and Asia. Imperialism and its associated colonial mercantile practices meant that variants of urbanism were mapped on to other parts of the world where they often created hybrid forms of cities over time. In the industrial era, new relations between cities and the countryside emerged, as new forms of production developed and as resources were harnessed from a more global hinterland. Radically different types of cities have emerged in the past two centuries.

Geography 427 will survey the global urban past and explore ways of decoding urban morphological complexity through historical cartographic record and extant landscape evidence. The ultimate objective is for students to develop an appreciation for the complexity of urban life and landscapes in times past and to understand some of the ways in which American urban forms adapt or draw distinction from urban forms elsewhere.

At the same time, the course aims to enhance student oral and written communication skills. To enhance their oral communication skills, each student will be expected to make two presentations on their research and to participate in class workshops. To enhance their written communication skills, students are required to write two papers that include instructor feedback on interim drafts, to craft three article summaries, and to write short log responses to most lectures.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**GEOG 428 (US)** Political Geography (3) Geographical foundations of political phenomena; significant geographic factors in growth and development of states, boundary problems, population distribution, colonies, and internal and international regional problems.

**Political Geography (3)**

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 428Y (US;IL)** Political Geography (3) Geographical foundations of political phenomena; significant geographic factors in growth and development of states, boundary problems, population distribution, colonies, and internal and international regional problems.

**Political Geography (3)**

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 429 (US;IL)** Geographic Perspectives on Global Urbanization (3) This course reflects critically on a number of issues related to global urbanization, including the culture and political economy of urban space.

**GEOG 429 Geographic Perspectives on Global Urbanization (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

One of the major themes in the discipline of geography is the study of the relationships between humans and the natural environment. GEOG 030 introduces students to the multiple ways in which people and the environment are interconnected. From a dynamic systems perspective, we refer to this interconnectedness as "coupled social-ecological systems." The course uses a geographic perspective to understand how differently these linkages are shaped in various ecological and cultural settings around the globe. The course follows an interdisciplinary approach, exploring from multiple angles major environmental and societal challenges such as climate change, genetically-modified food, over-consumption, disease, and environmental service provision in the industrialized North and the Global South. It promotes critical thinking regarding key concepts such as carrying capacity, ecological footprints, feedback, stability domains, and resilience. Students are encouraged to examine their role and responsibilities for the sustainability of the social-ecological systems we inhabit and to take action in their own lives to contribute to a more equitable and sustainable environment. The course will provide students with the opportunity to read, learn, and debate about the ways in which humans value, use, affect, and are affected by small-scale and large-scale human-environment interactions. It will provide them with skills for critically analyzing and evaluating the ways in which humans have transformed the environment in different parts of the world. They will also learn how to assess what future pathways are sustainable and ethically sound. One key goal of the course will be to help students increase their sensitivity to the global and international context of human interactions with nature. A recitation section is crucial because it allows students to explore controversial issues such as biotechnology, nature as a commodity, and global warming, and to develop critical positions on such issues.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 430** Human Use of Environment (3) The human use of resources and ecosystems and social causes and consequences of environmental degradation in different parts of the world; development of environmental policy and management strategies.

GEOG 430

**GEOG 430 Human Use of Environment (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Geography 430 examines the human use of resources and ecosystems, the multiple causes and consequences of environmental degradation, and adaptive institutional and policy arrangements as prerequisites for resilient and sustainable management and development in different parts of the world. The major objective of this course is to help

geographers, earth scientists, and other professionals to develop an awareness and appreciation of the multiple perspectives that can be brought to studies of human use of the environment and of the ways in which resource-management decisions are made in human society. This is a capstone course that encourages students to place their individual major and technical skills within the context of multiple approaches to environmental decision making and management in complex and dynamic social-ecological systems. GEOG 430 is designed as a collective/social learning experience. This implies that the professor and students share responsibility for the learning process and take advantage of collective skills, insights, experiences, and efforts of each other. As in system dynamics, this requires both commitment and flexibility and the willingness to explore foreign territory. As part of this philosophy, learning consists not only of information flow from professor to student, but also from student to student and student to professor. The course follows a case study approach to explore real life lessons of adaptive management around the globe. To make this process work, attendance and active participation are imperative. The course is run more like a seminar than a lecture course and integrates lectures, in-class discussions, presentations, and interactive activities. Student performance is evaluated based on active participation in all of the above, individual short assignments, group projects, in-class quizzes and exams, and one major writing assignment, varying by faculty teaching. This course is offered every semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 431** Geography of Water Resources (3) Perspectives on water as a resource and hazard for human society; water resource issues in environmental and regional planning.

### **GEOG 431 Geography of Water Resources (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Geography 431 is designed to help geographers, earth scientists, planners, other environmental professionals as well as non-science majors to develop an awareness and appreciation of the multiple perspectives that can be brought to studies of water as a resource and hazard, and of the ways in which resource-management decisions made in human society are strongly related to the availability, quantity, and quality of water. The course traces the hydrologic cycle as a cascading system, addressing factors contributing to flow of water through the system, models of each process, and how processes affect (and are affected by) other land use change and related resource decisions. The course then turns to issues of water resource management, including issues surrounding irrigation; dams and dam removal; provision of safe potable water; water quality including human and wildlife effects; the water economy including bottled water, privatization, and water as a free good; water law; institutions for water management at the global, national, regional and local scale; and issues of water for national security and international peace.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 432 (EME 432)** Energy Policy (3) Analysis, formulation, implementation, and impacts of energy-related policies, regulations, and initiatives.

### **GEOG (EME) 432 Energy Policy (3)**

As concerns for a secure, stable, and clean energy future grow, so does the need for individuals who can develop, assess, and implement effective energy policies and practices. GEOG 437 / EME 437 provides students with an in-depth exploration of energy policy development, implementation, and assessment at multiple governmental and corporate scales. The course utilizes contemporary real-world problems and actions to provide students context for the drivers, frameworks, and assumptions of energy policy.

The course is structured to provide students with the expertise necessary to identify energy policy needs, craft policy alternatives, and evaluate energy policy. Emphasis on tailoring energy policy to meet not just economic goals but also environmental and social goals creates a global perspective from which students learn to approach energy policy challenges. Students will undertake a course-long project in which they must research and write an energy policy at a scale and on a topic of their choosing. They will utilize activities from each lesson in the course to refine their topic, research policy options, and develop an energy policy. Because the demand for highly analytical individuals is so great among energy professionals, students will also anonymously critique another student's policy. This Capstone Project of the course will hone the analytical and communication skills necessary to complete this degree program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 434** Politics of the Environment (3) This course explores politics related to the use, transformation, valuation, and representation of the environment.

GEOG 434

**GEOG 434 Politics of the Environment (3)**

Scholarship in geography and related disciplines has demonstrated that nature in general and specific environments in particular are unavoidably political. Environmental management can thus never be a purely scientific or technological challenge; it requires critical analysis of cultural, political, and economic contexts, factors, and effects. For instance, effective environmental management requires consideration of how culture shapes how we perceive and value our environments, who wins and who loses in any particular approach to environmental management, and what the relative advantages and disadvantages of competing institutional approaches to environmental management are.

This course examines the development of environmental governance, with a primary focus on the United States. It explores both how various groups within society conceive of and value the environment, and multiple approaches to environmental governance and protection. It reviews the history of environmental movements and regulation, and contemporary issues and debates in environmental governance, with particular attention to the effects of institutional forms and social movements. In particular, it examines competing arguments for and against governance approaches centered on state action, market mechanisms, and prominent roles for NGOs and social movements.

Students will be evaluated based on: 1) their participation in class discussions, based on critical engagement with material from course readings and lectures; 2) their performance on a midterm and a final examination; 3) an individual research project on a topic relevant to the course, to be designed and carried out under the supervision of the course instructor.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 435H** (IL) Global Change and Sustainability - Bulgaria (3) Sustainability in the context of climate change, global socioeconomic change and regional transformation in Bulgaria; embedded foreign fieldwork (honors).

**GEOG 435H Global Change and Sustainability - Bulgaria (3)  
(IL)**

This course focuses on sustainable development and global change - vital issues for humanity - with specific attention to the challenges in Bulgaria of the transition from a centrally planned state to an open market economy with an emerging civil society. It is highly integrative in themes and case studies, including seminar work on-campus and field work in Bulgaria. Acquiring knowledge, understanding foreign environment, and developing new values embracing sustainable development are ultimate objectives of the course. Topics include rethinking established ways of production and consumption; policy and decision making affecting sustainability; finding new ways of greening economics, social accounting and planning; constraining consumerism; sustainable transportation, energy, engineering, architecture and construction; agriculture, forestry and water resources in a changing global climate; and the role of media, communication and NGOs. The course focuses on Bulgaria with the multiple challenges of the transition, globalization, global climate change, and important local land use and energy changes, including a critical assessment of sustainable aspects of former socialist states (e.g. compact cities, public transportation) in contrast to contemporary trajectories (e.g. urban sprawl, private automobile use). Within the general student-involved-learning framework of the course, students develop individual or team foci based on their academic major and personal interests, developing a proposal for in-country activity and post-field-session synthesis of a sustainability issue and the Bulgarian case. Special attention is given to meeting the goals of Schreyer Honors College: to demonstrate academic excellence with integrity, students will be held to a high standard of scholarly curiosity and performance, including developing skills and attitudes necessary for responsible and ethical interaction with local officials, scholars and host families. For building a global perspective, students will be challenged with seeing global and regional change from a non-North-Atlantic perspective reflecting the wider post-socialist world. For creating opportunities for leadership and civic engagement, students will be expected to show in their individual proposals and final projects aspects of their own learning and intellectual curiosity that will be shared with the people who assist them in Bulgaria. The course has honors expectations in the level of participation and collaborative learning, the formal project proposal, field work activities for achieving the proposal goals, and in the final symposium presentation and paper. The course contributes to a new generation capable of making vital decisions for a sustainable future in the face of climate change as well as social and economic transitions.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 436 Ecology, Economy, and Society (3)** Analyses of major themes in ecology and economic development, poverty-alleviation, and sustainability.

GEOG 436

**GEOG 436 Ecology, Economy, and Society (3)**

For many years, it was believed that there was a direct tradeoff between economic growth and a clean environment. Sustainable development has been proposed as an framework within which these two objectives can be pursued in harmony and actually can reinforce one another. This course focuses on sustainability issues at the broader (macroeconomic) level, as opposed to the operation of individual businesses (microeconomic, or industrial ecology) level.

The course will have two main emphases: 1) to evaluate the major conceptual ideas surrounding natural resource management and sustainable development, including equity, poverty, fairness, power, knowledge, and community empowerment; 2) to use empirical case studies to examine the practical, material and policy relevance of these concepts. The first part of the semester will be used to untangle and clarify the ideological and theoretical bases (biases) of broad human-environment discourses as they pertain to community empowerment and resource development. The final part of the semester will be used to analyze case studies in order to assess the relevance of existing theoretical framework for resource empowerment and community development in industrialized countries and the Third World, especially Africa.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 438W Human Dimensions of Global Warming (3)** Human dimensions of climate change: human causes, human consequences, and policy implications of global warming.

**GEOG 438W - Human Dimensions of Global Warming (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Geography 438W, the Human Dimensions of Global Warming, covers both the human causes and consequences of what many people view as the most significant problem facing society. Humans cause climate change primarily by emitting heat-trapping greenhouse gases through everyday activities associated with industrialized society (such as energy production and consumption, transportation, and manufacturing) and land transformation (such as agriculture and deforestation). People experience the consequences of climate change directly through reduced resources (such as food, fiber, forests, and fisheries) or increased natural hazards (such as droughts, floods, and intense storms). They also experience the consequences indirectly through such mechanisms as higher prices for food or larger insurance premiums. GEOG 438W does not address the physical science of climate change; instead, it concentrates on social science issues surrounding the topic.

GEOG 438W has two goals: (1) to develop understanding of a set of issues related to the human dimensions of climate change; (2) to develop and apply communication skills by discussing and writing about the topic. The specific content of the course will change with the instructor, but the focus on the human causes and consequences of climate change and on skill-development in writing will be constant.

Students will be evaluated on both the course goals: (1) understanding of the human dimensions of climate change; (2) application of communication skills. Although exact procedures for determining grades will vary with instructor, the basis for grades will always include a combination of written exams based on lectures and readings, regular written assignments with instructor feedback, and in-class discussion and participation.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 439 Property and the Global Environment (3)** This course reviews theoretical and empirical relationships between multiple legal, economic, and cultural approaches to property, and environmental quality and conflicts.

GEOG 439

**GEOG 439 Property and the Global Environment (3)**

Property relations are among the most powerful and pervasive institutions in human societies. Fundamental rules governing and legitimating who can do what, and where, they shape and reveal interactions between human societies and physical environments, a concern at the heart of geography. Our own property relations are often all but invisible to us precisely because they are so deeply woven into our perceptions, consciousness, social structures, and everyday experiences of the world. It is thus easy to overlook the fact that we live within highly specific and contingent property

arrangements and that changing circumstances are prompting important changes in contemporary property relations.

This course explores these issues with a particular focus on their implications for environmental politics and regulation. We will address questions such as: Is the privatization and commodification of nature a recipe for ecological disaster, or the most effective means of preservation? Can we own the weather? What were the historical-geographical circumstances surrounding the development of major modern property forms, and are those forms adequate to the environmental problems we now confront? Are there property relationships outside of the law? How do property relations and conflicts change in response to changing human control over nature, and how can different kinds of property arrangements lead to, or help to solve, environmental and social problems? Readings will review debates over common property; the benefits and dangers of privatization of environmental goods; distinctions between formal and informal property rights; the development of zoning and other regulation of private property; and contemporary debates over intellectual property rights in nature, and relationships among trade, property rights, and environmental quality.

The course will be of interest to students interested in environmental policy, land use planning and management, law, the areas of nature-society relations and historical geography, and environmental history. Students will gain a sophisticated understanding of the central underpinnings of much property and environmental regulation, and familiarity with many cutting-edge debates in these domains, both domestically and internationally. Evaluation methods will include examinations and an independent research paper and presentation by each student. The course will be offered every other year, with enrollment capped at 30 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 440** Topics in Regional Geography (3) Analysis of historical, contemporary and future environmental and societal issues in a specified world region from a geographical perspective.

GEOG 440

### **GEOG 440 Topics in Regional Geography (3)**

Geographers bring a uniquely holistic perspective to the study of places. This course provides an opportunity for geography faculty with regional expertise to share with students a learning experience that addresses major issues and challenges in a world region. Although the course will vary from instructor to instructor and offering to offering, the courses have common elements that help students to analyze and understand regions as academic constructs, as geopolitical reality, and places in which people interact with others and the environment to sustain livelihoods. The basic objectives underlying all offerings of this course are to learn how to accumulate and assess regional, geographic information and to synthesize such information in a coherent and meaningful understanding of the region in an holistic and comprehensive manner. Regional geography can be key for students in area studies programs, in international business, in regionally oriented environmental and social sciences, in the humanities, in international law and international affairs. Although each instructor will use her or his own course design and evaluation methods, common to all offerings will be activities that develop and assess student abilities to undertake regional analysis. For example, one instructor may require students to prepare briefing notes on a regional issue as might be given to an international agency; another may use the mechanism of a semester-end symposium with powerpoint presentations of student's investigations. Students should contact the faculty member offering a GEOG 440 in a specific instance for details about the course foci, activities and evaluation methods. It is anticipated GEOG 440 will be offered annually with varying regions covered from year to year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 444** African Resources and Development (3) Ecological and cultural factors in the geography of Africa; natural resources and development.

### **African Resources and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 461W** Dynamic Cartographic Representation (3) Theory and practice of mapping and geo-representation in a dynamic media context. Applications in science, policy, travel, and education.

GEOG 461W

**GEOG 461W Dynamic Cartographic Representation (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

Most maps produced today are electronic, dynamic, and often ephemeral -- with millions of maps generated on the web each day. At the same time, computer graphics technologies developed to enable scientific visualization generally, are being adapted and extended for applications with geographic information. The goal of this course is to provide students with both the conceptual understanding and practical experience needed to design effective dynamic representations and assess their effectiveness.

During the term we will explore the potential and implications of recent advances in cartography, exploratory data analysis, and information visualization as they relate to the theory and practice of geographic visualization (geovisualization). A key focus of the course is on "dynamic" representations of geographically referenced information. Dynamic representations are those that change as a result of user actions or data updates. Topics include: animated and interactive maps, exploratory multivariate spatial data analysis, geovisualization to support knowledge construction, interactive web maps, navigation aids for real and virtual worlds, map-enabled decision-support, collaborative geovisualization, dynamic maps to enable learning, semiotic principles for design of dynamic maps and related geovisualization tools, and perceptual/cognitive issues in dynamic geo-representation (including methods for studying the success of visual displays and interaction devices).

As a writing intensive course, particular attention will be given to writing for geographic information science (GIScience). This writing will include laboratory project reports, reviews of published literature, and a term project.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 463** Geospatial Information Management (3) This course examines geospatial data representations and algorithmic techniques that apply to spatially-organized data in digital form.

**Geospatial Information Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 464** Advanced Spatial Analysis (3) Skills and knowledge for applying quantitative methods to analyze information with spatial distributions.

GEOG 464

**GEOG 464 Analysis and GIS (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

Geography 464 is a course in methods for analyzing spatial data--methods that can and should be used when the geographic arrangement of a set of measured observations is thought to be of significance in explaining the values of those measurements. The methods of spatial analysis looked at in this course can be distinguished from conventional statistical analysis techniques, and also from many of the analysis functions programmed into many GIS packages. In fact several spatial analysis methods considered in this course the result of attempts to alter and extend conventional statistical techniques to take account of locational similarity and distance measurements (which is why Geography 364 or an equivalent primer in introductory statistical methods is a prerequisite). This means that the techniques that will be introduced in the course are often quite complex mathematically or statistically. Having said this, the overall goal of the course is to provide sufficient conceptual understanding and practical experience so that students become competent in selecting and applying methods appropriate to a variety of frequently-encountered analytical situations.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 467** Applied Cartographic Design (3) Project-based map production problems with emphasis on map design and advanced mapping tools in geographic information systems.

**GEOG 467 Applied Cartographic Design (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

The course objective is to immerse the student in applied problems of map production and geographic representation. Topics include advanced software methods for labeling and data editing; advanced symbolization and production of extended map series; conversion between software environments; and representation for multiple media, scales and purposes. The challenge of working with clients for mapping is often included in a project. Evaluation is based primarily on meeting draft deadlines, map project quality, written reports on project decisions, and an exam. The 300-level cartography course is a prerequisite for GEOG 467, and an introductory GIS course also provides useful background skills, though it is not a prerequisite.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 468** Geographic Information Systems Design and Evaluation (3) Design and evaluation of Geographic Information Systems and other forms of integrated spatial data systems.

GEOG 468

**GEOG 468 Geographic Information Systems Design and Evaluation (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course teaches GIS design, project management and communication skills and an appreciation of the ethical, legal and social issues surrounding maps, GIS and geographical data. It also introduces some of the newer information-technology aspects of handling geographic information, such as location-based services and sensor webs, that affect how GIS data are accessed and used. The bulk of practical component of the course is taken up with a large group project (four to six persons per group). The project gives students the opportunity to engage in an exercise that spans the entire range of GIS design and implementation: from problem inception to solution testing.

Outcomes revolve around the experienced gained by conducting a GIS project from inception to solution, including specification, design, implementation and evaluation, and specifically:

1. Practical experience with technical writing relating to GIS systems lifecycle, including interviewing, fact finding, description of the contents of the various project deliverables and their importance.
2. An appreciation of legal and ethical issues surrounding GIS, maps and geographic including copyright, responsibility and liability and computing law.
3. An understanding of newer technological innovations that will impact the access and use of geographic information, including: data sharing (interoperability), digital libraries and information portals, web services and grid computing.
4. A portfolio of practical systems development work, that documents all stages in the lifecycle of a GIS project.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 469** Energy Industry Applications of GIS (3) Roles of geographic information systems in energy siting decisions focusing on electric energy transmission networks.

**GEOG 469 Energy Industry Applications of GIS (3)**

Over 2 million miles of oil and gas pipeline and nearly 200,000 miles of electric transmission grid currently traverse the U.S. Geographic information systems (GIS) are used to help maintain these far-flung and extremely expensive energy infrastructures. GIS is also used to help determine optimal routes for pipelines and transmission lines as energy demand and production increase, and as the grid is extended to connect to new energy sources and consumers. GEOG 469 provides students with an in-depth exploration of the complexities of siting decisions. The course introduces a variety of siting challenges that confront the energy industry and its customers and neighbors, but focuses on the siting of electrical transmission lines. The course also provides hands-on experience with a common decision support technology, and considers how the technology may be used to facilitate public participation in siting decisions.

Students will undertake a term-length project in which they must propose, research, develop and implement a siting recommendation for an electrical transmission line. They will utilize activities from each lesson to develop primary and alternative routes. Using GIS, students will develop overlays, weights and rankings to determine the most suitable location for a proposed transmission line. Students' final product will be maps showing proposed routes based on the siting criteria and rankings developed to minimize the impacts associated with the various siting criteria used. To help students develop the critical thinking skills needed in the energy industry, students will learn to critique their peers' analyses systematically from the perspective of local stakeholders who are most affected by siting decisions.

GEOG 469 is designed to help students achieve two of the programmatic educational objectives established for the Energy and Sustainability Policy degree. It fosters energy industry knowledge by illuminating the difficulties intrinsic to facilities siting decisions. And it nurtures analytical skills by familiarizing students with GIS methodology, and by teaching them how to critique GIS analyses systematically.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 475H (LER 475H) Labor in the Global Economy: U.S. and South African Perspectives (3)** This course focuses on how the nature of work is changing in the global economy, and the implications for economic opportunity and inequality in both.

GEOG 475H

**GEOG (LER) 475H Labor in the Global Economy: U.S. and South African Perspectives (3)**

This seminar focuses on how the nature of work is changing in the "new economy", and the implications for economic opportunity and inequality in both the United States and South Africa. Sections of the course examine: theoretical approaches to understanding contemporary process of labor restructuring, including globalization, rise of an information economy, and growth in service sector employment; case studies of restructuring processes in different industrial sectors in both the U.S. and South Africa; and innovative labor organizing initiatives at a local, regional and global scale. This course aims to develop a framework for understanding the nature of contemporary processes of economic restructuring and its impact on the world of work. Drawing on research in both a South African and U.S. context, key case studies in the changing nature of work will be examined. This will provide a deeper understanding of how broad macro-level changes in the nature of contemporary capitalism are mediated by a variety of technological, political, and socio-economic factors in particular industries and geographic contexts. Finally, an in-depth look at workers' responses to these changes at different scales (local, regional, global) will help deepen our understanding of the contested nature of workplace restructuring while exploring promising strategies for improving working conditions. This is a reading-intensive course dealing with the theoretical literature on rapid economic restructuring and how this is shaping work and employment. It is run in collaboration with the Sociology of Work Program at the University of Witwatersrand in Johannesburg, South Africa, with video-conference discussions linking the two courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 480 Exploring Imagery and Elevation Data in GIS Applications (3)** Using imagery and terrain data in typical application scenarios faced by the geospatial professional.

**Exploring Imagery and Elevation Data in GIS Applications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 482 The Nature of Geographic Information (2)** Orientation to the properties of geographic data and the practice of distance learning.

GEOG 482

**GEOG 482 The Nature of Geographic Information (2)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course serves as an orientation to the study of geographic information systems in the Master of Geographic Information Systems degree program. It is also the first in a series of four courses that leads to Penn State's Certificate of Achievement in Geographic Information Systems. The course consists of readings, quizzes, projects, and discussions about fundamental properties of geographic data, how such data are produced, and how they are used. The course provides a comprehensive overview of geographic information technologies, including the global positioning system, land surveys, aerial surveys and photogrammetry, topographic mapping, social surveys such as the U.S. Census, and satellite remote sensing. It also ensures that helps students develop the skills required to become successful online learners. The course culminates in a final project in which students independently research, critically evaluate and report on the



characteristics and availability of a particular data product, service, or mapping technology. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 483 Problem-Solving with GIS (3)** How geographic information systems facilitate data analysis and communication to address common geographic problems.

GEOG 483

**GEOG 483 Problem-Solving with GIS (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 483 is a required course in the Master of Geographic Information Systems degree program. It is also the second in a series of four courses that leads to Penn State's Certificate of Achievement in Geographic Information Systems. The course consists of projects, associated readings, quizzes, and discussions about concepts, operations and tools in geographic information systems. Students confront realistic problem scenarios including such operations as geoprocessing, attribute and spatial joins, map projections, address geocoding and buffering. Students who successfully complete the course are able to access, display, manipulate, edit, and analyze geographic data. They are able to perform common GIS tasks using industry-standard tools and operations. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 484 GIS Database Development (3)** Database design, creation, maintenance, and data integration using desktop GIS software.

GEOG 484

**GEOG 484 GIS Database Development (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 484 is a required course in the Master of Geographic Information Systems degree program. It is also the second in a series of four courses that leads to Penn State's Certificate of Achievement in Geographic Information Systems. The course consists of projects, associated readings, quizzes, and discussions about designing, constructing, and maintaining GIS databases. Students who successfully complete the course are able to specify and perform the tasks involved in creating a digital geographic database, including geo-registering scanned base maps, digitizing vector features, entering attribute data, and compiling metadata. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 485 GIS Programming and Customization (3)** Customizing GIS software to extend its built-in functionality and to automate repetitive tasks.

GEOG 485

**GEOG 485 GIS Programming and Customization (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 485 is an elective course in the Master of Geographic Information Systems degree program. It is also one of the optional capstone courses that lead to Penn State's Certificate of Achievement in Geographic Information Systems. The course consists of readings, quizzes, projects, and discussions about constructing tools that solve geographic problems not easily solved using out-of-the-box GIS software. Students learn to use the Visual Basic for Applications (VBA) programming environment to add functionality to ArcGIS 8.x. No previous programming experience is assumed. The

course covers programming basics like object-orientation, COM, object model diagrams, loops, if-then constructs, and modular code design, as well as GIS-focused topics such as working with maps, layers, tables, and performing queries. Students who successfully complete the course are able to automate repetitive tasks, customize the *ArcGIS* interface, and share their customizations with others. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 486** Cartography and Visualization (3) Theory and practice of cartographic design emphasizing effective visual thinking and visual communication with geographic information systems.

GEOG 486

**GEOG 486 Cartography and Visualization (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 486 is an elective course in the Master of Geographic Information Systems degree program. It is also one of the optional capstone courses that lead to Penn State's Certificate of Achievement in Geographic Information Systems. The course consists of five projects and a capstone assignment. Each project includes readings, quizzes, and discussions about concepts and tools in cartography and visualization. Throughout the course, students complete "mile marker" assignments that are designed to help them progress toward the capstone assignment. Through the course projects, students confront realistic problem scenarios that incorporate such skills and concepts as creating symbolization schemes, coordinate systems and map projections, creating isoline and other terrain representations, interpolation, classification schemes, multivariate representation and representation of data uncertainty. Those who successfully complete the course are able to design and produce effective reference and thematic maps using GIS software, can create and analyze workflows, and can interpret and critique maps and related information graphics verbally. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 487** Environmental Applications of GIS (3) Real-world applications of GIS and spatial analysis to investigate a variety of current environmental issues.

**GEOG 487 Environmental Applications of GIS (3)**

GEOG 487 is an elective course in the Post baccalaureate Certificate Program in GIS and the Master of Geographic Information Systems (MGIS) degree program, both of which are offered exclusively through Penn State's World Campus. GEOG 487 consists of projects, associated readings, quizzes, and discussions related to environmental applications of GIS. Students are exposed to a variety of concepts, tools, data sources and formats, and environmental issues they are likely to encounter in a career involving GIS and environmental management. Like other courses in the GIS Certificate and MGIS programs GEOG 487 is offered in compressed 10-week terms that require a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October). GEOG 487 does not count toward the requirements of the resident B.A., B.S., M.S. or Ph.D. degrees in Geography, except by explicit permission of the student's graduate advisor and the Department of Geography's graduate officer.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 488** Acquiring and Integrating Geospatial Data (3) Advanced technical, legal, ethical and institutional problems related to data acquisition for geospatial information systems.

GEOG 488

**GEOG 488 Acquiring and Integrating Geospatial Data (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 488 is an elective in the Master of Geographic Information Systems degree program. The course is organized around six projects and a final project that spans three weeks. Each project includes associated readings, quizzes, and discussions about acquiring and integrating GIS data. The course adopts a developmental learning approach that prepares students to successfully complete projects given progressively less detailed and more realistic project guidelines. Students confront realistic problem scenarios that incorporate such skills and concepts as definition of data needs, metadata content standards, legal and ethical issues related to data use, data formats and types, interoperability, field collection methods and contributing data for public use. Those who successfully complete the course are able to spec out a GIS project, identify appropriate and cost-effective data sources, create data dictionaries, assess and ensure data quality, determine appropriate data formats given an intended data use, transform data from one format to another and understand GIS software functionality related to data conversion. The course is ten weeks in length and requires a minimum of 8/12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 489** GIS Application Development (3) Advanced topics in GIS customization, including the Systems Development Life Cycle, packaging and deployment, and consuming Web services.

GEOG 489

### **GEOG 489 GIS Application Development (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 489 is an elective course in the Master of Geographic Information Systems degree program. The course consists of readings, quizzes, projects, and discussions about advanced GIS programming concepts and techniques. It builds on the material covered in GEOG 485: GIS Programming and Customization. Students will work with ESRI's ArcObjects component library to customize ArcGIS software products using Visual Studio.NET as their development platform.

Students who successfully complete the course are able to use the Systems Development Life Cycle methodology to build custom GIS solutions. They are able to package and deploy their customizations through dynamic link libraries (DLLs) and register them with ArcGIS, a more robust deployment solution than those covered in GEOG 485. Students are also able to explain the fundamental differences between COM and .NET software development. Lastly, they are able to consume web services and integrate them into custom Web applications. The course is ten weeks in length and requires approximately 100 hours of student activity. It is offered quarterly (starting in January, April, July, and October).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 493** Service Learning (3-12) Classroom instruction with supervised student activity on a group community service project.

GEOG 493

### **GEOG 493 Service Learning (3-12)**

GEOG 493, Service Learning, provides students with activities that integrate community service with academic study. The aim of service learning is to enrich traditional classroom-based education by getting students into a community, thereby engendering civic responsibility and simultaneously strengthening communities. GEOG 493 has five objectives: (1) to develop understanding of a set of issues; (2) to learn and apply skills associated with those issues; (3) to learn to interpret science issues for dissemination to the public; (4) to develop and apply communication skills by speaking, writing, and/or desktop publishing; and (5) to reflect on personal and career interests in science, the environment, public policy, or related areas. Thus, students will read, write, and talk about a set of issues of importance to a community and engage in a project in that community.

The specific service-learning projects will change each semester, although some projects will be ongoing. In addition, more than one GEOG 493 project will be available to students in most semesters and will have alphabetical designations (e.g., 493A or 493B). Students can take GEOG in more than one semester, to a maximum of 12 credits.

Depending on the topic of the service-learning project, GEOG 493 can complement courses in most colleges and their majors. The course is available to all Geography majors as elective credits; it is also available to all Geography Minors for credit toward the minor. It counts for credit as an Advanced Physical/Environmental Geography course in the Physical/Environmental Geography Option, and counts for credit as an Advanced Geography course in the General Geography Option.

Students will be evaluated on four of the five course objectives: (1) understanding of the issues, (2) learning and application of skills, (3) interpretation of issues for public dissemination, and (4) application of communication skills.

Although exact procedures for determining grades will vary with the instructor and service-learning project, the basis for grades will include a combination of written work, oral presentations, in-class participation, and outside-class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 494** Research Project in Geography (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project in Geography (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 494H** Research Project in Geography (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project in Geography (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 495** Internship (1-13) Supervised off-campus, non-group instruction including individual field experience, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-13)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 1981  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 495B** Geography Teaching Internship (1-10) Supervised undergraduate teaching experience in which students serve as peer tutors, laboratory assistants, or course material developers.

GEOG 495b

#### **GEOG 495B Geography Teaching Internship (1-10)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The Teaching Internship provides undergraduate students with formal, supervised teaching experience. Instructors recruit students who excel in a particular course to serve as teaching interns (TIs) in subsequent offerings of the same course. TIs may assist their peers as tutors or as laboratory assistants. They may be assigned to assist faculty members by developing and evaluating new course activities and materials. Although TIs may not evaluate their peers' class work, they can play important roles in the formative course assessment by providing feedback in regular meetings with instructors. In the process of developing the knowledge, skills and dispositions needed to be effective in helping fellow students learn, TIs gain experience that prepares them for leadership roles in their professional careers. TIs also gain respect for the effort and imagination involved in designing and conducting college classes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**GEOG 495C** Internship Supervision and Mentoring (1) Candidates for the Master of GIS degree sponsor a GIS-related internship for students in Penn State's resident undergraduate program.

GEOG 495c

**GEOG 495C Internship Supervision and Mentoring (1)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GEOG 495C enables MGIS students who participate at a distance through the University's World Campus to earn credit through contributions to the Department's resident programs. Qualified MGIS students will be encouraged to earn one credit (up to a maximum of three) for every semester that they supervise a resident Penn State Geography student in GIS-related internship conducted in the MGIS student's place of work. Qualifications will be judged by MGIS students' academic advisors. Advisors will help MGIS students recruit qualified internship candidates. Advisors will also evaluate the quality of supervision on the basis of the documentation provided by both the MGIS student and the student intern he or she supervised. MGIS students unable to provide internships may still contribute by serving as mentors to students enrolled in the resident course EM SC 300: Professional e-Portfolio Development, through the University's LionLink program.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 495G** Giscience Internship (1-10) Supervised research experience within the Department of Geography's GeoVISTA Center, Gould Center, or an appropriate external agency.

GEOG 495G

**GEOG 495G Giscience Internship (1-10)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Prospective interns apply directly to faculty members in charge of the Department of Geography's Geo VISTA Center or Gould Center for Geography Education and Outreach, or to persons in charge of appropriate public or private agency external to the University. Students accepted into the internship program are assigned to research or application projects that involve the development, evaluation and/or use of geographic information technologies under the supervision of an experienced faculty member or professional. Per Faculty Senate rules, interns are expected to devote 40 hours of effort for each credit earned.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 496C** Individual Studies (3) Individual project work supervised by a faculty member on a topic of mutual interest in geography and geographic information science.

**Individual Studies (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497A** Geographics of Justice: Environment, Society and Development (3) This course will examine the origins of social and environmental justice in the United States and their application globally.

**Geographics of Justice: Environment, Society and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497A** Geographics of Justice: Environment, Society and Development (3) This course will examine the origins of social and environmental justice in the United States and their application globally.

**Geographics of Justice: Environment, Society and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497B** Location Intelligence for Business (3) Understanding location technology and geospatial analysis to support an efficient and effective pathway to better business decisions.

**Location Intelligence for Business (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497C** Health Geographics (3) This course provides a rigorous examination of the geographics of human health using case studies from the United States and abroad.

**Health Geographics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497C** Health Geographics (3) This course provides a rigorous examination of the geographics of human health using case studies from the United States and abroad.

**Health Geographics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497D** Lidar Technology and Applications (3) Understanding lidar systems' design, operation, data processing techniques, and product generation to address typical application scenarios faced by the geospatial professional.

### **Lidar Technology and Applications (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 497D** Lidar Technology and Applications (3) Understanding lidar systems' design, operation, data processing techniques, and product generation to address typical application scenarios faced by the geospatial professional.

### **Lidar Technology and Applications (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 500** Introduction to Geographic Research (1-3) No description.

### **Introduction to Geographic Research (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 501A** Research Perspectives in Physical Geography (1) This course presents contemporary perspectives on Physical Geography, emphasizing the major issues and integrative themes of the sub-discipline.

### **GEOG 501A Research Perspectives in Physical Geography (1)**

The contemporary study of Physical Geography unites all sub areas of Earth's physical environment--biogeography and ecology, climatology, and geomorphology--according to the following cross-cutting themes: water and mass in the

environment; energy; scale and scale interactions; systems approach; and historical perspective. These themes are emphasized in each of the seven lectures comprising 501A, through discussion of theory (e.g., feedback processes) and application (e.g., vegetation-soil-cloud-precipitation interactions). Beyond the topical treatment of Physical Geography, the course covers the role of instrumentation and measurement as well as numerical modeling (statistical, dynamical) in the systems approach to studying landscape processes. The role of cross-scale spatial interactions (micro-meso-macro) in the flows of mass and energy at and near the Earth's surface are presented, along with the statistical techniques for extracting those scale interactions (e.g., Artificial Neural Networks, Self-Organizing Maps). The temporal perspective on landscape processes involves particularly the role of humans in rapidly modifying--both intentionally and inadvertently--the transfers of energy and mass through land-cover modifications (e.g., deforestation/afforestation, urbanization) and atmospheric impacts.

The course aims are achieved through lectures, and by student readings of two or three seminal papers per week and a half-term paper. Although GEOG 501A is a stand-alone course, it dovetails with the three other new graduate-level courses proposed in Geography (Nature-Society, Human Geography, Geographic Information Science).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 501B** Research Perspectives in Human Geography (1) This course presents contemporary perspectives on Human Geography, emphasizing the major issues and integrative themes of the sub-discipline.

GEOG 501B

### **GEOG 501B Research Perspectives in Human Geography (1)**

The contemporary study of Human Geography reflects the heritage of place-based analysis that was typically regional geography and the space-based (yet often place-grounded) work of those that seek to explore spatial patterns associated with various economic, political, social and cultural processes. These patterns and processes are explored at a variety of scales, from the local through regional and global, and each sub-discipline has its own ways of operationalizing the emphases on place and space. The extent to which practitioners draw on theories from cognate disciplines in the social sciences and humanities often colors recent research in the subfields and confirms the ongoing subdivisions rather than point towards a singular integrated field of human geography.

The course aims are achieved through lectures, and by student readings of two or three seminal papers per week and a half-term paper. Although GEOG 501B is a stand-alone course, it dovetails with the three other new graduate-level courses proposed in Geography (Nature-Society, Physical Geography, and Geographic Information Science).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 501C** Research Perspectives in Human-Environment Geography (1) Contemporary perspectives on Human-Environment Geography, emphasizing major issues and integrative themes of the sub-discipline.

### **Research Perspectives in Human-Environment Geography (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 501D** Research Perspectives in GIScience (1) This course presents contemporary perspectives on Geographic Information Science, emphasizing the major issues and integrative themes of the sub-discipline.

### **GEOG 501D Research Perspectives in GIScience (1)**

The field of GIScience concerns the investigation of the properties of data and information relating to Earth, the creation of information from observational facts, how information is transferred from one person to another, and optimal means for making that transfer, in both natural and artificial systems. GIScience is also concerned with the individual, organizational and societal effects of generating and providing this information.

GIScience has its own body of theory focused on geographic scale, geographic representation, spatial information, and systems for the capture and use of spatial data. This theory draws heavily from a variety of other disciplines beyond Geography, including: computer science, information science and technology, cognitive science, graphic design, statistics,



geodesy, and geometry. This course introduces these various underpinnings, with a focus on current research themes and directions within an integrative framework. The objective is to help graduate students become familiar with GIScience research, specifically: the major intellectual foundations of GIScience, the current state of the field, and the ongoing researcher agenda.

The course aims are achieved through a combination of lectures, discussion of 2-3 seminal papers per week, and a half-term paper. Although GEOG 501D is a stand-alone course, it dovetails with the 3 other graduate-level courses proposed in Geography (Physical, Nature-Society, and Human).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 502** Research Scholarship in Geography (3) Learning the craft of scholarly research in geography.

### **GEOG 502 Research Scholarship in Geography (3)**

Graduate students are expected to make a significant research contribution as part of the requirements for a MS or Doctoral degree in Geography. The Research Scholarship in Geography course provides students with a basic understanding of the craft of scholarly geographic research. It does so by setting research into a tradition of commonalities that shape expectations (e.g., disciplinary and federal IRB ethics standards; ideas of academic freedom and responsibility) and by focusing on the mechanics of key steps in the research process (identifying problems, developing questions and proposals, designing programs of research, executing a systematic program of research, responding to criticism and to opportunities, preparing and delivering oral presentations, and writing and publishing research reports). The course emphasizes important skills in developing research proposals, seeking research funding, writing manuscripts, giving presentations, and publishing research results.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 510** Seminar in Physical Geography (3 per semester/maximum of 18) Analysis of current literature in physical geography focusing on theoretical and methodological debates.

### **GEOG 510 Seminar in Physical Geography (3 per semester/maximum of 18)**

This seminar explores current issues in physical geography. The focus for each offering of this advanced seminar is on a specific theme of current importance. Recent developments and ongoing research issues within that topic are explored in-depth. Topic examples include, but are not limited to: synoptic climatology and climate dynamics, the cryosphere, remote sensing, ecological biogeography and ecosystem dynamics, landscape and restoration ecology, wetlands ecology and management, and coastal and inland hazards.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 520** Seminar in Human Geography (3 per semester/maximum of 18) Analysis of current literature in human geography focusing on theoretical and methodological debates.

### **Seminar in Human Geography (3 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 521** Map Symbolization and Design Theory (3) Introduction to theoretical issues in map design and symbolization with emphasis on current research trends and practical application of research. Students who have passed GEOG 421 may

not schedule this course for credit.

### **Map Symbolization and Design Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 530** Human-Environment Seminar (3 per semester/maximum of 18) Theory and method in human-environment interaction subfields; may be re-taken when topics vary; readings, discussions, research.

### **Human-Environment Seminar (3 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 560** Seminar in Geographic Information Science (3 per semester/maximum of 18) Geographic information science problems/theory, e.g. GIS, cartography, remote sensing, spatial analysis, modeling.

### **Seminar in Geographic Information Science (3 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 565** Selected Topics in Geographic Information Science (3) Examination of geographic information science topics: GIS, cartography, remote sensing, spatial analysis, modeling, spatial cognition, geospatial semantics, geovisualization.

### **Selected Topics in Geographic Information Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 580** Spatial Data Structures and Algorithms (3) In-depth examination of geographic information system components; representation and storage of spatial data, spatial algorithms, input-output considerations. Students who have passed GEOG 480 may not schedule this course for credit.

### **Spatial Data Structures and Algorithms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 583** Geospatial System Analysis and Design (3) Systematic approach to requirements acquisition, specification, design and implementation of geospatial information systems.

GEOG 583

### **GEOG 583 Geospatial System Analysis and Design (3)**

GEOG 583 is a required course in the Master of Geographic Information Systems degree program offered through the World Campus. The course is organized around four projects and a capstone assignment. Each project includes associated readings and discussions about concepts and tools of system design and analysis. Throughout the course, students have "mile marker" assignments that are designed to maintain progress toward the capstone assignment. The course demonstrates uniqueness of geospatial system design in a succession of related projects. The projects require students

to confront realistic problem scenarios that cultivate the skills and understanding required to effectively complete a geospatial system specification, design, and implementation. Particular attention is given to the use of an established system develop process and modeling language. Those who successfully complete the course are able to model a system with UML as part of a design process utilizing RUP. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 584** Geospatial Technology Project Management (3) Principles of effective project management applied to the design and implementation of geospatial information systems.

GEOG 584

### **GEOG 584 Geospatial Technology Project Management (3)**

GEOG 584 is a required course in the Master of Geographic Information Systems degree program offered through the World Campus. The course is organized around four projects and a capstone assignment. Each project includes associated readings and discussions about concepts and tools in project management. Throughout the course, students will also be given "mile marker" assignments that are designed to help them progress toward the capstone assignment. Through the course projects, students confront a realistic problem scenario that incorporates such skills and concepts of managing a GIS project. Those who successfully complete the course are able to effectively conceptualize and manage a GIS project. The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 585** Open Web Mapping (3) Design, development, and implementation of web mapping applications using OGC standards and open source software.

### **GEOG 585 Open Web Mapping (3)**

The geospatial industry has developed a culture of open standards and specifications by which both data and mapping tools can be made interoperable. Web Mapping requires the detailed application of a thorough theoretical understanding of these standards, as well as a working knowledge of how these standards are realized through recent information technology advances in web services and middleware. The course gives students the theoretical base from which they can go on to design, develop, and implement custom web mapping applications using open standards and open source software. On completion of the course, students will be able to build and deploy a complete web mapping solution including selecting the spatial data, the server and client software. Students will be able to determine which type of mapping server is required for their needs and to explain why choosing an open standard based solution is better than a proprietary solution. The course will cover a variety of open source software packages for web mapping and will provide pointers to commercial solutions where appropriate.

Open Web Mapping is designed specifically for adult professionals. The course will be broken down into ten lessons. Each lesson will take one week to complete and requires a minimum of 8-12 hours of student activity each week, totaling approximately 120 hours of activity. Topics to be covered in each lesson include:

#### Lesson 1

Open Web Mapping Framework  
 International Methods

#### Lesson 2

Web Map Servers (WMS) basics  
 Understanding the structure of a WMS request  
 Understanding the structure of a WMS response

#### Lesson 3

Web Feature Server (WFS) basics  
 Understanding the structure of a WFS request  
 Understanding the structure of a WFS response

#### Lesson 4

Introduction to XML  
 XML and web mapping  
 XML schemas

#### Lesson 5

Styling maps with WMS and Styled Layer Description (SLD)  
Cascading Web Map Servers

## Lesson 6

Geographic Markup Language (GML)  
Application Schemas and Profiles

## Lesson 7

Advanced WFS  
Gazetteers  
Other specialist applications of WFS

## Lesson 8

Building a web mapping applications  
Deploying a WMS  
Deploying a WFS

## Lesson 9

Building a thin web mapping client  
Client/Server techniques  
Web mapping libraries and customizing them

## Lesson 10

The future of web mapping

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 586** Geographical Information Analysis (3) Choosing and applying analytical methods for geospatial data, including point pattern analysis, interpolation, surface analysis, overlay analysis, and spatial autocorrelation.

GEOG 586

### **GEOG 586 Geographical Information Analysis (3)**

GEOG 586 is an elective course for students in the Master of Geographic Information Systems degree program offered through the World Campus. The course is organized around eight short weekly projects and a more substantial project pursued through the all ten weeks of the course, with milestones through the quarter. Weekly projects include associated readings, quizzes, and discussions about the analysis of spatial data.

This is a course in analytical methods for handling specifically spatial data, that is, data where the arrangement of observations in space is through to be of significance. The techniques introduced are often mathematically complex, but while these aspects are covered in the course, the emphasis is on the choice and application of appropriate methods for the analysis of the spatial data often encountered in applied geography. Weekly projects are hands-on using geographic information systems or other appropriate computational tools, so that students appreciate the practical complexities involved, and the relative limitations of these methods in contemporary desktop GIS.

Through the weekly projects, students acquire familiarity with use of a single method or family of methods in standard desktop tools, so that they can focus on aspects of that method and develop a thorough understanding of its potential and of its limitations. Problem scenarios range across demographic, planning, crime analysis, landscape analysis, and other application areas. The course-long project is intended to allow students to formulate a research problem in a topic area of their own choosing, to gather and organize appropriate available datasets, and to understand how a variety of methods among those covered in the course can be applied in combination to thoroughly explore real questions. Students will be asked to engage with their peers; work during the project planning stage. They will also be encouraged to consider developing customized tools to automate repetitive analysis tasks, if they have previous programming experience.

A text that closely corresponds with much of the course content (while also covering further topics in this broad field) has been published by the course developer: O'Sullivan, D. and Unwin, D.J., 2003, *Geographic Information Analysis*, (Wiley, Hoboken, NJ).

The course is ten weeks in length and requires a minimum of 8-12 hours of student activity each week. It is offered once a year through Penn State's World Campus.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 587** Conservation GIS (3) Conservation GIS applies geospatial problem solving to ecological research and resource management issues to enhance conservation planning.

**Conservation GIS (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 588** Planning GIS for Emergency Management (3) Requirements analysis and proposal writing to plan and implement GIS solutions supporting emergency management activities of government agencies and contractors.

**GEOG 588 Planning GIS for Emergency Management (3)**

Planning GIS for Emergency Management is designed specifically for adult professionals and is offered exclusively through the World Campus as an elective course in Master of GIS degree program. This course introduces the potential of GIS to support all stages of emergency (crisis or disaster) management activities, the latest R&D advances that are helping to achieve this potential now, and some challenges for the future. The course focus is on requirements analysis and proposal writing targeted toward planning and implementing GIS solutions for government agencies and contractors.

As a basis from which to pursue these objectives, Planning GIS for Emergency Management introduces the current and potential future roles of GIS in support of crisis (emergency) management activities at all geographic scales (local to international). These roles are considered at each of the four stages of crisis management, including planning and mitigation, preparation, response, and recovery. Then, selected focus topics (e.g., GIS for evacuation planning and support, real time data integration, and international crisis response) are considered in detail.

The course provides a framework for understanding use of GIS in crisis management situations and for addressing the applied research needed to enable more effective GIS application in this context. It provides the background and perspective needed by project managers, consultants, and other professionals who are engaged in activities that range from initial requirements analysis (to determine whether and how to implement or extend GIS capabilities for emergency management), through design of training exercises (to develop requisite staff expertise in application of GIS to different kinds of emergency situations), to development of technological enhancements intended to improve the effectiveness of GIS in specific emergency management activities.

This course will challenge students to exercise the analytical and writing skills needed to develop successful proposals. Assignments focus on helping students to improve their ability to write and critique proposals to agencies that provide funding to support state and local implementation and application of GIS for Emergency Management and/or to support industry development of new technologies (e.g., the U.S. Department of Homeland Security or State Departments of Emergency Management). A term project involves proposal writing in response to real or hypothetical solicitations for a project that targets GIS tool development, implementation, and/or training to support emergency management activities in local, regional, state, national, or international contexts. Writing skills are honed through instructor critiques and peer reviews.

Weekly lessons focus on: (a) critical appraisal of relevant literature about development of GIS for and application to emergency management and (b) application of knowledge gained to representative challenges faced by IT managers who implement or upgrade GIS to support emergency management and by IT researchers/developers who attempt to develop advanced GIS capabilities to better meet the needs of emergency managers. Students will be required to post weekly statements relating readings to their individual professional and community contexts and to their own in-progress proposals.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 591** GIS for Health Analysis (3) Applications and theory in geographic information systems for analyzing the geographic dimensions of human health.

**GIS for Health Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 594A** Culminating Experiences in Geospatial Intelligence (1-3 per semester/maximum of 3) Culminating experiences in current professional and ethical problems facing the geospatial intelligence professional.

**Culminating Experiences in Geospatial Intelligence (1-3 per semester/maximum of 3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 594B** Geospatial Intelligence Capstone Experience (2) Culminating experience in the iMPS-HLS for the online geospatial intelligence option.

**GEOG 594B Geospatial Intelligence Capstone Experience (2)**

GEOG 594B is the culminating experience for the Geospatial Intelligence Option of the Intercollege Master of Professional Studies in Homeland Security (iMPS-HLS) program; as such, the course expects the student to explore and critically analyze a topical area of interest in appropriate depth. To successfully complete the GEOG 594B, students in the Geospatial Intelligence Option of the iMPS-HLS must communicate a high-level of knowledge of the subject based upon their thinking, organization, and technical analysis of the evidence. This course provides the iMPS-HLS Geospatial Intelligence Option student an opportunity to apply the technical tools, concepts, and theories learned in previous coursework while investigating a current analytic problem. GEOG 594B is designed specifically for current and aspiring geospatial intelligence professionals who are able to study only on a part-time basis, online, and is offered exclusively through the World Campus.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596A** Individual Studies -- Peer Review (3) Preparation and presentation of a proposal for an individual capstone project, and review of presentation by student peers.

**Individual Studies -- Peer Review (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596A** Individual Studies -- Peer Review (3) Preparation and presentation of a proposal for an individual capstone project, and review of presentation by student peers.

**Individual Studies -- Peer Review (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596B** Individual Studies--Capstone Project (3) Preparation and delivery of a formal professional presentation of the results of an individual capstone project.

**Individual Studies--Capstone Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596B** Individual Studies--Capstone Project (3) Preparation and delivery of a formal professional presentation of the results of an individual capstone project.

**Individual Studies--Capstone Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596C** Individual Studies (3) Individual project work supervised by a graduate faculty adviser.

**Individual Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596C** Individual Studies (3) Individual project work supervised by a graduate faculty adviser.

**Individual Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596I** Independent Study in Geospatial Intelligence (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study in Geospatial Intelligence (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596I** Independent Study in Geospatial Intelligence (3) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study in Geospatial Intelligence (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596K** Independent Study in Geospatial Intelligence (1) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study in Geospatial Intelligence (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 596K** Independent Study in Geospatial Intelligence (1) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study in Geospatial Intelligence (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 597A** Visual Analytics: Leveraging GeoSocial Data (3) Conceptual and project-based introductions to visual analytics and its applications to geo-social data analysis and Big Data Social Science research.

**Visual Analytics: Leveraging GeoSocial Data (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 597E** Emerging Trends in Remote Sensing and Advanced Image Analysis (3) Advanced topics in remote sensing and image processing, including new sensors, applications, and decision making.

**Emerging Trends in Remote Sensing and Advanced Image Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**GEOG 597G** Geographic Dimensions of Unmanned Aerial Systems (UAS) (3) Common platforms, analytical strategies, and policy dimensions of Unmanned Aerial Systems (UAS) in public, private, defense, and humanitarian applications.

**Geographic Dimensions of Unmanned Aerial Systems (UAS) (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 597I** Special Topics in Geospatial Intelligence Futures (3) Addresses cutting edge Geospatial Intelligence topics that impact the global academic and professional community.

**Special Topics in Geospatial Intelligence Futures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 597I** Special Topics in Geospatial Intelligence Futures (3) Addresses cutting edge Geospatial Intelligence topics that impact the global academic and professional community.

**Special Topics in Geospatial Intelligence Futures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 597K** GIS for Analysis of Health (3) The role of geographic information systems in understanding disease, including relevant spatial analysis of cartographic visualization techniques.

**GIS for Analysis of Health (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**GEOG 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Theoretical and practical aspects of undergraduate instruction in geography.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 860** Comparative GIS (3) Formal methodology for evaluating, comparing, and recommending geospatial software solutions for a variety of professional uses.

**Comparative GIS (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 861** Map Projections for Geospatial Professionals (1) Cultivates a working knowledge of map projections that professionals need to process geospatial data effectively for mapping and analysis.

### **GEOG 861 Map Projections for Geospatial Professionals (1)**

Topic: Map projections are mathematical formulae by which geographical coordinates that represent positions on the Earth (i.e., latitude and longitude) are transformed to plane coordinates that represent positions on two-dimensional representations. Map projection formulae are implemented as algorithms in geographic information systems (GIS), image processing and other kinds of mapping and analysis software. Although many types of map projections are available, only certain types are well suited to any given mapping or analysis task. Furthermore, since GIS often involves merging multiple datasets, each of which is likely to be the product of a different projection, GIS professionals need to be knowledgeable about this advanced topic.

Course Objectives: GEOG 861 cultivates a working knowledge of map projections that professionals need to process geospatial data effectively by daily discussions with instructors and peers.

Student Activities: To fulfill course and educational objectives, students will participate in weekly lessons and project assignments, supported by daily discussions with instructors and peers.

1. Weekly Lessons: Text, graphics, and software-based exercises and quizzes will help students master the vocabulary of map projections, the variety of projections commonly implemented in GIS and related software environments, how to choose an appropriate map projection for a given task, how to specify the parameters required to generate a selected projection (and what the parameters mean), and what to do when merged datasets fail to align correctly.
2. Projects: Students will demonstrate their mastery of lesson topics in realistic project assignments that involve use of authentic GIS software and data.
3. Discussions: The course instructor will answer questions about lesson topics, and provide individual feedback to student assignments, via course email and discussions forums within the ANGEL learning management system. Synchronous communications, including telephone and chat, may also be used as needed.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 862** GPS and GNSS for Geospatial Professionals (3) Cultivates a working knowledge of current and future capabilities of GPS and the emerging Global Navigation Satellite System.

### **GEOG 862 GPS Modernization for Geospatial Professionals (1)**

Topic: The Global Positioning System (GPS) includes a constellation of earth-orbiting satellites that broadcast their locations in space and time, a network of ground control stations, and military and civilian receivers that calculate ground positions by trilaterating satellite positions. Geospatial professionals need to possess a working knowledge of current and future GPS capabilities because GPS positioning is so prevalent in geographic information systems (GIS) applications in government, industry, and academia.

GPS has always been a dual use system, military and civilian. From the beginning, GPS signals have been available with no direct user fees. GPS is used now in all of transportation-aviation, maritime, railroad, highway and mass transit. Satellite positioning also plays critical roles in telecommunications, land surveying, law enforcement, emergency response, precision agriculture, mining, finance, and scientific research. It controls computer networks, air traffic, power grids, and so on. As the scope of GPS has expanded, the system continues to evolve.

Course Objectives: GEOG 862 provides students with an opportunity to develop an in-depth understanding of the Global Positioning System that exceeds the basic awareness that is cultivated in prerequisite courses. For example, while it is useful to know that a minimum of 24 GPS satellites ensure 24-hour worldwide GPS coverage, it is equally important to understand why there are more than the minimum on orbit. Students in GEOG 862 learn that redundancy is necessary in a system upon which much of the U.S. economy now depends. Society's reliance on satellite positioning mandates GPS modernization.

Student Activities: The course consists of four weekly lessons. Each lesson will require a minimum of 8-12 hours of activity. Lessons will include weekly lectures (via synchronous Web conference and/or streaming video), threaded discussion, readings, two quizzes and two writing assignments about concepts and tools in GPS Modernization. These assignments are designed to help students progress towards successfully completing the objectives for this course.

\* Class Participation: Individual participation via online discussion. Students will be encouraged to post and respond to questions and comments in online discussions forums.

\*Quizzes: There will be a mid-course quiz at the end of Week 2 and a final quiz at the end of Week 4 to test the students' comprehension of class materials and other reading as required.

\*Papers: There are two writing assignments in this course. The first falls after Week 1 and asks students to prepare a 1200 word paper on one topic covered in "Basic GPS," The first lesson. The second falls after Week 3 and asks the students to prepare a 1200 word paper on one topic covered in either Week 2 or Week 3.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 863 GIS Mashups for Geospatial Professionals (3)** Cultivates a working knowledge of how and why geospatial professionals develop web mapping applications that combine data from multiple sources.

#### **GEOG 863 GIS Mashups for Geospatial Professionals (1)**

Topic: In the context of information technology, the term "mashup" refers to a web application that combines content from multiple sources into a whole that is greater than its parts. A GIS mashup is one in which at least a portion of the content is geographic in nature and in which information is typically conveyed through a map. For example, tabular crime data published on a city's web site can be combined with base data layers such as municipal boundaries and roads to produce a map that is valuable for both the city's policies department and its citizens. GIS vendors have offered web mapping software products for many years. However, companies like Goggle and Yahoo now offer free application programming interfaces (APIs) which make it easier and more affordable to publish online maps. These APIs provide a set of base layers upon which the map developer can overlay his/her own geocoded data. These data may be stored in files on the developer's own server or they may be obtained dynamically through public web services or by parsing data embedded within other web pages. This course prepares students to use the Google Maps API to design and develop mashups that meet the needs of their particular organizations and clients.

Developing mashups requires considerable conceptual and technical knowledge. Practitioners need to understand geospatial databases, open standards for interoperability, web content authoring, computer programming, and the business need to view and analyze geospatial information in many ways, including as tables and as maps. Successful completion of Penn State's four-course Postbaccalaureate Certificate Program in GIS, including GEOG 485: GIS Programming and Customization, is required for enrollment.

Course Objectives: GEOG 863 provides students with an understanding of the technology that makes building mashups possible and teaches them how to build their own mashups.

Student Activities: To fulfill course and educational objectives, students will participate in weekly lessons and project assignments, supported by daily discussions with instructors and peers.

1. Weekly Lessons: Text, graphics, software-based exercises and quizzes will help students master the concepts that underpin GIS mashup development and will provide examples of techniques involved in the development of GIS mashups.
2. Projects: Students will demonstrate their mastery of lesson topics in three realistic project assignments that involve the development of GIS mashups. In the first project, students are asked to plot their hometown on a map. In the second, they are required to develop a more interactive map that displays the locations of numerous cities along with selected attributes. In the third and final project, the students demonstrate that they can apply what they've learned to develop a mashup that incorporates data from their workplace.
3. Discussions: The course instructor will answer questions about lesson topics, and provide individual feedback to student assignments, via course email and discussion forums within the ANGEL learning management system. Prescribed discussions will be held on well-known mashup examples, the commercial prospects of mashups, and issues surrounding data ownership. Synchronous communications, including telephone and chat, may also be used as needed.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 864 Professionalism in Geographic Information Science and Technology (2)** Prepares current and aspiring professionals to recognize, analyze and address legal and ethical issues in the GIS&T (geospatial) field.

#### **Professionalism in Geographic Information Science and Technology (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 882 Geographic Foundations of Geospatial Intelligence (3)** Orientation to the geographic foundations of geospatial intelligence and its applications in national security, international relief work, and disaster management.

#### **GEOG 882 Geographic Foundations of Geospatial Intelligence (3)**

Topic: Geospatial intelligence (GEOINT) leverages geographic information science and technology (including cartography,

geographic information systems, remote sensing, and global positioning systems) with intelligence tradecraft to develop intelligence products that support national security, disaster response, and international relief efforts.

**Course Objectives:** GEOG 882 is designed to challenge current and aspiring GEOINT professionals to be more than technicians. Students who successfully complete GEOG 882 will appreciate that while geospatial technologies are useful in revealing what, who, and where, and to some extent how events are taking place, they are less useful in explaining why events occur, or what response is most appropriate. Students will learn that the political, cultural, historical, and economic perspectives of human geography are needed to put GEOINT analyses in context. The course will also challenge students to approach analyses critically, to consider alternative viewpoints and explanations, and to question their own assumptions.

**Student Activities:** The course consists of 12 lessons that will span either the 15-week semester or the combined 12-week summer sessions. Each lesson will require approximately 10 hours of student activity. Student activity will include viewing and responding to recorded instructor lectures (delivered by digital video and audio), readings from textbooks or selected library resources, five quizzes on readings, four asynchronous online discussion forums, three reflection papers, and a collaborative role-playing simulation that provides a capstone experience.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 883 Remote Sensing for the Geospatial Intelligence Professional (3)** Understanding remote sensing systems' operation, data products, and processing techniques to address typical problem scenarios faced by the GEOINT professional.

### **GEOG 883 Remote Sensing for the Geospatial Intelligence Professional (3)**

**Topic:** Geospatial intelligence (GEOINT) leverages geographic information science and technology (including cartography, geographic information systems, remote sensing, and global positioning systems) with intelligence tradecraft to develop intelligence products that support national security, disaster response, and international relief efforts.

**Course Objectives:** GEOG 883 cultivates students' knowledge of the capabilities and limitations of digital remote sensing instruments, processing systems, and derived data products. It helps students master basic skills needed to leverage these data sources and information products in the context of geospatial intelligence tradecraft.

**Student Activities:** The course consists of eight lessons and one capstone group project that will span either the 15-week semester or the combined 12-week summer sessions. Each lesson will require approximately 10 hours of student activity. Student activities will include reading lesson text, online quizzes, and discussions about the ways in which remote sensing sciences is applied to geospatial intelligence analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 884 Geographic Information Systems for the Geospatial Intelligence Professional (3)** How geographic information systems facilitate data analysis and communication to address common geographic problems faced by the geospatial intelligence professional.

### **GEOG 884 Geographic Information Systems for the Geospatial Intelligence Professional (3)**

**Topic:** Geospatial intelligence (GEOINT) leverages geographic information science and technology (including cartography, geographic information systems, remote sensing, and global positioning systems) with intelligence tradecraft to develop intelligence products that support national security, disaster response, and international relief efforts. The objectives and concepts are drawn from the University Consortium for Geographic Information Sciences's GIS&T Body of Knowledge (2006).

**Course Objectives:** GEOG 884 cultivates in students the knowledge of the capabilities and limitations of geographic information systems (GIS) and the skills needed to realize their potential in the context of the geospatial intelligence tradecraft.

**Student Activities:** The course consists of seven project assignments that will span either the 15 week semester or the combined 12-week summer sessions. Each assignment will require 16-24 hours of student activity. Assignments will include readings, online quizzes about the readings, projects involving the GIS workflow development and implementation in the context of realistic scenarios, discussions about the benefits and limitations of GIS for geospatial intelligence analysis, and reflections about the relevance of course activities to students' professional experiences.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 885** Advanced Analytic Methods in Geospatial Intelligence (3) Prepares current and aspiring geospatial intelligence professionals to apply and interpret results of non-quantitative analysis and modeling techniques.

**Advanced Analytic Methods in Geospatial Intelligence (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 889** Seminar in Geospatial Intelligence (2) Culminating experience that synthesizes topics addressed in earlier classes and explores emerging topics and methods of geospatial intelligence analysis.

**GEOG 889 Virtual Field Exercise for the GEOINT Professional (2)**

GEOG 889 is a comprehensive examination for the Geospatial Intelligence (GEOINT) professionals who have completed four required prerequisite courses leading to the Postbaccalaureate Certificate in Geospatial Intelligence. The comprehensive examination evaluates the student's ability to integrate knowledge of geospatial technology, show critical and independent analytical skills, and demonstrate mastery of the knowledge and skills that characterize the geospatial intelligence tradecraft. To successfully complete the GEOG 889, students must demonstrate independent thinking, appropriate organization, high-level writing competency, critical analysis, ethical reasoning ability, and accuracy of documentation. GEOG 889 will challenge students to reflect upon what they have learned in the Certificate Program, and to become more familiar with the professional aspects of the field. The course will enable faculty to identifying students who need additional course work or independent study before being granted the certificate.

GEOG 889 is a required course in the Postbaccalaureate Certificate Program in Geospatial Intelligence. It is designed specifically for current and aspiring geospatial intelligence (GEOINT) professionals who are able to study only on a part-time basis and at a distance.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897** Special Topics (1-9) Formal courses given on a topical or special interest subject.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897A** Cultural Intelligence, Applied Geography, and Homeland Security (3) The process of geographically analyzing social, political, institutions, beliefs, and behaviors.

**Cultural Intelligence, Applied Geography, and Homeland Security (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897A** Cultural Intelligence, Applied Geography, and Homeland Security (3) The process of geographically analyzing social, political, institutions, beliefs, and behaviors.

**Cultural Intelligence, Applied Geography, and Homeland Security (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897B** Special Topics/GIS (3) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Special Topics/GIS (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897C** Cloud and Server GIS (3) Students will evaluate and implement GIS which use cloud and server resources, using infrastructure, platform, and software service models.

**Cloud and Server GIS (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897D** Spatial Database Management for Geospatial Professionals (3) Advanced topics in the storage, management, and retrieval of geospatial data using common proprietary and open-source relational database technologies.

**Spatial Database Management for Geospatial Professionals (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOG 897K** Map Projections for Geospatial Professionals (3) Cultivates a working knowledge of map projections that professionals need to process geospatial data effectively for mapping and analysis.

**Map Projections for Geospatial Professionals (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Geosciences (GEOSC)**

**GEOSC 402Y** (IL) Natural Disasters (3) Case studies of the causes and consequences of natural disasters; analysis of disaster impact in different economic, cultural, and social conditions.

GEOSC 402Y

**GEOSC 402Y Natural Disasters (3) (IL)**

Is anywhere safe from natural disasters? Can we hide, or should we learn to live with the hazards around us? This course will explore the causes, effects, and societal response to disasters. By learning from previous disasters, we can develop

strategies to avert the disasters or at a minimum mitigate their affects. We will look at a variety of natural hazards and related disasters including flooding, volcanoes, landslides, earthquakes, hurricanes, and tsunamis. By the use of case studies of recent occurrences of natural disasters, we will determine how damaging disasters can be, and what we can do to minimize their impact on society. This course will provide an in-depth, hands-on study of natural hazards, their geography, and their impact on societies worldwide. We will focus on both the physical processes (e.g. underlying geology or geophysics) of selected natural hazards and the human systems that have developed to minimize the impact of natural disasters.

The course will place emphasis on active learning exercises to investigate processes and responses to natural hazards. We will meet for two periods each week which will include both lecture and group research activities (approximately 30% of time is in lectures, 70% time is in group research activities). Grading will be based on reports for each topic, a disaster diary, and a term report. The term report is an independent project which focuses on a selected city facing significant natural hazards. Cities will be selected from both the developed and developing world to allow comparisons of the impacts of natural disasters under different socio-economic and cultural conditions.

The course is offered once each year with a target enrollment of 25-30 students.

Prerequisites for the course are at least 6 credits in science courses (including GN courses).

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 405 (SOILS 405) Hydropedology (3)** Soil and water interactions across scales, integrated studies of landscape-soil-water relationships, fundamental processes of water flow and chemical transport.

GEOSC 405

### **GEOSC (SOILS) 405 Hydropedology (3)**

Hydropedology is the study of the fluxes, storages, pathways, residence times, and spatio-temporal organization of water in the root and deep vadose zones, and their relations to climate, ecosystem, land use, and contaminant fate. The aim is to characterize integrated physical, chemical, and biological processes of soil-water interactions across scales (including chemicals and energy transported by water flow). This course embraces interdisciplinary and multiscale studies of interactive pedological and hydrological processes in the earth's surface and subsurface environments. The course will address the fundamental issues and practical applications of hydropedology (as a sister discipline of hydrogeology). This course emphasizes *in situ* soils that have distinct characteristics of pedogenic features, structures, layers, and soil-landscape relationships in the real world. Students will gain an in-depth understanding of soil and water interactions across scales from point observations to watershed phenomena, and will gain skills in predicting flow pathways and water fluxes in the landscape. This course promotes active learning, critical thinking, and hands-on skills. Course format will consist of two lectures and one laboratory/field exercise each week. The course will utilize a network of local watersheds with different land uses for demonstrations and class projects. Grading will be based on weekly lab/field exercise (20%), class research project (40%), homework (10%), one midterm exams (15%), and one final exam (15%). Since hydropedology is linked to a wide array of environmental, ecological, geological, agricultural, and natural resource issues of societal importance, SOILS (GEOSC) 405 will support interdisciplinary training of students in Soil Science as well as in other disciplines of the College of Agricultural Sciences, especially Agricultural and Biological Engineering, Agronomy, and Forest Resources. Students in the College of Earth and Mineral Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Program in Ecology also will find this course useful when undertaking research on the vadose zone, the hydrologic cycle, and the earth system. The course will be offered every fall semester with an anticipated enrollment of 20 students per class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 409W Geomicrobiology (3)** Investigation of modern and ancient microbial interactions with soils, sediments, the atmosphere, minerals, rocks, nutrients, and pollutants.

### **Geomicrobiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**GEOSC 410** Marine Biogeochemistry (3) Exploration of the ways in which life influences and is influenced by chemical, physical, and geological processes in the ocean.

**GEOSC 410 Marine Biogeochemistry (3)**

This course covers the basics of the chemistry of the ocean, its circulation, the types of organisms that live in the ocean, and the ways in which organisms influence and are influenced by their physicochemical environment. The format includes lectures, hands-on laboratory exercises, and a field trip to an aquatic environment during which students undertake group research projects. The course is offered in alternate years, in the spring. It satisfies one of the course requirements of the Marine Science minor for undergraduates, and the Data Gathering requirement of students in the Geosciences graduate program. Grades are based on class participation, midterm and final examinations, and an oral and/or written report of the research project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 412** Water Resources Geochemistry (3) Aqueous geochemistry of silica, alumina, carbonate minerals, and selected metals; organic species in water; isotope geochemistry applied to water.

**Water Resources Geochemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 413W** Techniques in Environmental Geochemistry (3) This course teaches techniques needed for the collection, chemical analysis, and data analysis of environmental geochemical measurements. This course has one or more required field trips for which a fee is charged to the student.

**Techniques in Environmental Geochemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 415** Geochemistry (3) Element abundance and genesis, application of chemical principles to earth materials, element fractionation in geologic processes.

**Geochemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 416** Stable and Radioactive Isotopes in Geosciences: Introduction (3) Discussions on theories for natural isotopic and element variations and their applications to the solution of geologic and cosmologic problems.

**Stable and Radioactive Isotopes in Geosciences: Introduction (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 418** (SOILS 419) Soil Environmental Chemistry (3) Introduction to chemical constituents and processes occurring in

soils. Topics include mineral weathering, soil solution chemistry and adsorption of solutes.

GEOSC 418

### **GEOSC 418 (SOILS 419) Soil Environmental Chemistry (3)**

Upon completion of the course, the students will be able to identify the soil components and properties responsible for the chemical reactivity of soils and will know the fundamental chemical processes that occur in soils. The students will also be able to link theoretical concepts to real life environmental problems. The students will be evaluated on examinations, homework, and class participation. GEOSC 418 (SOILS 419) is offered every Spring semester. Class limit: 25 students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 419** The Organic Geochemistry of Natural Waters and Sediments (3) Composition, sources, and fates of particulate and dissolved organic matter in natural environments; biogeochemical processes; organic geochemistry of anthropogenic contaminants.

### **The Organic Geochemistry of Natural Waters and Sediments (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 420 (BIOL 420) Paleobotany (3)** Classification, morphology, phylogeny, and stratigraphic occurrence of fossil plants; practicum includes field trips and study of paleobotanical techniques and specimens.

GEOSC 420

### **GEOSC (BIOL) 420 Paleobotany (3)**

Land plants provide the oxygen, food, and forest structure that make our lives on land possible. They are sensitive indicators of global change in the past as well as today. This course will examine the history of green plants on the dynamic Earth from their beginnings in the Proterozoic oceans to today, with emphasis on central topics such as the colonization of land, the histories and relationships of major plant groups, the evolution of seeds and flowers, the evolution of plant-animal interactions, extinction and diversification, paleoclimates, and the origins of modern biomes such as rainforests and grasslands.

This course is strongly recommended to graduate students and advanced undergraduates with interests in paleobiology and/or plant biology. Specimen observation and field trips will be important course components. Exams, assignments, and class participation will be the primary bases of evaluation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 422** Vertebrate Paleontology (3) Course covers scientific thinking and skills in scientific writing, the history of vertebrates, and modern evolutionary theory applied to vertebrates.

### **Vertebrate Paleontology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 424** Paleontology and Fossils (3) Concepts and procedures using fossils to solve problems in systematics, evolution, biostratigraphy, correlation, sedimentation, paleoecology, and global change.

**Paleontology and Fossils (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEO SC 428** Micropaleontology (4) Biology and ecology of microfaunas and microfloras (e.g., foraminifera, coccolithophores, radiolaria, diatoms, dinoflagellates) and applications in biostratigraphy and paleoenvironmental reconstruction.

GEO SC 428

**GEO SC 428 Micropaleontology (4)**

Micropaleontology is the study of the fossilized remains of microscopic plants and animals, most of which are single-celled and belong to the Protista. Although nearly invisible, the organisms at the base of the food chain make up most of the biomass in oceans and lakes. Only a few kinds of microplankton and microbenthos groups have shells that readily fossilize, but these can be so abundant that in places they form mountains of pure fossil remains. The abyssal floor of the ocean is made up of layers of microfossil-rich "ooze" that slowly accumulates from microscopic shells settling to the seafloor. Changes in the abundance and types of microfossils in these layers provide a detailed record of the geological past, in response to climate change and biological evolution. In addition, each time a new species of micro-organism evolves, it quickly spreads throughout the oceans, forming a worldwide time marker in the fossil record. Such marker horizons allow geological events in different parts of the world to be related in a global earth history.

The course has four main objectives: (1) to provide a broad overview of the biology and ecology of living microplankton and microbenthos with a focus on foraminifera and radiolaria (predatory, non-vegetative protists), coccolithophores and diatoms (vegetative, photosynthesizing protists), and dinoflagellates (both predatory and photosynthesizing); (2) to learn about the evolutionary record of these groups; (3) to understand their applications in biostratigraphy and paleoenvironmental reconstruction; and (4) identification of microfossil groups in the light microscope and scanning electron microscope. Group projects will be a key element of laboratory sessions. Assessment will be based on mid-term and final exams, a term paper, and a laboratory exercises.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEO SC 434** Volcanology (3) Phenomena and products of volcanic eruptions; physical characteristics of lava and pyroclastic material.

**Volcanology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEO SC 439** Principles of Stratigraphy (3) An introduction to the description and genesis of sedimentary rock bodies, the determination of their stratal geometries, and their correlation. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)

**Principles of Stratigraphy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEO SC 440** Marine Geology (3) Chemical and physical processes affecting the topography and sediments of the sea floor.

**Marine Geology (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 444 Matlab Applications for Geoscience (2)** An introduction to Matlab: m-file development, descriptive statistics, bootstrapping, Fourier transforms, regression, interpolation, least-squares, differentiation, integration, differential equations, signal analysis, graphics.

#### **GEOSC 444 Matlab Application for Geoscience (2)**

The goal of this class is that students become familiar with Matlab so that they can conduct scientific research without needing to manipulate spreadsheets or other non-mathematically based software. The course is geared towards, beginning graduate and advanced undergraduate students with little or no previous Matlab experience, and examples are focused on applications in the science and engineering with a focus on the geosciences, including problems from groundwater hydrology, tectonics, geochemistry, rock physics, and climate change. Some basic concepts about vectors and matrices will be helpful, but are not required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 450 Risk Analysis in the Earth Sciences (3)** An introduction to concepts and methods of quantitative risk analysis with focus on water, climate, and energy related risks.

#### **GEOSC 450 Risk Analysis in the Earth Sciences (3)**

Geosc 450 is an introduction to concepts and methods of quantitative risk analysis in the Earth system. Key concepts include probability, impacts, risk, uncertainty, statistical estimation, and decision-making under uncertainty. Important methods to be covered are sensitivity studies, probabilistic prediction, and uncertainty analysis. Examples of risks to be analyzed include: drought, flooding, nuclear waste storage, and anthropogenic climate change. Students will also use simple risk analysis software (provided by the instructor and accessible without prior programming experience) to actively apply these concepts to example problems. The course is designed for advanced undergraduate students with a prior exposure to basic statistics and calculus.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 451 Natural Resources: Origins, Economics and Environmental Impact (3)** Geologic, economic and environmental issues related to exploitation of non-renewable natural resources (metals, minerals, rocks, and fossil fuels).

GEOSC 451

#### **GEOSC 451 Natural Resources: Origins, Economics and Environmental Impact (3)**

All the materials needed for health and prosperity in our complex society come from the earth, such as water, iron and other metals to make steel, silica to make glass, limestone to make concrete, potash and phosphate to make fertilizers, and oil, natural gas, coal and uranium to generate heat and electricity. Most of these natural resources are non-renewable, and easily recoverable quantities are limited. The main purpose of this course is to increase understanding and appreciation of geological, economical and environmental aspects of exploitation of mineral and energy resources. Approximately two-thirds of the lectures/discussions will focus on geological, geochemical and biological processes that have governed the concentration and dispersion of economically important elements and natural materials on Earth, including water, heavy metals (aluminum, iron, copper, zinc, lead, etc.), precious metals (gold, silver, platinum, etc.), industrial minerals and rocks (clays, limestone, gypsum, salts, etc.), nuclear-energy sources (uranium and thorium) and fossil fuels (petroleum, natural gas and coal). The remaining one-third of the lectures/discussions will focus on: (i) exploration methods to discover new mineral (and fossil fuel) deposits; (ii) economic aspect of mineral commodities (usages, production statistics, economic of mining and concentration); and (iii) environmental issues related to mining, nuclear waste disposal, and constructions. There will be two half-day field trips to study the nature of sulfide mineralization and acid-water pollution.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 452 Hydrogeology (3)** Hydrologic cycle: occurrence, movement, quality, and quantity of groundwater; solute transport; quantitative hydrogeologic methods; role of water in geologic processes. This course has one or more required field trips for which a fee may be charged to the student.

GEOSC 452

### **GEOSC 452 Hydrogeology (3)**

GEOSC 452 is the study of the relation between geological and hydrological processes in the earth's surface and subsurface environments. The course will address the fundamental issues and practical applications of natural flow systems, emphasizing the occurrence, movement, quality, and quantity of groundwater and its relations to contaminate fate and transport. The primary objective is to provide students with the fundamental knowledge and tools that are necessary to understand the hydrologic cycle. Students will gain an in-depth understanding of fluid flow across scales from point observations to watershed phenomena, and will gain skills in using mathematics to describe water fluxes. The course format consists of two lectures each week, and includes two field trips. Grading is based on weekly homework assignments, exams, and participation on the field trips. Because hydrogeology is linked to a wide array of environmental, ecological, engineering, and natural resource issues of societal importance, GEOSC 452 will support interdisciplinary training of students in the natural sciences and engineering. Students will find this course useful when undertaking research about fluids in geologic processes.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 454 Geology of Oil and Gas (3)** Properties, origin, migration, and occurrence of oil and gas. This course has one or more required field trips for which a fee is charged to the student.

### **Geology of Oil and Gas (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 461 Geology of North America (3)** Evolution of structural-stratigraphic framework of continent; interpretation of relevant data obtained from field, experimental, and geophysical observation.

### **Geology of North America (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 465 Structural Geology (4)** Effects and mechanics of deformation of the earth's crust; practicum includes field trips and studies of maps and structural problems. This course has one or more field trips for which a fee is charged to the student.

### **Structural Geology (4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 470W Introduction to Field Geology (3)** Field interpretation of geologic features; principles and techniques of geologic mapping; interpretation of geologic maps and diagrams. This course has one or more required field trips for

which a fee is charged to the student.

### **Introduction to Field Geology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 472A** Field Geology I (Introduction to Field Methods (3) Introduction to geologic field methods and the 3-D characterization of earth structure and the reconstruction of geologic histories. This course includes travel outside the University for which an additional charge will be made to cover transportation, food, and lodging.

### **Field Geology I (Introduction to Field Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 472B** Field Geology II (Advanced Field Methods) (3) Advanced application of geologic field methods to the 3-D characterization of earth structure and the reconstruction of geologic histories. This course includes travel outside the University for which an additional charge will be made to cover transportation, food, and lodging.

### **Field Geology II (Advanced Field Methods) (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 474** (BIOL 474) Astrobiology (3) In depth treatment of principles/concepts of biochemical evolution, the origin/evolution of life; evaluation of distribution of life in the universe.

### **GEOSC 474 GEOSC (BIOL) 474 Astrobiology (3)**

Astrobiology is the study of life in the universe. Astrobiology has become a major focus of scientific research in the United States and a topic often discussed in popular science literature. The recent interest in astrobiology has resulted in the formation of an Astrobiology Institute at Penn State University. This advanced undergraduate course in astrobiology will cover many topics in the field including, biochemical evolution, the origin and evolution of life on Earth, microbial diversity, protein evolution, and the distribution of life in the universe. This course is intended to provide students of the natural sciences with the opportunity to prepare for a research career in the rapidly expanding field of astrobiology. The course will also present astrobiology as a cross-disciplinary framework that ties together the diverse courses the students have already taken. The students will learn new concepts while having, to draw on their previous knowledge of chemistry, biology, and the geosciences. In summary, this course has the following objectives: (1) to develop the student's literacy in astrobiology so that they can critically evaluate claims that they encounter well after the course has ended; (2) to present a scientific question that requires the sum of the student's previous education to solve; (3) to provide a deep background to some of the astrobiological concepts that are often only briefly mentioned in other classes or in the media; (4) to develop research and communication skills required for a young scientist through a class term paper and short oral presentation; and (5) to prepare the students for graduate research in astrobiology by giving them a broad background of the field and by demonstrating many of the outstanding problems yet to be solved.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 479** Advanced Stratigraphy (3) Modern topics of sequence stratigraphy are addressed, with a heavy emphasis on field and laboratory data analysis and interpretation.

### **Advanced Stratigraphy (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 483 Environmental Geophysics (3)** This course presents the principles and applications of the variety of techniques geophysicists use to address environmental problems.

### **Environmental Geophysics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 487 Analysis of Time Series (3)** Nonstatistical approach to data analysis; spectral and correlation analysis; filter theory; signal-to-noise improvement applied to geoscience data.

### **Analysis of Time Series (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 488 An Introduction to Seismology (4)** An overview of the observations, methods, and frameworks used in seismogram analysis for earthquake and earth-structure investigations (includes laboratory).

GEOSC 488

### **GEOSC 488 An Introduction to Seismology (4)**

This course is an overview of the observations, methods, and frameworks used in seismogram-based investigation of earthquake and earth-structure. The main goals of the course are to prepare students of seismology for further study of earthquakes and earth structure using seismograms; to provide an overview of earthquake seismology for nonseismologists, to introduce undergraduate geophysics students to quantitative geoscience. Topics covered include stress and strain, faulting and tectonics, seismic body and surface wave propagation including ray methods, dispersion, and attenuation. Students perform fundamental seismological analyses using a computer-based, experiential laboratory exercises exploring the signals contained in research-quality data from recent earthquakes recorded on the international global seismic network.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 489 Dynamics of the Earth (4)** Constitution and dynamics of the solid earth; mechanics and consequences of Plate Tectonic processes.

### **Dynamics of the Earth (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 494M Senior Thesis (1-4)** Supervised student activities on research projects identified on an individual or small group basis.

### **Senior Thesis (1-4)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 494W** Senior Thesis (1-4) Supervised student activities on research projects identified on an individual or small group basis.

#### **Senior Thesis (1-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 497A** Geologic Maps in ARCGIS (1) This course provides an introduction to Geographic Information Systems (GIS) and their use in making geologic maps.

#### **Geologic Maps in ARCGIS (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 497A** Geologic Maps in ARCGIS (1) This course provides an introduction to Geographic Information Systems (GIS) and their use in making geologic maps.

#### **Geologic Maps in ARCGIS (1)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 500** Issues in Geosciences (3) Introduction of first year graduate students to issues in geosciences.

GEOSC 500

#### **GEOSC 500 Issues in Geosciences (3)**

This course is designed for graduate students joining the Geosciences Department and is limited to them. The objectives of the course include the developing of a sense of community among the new students, teaching them to cooperate and work in teams, emphasizing to them the importance of communications skills, giving them practice in them, and doing so in the context of an introduction to some broader issues of current interest in the geosciences. The course emphasizes student participation and faculty-student interaction in all sections of the course. This is accomplished via class discussions, specially set up and prepared debates between student teams promoting opposite points of view, and field studies, designed to collect pertinent information to support opposing arguments on an issue. Part of the course is dedicated to develop the intellectual tools necessary to pursue successful graduate student careers. These include the critical analysis of publications, communication and presentation skills, as well as the preparation of research proposals for funding. While the overall objectives of the course remain the same from year to year, the details of how they are pursued in the course is left to the individual instructors. This is necessary to maintain a dynamic course, which can only be achieved if the teaching faculty becomes personally involved. The course involves, each time that it is offered, two principal instructors who draw on the expertise of other faculty members for different areas of expertise. The commitment to teach the course is for two years. The instructorships are staggered so that each year one the participants rotates off while a new one is introduced. This provides for continuity in the pursuit of the course objectives while continuing to introduce new ideas. The Graduate Program Committee of the Department of Geosciences makes the selection of the instructors for this course. Student evaluations are typically based on: A short paper, field trip participation, debate, proposal, oral presentation and class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 502** Evolution of the Biosphere (4) The geologic history of the co-evolution of life and the surface environment is examined from a systems perspective.

#### **Evolution of the Biosphere (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 505** Quantitative Physical Sedimentology (3) Principles of fluid mechanics and mathematical modeling; their use in describing sediment transport, sedimentary structures, and sedimentary environments.

### **Quantitative Physical Sedimentology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 508** Mechanics of Earthquakes and Faulting (3) An in-depth treatment of fundamental concepts in brittle faulting and earthquake mechanics with emphasis on physical processes.

GEOSC 508

### **GEOSC 508 Mechanics of Earthquakes and Faulting (3)**

This is a core course in the geophysics sub discipline. The course will cover material that is fundamental to all students who will carry out thesis research in seismology, tectonics, and other areas of solid Earth geosciences. The course will cover brittle fracture, macroscopic failure criteria, effective stress laws, rheology, and friction constitutive laws. Continuum mechanics and elasticity will be introduced and developed in the context of crustal faulting. The state of stress in Earth's crust will be discussed. Detailed development of the theory and observations of fault nucleation and growth. Discussion of fault rocks and structures, the strength and rheology of faults, and seismotectonics. Processes of earthquake rupture and instability conditions will be developed in the context of an energy balance for faulting. The course is designed to provide an introduction to the quantification of earthquakes, including earthquake source parameters and scaling laws. The seismic cycle will be explored in terms of its relation to faulting, earthquake prediction, and earthquake physics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 511B** (MATSE 511B) Transmission Electron Microscopy (1) Principles and practice of transmission electron microscope operation. Students undertake individual projects.

### **Transmission Electron Microscopy (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 512** (MATSE 512) Principles of Crystal Chemistry (3) Relation of structure to ionic size and nature; influence of pressure and temperature on structure; chemical-structural defects, crystalline solutions, phase-transitions.

### **Principles of Crystal Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 514** Data Inversion in the Earth Sciences (3) This course focuses on how one finds theoretical parameters to explain observed data using discrete inverse theory.

### **Data Inversion in the Earth Sciences (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 518 Stable Isotope Geochemistry (3)** Theory of isotope fractionation mechanisms; its application to a wide range of problems in the earth and planetary sciences.

**Stable Isotope Geochemistry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 519 Mineral Equilibria (3)** A thermodynamic treatment of minerals and their reactions under geochemically important conditions of temperature and pressure.

**Mineral Equilibria (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 521 Thermal State of the Earth (2-3)** Analytical and numerical solutions to earth-related heat conduction and convection problems; geothermal energy; earth's heat flow and temperature.

**Thermal State of the Earth (2-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 522 Geochemistry of Aqueous Systems (2-3)** Ionic and molecular equilibria related to stabilities and solubilities of minerals, with applications to ground water, sea water, and hydrothermal fluids.

**Geochemistry of Aqueous Systems (2-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 523 Sedimentary Geochemistry (2)** Kinetics and thermodynamics of low-temperature processes in sediments. Applications to weathering processes, natural waters, deposition of sediments, and diagenesis.

**Sedimentary Geochemistry (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 529 Paleontology (1-6 per semester/maximum of 9)** Morphology and distribution of significant fossil groups; sampling, preparation, and applications to biostratigraphy, evolution, paleoecology, sedimentation, and petrography.

**Paleontology (1-6 per semester/maximum of 9)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 533** Principles of Geochemistry (3) A comprehensive treatment of the principles of geochemistry applied to a wide variety of geologic settings and scales.

### **Principles of Geochemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 540** Ore Deposits I (3) Geochemistry and geology of ore deposits formed by igneous and high- temperature hydrothermal processes.

### **Ore Deposits I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 541** Ore Deposits II (3) Geochemistry and geology of ore deposits formed by low-temperature hydrothermal, sedimentary, and metamorphic processes; continuation of GEOSC 540.

### **Ore Deposits II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 542** Quantitative Methods in Hydrogeology (1-4) Investigation of groundwater systems and resources, emphasizing both the practical use and limitations of modeling techniques.

### **Quantitative Methods in Hydrogeology (1-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 545** Glacial Geology (3) Glaciers: their characteristics, causes, deposits, landforms, effects in periglacial regions.

### **Glacial Geology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 548** Surface Processes (3) Principles, application, and interpretation of Quaternary geochronology, surface process studies, and landscape evolution.

### **Surface Processes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 555** Advanced Structure and Petrofabrics (1-3) Macroscopic and mesoscopic recognition, measurement, and interpretation of small-scale rock structures and mineral orientation patterns in deformed rocks.

#### **Advanced Structure and Petrofabrics (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 558** Multi-channel Seismic Processing and Interpretation (4) This course covers the basics of seismic energy propagation, modern 2- and 3-D multi-channel seismic data acquisition methods, and data processing.

#### **Multi-channel Seismic Processing and Interpretation (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 559** Seismology II (3) Rigorously covers the methods of computing wave fields for point and distributed seismic sources in vertically inhomogeneous elastic media.

#### **Seismology II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 560** Kinetics of Geological Processes (3) General development of the kinetic theory of crystal growth, diffusion, irreversible thermodynamics, and heterogeneous reactions needed for geosciences and related fields with applications to current problems.

#### **Kinetics of Geological Processes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 561** Mathematical Modeling in the Geosciences (4) The process of transforming a conceptual geoscience model into a numerical model is presented; students create and solve numerical models.

#### **Mathematical Modeling in the Geosciences (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 565** Tectonic Geomorphology (3) Tectonic geomorphology examines interactions between tectonic and surface

processes, paleoseismology, geodesy, structure, active deformation, and landform evolution.

### **Tectonic Geomorphology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 572** Field Stratigraphy (1-2) This course introduces students to field techniques used by stratigraphers, with the capstone experience being a field trip during May.

### **Field Stratigraphy (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 584** Clastic Depositional Environments (3) Readings, group discussions, and field work on processes and sedimentary responses of common rock-forming environments.

### **Clastic Depositional Environments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 585** Sedimentary Geology (3) An integrated approach to the study of modern and ancient sedimentary environments and their deposits.

### **Sedimentary Geology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 587** Preparing for an Academic Career in the Geosciences (3) The course focuses on successful strategies for the academic job market and for launching an academic career.

### **GEOSC 587 Preparing for an Academic Career in the Geosciences (3)**

This seminar is designed for advanced doctoral students who are ready to launch their own search for an academic position. We will explore important elements of the transition into an academic career, including the application and interview process and strategies to establish teaching and research programs. During the semester students will: (a) learn about roles and responsibilities of faculty members in different educational settings (e.g., community colleges, four-year colleges, universities); (b) Design a teaching and research plan suitable for the next career stage and write teaching and research statements to summarize these plans; (c) Learn strategies for documenting their strengths and accomplishments in teaching and research; (d) Learn "the inside scope" about job searches including how to navigate the application process, interviews, and negotiation; (e) Learn how to give an effective job talk; (f) Discuss strategies for balancing the many demands and expectations they will face in an academic career. Finally, students will develop a self-inventory of preferred options for the next career stage and a personal action plan.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 589** Seminar in Aqueous Geochemistry (1) A seminar aimed at reading current articles in aqueous geochemistry and biogeochemistry.

**Seminar in Aqueous Geochemistry (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597A** Topics in Earth Systems Science (2) EarthTalks is an interdisciplinary seminar series that meets weekly and seeks to examine complex environmental challenges facing our world today.

**Topics in Earth Systems Science (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597A** Topics in Earth Systems Science (2) EarthTalks is an interdisciplinary seminar series that meets weekly and seeks to examine complex environmental challenges facing our world today.

**Topics in Earth Systems Science (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597B** AAPG Imperial Barrel Award Competition (3) A team of five graduate will compete in AAPG's annual Imperial Barrel Award competition. (IBA). This class provides practical hands-on experience for students.

**AAPG Imperial Barrel Award Competition (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597B** AAPG Imperial Barrel Award Competition (3) A team of five graduate will compete in AAPG's annual Imperial Barrel Award competition. (IBA). This class provides practical hands-on experience for students.

**AAPG Imperial Barrel Award Competition (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597C** Topics in Earth Systems Science (2) EarthTalks is an interdisciplinary seminar series that meets weekly and seeks to examine complex environmental challenges facing our world today.

**Topics in Earth Systems Science (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597D** Paleobiology Seminar (1) Discussion of foundational papers and current, including student, research in paleobiology.

**Paleobiology Seminar (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597D** Paleobiology Seminar (1) Discussion of foundational papers and current, including student, research in paleobiology.

**Paleobiology Seminar (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597E** Topics in Biogeochemistry (2) This seminar addresses chemical interactions between the biosphere and the physical environment over Earth's history and as impacted by humans.

**Topics in Biogeochemistry (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597F** Advanced Crystallography (1) We will review group theory, symmetry operations, and derive plane and space groups.

**Advanced Crystallography (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 597G** Dynamics of Rivers and Floodplains, Past and Present (1) Seminar aimed at exploring physical, chemical, and biological dynamics of modern and ancient rivers and floodplains.

**Dynamics of Rivers and Floodplains, Past and Present (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching geosciences courses.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GEOSC 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## German (GER)

**GER 401Y** (IL) Advanced Composition (3) Intensive practice in writing different text types in German.

**GER 401Y Advanced Composition (3)  
(IL)**

GER 401Y is the writing across the curriculum component of the German language sequence. After thorough discussion of various text types, students will read and practice writing in different genres. GER 401Y concentrates on building other language skills as well. We will do so by reading and discussing short German texts from a variety of sources and watching film and television. In addition, we will review aspects of German grammar that present difficulties to many English speakers. Evaluation will be based on five writing assignments, a writing portfolio, quizzes, and class participation.

The course will be offered twice a year with an enrollment of up to twenty students.

GER 401Y is required for all German B.A. and B.S. major options as well as for the German minor.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 408** (IL) Advanced German Business Communications (3) Study of German business organization, forms of business communications, business terminology; writing of reports and abstracts.

**Advanced German Business Communications (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 411** The Teaching of German (3) Theory, methods, techniques, materials, bibliography; use of inter-active media; contributions of linguistics or psychology to language learning.

### **The Teaching of German (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 412** (IL) Contrastive Analysis of Modern German and English (3) Structural comparison of the German and English grammatical systems: morphology, syntax, phonology.

### **Contrastive Analysis of Modern German and English (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 420** (IL) Genre (3-9) Special studies in a particular literary genre in German literature, such as lyrical poetry, drama, or narrative prose.

### **Genre (3-9)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 430** (IL) History of the German Language (3) Development of German from its earliest stages, including historical and cultural aspects.

### **GER 430 History of the German Language (3) (IL)**

This course provides an overview of the history of the German language from its origins to the present. Historical changes and dialectal variation in phonology (sound system), morphology (word structure), syntax (sentence structure), lexicon (vocabulary), and semantics (word meaning) will be examined. Particular emphasis is placed on the impact of cultural and historical changes on the development of German, including its standardization. Students will be evaluated on the basis of homework, classroom participation, tests, and an in-class presentation with a written abstract. No prior knowledge of linguistics is required. The class is conducted in German.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 431** (IL) History of German Literature and Culture I (3) Significant works of German literature before the mid-eighteenth century considered in their cultural context.

### **History of German Literature and Culture I (3)**

General Education: None  
 Diversity: IL

Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 432 (IL) History of German Literature and Culture II (3)** Significant works of German literature from the mid-eighteenth century to the present considered in their cultural context.

### **History of German Literature and Culture II (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 440 (IL) Seminar in German Culture (3-6)** Seminar devoted to a special topic in the field of German culture and civilization.

### **Seminar in German Culture (3-6)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 472 (IL) Romanticism (3)** A study of both early and late romanticism, including such writers as Novalis, the Schlegels, E.T.A. Hoffmann, and Heine.

### **Romanticism (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 489 Introduction to German Film History and Theory in Context (3)** Introduces films in German since the 1960s and addresses issues relevant to German and European cultures and politics.

### **GER 489 Introduction to German Film History and Theory in Context (3)**

This course focuses on German cinema's development since the 1960s. The course situates the "Young" and then "New German Cinema" within contemporaneous European and U.S. film cultures. Thus the course will address the difference between the European cinematic culture of *"auteurs"* versus the school of "genres" in the U.S.

The preceding traditions of Italian Neo-realism and of the French *nouvelle vague* are also engaged alongside a few Hungarian, Czech and/or Polish films. The students will have the opportunity to consider how these other national cinematic productions impacted the German filmmakers who were involved in the creation of a national German cinema that would critically engage Hollywood on the one hand, and distance itself from the Nazi past on the other.

The course will be structured around questions about the grounds for a national cinema and its cultural and critical relevance both at the time these films were produced and today. Yet, the national question will not be the only focus of this class, in the course of which students will be able to discuss the historical, political and ethical questions raised by the directors selected. In addition, students in this course will learn about the specificity of cinematic language and will be exposed to some film theory. In conclusion, the course provides upper level undergraduate students with a basic knowledge of the most important New German films, with a confrontation with issues specifically relevant to a study of German culture, and with some familiarity with film theory.

The evaluation methods for this course will be based on 1) participation [attendance; reports/worksheets, after each film and in class discussion]: 30%; 2) presentation 20%; 3) take-home mid term essay 20%; and 4) final paper 30%. The course is part of the German Program, in particular of the German Studies curriculum. It teaches students of German culture about German and European contemporary cinema, while situating the cinema within broader historical-political debates concerning Europe. It functions as an excellent complementary course to our GER LIT classes at the 400 level and offers an additional choice to pursue cultural studies to those who are more reticent about reading texts. Enrollment: 25. The course will be offered every other year.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 495** Internship (3-9) Supervised off-campus, non-group instruction including individual field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1981  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1985

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 499** (IL) Foreign Study--German (3-12) Advanced studies in German language, literature, and culture.

**Foreign Study--German (3-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 510 Literary Theory: An Introduction (3)** Introduction to the major theoretical approaches to the contemporary study of culture (literature, film, art and politics).

### **GER 510 Literary Theory: An Introduction (3)**

This seminar will introduce students to contemporary literary and cultural theory in an effort to provide them with the methodological tools they need to undertake cutting-edge literary and cultural analysis themselves. German Studies in the U.S. has at least two defining characteristics. First, though, at least for those of us in German Departments, its emphasis is mainly on culture, it is genuinely interdisciplinary, attempting to explore how cultural products and practices (defined as extending far beyond the traditional canon of German literature) are constituted by and help to constitute history and politics. And, secondly, it advances its interdisciplinary analyses by drawing increasingly on new methodologies elaborated by Anglo-American and foreign cultural theorists. Among the theoretical approaches we may focus on will be formalism and structuralism, psychoanalysis, Marxism, cultural studies, feminism, gender studies, and queer theory, and post-colonial theory. These new theories have profoundly transformed disciplines such as Anglo-American literary studies, comparative literature, women's studies, history, and anthropology, since the Seventies. In this course we shall find out if/how such theories could transform German Studies, too. The course is reading-intensive and students are expected to invest most of their time in reading and preparing for class discussions. Regular attendance and informed participation in class discussion will be required. This involves reading all assigned articles on a regular basis (20%); oral presentation of one weekly section (30%); second oral presentation that includes a sample analysis of the assigned texts (20%); and one 12-15 page paper due at the end of the semester (30%). German 510 will be the second unit in a three-course package intended to provide beginning graduate students with a set of correlated introductory courses. German 510 is the only wide-ranging course in theory offered by the Department for incoming students. This course will be offered once a year with 5 to 10 students (15 max) per offering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 511 The Teaching of College German (3)** Theory, methods, techniques, materials, bibliography contributions of linguistics and psychology to language learning; methods of teaching post- secondary German.

### **GER 511 The Teaching of College German (3)**

German 511 introduces students to the theory and methods of teaching German at the college level. It deals not only with techniques, materials, and bibliography of the field but also evaluates the contributions of linguistics and psychology to college-level language pedagogy. German 511 familiarizes students with current theories of foreign language education as they relate to post-secondary language acquisition. This course further includes the practical aspects of college-level teaching with special reference to problems related specifically to the teaching and learning of German. Evaluation procedures include examinations, research papers, and the preparation of sample teaching materials. German 511 is a required course for all German graduate students both at the M.A. and Ph.D. level. It is offered every year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 513 German Phonetics and Phonology (3)** This course examines German speech sounds and their organization into a linguistic system.

### **GER 513 German Phonetics and Phonology (3)**

This course provides an overview of the major subfields of phonology as they apply to the German language. No prior knowledge of linguistics or phonology is assumed. Topics discussed include articulatory phonetics, the phoneme, distinctive features, and common phonological processes in German such as final devoicing, prosody, prosodic morphology and dialectal variation. The class will practice phonetic transcription of German and English. We will discuss common phonetic and phonological difficulties presented by German for native speakers of English. In addition to practical applications of phonetics, the class will investigate theoretical concepts such as the phoneme, distinctive features, lexical stress, the syllable and the prosodic foot. Reading assignments include scholarly articles employing

different theoretical frameworks and excerpts from seminal works in the field. Frameworks to be discussed include derivational approaches and Optimality Theory. The class will also examine dialectal variation with a particular emphasis on differences between Low, Middle and Upper German dialects. Each student will make a presentation investigating the phonological system of a German dialect. Evaluation is based on problems, class presentations and a final research paper.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 514 German Syntax (3)** This course provides an overview of morphosyntactic processes in German.

### **GER 514 German Syntax (3)**

This course provides an overview of the major components of morphology and syntax as they apply to the German language. No prior knowledge of linguistics or morphosyntax is assumed. Topics discussed include the basic syntactic constituents in German, the verbal bracket and movement rules, German argument structure, the tense/mood/aspect system for German verbs, the connection between pragmatics and word order in German, and dialectal variation as it relates to German syntax. Emphasis will also be placed on how these different areas of German syntax are related to descriptive grammar rules as presented in many German language classes. Reading assignments include scholarly articles employing different theoretical frameworks, including minimalism, and excerpts from seminal works in the field. Evaluation is based on problem sets, two take-home exams and a research paper.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 515 Introduction to German Applied Linguistics (3)** Introduction to the major areas of the broad field of Applied Linguistics as relevant to the study of German.

### **GER 515 Introduction to German Applied Linguistics (3)**

This course provides an introduction to some of the major areas of Applied Linguistics as they apply to users of the German language. No prior knowledge of linguistics is assumed. Topics discussed include the acquisition of German by people who do not speak it natively, the teaching of German to people who do not speak it natively, the use of technology in the instruction of German, the relationships between users of German and German (Pragmatics) in both oral and written discourse, and the inter-relationships of society and culture, users of the German language, and the use of the German language in global and local contexts (Sociolinguistics). This is not a language course that focuses on the speaking and writing of German. The course will be conducted in either German or English. Reading assignments will include scholarly articles and excerpts from seminal work in the field. Students will work extensively on published and self-collected data, e.g. recordings of German classroom discourse, German conversations, German advertising. Evaluation is based on problem sets, seminar presentations, assigned readings, classroom participation, and written assignments. The course is required for students pursuing the German PhD Option in Applied Linguistics and may be selected to satisfy the core requirements for the M.A. in German. This course will be offered once each year with 15 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 516 The Acquisition of German and Dutch (3)** This course examines how children and adult learners acquire German and Dutch in naturalistic settings (i.e. non-classroom situations).

### **GER 516 The Acquisition of German and Dutch (3)**

This course is designed to provide students with an overview of the current literature on the acquisition of German and Dutch by children, with a comparative examination of selected research on the acquisition of German as a second language (L2). Though we will deal mainly with German and Dutch data, these will be evaluated within the larger context of general theories of both first- and second-language acquisition. Over the course of the semester we will consider questions surrounding the acquisition of phonology, morphology (especially grammatical gender and noun plurals) and syntax (specifically verbal inflection and word order). Students do not need to have background or previous coursework in linguistics or psycholinguistics. Although the class will be conducted in English, reading knowledge of German is desirable, in order to better understand the data we will be examining.

The goals of this course are as follows: 1) familiarize students with general theories of child language acquisition, and aspects of German and Dutch L1 acquisition in particular, 2) draw connections between theories of L1 acquisition and phenomena in L2 acquisition (both of German/Dutch and in general), 3) familiarize students with how researchers analyze child language data.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 520** Introduction to Middle High German (3) Descriptive and historical grammar; readings in simple Middle High German texts.

### **Introduction to Middle High German (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 523** Gothic (3) Introduction to the historical and comparative Germanic grammar; emphasis on the Gothic language and texts. Suitable for advanced students in English.

### **Gothic (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 540** Seminar in German Culture and Civilization (3-12) Examination of special problems in German culture and civilization.

### **Seminar in German Culture and Civilization (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 541** German Literature of the Renaissance and Baroque (3) Intensive survey and review of German literature between 1450 and 1700.

### **German Literature of the Renaissance and Baroque (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 551** German Literature from the Early Enlightenment to Storm and Stress (3) Advanced overview of major developments in German literature from the early to the late 18th century.

### **German Literature from the Early Enlightenment to Storm and Stress (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 552** German Classicism and Romanticism (3) Intensive survey of German literature from the late 18th through the first third of the 19th centuries.

**German Classicism and Romanticism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 561** German Literature of the 19th Century--From Beidermeier to Realism (3) Survey of major developments in German literature from the mid- to the late-19th century.

**German Literature of the 19th Century--From Beidermeier to Realism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 571** German Literature from the Turn of the Century to 1945 (3) Advanced survey of German literature from the era of Naturalism to that of Exile literature.

**German Literature from the Turn of the Century to 1945 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 572** Post-War and Contemporary German Literature (3) Intensive survey of German literature from Gruppe 47 through the literature of the GDR and down to the present.

**Post-War and Contemporary German Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 581** Topics in Literary Genres (3-12) Special studies in the German lyric, drama, short story, and novel.

**Topics in Literary Genres (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 582** Topics in Germanic Philology and German Linguistics (3 per semester, maximum of 12) Special studies of modern or older Germanic languages.

**Topics in Germanic Philology and German Linguistics (3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 589** (CMLIT 589, FR 589, SPAN 589) Technology in Foreign Language Education: An Overview (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)

**Technology in Foreign Language Education: An Overview (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 591** German Literary Theory and Criticism (3-6) Examination of major movements in literary theory and criticism with special reference to German literary thought.

**German Literary Theory and Criticism (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 592** Seminar in German Literature (3 per semester, maximum of 12) Focused investigation of a major figure or theme in German literature.

**Seminar in German Literature (3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 593** Seminar in German Philology and German Linguistics (3 per semester, maximum of 12) Focused investigation of a major topic in Germanic philology or linguistics.

**Seminar in German Philology and German Linguistics (3 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 596** Individual Studies (1-9) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 597A Sociability and Theory: from Socrates to Facebook with a String of Germans in Between (3)** This course examines the connection between social networks among intellectuals and the formation of critical aesthetic theories. Intellectuals do not all work in isolation, rather they can thrive on friendship and sociability. Starting with Plato's "Symposium" and concluding with the social media of digital humanities, this course will examine how the give and take of written correspondence and conversation heightens the complexity of aesthetic theory.

**Sociability and Theory: from Socrates to Facebook with a String of Germans in Between (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 600 Thesis Research (1-15)** No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 601 Ph.D. Dissertation Full-Time (0)** No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 602 Supervised Experience in College Teaching (1-3 per semester/maximum of 6)** Instruction of lower division German courses with observation by the supervisor and attendance at regular meetings to discuss classroom techniques.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 603 Foreign Academic Experience (1-12)** Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 610 Thesis Research Off Campus (1-15)** No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GER 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Global Health (GH)**

**GH 717** Global Health Scholars First Year Elective (1-5) This course provides exposure to basic concepts of global health, tailored to first year medical students with a focus on community health assessment and engagement.

**Global Health Scholars First Year Elective (1-5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GH 727** Global Health Scholars Second Year Elective (1-5) This course provides exposure to basic concepts of global health, designed for the second year medical students, with a focus on the global burden of disease and community-oriented participatory research. Students will utilize the knowledge and skills gained during this year, guided by faculty, to develop a health improvement intervention for the host site (e.g. San Pablo, Ecuador). This elective does not meet graduation requirements. It is offered as part of the Global Health Scholars Program.

**Global Health Scholars Second Year Elective (1-5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GH 747** Global Health Scholars Fourth Year Elective (4) Global Health Scholars 4th year elective.

**Global Health Scholars Fourth Year Elective (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Government & Politic (GOVMT)**

**GOVMT 952** Administrative Law (3) The administrative process, rules and rule making, inspections and investigations, administrative hearings, rules of evidence, presumptions, burden of proof, formal and informal actions, orders, the right to, methods of obtaining, and scope of judicial review are examined.

**Administrative Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GOVMT 954 Election Law (2)** This course covers federal and state election law and will examine the constitutional basis for the regulation of elections, the development of the law in this area over the last 30 years, as well as criminal and civil enforcement of the law, the role of the Federal Election Commission, the formation and regulation of political action committees, as well as related federal tax law provisions impacting operation of political committees and advocacy organizations. The course will also examine the intersection of the election law with congressional ethics rules, lobbying regulations and representation of political candidates and entities in election law matters.

**Election Law (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GOVMT 970 Legislation (3)** This course deals with the enactment and construction of statutes with specific attention to the organization, procedures and powers of federal and state legislative bodies, to statutory drafting and construction, and to lobbying.

**Legislation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GOVMT 971 Statutory Interpretation (3)** The course covers the wide variety of tools that lawyers and judges use to interpret statutes. A basic introduction to the legislative process and how important aspects of that process are relevant to statutory interpretation is also included. Students will be introduced to important techniques of statutory interpretation and the theoretical support for varying approaches to how judges do and should interpret statutes.

**Statutory Interpretation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GOVMT 985 Aviation Law (2)** This course seeks to give the students a firm grounding in the law governing the domestic use of airspace for transportation and recreation. The licensing requirements of pilots, the struggle of the aviation industry to adapt to the market, the safety and security of passengers and the problems involved in building airports are just a few of the topics covered. The course provides an opportunity for those students who are interested in aviation to apply many of the subject they have studied in law school to a particular area of human activity. The cases studied in the course involve, inter alia: Administrative Law, Antitrust, Bankruptcy, Conflicts of Law, Contracts, Local Government Law, Environmental Law, Labor Law, Property Sales, Taxation and Torts.

**Aviation Law (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GOVMT 987 State and Local Government Law (3)** Important issues in governmental organization and management are

surveyed. Emphasis is placed on intergovernmental relations, the legislative process, personnel issues, financing, and contracting. The course will conclude with a consideration of recent trends toward metropolitan regionalism.

### **State and Local Government Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GOVMT 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Greek (GREEK)**

**GREEK 401** Introductory Reading in Greek Literature (3-6) Analysis of selected passages of ancient Greek literature; attention will be paid to grammatical as well as literary details.

### **GREEK 401 Introductory Reading in Greek Literature (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GREEK 401 is an ancient Greek literature course in which students will read selections from various genres. Students also will read in English additional selections of the authors they are studying. The overall goal of the course is to increase the ease and fluency of advanced-level students with ancient Greek. Although students will be expected to enter the class with a comfortable level of reading skill as acquired in GREEK 003 or 102 or their equivalent, the course will include grammar and building vocabulary. By the end of the course, it is expected that students will be able to read Greek fluently, and be able to analyze grammatical structures.

Students' work in the course will be evaluated based on class participation, several in-class quizzes and tests, and a final examination. GREEK 401 is one of a series of advanced Greek poetry and prose courses that allow students to gain skill and knowledge about a range of ancient Greek literature. GREEK 401 may be used to fulfill several requirements for the CAMS major including the requirement of courses in Greek or Roman language, literature, or archaeology and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin. The course will be offered every other year with 20 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 420** Greek Prose Authors (3-6) Readings in representative authors.

### **Greek Prose Authors (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 425** Greek Historians (3-6) Translation and study of one or more of the ancient Greek historians.

### **GREEK 425 Greek Historians (3-6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

GREEK 425 is a reading course in ancient Greek focusing on one or more of the major ancient Greek historians (usually Herodotus, Thucydides, or Xenophon, or Polybius). The course is designed to advance the student's fluency in reading Greek prose, while at the same time enriching their understanding of Greek civilization and history by a thematic choice of historical readings. The course may concentrate on one author or may address a thematic issue with readings from a variety of Greek historians. For example, readings may be selected from Herodotus' accounts of ancient Egypt. Or readings may focus on a comparative study of Thucydides' and Polybius' reasons for writing history. The major portion of class time will be devoted to translating prepared passages. These passages will also be the basis for discussing grammatical forms, as well as stylistic issues in prose writing. The class will also include discussions of historical themes relevant to the readings. Students' work in the course will be evaluated based on class participation, three in-class tests, a final examination, and a term research paper or oral presentation.

GREEK 425 is one of a series of advanced Greek poetry and prose courses that allows students to gain skill and knowledge about a range of ancient Greek literature. This course requires a mastery of basic Greek grammar and vocabulary acquired in GREEK 003, 102, or their equivalent. GREEK 425 may be used to fulfill several requirements for the CAMS major including the requirement of courses in Greek and Roman language, literature, and archaeology, and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin.

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 430** Greek Poetry (3-6) Translation and analysis of selected readings in Greek poetry.

**GREEK 430 Greek Poetry (3-6)****(BA) This course meets the Bachelor of Arts degree requirements.**

GREEK 430 is an advanced Greek literature course in which students will read 1200-1500 verses of a non-dramatic genre of ancient Greek poetry (in different years the course is offered, this might be epic, lyric, bucolic, or didactic poetry). Students also will read in English the entire output of the author they are studying. The overall goals of the course are as follows: (1) to increase the ease and fluency of advanced-level students with ancient Greek in general and poetic idiom in particular; and (2) to expose students to a limited amount of scholarly literature and give practice in understanding and evaluating a scholarly argument in relation to a primary text with which they are familiar. Students will be expected to enter the class with a comfortable level of reading skill (as acquired in GREEK 003, 102 or their equivalent); the course will not cover grammar, nor will all the assigned readings in Greek be translated in class. Emphasis is on reading a generous amount of poetry in the original Greek and on literary interpretation.

The approach in the classroom will change as the term progresses. Initially, classes will be more lecture-driven in order to explain the background and characteristics of the poetry being read. Translation assignments early in the semester will be relatively short (30-50 verses per class). As students gain in ease and familiarity with the Greek they are reading, assignments will become longer (with a goal of approximately 100 verses per class by the end of the term) and students will assume an increasing proportion of the responsibility for conducting individual class sessions, culminating in student presentations at the end of the semester. GREEK 430 is one of a series of advanced Greek poetry and prose courses that allows students to gain skill and knowledge about a range of ancient Greek literature. GREEK 430 may be used to fulfill several requirements for the Classics and Ancient Mediterranean Studies major including the requirement of courses in Greek or Roman language, literature, or archaeology and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin. Students will be evaluated through class participation, quizzes, tests, an oral presentation, and a final exam. The course will be offered once every other year and will offer 20 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 440** Greek Drama (3-6) Translation and study of a selected play.

**GREEK 440 Greek Drama (3-6)****(BA) This course meets the Bachelor of Arts degree requirements.**

GREEK 440 is an advanced Greek drama course in which students will read 1200-1500 verses of an ancient Greek drama. Students also will read in English additional plays by the author they are studying. The overall goals of the course are as follows: (1) to increase the ease and fluency of advanced-level students with ancient Greek in general and dramatic idiom in particular; and (2) to expose students to a limited amount of scholarly literature and give practice in understanding and evaluating a scholarly argument in relation to a primary text with which they are familiar. Students will be expected to enter the class with a comfortable level of reading skill. The course will not cover grammar, nor will all the assigned

readings in Greek be translated in class. Emphasis is on reading an entire play in the original Greek and on literary interpretation.

The approach in the classroom will change as the term progresses. Initially, classes will be more lecture-driven in order to explain the background and characteristics of the poetry being read. Translation assignments early in the semester will be relatively short (30-50 verses per class). As students gain in ease and familiarity with the Greek they are reading, assignments will become longer (with a goal of approximately 75-80 verses per class by the end of the term) and students will assume an increasing proportion of the responsibility for conducting individual class sessions. Students will be evaluated through class participation, quizzes, tests, and a final examination.

GREEK 440 is one of a series of advanced Greek poetry and prose courses that allow students to gain skill and knowledge about a range of ancient Greek literature. This course requires a mastery of basic Greek grammar and vocabulary acquired in GREEK 003, 102, or their equivalent. GREEK 440 may be used to fulfill several requirements for the Classics and Ancient Mediterranean Studies major including the requirement of courses in Greek or Roman language, literature, or archaeology and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin. GREEK 440 will be offered once every other year with 20 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 499** (IL) Foreign Studies (12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 509** Greek Seminar (3-9) No description.

**Greek Seminar (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 520** Greek Mythography (3) This graduate seminar focuses on ancient Greek mythographic authors from the beginnings of the genre (6th C.B.C.E.) to the Roman period.

**GREEK 520 Greek Mythography (3)**

This graduate seminar focuses on the ancient Greek mythographic authors from the beginnings of the genre in the sixth century B.C.E. to the Roman period. We shall define "mythography" simply as the prose exposition of mythic narratives (the most well-known Greek mythographer is Apollodorus, whose first-century C.E. "Bibliotheca" is consulted regularly by students of myth; some of the earlier practitioners include Hellanicus and Pherecydes). The seminar will consider selected readings in the theory of myth, alongside which we will examine in detail and evaluate the content of sources of the mythographers' writings. Some of these provide quite outlandish variants on known myths or bizarre stories otherwise unknown. Through a series of case studies of particular mythic stories, we shall place these texts in literary and cultural relief by seeking to understand how they interact with the more well-known mythic genres of Greece such as epic, lyric, and tragedy. We will also probe the borders of what we call "mythography" by examining other prose texts not normally associated with the genre, such as Herodotus' Histories or even philosophical texts such as Plato or Aristotle. In addition, since much of the material we will treat is in a fragmentary state, we will try our hands at reconstructing both texts and myths that survive in only incomplete form. Some attention will also be given to the Latin mythographic tradition (e.g. Hyginus and others) which is mostly, or perhaps wholly, dependent upon earlier or contemporary Greek mythography.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**GREEK 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None

Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Health Administration (H ADM)

**H ADM 503** (P ADM 503) Research Methods (3) Examination of research methodologies relevant to administration, planning, and public policy.

### Research Methods (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 506** (P ADM 506) Management Information Systems for Public and Health Administration (3) The design, implementation, and purpose of computerized management information systems in health and non-profit organizations.

### Management Information Systems for Public and Health Administration (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 510** (P ADM 510) Organization Behavior (3) Examines the concepts of human behavior in formal organizations, systems analysis, conceptual models, and decision processes.

### Organization Behavior (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 539** Health Systems Organization (3) Health care delivery presented as a socio-technical systems focusing upon resources, policy issues, institutions, technology, and innovations.

### Health Systems Organization (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 540** Health Administrative Policy Formulation (3) Analysis of administrative problems from a total organization viewpoint. Case studies of actual organizations are used for analysis.

### Health Administrative Policy Formulation (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 541** Health Economics and Policy (3) Public policy issues, health system components from economic perspective.

Economic analysis of health sector, medical markets, health care regulation.

### **Health Economics and Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 542** Health Care Politics and Policy (3) This course reviews political considerations and the policy process as they pertain to health care in the United States.

### **Health Care Politics and Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 543** Long-Term Care Administration and Policy (3) This course reviews theory and practice related to long-term care administration and policy.

### **Long-Term Care Administration and Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 545** Health Financial Management (3) Theory and techniques of financial management applied to health organizations; forecasting, control systems, working capital, capital budgeting, and institutional financing.

### **Health Financial Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 546** Health Planning for Public Administration (3) Comprehensive planning and program planning for health services, facilities, and manpower; social, economic, and political considerations; methodological problems.

### **Health Planning for Public Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 548** Health Care Quality Assurance (3) This course reviews theory, methods, outcomes, and management of quality assurance in health care organizations.

### **Health Care Quality Assurance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**H ADM 551 Health Care Law (3)** Course on health law for administrators with coverage including hospital governance, taxation, licensure, liability, malpractice, patients' rights, anti-trust.

**Health Care Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 552 Health Delivery Systems (3)** This course discusses design and implementation of health care delivery systems and the pressure and stakeholders which impact those systems.

**H ADM 552 Health Delivery Systems (3)**

This course covers the design and implementation of health care delivery systems. Beginning with policy and environmental pressures, the course considers the interests of diverse stakeholders such as regulators, purchasers, providers and consumers. The content of the course is organized in four areas: (1) traditional delivery systems; (2) managed care concepts and practices; (3) healthy communities approaches; and (4) reform and futures issues.

The objective of the course is to increase students' knowledge of the evolving health care delivery systems. This course functions as an elective course in the MHA program. It builds on core courses that have presented the basics of health systems. Students will be required to take a mid-term and final exam and write a term paper (grade 1/3 each). The course will be offered every third semester with an expected enrollment of 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 597A** Comparative Health Systems (3) This course will examine global health systems from a comparative perspective. For each country (from developed to developing countries) we will examine the following: a very general overview of the economy and very brief history; a description of their healthcare system; an evaluation of each health system in terms of cost, quality, and access; and current and emerging challenges facing each country. In an increasingly globalized society, a clear understanding of international healthcare systems is a fundamental step toward improving the quality of health and healthcare systems in the United States and abroad.

### **Comparative Health Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 597A** Comparative Health Systems (3) This course will examine global health systems from a comparative perspective. For each country (from developed to developing countries) we will examine the following: a very general overview of the economy and very brief history; a description of their healthcare system; an evaluation of each health system in terms of cost, quality, and access; and current and emerging challenges facing each country. In an increasingly globalized society, a clear understanding of international healthcare systems is a fundamental step toward improving the quality of health and healthcare systems in the United States and abroad.

### **Comparative Health Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 597A** Comparative Health Systems (3) This course will examine global health systems from a comparative perspective. For each country (from developed to developing countries) we will examine the following: a very general overview of the economy and very brief history; a description of their healthcare system; an evaluation of each health system in terms of cost, quality, and access; and current and emerging challenges facing each country. In an increasingly globalized society, a clear understanding of international healthcare systems is a fundamental step toward improving the quality of health and healthcare systems in the United States and abroad.

### **Comparative Health Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 597B** Health Care Leadership (3) This course examines the dynamic nature of leadership in the healthcare organizations. An emphasis is placed on the application and practice of leadership theories, models, practices, and capabilities of leadership within a health organization. Students will also explore the leadership qualities of successful healthcare leaders as well as embark on a journey of self-discovery of their own leadership potential.

### **Health Care Leadership (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H ADM 897A** Health Care Costs for Health Administration (3) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Health Care Costs for Health Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Health Education (HL ED)**

**HL ED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 596** Individual Studies (1-9) Individual studies course.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 597** Special Topics (1-9) Special topics course.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 602** Supervised Experience in College Teaching (1-3 per semester maximum of 6) Preparation and presentation of materials in lecture and laboratory classes under the supervision of a full-time faculty member.

**Supervised Experience in College Teaching (1-3 per semester maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HL ED 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Health Education (HLHED)

**HLHED 406** Human Sexuality (3) Examination of physiology, diseases, attitudes, morality, and controversial topics related to human sexuality.

### Human Sexuality (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 415** Planning and Developing Health Education Programs (3) Premises and strategies for planning, implementing, and evaluating wellness programs in corporate, hospital, and community agency settings.

### Planning and Developing Health Education Programs (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 420** Development of Stress Management Programs for Health Education (3) Planning, development, and implementing strategies for stress management programs for health education professionals in school, community, and corporate settings.

### Development of Stress Management Programs for Health Education (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 443** Alcohol and Drug Education (3) Principles of integration and coordination of alcohol and drug education programs for health education and other social service professions.

### Alcohol and Drug Education (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 456** Advanced Techniques in School and Community Health Education (3) Public health, mental health, nutrition, dental school health, physical education, accident prevention, health teaching; projects, consultation, visitation, discussions, and resources.

### Advanced Techniques in School and Community Health Education (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Fall 1997

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 501 World Health Promotion (3)** Analysis of the various health problems that affect humans throughout the world; emphasis will be placed on personal health issues.

### **World Health Promotion (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 516 Evaluation of Health Education and Promotion Programs (3)** Criteria and strategies to assess the impact of health education and health promotion programs in school, community, and corporate settings.

### **Evaluation of Health Education and Promotion Programs (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 530 Research Techniques in Health Education (3)** Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in the health education field.

### **Research Techniques in Health Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 552 Current Health Education Issues (3)** Analysis of scientific and political foundations of current issues within health education tasks, with emphasis on research and action implications.

### **Current Health Education Issues (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 553 Multicultural Health Issues (3)** This course is designed to explore cultural factors influencing the health status among racial/ethnic groups in the United States.

### **HLHED 553 Multicultural Health Issues (3)**

This course is designed to explore ethnic and cultural factors influencing the health status among racial/ethnic groups in

the U.S. Through lecture, discussion, simulations, and case studies, the students will be able to develop an appreciation for the cultural traditions and practices of different groups. The importance and implications of these traditions on health outcomes and health status will be examined. The students will also learn skills of cultural competence that are essential for public health practitioners.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 582 (EDUC 582) Spirituality and Culture in Health and Education Professions (3)** This course focuses on the cultural aspects of spirituality and its place in the health and education professions.

### **HLHED (EDUC) 582 Spirituality and Culture in Health and Education Professions (3)**

This course will focus on the examination of the place of the cultural aspects of spirituality and its place in the education and health professions and its implications for culturally responsive education and/or health care in a multicultural society. In particular the goals of the course are as follows:

- 1) To clarify the difference between spirituality and religion and to understand how spirituality is currently being examined in the fields of adult education, medical education and the health professions.
- 2) To examine how culture informs spirituality generally, and more specifically, to examine how culture relates to one's own spiritual development and overall health in the world.
- 3) To develop a sense of how people construct knowledge through image and symbol, which for many people, maps to their spirituality and culture, as they make new and deeper meaning of their own lives.
- 4) To begin to consider WHEN and HOW one might appropriately draw on one's own spirituality and that of participants in adult and higher educational practices and health care settings to increase cultural understanding and/or responsiveness to patient needs and when such discussion might seem to impose a spiritual or religious agenda.
- 5) To examine the connections among spirituality, culture, some complementary and alternative medicine modalities and overall holistic health and education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 591 Capstone Seminar in Health Education (3)** Culminating or capstone experience for students in the M. Ed. program in Health Education.

### **Capstone Seminar in Health Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLHED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Health Law (HLTHL)**

**HLTHL 960** Food and Drug Regulation (3) This survey course covers the federal regulation of food, human and animal drugs, medical devices, cosmetics, biologics, and agricultural biotechnology. The primary focus will be on the Federal Food, Drug, and Cosmetic Act and the operations of the U.S. Food and Drug Administration. The course will also cover related status implemented by the U.S. Department of Agriculture, the interaction between federal regulation and private tort litigation, and international trade in FDA-regulated products.

**Food and Drug Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLTHL 960** Food and Drug Regulation (3) This survey course covers the federal regulation of food, human and animal drugs, medical devices, cosmetics, biologics, and agricultural biotechnology. The primary focus will be on the Federal Food, Drug, and Cosmetic Act and the operations of the U.S. Food and Drug Administration. The course will also cover related status implemented by the U.S. Department of Agriculture, the interaction between federal regulation and private tort litigation, and international trade in FDA-regulated products.

**Food and Drug Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLTHL 961** Bioethics and Public Health Law (3) The course will focus on the laws governing ethical issues that arise in the course of providing medical care and ensuring public health. Specific topics include treatment at the end of life, reproductive rights, organ transplantation, genetic testing, human experimentation, and infectious disease control and prevention. A central theme is the conflict between patients' interests and the interests of others and/or social interests. This course also explores the intersection of ethics and economics in terms of the social right to care and the rationing of limited medical resources.

**Bioethics and Public Health Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLTHL 963** Healthcare Organization and Finance (3) This introductory health law course will examine how the law influences the regulation, structure, financing, and delivery of healthcare in the United States. We will also consider the challenges facing healthcare providers, regulators, and consumers. Issues to be addressed include private health insurance and managed care, ERISA, COBRA, HIPAA, Medicare, Medicaid, fraud and abuse, and antitrust.

### **Healthcare Organization and Finance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLTHL 971** Law and Medicine (3) This course focuses on law concerning the physician-patient relationship as well as bioethical issues that arise in that relationship. It covers confidentiality, medical malpractice, informed consent, the duty to treat, refusing life-sustaining medical treatment, physicians and patients on matters relating to patient care.

### **Law and Medicine (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLTHL 997** Special Topics (1-9) Special topics in the Health Law field.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Health Policy and Administration (H P A)**

**H P A 401** (IL) Comparative Health Systems (3) Comparative analysis of health services in selected developed and developing countries.

### **Comparative Health Systems (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 410** Principles of Public Health Administration (3) The rationale for, and the patterns of, public health service at all levels of government in the United States.

### **Principles of Public Health Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 420** Principles of Managed Care (3) Survey of managed health care, including history, typology, current issues, management challenges, and impacts on patients, providers, and special populations.

### **Principles of Managed Care (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 430 Health Care Leadership (3)** This course provides an opportunity to students to learn about the challenges of leadership in health care.

### **H P A 430 Health Care Leadership (3)**

Leadership has been identified as one of the core competencies needed to improve the U.S. health care system and one of the challenges to solving the problems of cost, quality and access. This course provides an opportunity for students to learn about the challenges of leadership in health care. Through experience, reflective reading and writing, and discussion, students will explore their own leadership capabilities.

The course content covers three main areas. First, after reviewing academic research and the history of leadership development in health care, the course examines current models of leadership competency used for leadership development in both university programs and health care organizations. The knowledge, skills, and attitudes contained in these competency models and needed to become a leader in health care are each reviewed in detail. Second, current challenges for health care leaders are presented and discussed, emphasizing how different dimensions of leadership come into application in trying to meet these challenges and solve the problems they create. Third, through exercises and assignments, students explore their strengths and weaknesses in these leadership competencies, gaining additional understanding of the competencies through this application.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 433 Administration of Hospital and Health Service Systems (3)** Analysis of administrative structures and interorganizational arrangements among hospitals and other health care organizations.

### **Administration of Hospital and Health Service Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 440 (US;IL) (BB H 440) Principles of Epidemiology (3)** Theory of epidemiology and significant case studies. Potential application to health care.

### **H P A (BB H) 440 Principles of Epidemiology (3) (US;IL)**

This course is designed to provide students with a basic understanding of the principles of Epidemiology and to familiarize students with the methods and applications of epidemiology to understanding the bases for heterogeneity of disease and health among populations.

The goals of the course are: 1) recognize and use basic principles, concepts, terminology, and techniques in Epidemiology as applied to the study of infectious disease, chronic diseases, and other health-related problems; 2) examine and understand measures of risk and burden of illness on populations defined in terms of age, race, gender, class, time, and other relevant socio-cultural and demographic factors; 3) be able to interpret and critique epidemiological research reports on the identification of risk factors and casual factors for diseases in populations; 4) assess the health status and burden of diseases and health problems of populations at multiple levels of analysis for the purpose of planning health promotion activities and health care services; 5) have a basic understanding of the epidemiology tools for disease screening and other methods for primary and secondary prevention of disease and health problems; 6) examine the validity and applicability of various health interventions used to improve health status and the barriers for successful interventions; and 7) have a basic understanding of the epidemiology of the major causes of morbidity and mortality in the U.S. and for other selected regions and nations of the world.

This is a required course in the Biobehavioral Health major and an elective course in the Health Policy and Administration major. The course is also appropriate for students intending to advance to post-baccalaureate graduate and professional programs in medicine, public health, health policy and planning, and other health-related careers.

Students will be evaluated based on their performance on a combination of written assignments, a term paper or project, and exams.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 440U** (US;IL) (BB H 440U) Principles of Epidemiology (3) Theory of epidemiology and significant case studies. Potential application to health care.

### **Principles of Epidemiology (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 442** Long-Term Care Management (3) Management and policy issues for institutional, community, and home settings for chronic care services.

### **Long-Term Care Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 445** (ECON 445) Health Economics (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

### **Health Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 445W** (ECON 445W) Health Economics (3) Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

### **H P A (ECON) 445W Health Economics (3)**

The healthcare sector comprises a set of markets that differ in some significant ways from the textbook model. In the US, this sector performs well in some respects and questionably in others. Notably, there has been sustained improvement over time in life expectancy and other indicators of the effectiveness of health care for most people, but the resources devoted to producing this improvement have been growing considerably faster than GDP. The goal of this course is to examine several broad questions raised by these facts.

The course begins with an overview of evidence on wealth, health expenditure, and life expectancy across countries, and then examines increasing life expectancy and medical expenditures in the US and their causes. Issues in measuring the value of medical expenditures are addressed, and an overview of the industrial organization of health care is provided. A major component of the course covers the economics of health insurance, and the course also examines medical R&D and the pharmaceutical industry as well as issues in the financing of medical care for the elderly.

The course seeks to introduce students to the economic analysis of health care. It is in the area of applied microeconomics, and deals with issues relating to labor markets and public finance, in particular. This writing-intensive course will be one of several 400-level W seminars that the Economics Department is seeking to establish, with the broad objective of exposing our advanced undergraduate students to economic analysis in a seminar setting requiring significant writing by the students.

The course counts toward the major and the minor in economics, as a 400-level course. In addition, it also counts toward a "module" (area of concentration) in human resource and public economics.

Student performance in the course will be evaluated based on three papers. The course will be offered once each year, with an enrollment of 25 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 447 Financing Health Care (3)** Analysis of financial flows, third party payment programs, and reimbursement practices in the health services sector.

### **Financing Health Care (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 450 Healthcare Policies and Politics (3)** Survey of health care's political contexts: formulation, implementation, and modification stages of policy process; politics of private interests (associations) at national and state levels.

### **Healthcare Policies and Politics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 455 Strategic Planning and Marketing for Health Services (3)** Introduction to principles and methods of strategic planning and marketing.

### **Strategic Planning and Marketing for Health Services (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 460 Human Resource Management in Health Care Organizations (3)** Foundations of human resource management applied to health care organizations, including hospitals, long-term care facilities, and community health organizations.

### **Human Resource Management in Health Care Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 470 Health Care Information Management (3)** This course introduces information systems terminology, data structures, software applications, and their management functions in health services organizations.

### **H P A 470 Health Care Information Management (3)**

This course introduces the student to information systems terminology, structures, specific applications, and their relationships to management functions in health services organizations. Health providers and health systems are continuing to make multi-million dollar investments in information systems in order to meet new market and regulatory requirements. All health services managers will play a role in the analysis, design, acquisition, installation, operation and ultimate success of information systems necessary to meet organizational goals and objectives. This course exposes students to the IS/IT applications used to support management functions. Further, applications and management issues unique to industry segments (e.g., long-term care, home care, hospital administration, physician practice management)

will also be explored.

The goal of the course is to ensure that students are schooled in the terminology, conceptual models, applications and opportunities and limitations of information systems in health services to the point that they can ask appropriate questions, recognize and state significant issues, and participate in the discussion and analysis of information systems development and application.

The course is one of several elective courses in the Health Policy Administration major that students can complete and is also a required part of the Information Sciences and Technology/Health Policy Administration Minor providing students with an understanding of the basic structures of information systems in health administration; the relationship of these systems to managerial functions such as communications, coordination, control strategic and process planning and decision making, and the important policy and ethical issues associated with privacy, confidentiality, and security in information systems. Since the course represents the capstone of the Information Sciences and Technology/Health Policy Administration minor, it is important for students to have the pre-requisites for the course (H P A 332, IST 210, and IST 220), including an understanding of major issues in the health care system, health care management and information systems.

Student's attainment of educational objectives will be assessed through a variety of evaluation methods. Understanding and appropriate application of terminology, management issues, and ethical/privacy concerns will be assessed through examination. Concept integration will be assessed through case-study analysis and project papers. Data presentation and training communication issues will be assessed through individual application projects and presentations.

A technology classroom with access to the World Wide Web and Penn State servers is required for effective instruction. We will use these facilities to demonstrate software applications, provide technical support for guestspeaker presentations, and facilitate student presentations. The course will be offered once per academic year with an expected enrollment of 20-40 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 490 Physician Practice Management (3)** Development of skills needed to effectively manage physician practices.

### **H P A 490 Physician Practice Management (3)**

This course is designed to provide undergraduate and graduate level students the basic knowledge necessary to effectively manage a physician practice in today's health care environment.

With the ever changing delivery of health care services in the U.S., it is critical for young professionals entering the field to understand the importance of working with physicians.

It is also critical, that students understand the differences that exist between managing physician practices as compared to other health care environments. That includes; physicians as employees, physician practice revenue cycle management, outpatient vs inpatient services, and other factors that are unique to managing doctors of all specialties.

The course will also discuss the role of mid-level providers such as physician's assistants, nurse practitioners, nurse midwives, and nurse anesthetists play in the delivery of health care services.

Students will also gain a better understanding of how to effectively communicate with physicians and use their knowledge to become partners with the administration of complex issues such as access, quality, and cost containment.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 494H Senior Honors Thesis (1-6)** Independent study related to student's interests directed by a faculty supervisor and culminating in the production of a thesis.

### **Senior Honors Thesis (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**H P A 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497A** Healthcare Leadership II (3) Teambuilding and group leader course for HPA seniors.

**Healthcare Leadership II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497A** Healthcare Leadership II (3) Teambuilding and group leader course for HPA seniors.

**Healthcare Leadership II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497A** Healthcare Leadership II (3) Teambuilding and group leader course for HPA seniors.

**Healthcare Leadership II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497B** Human Diversity and Health Administration (3) The health care literature makes frequent reference to the terms culture, cultural competence, diversity, and health disparities. Understanding these terms, their complex meanings and current application in health policy and administration is the subject matter of this course. By the end of the course students will be able to describe the above concepts and their use in health I care policy; identify and describe the application of these concepts in health care administration; and demonstrate an understanding of these concepts and their application in health care practice.

**Human Diversity and Health Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497B** Human Diversity and Health Administration (3) The health care literature makes frequent reference to the terms culture, cultural competence, diversity, and health disparities. Understanding these terms, their complex meanings and current application in health policy and administration is the subject matter of this course. By the end of the course students will be able to describe the above concepts and their use in health care policy; identify and describe the application of these concepts in health care administration; and demonstrate an understanding of these concepts and their application in health care practice.

### **Human Diversity and Health Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 497C** Introduction to Health Insurance and Payment (3) This course covers basic concepts and issues related to health insurance and payment for health care providers. Topics covered in the course include theories behind demand for health insurance, mechanisms through which Americans obtain health insurance, the impact of health insurance on health, as well as payment arrangements for health care providers.

### **Introduction to Health Insurance and Payment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 503** Health Services Organizational Behavior (3) A systematic application of the principles of organizational behavior to understanding professional roles in health services organizations.

### **Health Services Organizational Behavior (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 510** Health Services Financing and Policy (3) Introduction to health policy focusing on health services financing, insurance and other current health policy topics.

### **H P A 510 Health Services Financing and Policy (3)**

The second in a two-course sequence that introduces graduate students to the organization, financing, and delivery of health services in the US. This course focuses on health services financing and policy. This course will cover policy issues in the federal Medicare program, state Medicaid programs and private health insurance markets, and other important current health care policy issues. The course will also introduce students to the discipline of policy analysis, primarily the economic perspective, but will also include discussions on the political perspective and the policy-making process. The objectives of this course are to help students: 1) Understand the mechanisms by which Americans pay for their health care and become familiar with current health policy issues. The topics covered in this course will serve as a context for key policy issues that will be intensively discussed in a paired research seminar course; 2) Appreciate the policy-making process and the role of political perspectives in the formation and implementation of policy proposals; 3) Understand approaches of policy analysis, which will provide them with an analytic framework for critiquing health policy issues as well as health services research; 4) Develop policy analysis skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 511 Research Seminar on Health Services Financing and Policy (3)** An examination of seminal and current research on health services financing, insurance and health policy.

**H P A 511 Research Seminar on Health Services Financing and Policy (3)**

H P A 511 is one of two seminars designed to complement introductory courses in the graduate H P A curriculum. This course allows graduate students seeking careers in health services research to engage in deeper study and discussion of the classic and current research on the issues of payment, insurance, regulation and policy related to health care delivery in the U.S. health care system and to begin to explore their research interests for a thesis.

The primary objectives of the course are:

- (a) to help students become familiar with a selection of "classic" and "cutting edge" papers in the field of health services research
- (b) to develop students' ability to critically read and analyze the health services research literature with an emphasis on the conceptual and methodological approaches used by researchers
- (c) to assist students in developing their ability to organize, synthesize and integrate research drawn from a variety of disciplinary approaches into a coherent foundation for further study in health services research
- (d) to improve students' oral and written communication skills, emphasizing organization, clarity, and the ability to give and respond to constructive professional criticism

The readings for this class are all drawn from important journals in the field of health services research. Class will generally include 2 or 3 different activities designed to meet the objectives above. During each class, we will spend some time discussing the assigned articles to review the key points, analyze strengths and weaknesses of the research design, and consider how they provide a framework for studying the issues. In some classes, students will be asked to provide a short oral presentation of a topic, complemented by a written summary of the presentation topic. The class will discuss the paper and presentation, giving students constructive critical feedback on the presentation and paper. Finally, in some classes, the entire class will collaborate in developing a research question into a basic research proposal.

Students will be responsible for writing papers, giving presentations, preparing written critiques of articles as a seminar class, the full participation of every student is necessary. Students must not only come prepared to class, they must be active participants in all aspects of the class each week. Grades in the class are based on oral presentations, written papers, article critiques and student participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:  
 Concurrent: H P A 510

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 520 Introduction to Health Services Organizations and Delivery (3)** Introduction to health systems, health services organization and health care delivery focused on trends, problems and issues.

**Introduction to Health Services Organizations and Delivery (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 521 Research Seminar on Health Services Organization and Delivery (3)** An examination of seminal and current research on health services organization and delivery, emphasizing costs, access and quality.

**H P A 521 Research Seminar on Health Services Organization and Delivery (3)**

H P A 521 is one of two seminars designed to complement introductory courses in the graduate H P A curriculum. This course allows graduate students seeking careers in health services research to engage in deeper study and discussion of the classic and current research on the issues of health services organization and delivery in the U.S. health care system and to begin to explore their research interests for a thesis.

The primary objectives of the course are:

- (a) to help students become familiar with a selection of "classic" and "cutting edge" papers in the field of health services research
- (b) to develop students' ability to critically read and analyze the health services research literature with an emphasis on the

conceptual and methodological approaches used by researchers

(c) to assist students in developing their ability to organize, synthesize and integrate research drawn from a variety of disciplinary approaches into a coherent foundation for further study in health services research

(d) to improve students' oral and written communication skills, emphasizing organization, clarity, and the ability to give and respond to constructive professional criticism

The readings for this class are all drawn from important journals in the field of health services research. Class will generally include 2 or 3 different activities designed to meet the objectives above. During each class, we will spend some time discussing the assigned articles to review the key points, analyze strengths and weaknesses of the research design, and consider how they provide a framework for studying the issues. In some classes, students will be asked to provide a short oral presentation of a topic, complemented by a written summary of the presentation topic. The class will discuss the paper and presentation, giving students constructive critical feedback on the presentation and paper. Finally, in some classes, the entire class will collaborate in developing a research question into a basic research proposal.

Students will be responsible for writing papers, giving presentations, preparing written critiques of articles as a seminar class, the full participation of every student is necessary. Students must not only come prepared to class, they must be active participants in all aspects of the class each week. Grades in the class are based on oral presentations written papers, article critiques and student participation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

Concurrent: H P A 520

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 523** Managerial Epidemiology (3) Introduction to the principles and methods of managerial epidemiology and its application to health care.

### **HPA 523 Managerial Epidemiology (3)**

This course is intended to familiarize students with the methods and principles of managerial epidemiology. Changes in the structure of the health delivery and financing systems are making managers more responsible for the health of enrolled and constituent populations. The tools of epidemiology are important for purposes of planning, monitoring, and evaluation of population health. Managing the health of populations requires both an understanding of the factors that influence population health and how those factors can be influenced by health care organizations and systems. In addition to the management of population health, the methods of managerial epidemiology can be applied to organizational evaluation and clinical practice improvement. Epidemiology, interaction between health behavior and health management, health interventions, quality improvement, outcomes management, and program implementation and evaluation methods are examined. Particular emphasis is given to health management applications aimed at vulnerable populations, such as racial/ethnic minorities and the elderly.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 524** Management of Health Services Organizations (3) A systematic study of the roles of health services managers and the organizational and environmental context within which they work.

### **Management of Health Services Organizations (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 526** (SOC 526) Health Disparities (3) This course provides an overview of social factors that lead to demographic disparities in health.

### **H P A(SOC) 526 Health Disparities (3)**

This course provides a broad exploration of U.S. health disparities. In particular, it examines several types of U.S. health disparities that emerge as a result of individuals' race/ethnicity, socioeconomic status, nativity status and gender. The course focuses on theoretical and methodological strategies for studying health disparities as well as empirical evidence supporting the existence of different health disparities and explanations for understanding and ameliorating them.

Students will summarize and discuss weekly readings and apply course materials to understand the state of the field and to carry out an original research project on a particular health disparity that interests them. This course fulfills basic seminar requirements in the Sociology graduate curriculum and serves as a process course for the interdisciplinary Demography dual-title graduate curriculum.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 528 Health Data Analysis for Research (3)** Introduction to data sources and use of software for data management and analysis in health services research.

### **H P A 528 Health Data Analysis for Research (3)**

The statistical analysis of quantitative data is a major tool for health services researchers. This course provides students with an overview of practical, concrete information about identifying, acquiring, processing, and analyzing data in typical health service research settings. The course covers three main content areas: Data issues in health services research, including legal and ethical information on human subjects and private health information; manipulating primary and secondary health services research data to create files amenable to research analysis; and basics of descriptive and exploratory analysis of health services research data. The objectives of the course are: (1) to give students a solid foundation of knowledge about health services data issues for their thesis and related research projects in the future; (2) to give them practical experience manipulating commonly used data sets in health services research; and, (3) to allow them to begin to explore potential research hypotheses for thesis and other research. Its primary role is to guide students in the master's of science and doctoral programs in Health Policy and Administration as they begin to explore research. It is also appropriate for other graduate students who intend to do research in or related to health services research.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 531 Health Problem Analysis (3)** Logic of empirical inquiry in study of community problems in health; integration of theory and practice, technical data, and values.

### **Health Problem Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 540 Epidemiological Applications in Health Services Research (3)** The course emphasizes theoretical as well as practical issues relating to applying advanced methods of epidemiology in health services research.

### **H P A 540 Epidemiological Applications in Health Services Research (3)**

Advanced methods of epidemiology are presented with examples and exercises. The course emphasizes theoretical as well as practical issues. Students will identify opportunities for implementing the epidemiological principles in health services research. Students will also have the chance to explore the existing secondary data resources and/or to collect primary data and prepare them for epidemiological analysis. The course examines various applications of epidemiological methods in health services research. It focuses on the design and implementation of research projects utilizing epidemiological techniques to study the health of an identified population (Pennsylvanians), using data that is part of a national program, Behavioral Risk Factors Surveillance System (BRFSS) run by the Centers for Disease Control and Prevention in all states.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 541** Poverty, Race, Ethnicity and Child Health (3) Seminar focusing on disparities in infant, child, and adolescent health, and policies and programs impacting these disparities.

**H P A 541 Poverty, Race, Ethnicity and Child Health (3)**

This course is designed to 1) strengthen students' understanding of the multidimensional nature of health and well-being at each stage of childhood and adolescence, and the magnitude of health disparities that exist among children of differing socioeconomic position and race/ethnicity; 2) encourage critical evaluation of existing governmental policies and programs impacting children's health and health disparities, and exploration of other potentially effective approaches; and 3) enhance students' expertise in the synthesis, critical analysis, and presentation of material in class and in written form. The content of this course is relevant not only to students in the Health Policy and Administration program, but also for students in other disciplines including but not limited to Demography, Human Development and Family Studies, Biobehavioral Health, Nutrition, and Nursing who are interested in learning about children's health and health disparities. Students are expected to participate actively in all class discussions and homework assignments, lead the class in the discussion of a specific government program impacting children's health, write a short reaction paper on the class text, write a final term paper on socioeconomic and racial/ethnic disparities in an aspect of children's physical or mental health including evaluation of current and potential policy approaches for addressing these disparities, and present the major points made in the term paper to the class for discussion. This course will be offered once a year, with enrollment limited to 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 545** Introduction to Health Economics (3) Survey of the application of economics to the roles of markets and government in health care.

**Introduction to Health Economics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 547** Health Services Reimbursement (3) Analysis of third party reimbursement of health care providers.

**Health Services Reimbursement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 551** Quality Improvement in Healthcare (3) Examination of major approaches to performance improvement in contemporary healthcare systems.

**H P A 551 Quality Improvement in Healthcare (3)**

The goal of this course is to provide students with requisite knowledge and skills for managing quality improvement and patient safety efforts in health care organizations. The various perspectives on the challenges of providing safe and reliable health services are covered. Operational approaches to quality improvement adapted from industry are examined and practiced in cases and exercises. Students learn to identify key aspects of systems and work flows. They employ currently used analytic tools to analyze quality-related systems problems and identify potential solutions. Finally, the course will assist students in improving management skills in the affective realm. Specifically, excellent performance in this competency realm will be demonstrated through: (a) persuasive written and verbal communication skills; (b) the ability to facilitate group problem solving in a situation that includes conflict; and (c) the ability to effectively navigate difficult conversations. The teaching and learning methods used in the course will include lectures by the instructor (usually brief), briefings by students, discussion, role play and other structured active learning exercises. Weekly class process reflections will be used for improvement purposes. The class serves as part of the culmination of the professional master's degree program. It is also appropriate as an elective course for students in master's and doctoral programs who are interested in research and applications in quality improvement in health care.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 556** Strategy Development in Health Services Organization (3) Integration of prior course work in the program to develop a strategic plan for a health services organization.

**Strategy Development in Health Services Organization (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 561** Introduction to Research Design in Health Services Research (3) Review and critical analysis of state-of-the-art health services research methods.

**Introduction to Research Design in Health Services Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 562** Economics Applications in Health Services Research (3) Application of theoretical and empirical tools of microeconomics to issues in health services utilization and delivery.

**Economics Applications in Health Services Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 563** Organizational Studies in Health Services Research (3) Applications of theoretical and empirical tools of organizational studies in the delivery of health care.

**Organizational Studies in Health Services Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 564** Research Methods in Health Services Research (3) Introduction to regression models in health services research, including violations and tests of model assumptions and solutions for those violations.

**H P A 564 Research Methods in Health Services Research (3)**

This course is the initial course on health services research methods for master's of science and doctoral students in the Department of Health Policy and Administration. In the context of the typical types of data used by health services researchers, students are introduced to the basic linear regression models that are fundamental for understanding more complex modeling of health care data. The course also reviews common data problems in health services research, including heteroskedasticity, serial and auto-correlation, and limited dependent variables. The objectives of the course are:

to help students understand the theoretical and practical aspects of applying linear regression models to health care data;

to help students understand the typical ways in which health care data often lead to violations of the assumptions of

linear regression

to develop students' knowledge and skills in being able to use statistical models to test for and correct health data for heteroskedasticity, serial and autocorrelation

to introduce students to binary response models that are ubiquitous in health services research

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 566** Advanced Methods in Health Services Research I (3) Advanced topics course focusing on extensions of the ordinary least squares regression model and nonlinear methods in health services research.

#### **H P A 566 Advanced Methods in Health Services Research I**

The objectives of this course are to help students identify problems that may arise in health services research data, understand methods designed to address such problems, and apply those methods to problems that they encounter in their empirical work. This course is part of the methods core in the HPA doctoral curriculum, and builds from students' introduction to research methods which is a pre-requisite course. Students should have a strong foundation in statistical and research methods prior to taking H P A 566. After completing the course, students should be prepared for the beginning stages of data analysis for a thesis and for further advanced level study in health services research methods. Evaluation is based on homework and examinations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 567** Advanced Methods in Health Services Research II (3) Application of advanced methods to health services research topics focused on empirical approaches to causal inference in nonexperimental data.

#### **H P A 567 Advanced Methods in Health Services Research II (3)**

The main theme of the course will be estimating causal effects using non-experimental data in health services research. These general topics, and the associated estimation methods, often go by other names; in economics they are referred to as "identification strategies," while in other disciplines they are sometimes labeled "quasi-experimental research designs." Causal inference is one of the main issues to confront in conducting health services research. Devising empirical strategies that increase the likelihood that estimates have a causal interpretation is one of the primary objectives of health services researchers. The course will have a distinctively applied bent. The goal will be to survey as many estimation strategies as possible, with particular emphasis placed on those most commonly used by empirical researchers. The objectives will be to understand the strengths and weaknesses of the various approaches, the assumptions they require, and how they have been used in practice.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 590** Colloquium (1-3) Introduction to the field of health services research.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**H P A 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 596** (CSP D 596) Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 597A** HealthCare Across the Lifecourse (3) Introduce students to fundamental theories, concepts, issues, and strategies related to a population health approach to health and health services across the lifecourse.

**HealthCare Across the Lifecourse (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 597B** Program Planning and Evaluation (3) Theory and methods specifically applicable to program, design, and evaluation of human services within a lifespan perspective.

**Program Planning and Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 600** THESIS RESEARCH (1-15) NO DESCRIPTION.

**THESIS RESEARCH (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**H P A 601** PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION FULL-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Supervised and graded teaching experience in selected undergraduate Health Policy and Administration courses.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 610** THESIS RESEARCH OFF-CAMPUS (1-15) NO DESCRIPTION.

**THESIS RESEARCH OFF-CAMPUS (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 611** PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION PART-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 805** Change Leadership in Health Services Organizations (3) Exploration of diagnostic and intervention strategies employed in planned change in health services organizations and programs.

**Change Leadership in Health Services Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 822** Clinical Issues for Health Services Management (3) Introduction to current clinical issues in health services organizations focusing on the role of managers.

**H P A 822 Clinical Issues for Health Services Management (3)**

This course is designed to provide the clinical aspect to the HPA graduate students' education, an important component of understanding population health and status assessment. It will allow students to gain exposure and utilize important clinical technologies which are used to formulate patient diagnoses. Students will also apply their knowledge in designing treatment plans for patients through hypothetical case studies. All students will learn basic medical vocabulary and terminology that is used in the field of medicine and will gain an understanding of the pathophysiology, diagnosis, prevention and treatment of common diseases. Students will gain an awareness of methods of health promotion and apply that knowledge to real life and hypothetical cases. This class will focus on the clinical aspects of medicine.

By the end of this course, students will have the necessary skills and knowledge to:

1. Describe and identify technologies used to diagnose and treat diseases.
2. Demonstrate in written and oral work an understanding of the basic pathophysiology, diagnosis and treatment of common diseases.
3. Compose written and oral work displaying a basic knowledge of commonly used medical terminology.
4. Recognize the clinical approach that health care providers take in diagnosing and treating common disorders, including tools and analytical thought process used in providing quality care.
5. Demonstrate a working understanding of the importance of computers and information technologies used in patient care.
6. Utilize health care resources such as the internet to analyze and examine health care topics.

This course will contribute to the student's development in:

1. Information seeking. Students will be responsible for acquiring knowledge from lectures, text books, medical journals, the internet, presentations, question and answer time with medical professionals and other resources needed to understand disease processes involving many organ systems.
2. Analytical thinking. Discussions will focus on decision-making skills used in clinical care and transferable to non-clinical settings. Students will need to use the knowledge gained in class and apply learned analytical skills comprehensively to evaluate and analyze the health care delivered to a specific healthcare consumer.
3. Communication skills. Students will be expected to use accurate and complete information in preparing for and participating in classroom discussions and presentations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 835** Financial Management in Health Institutions (3) The financial environment of health institutions; financial aspects of management decision making; emphasis on revenue sources, budgeting, and cost control.

### **Financial Management in Health Institutions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 836** Health Law (3) The legal process as it applies to the health administrator, health organization, medical provider, and patient.

### **Health Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 850** Health Care Marketing (3) Introduction to the theory, concepts, skills, and principles of marketing applied to health related organizations and networks.

### **Health Care Marketing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 855** Information Systems in Health Services Administration (3) Foundations of information systems for supporting clinical services, quality improvement, and administrative functions in health services management.

### **Information Systems in Health Services Administration (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 895** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practica, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 896** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H P A 897A** Health Care Operations Management (3) WD course offering for the MHA On0line program.

### **Health Care Operations Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Hebrew (HEBR)**

**HEBR 401** Advanced Hebrew--Conversation Emphasis (3 per semester, maximum of 6) Development of oral proficiency through discussions focusing on issues in contemporary Jewish culture.

### **Advanced Hebrew--Conversation Emphasis (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 402** Advanced Hebrew--Reading Emphasis (3 per semester, maximum of 6) Readings in representative works of traditional and modern literature; practice in composition; study of aspects of Jewish culture.

**Advanced Hebrew--Reading Emphasis (3 per semester, maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 451** Advanced Biblical Hebrew (3) Translation and analysis of selected readings in Biblical Hebrew texts; attention will be paid to grammatical as well as literary details.

**HEBR 451 Advanced Biblical Hebrew (3)**

HEBR 451 is a Biblical Hebrew literature course in which students will read selections of various genres and dates from different sections of the Hebrew Bible. The overall goal of this course is to increase the ease and fluency of advanced-level students with Biblical Hebrew. Although students will be expected to enter the class with a comfortable level of reading skill as acquired in HEBR 152 or its equivalent, the course will include grammar and building vocabulary. By the end of the course, it is expected that the students will be able to read a Biblical Hebrew text comfortably and be able to analyze grammatical structures. Students' work in the course will be evaluated on class participation (20%), several in class quizzes (20%), and a mid-term (30%) and final exam (30%). HEBR 451 is part of a series of advanced Hebrew classes that will allow students to gain skill and knowledge about a range of Biblical Hebrew texts. HEBR 451 may be used to fulfill a requirement for the Hebrew minor, as well as for the CAMS major language requirement. The course will be offered every other year, with 20 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 452** Readings in Biblical Hebrew (3) Translation and analysis of selected readings in Biblical Hebrew texts; attention will be paid to grammatical as well as literary details.

**HEBR 452 Readings in Biblical Hebrew (3)**

HEBR 452 is a Biblical Hebrew literature course which students will read selections of various genres and dates from different sections of the Hebrew Bible. The overall goal of this course is to increase the ease and fluency of with which advanced students are able to read all types of Biblical texts. Although students will be expected to enter the class with a comfortable level of reading skill as acquired in HEBR 451 or its equivalent, the course will continue to emphasize grammar and building vocabulary. By the end of the course, it is expected that the students will be able to read any Biblical Hebrew text comfortably and be able to analyze grammatical structures. Students' work in the course will be evaluated on class participation (20%), short in class quizzes (20%), and a mid-term (30%) and final exam (30%). HEBR 452 is part of a series of advanced Hebrew classes that will allow students to gain skill and knowledge about a range of Biblical Hebrew texts. HEBR 451 may be used to fulfill a requirement for the Hebrew minor, as well as for the CAMS major language requirement. The course will be offered every other year, with 20 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 496** Independent Studies (1-18) Creative projects including research and design which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1982

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 499** (IL) Foreign Study--Advanced Hebrew (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Study--Advanced Hebrew (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HEBR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Hematology-Hy (HEM)**

**HEM 721** Hematology (3) Some of the areas studied will be: Erythrocyte Disorders; Hemostasis; Myeloid Stem Cell Disorders; Lymphoproliferative and Immunoproliferative Diseases; Blood Banking; and Hematology Laboratory.

### **Hematology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Higher Education (HI ED)**

**HI ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 497A** Pro Seminar: Topics in the Study of Higher Education for HIED MED Students (3) An orientation to graduate study in HI ED, exploration of foundational topics in HI ED, the identification of careers for HI ED MED.

### **Pro Seminar: Topics in the Study of Higher Education for HIED MED Students (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 503** (CI ED 503, EDTHP 507) Ethnicity, National Identity, and Education (3) Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.

**Ethnicity, National Identity, and Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 545** Higher Education in the United States (3) Introduction to the educational context and major organizational and academic characteristics of postsecondary education; analysis of issues and future trends.

**Higher Education in the United States (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 546** College Teaching (2-3) Principles involved in teaching at the college level; effective use of teaching aids; criteria used in evaluation.

**College Teaching (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 548** Curriculums in Higher Education (2-3) Various types of curriculums and philosophies underlying them; ways in which curriculums are developed; elective versus required courses; evaluation of achievement.

**Curriculums in Higher Education (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 549** (ADTED 549) Community Junior College and the Technical Institute (2-3) Distinctive contributions to meeting the need for postsecondary education; development, functions, curriculum and instruction, government, administration, and finance.

**Community Junior College and the Technical Institute (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 552** Administration in Higher Education (3) Philosophy of administration; principles of scientific management and their application in colleges and universities; case studies of administrative problems.

**Administration in Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995



Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 553** (CI ED 553, EDTHP 553, SOC 553) Educational Mobility in Comparative Perspective (3) Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America.

**HI ED 553. (SOC 553, EDTHP 553, CI ED 553) Educational Mobility in Comparative Perspective (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 554** The History of American Higher Education (3) An examination of the development of American higher education against the background of influential social, political, economic, and intellectual issues.

**The History of American Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 556** Higher Education Students and Clientele (3) Characteristics of higher postsecondary education students and other clientele; changes during postsecondary education years and during college; educational challenges and responses.

**Higher Education Students and Clientele (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 557** (EDTHP 557, SOC 557) Sociology of Higher Education (3) Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis.

**HI ED (EDTHP, SOC) 557 Sociology of Higher Education (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 560** Legal Issues in Higher Education (3) A process for analyzing case law on issues of access, student rights, employment, collective bargaining, church/state, private sector, and liability.

**Legal Issues in Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 562** Organizational Theory and Higher Education (3) Application of social science theory and research to postsecondary education organizations and administration; use of research in administrative practice.

**Organizational Theory and Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 571** (CI ED 571) Comparative Higher Education (3) Comparative methods of studying structural variations in systems of higher education in principal industrialized nations and other selected countries.

**Comparative Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 585** (EDLDR 585, EDTHP 585) Research Design: Implications for Decisions in Higher Education (3) A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.

**HI ED (EDLDR, EDTHP) 585 Research Design: Implications for Decisions in Higher Education (3)**

By the end of this course you should be able to: (1) Define and explain the following concepts/tools of social science research: The scientific method-Theory and its role, Constructs and variables, Hypotheses and relations, Experimental designs, Quasi-experimental designs and Ex post facto designs. Sampling theory and designs-Survey designs and methods, Approaches to data collection, Measurement reliability and validity, Quantitative analytical designs, and Ethical practices. (2) Apply these concepts/tools in designing a study relating to educational research. (3) Effectively critique both the theoretical bases and methods of a journal article or report of research or policy analysis. (4) Prepare a sound research proposal.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 586** (EDLDR 586, EDTHP 586) Qualitative Methods in Educational Research (3) Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques.

**HI ED (EDLDR, EDTHP) 586 Qualitative Methods in Educational Research (3)**

This course is the introductory course in the EPS qualitative research methods sequence. This is the first course in a three-course sequence departmental sequence intended to take students from basic knowledge of qualitative methods through mastery of advanced topics. This course was designed specifically to 1) orient students to the various types of qualitative methods most widely used in educational policy research and their theoretical underpinnings; 2) provide training in basic qualitative research techniques; 3) introduce students to basic research design; 4) provide systematic practice (and feedback) in evaluating qualitative research that would allow students to become sophisticated consumers of qualitative studies; 5) prepare students for the Level II course. The course will begin with a brief review the development of qualitative methods in related fields (anthropology, sociology, linguistics) and quickly move on to an overview of qualitative methods in education. Students must have read the material prior to class in order to take part in in-class

exercises and discussions. We will focus on key issues such as validity, interpretation and representation. Students will be asked to read studies, assess the general quality of the work, and provide a critical evaluation. Students will study specific methods of qualitative field research, and most weeks we will practice and discuss a particular research technique (e.g. participant observation, focus group interviews). These practice sessions will be informed by relevant readings. Students will practice developing coding schemas as well as get a quick overview of qualitative data analysis (QDA) packages. Finally, in small groups, students will design a basic qualitative study to be presented as a final product in the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 587** (EDLDR 587, EDTHP 587) Education Policy and Politics (3) The political economy and bureaucratic politics of educational organizations, with special attention to the policy-making, implementation, and evaluation processes.

### **Education Policy and Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 588** (EDLDR 588, EDTHP 588) Qualitative Methods in Educational Research II (3) Advanced study of methods involved in executing and analyzing qualitative research in education.

### **HI ED (EDLDR, EDTHP) 588 Qualitative Methods in Educational Research II (3)**

The course will provide practical experience with methods of qualitative data collection, data management, and preliminary data analysis that extends and deepens students' understanding of qualitative research in education. The class, limited to 15 students, will take as the focus with inquiry a common "site" around which projects of individual and group interest will be designed. Sessions will take place in "workshop" blocks during which students will present and critique the work of the project. Readings will be interspersed with the practicing of methods. The final project for the course will be the compilation of a synthesized data set that could serve as the basis of further analysis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 595** Internship in Higher Education (1-9) Supervised experience in administrative offices, in research, on instructional teams, and in college teaching.

**Internship in Higher Education (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597A** College Student Development (3) Administrative and teaching effectiveness in postsecondary educational settings is largely dependent upon one's familiarity with and appreciation for the unique developmental needs of students. Student outcomes can be significantly enhanced when programs, services, curricula, and pedagogical techniques are designed by those who understand and intentionally apply appropriate theoretical frameworks to their work. Exposure to student development theory is essential in the academic preparation of postsecondary administrations and faculty, as students unarguable should be the primary focus of current and future efforts in higher education. To this end, theories that have emerged from years of research on college students will be reviewed and discussed in this course, with the ultimate goal of inspiring class members to become more reflective and intentional facilitators of environments and experiences that offer healthy, constructive developmental opportunities.

**College Student Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597A** College Student Development (3) Administrative and teaching effectiveness in postsecondary educational settings is largely dependent upon one's familiarity with and appreciation for the unique developmental needs of students. Student outcomes can be significantly enhanced when programs, services, curricula, and pedagogical techniques are designed by those who understand and intentionally apply appropriate theoretical frameworks to their work. Exposure to student development theory is essential in the academic preparation of postsecondary administrations and faculty, as students unarguable should be the primary focus of current and future efforts in higher education. To this end, theories that have emerged from years of research on college students will be reviewed and discussed in this course, with the ultimate goal of inspiring class members to become more reflective and intentional facilitators of environments and experiences that offer healthy, constructive developmental opportunities.

**College Student Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597B** Campus Environments (3) Simply stated: context matters. While many would like to think that individuals' behaviors and outcomes are shaped by a person's character and internal characteristics alone, environment can have a powerful, and often unconscious, influence. This principle has been widely applied in social psychology, and particularly applies to the experiences of community members on college campuses.

**Campus Environments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597B** Campus Environments (3) Simply stated: context matters. While many would like to think that individuals' behaviors and outcomes are shaped by a person's character and internal characteristics alone, environment can have a powerful, and often unconscious, influence. This principle has been widely applied in social psychology, and particularly applies to the experiences of community members on college campuses.

**Campus Environments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597C** (EDTHP 597C, EDLDR 597C) Foundations of Educational Research (3) This course is designed to begin a reading of the history and philosophies of education research.

**Foundations of Educational Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597C** (EDTHP 597C, EDLDR 597C) Foundations of Educational Research (3) This course is designed to begin a reading of the history and philosophies of education research.

**Foundations of Educational Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597D** (EDTHP 597D) Data Analysis for Educational Research (3) This course bridges theoretical statistics coursework and practical research with real, large-scale datasets.

**Data Analysis for Educational Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597E** (EDTHP 597E, EDLDR 597E) Reviewing and Editing for Education Policy Journals (3) This course introduces advanced doctoral students to the major journals in the field of education policy and provides a systematic introduction to reviewing and editing policy journals in the field of education.

**Reviewing and Editing for Education Policy Journals (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 597F** (EDLDR 597F, EDTHP 597F) Race, Law and Education: Six U.S. Supreme Court Cases (3) This class is designed to introduce students to the legal standards used to examine "race-conscious" policies intended to address racial/ethnic inequities in K-12 and higher education. We will consider the justifications educators have presented to support these policies, which justifications have been convincing to the Court, and how these justifications intersect across K-12 and higher education. We will also focus on how social science research has informed the legal developments in these cases. Over the course, we will cover six landmark U.S. Supreme Court cases on race and education, including Brown v. Board of Education (1954), the Court's most recent decision on K-12 voluntary desegregation policies, Parents Involved in Community Schools v. Seattle School District No. 1 (2007), and the Court's forthcoming opinion on affirmative action in higher education, Fisher v. University of Texas (2013).

**Race, Law and Education: Six U.S. Supreme Court Cases (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 9) Preparation and presentation of materials in undergraduate classes under the supervision of a full-time faculty member.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 801** Foundations of Institutional Research (3) Survey course explores fundamental methods and research on campus decisions, enrollment management, faculty work analysis, institutional effectiveness, accreditation, student outcomes.

**HI ED 801 Foundations of Institutional Research (3)**

This is a graduate level course that provides students with an overview of the institutional research profession and the most common functions that institutional research offices carry out. HI ED 801 is a core course in the IR Certificate Program and is designed for higher education professionals who seek to gain a fuller understanding of campus decision support activities and processes such as strategic planning, compliance reporting, enrollment management, resource management, institutional effectiveness, student outcomes assessment, and program evaluation. The course is designed:

- 1) To give students a foundation in the concepts, methodologies, research practices, and information systems that support campus decision making.
- 2) To examine the diversity of the institutional research profession, including office organization and staffing, and functions/activities.
- 3) To acquaint students with the major IR topics including overview of National Data sets, Planning and Budgeting, Enrollment Management and enrollment forecasting, Faculty Studies and Instructional Analysis, Institutional Effectiveness and accreditation, Educational Effectiveness and Student Outcomes Assessment.
- 4) To give students experience in using SPSS software, making Power Point presentations, and effective reporting on selected IR topics.

During this course, the classroom and work experiences are aimed at understanding the readings, obtaining hands-on experience in analyzing data, and developing reporting skills for the purposes of institutional research. The course serves as a bridge to the other courses that will be offered subsequently in the Institutional Research Certificate program. This course introduces main topics, concepts and processes that are central to the practice of institutional research. It gives an overview of sources used in institutional research and the methods employed. Most importantly, this course aims at introducing students to a variety of reporting strategies and developing report writing skills. Pre-requisite: Working knowledge of basic statistics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 810** Planning and Resource Management in Higher Education (3) Strategic planning and resource management in higher education through institutional research.

**HI ED 810 Planning and Resource Management in Higher Education (3)**

This course provides students with a working knowledge of strategic planning models and budgeting structures and processes. Planning and budgeting skills are important components in institutional decision support, and this course provides students with tools and skills in environmental scanning, revenue forecasting, expenditure controls, and benchmarking.

Curricular goals: Upon completion, students will be able to:

- 1) discuss, in an informed way, the history, evolution, theory and practice of strategic planning in higher education;
- 2) appreciate contextual influences (such as organizational politics and culture, leadership, environmental constraints, and the like) on planning;
- 3) apply data and decision-support tools that can support strategic planning and resource management;
- 4) apply group process tools to enhance communication, consensus, and action;
- 5) demonstrate a pragmatic ability to help integrate strategic planning with institutional research and organizational improvement in a college or university setting.

HI ED 810 is designed for institutional research professionals, and the on-line learning experiences are aimed at applying the readings, obtaining hands-on experience in analyzing data, and developing reporting skills. Each Unit lists supplementary readings and weblinks where you can find additional information to explore the topic in greater depth. The methods of teaching and learning include Readings and Supplemental Resources, Professor's Notes, Discussion Forums, Drop Boxes, Collaborative Learning Opportunities in small groups, Individual Learning Opportunities or a personal project, and Essays or Papers. This course has an established start and end date and includes interaction with other students throughout the course. Pre-requisite: a working knowledge of basic applied statistics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 820** Studying Students & Student Affairs Program (3) Studying the relationship of college activities to academic success by students.

### **HI ED 820 Studying Students & Student Affairs Programs (3)**

This course examines the characteristics of post secondary education students, both traditional and non-traditional. It draws upon the voluminous research documenting the changes that take place in various populations of students during college. The course equips institutional researchers and student affairs administrators to engage in research on student growth, campus climate, and evaluation of student services.

Curricular goals for students in HI ED 820:

- To examine changing student demographics and how these influence student outcomes and institutional operation
- To understand how different populations of student change while in college and what factors contribute to the change
- To become familiar with theories and research on student development
- To gain a general knowledge of the functional areas of student affairs and their intended purposes for the students they serve
- To learn about the tools available to assess student/student affairs program outcomes
- To learn how to plan assessment in the area of student affairs

HI ED 820 is designed for higher education professionals who seek a fuller understanding of Students and Student Affairs Programs. During this particular institutional research course, the on-line experiences are aimed at applying the readings, obtaining hands-on experience in analyzing data, and developing reporting skills. Each Unit lists supplementary readings and weblinks where students can find additional information to explore the topic in greater depth.

The methods of teaching and learning include Readings and Supplemental Resources, Professor's Notes, Discussion Forums, Drop Boxes, Collaborative Learning Opportunities in small groups, Individual Learning Opportunities on a personal project, and Essays or Papers. This course has established start and end dates and includes interaction with other students throughout the course. Pre-requisite: Working knowledge of basic statistics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 830** Designing Institutional Research Studies (3) Develop skills to design and execute IR studies using quantitative and qualitative research methods.

### **HI ED 830 Designing Institutional Research Studies (3)**

This course acquaints students with best practices and necessary skills in quantitative and qualitative research design including sampling and basic measurement issues, research methods, survey research, interviews, focus groups, and selecting appropriate statistical tools. Upon completion of this course, students will be able to:

1. Define and explain the following concepts/tools of social science research:

The scientific method  
 Theory and its role  
 Constructs and variables  
 Experimental designs



Hypotheses and relations  
 Ethical Principles and practices  
 Survey designs and methods  
 Sampling theory and designs  
 Approaches to data collection  
 Quasi-experimental designs  
 Measurement reliability and validity  
 Ex post facto designs  
 Quantitative analytical designs  
 Focus Groups & Interviews  
 Qualitative analytical designs

2. Apply these concepts/tools in designing a study relating to education research or policy analysis;
3. Effectively critique and evaluate both the theoretical bases (if any) and methods of a journal article or report of a piece of research or policy analysis.

This course has established start and end dates and includes interaction with other students throughout the course. Use of the course Web site is required (the central area for accessing class notes and postings, e-mail communication, ANGEL, downloading files). The course is structured around learning units, each roughly corresponding to one week of a Penn State semester. Learning units are self-contained and built around a single theme or topic. Each contains an introduction, objectives, reading assignments, professor's content, and learning activities. While it is possible to accelerate or vary the reading and research schedule, the discussion components among peers should adhere roughly to the time frame (the week) within which each Unit is presented.

As a pre-requisite for this course, students are expected to:

- \* Know the definition of a "variable" and the distinctions among dependent, independent, and control variables.

Know basic descriptive statistics (e.g., mean, median, variance, standard deviation, percentage distributions), basic inferential statistics (chi-square test of association and goodness-of-fit test, t-tests, one-way analysis of variance, correlations); the concepts underlying ordinary least-squares (OLS) multiple regression and the basic multiple regression statistics ( $R^2$ ,  $R^2$ -change, b-weights, and beta weights).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 840 Assessing Student Outcomes & Evaluating Academic Programs (3)** Academic program assessment/student outcomes in accountability and accreditation processes.

### **HI ED 840 Assessing Student Outcomes & Evaluating Academic Programs (3)**

This course pulls together the many threads that add up to educational effectiveness: evaluating academic programs and curricula, assessing student learning outcomes, coping with accountability and performance reporting requirements, responding to the demands of both regional and disciplinary/vocational accreditation bodies. The course acquaints students with strategies and instruments for conducting outcomes studies of programs, students, and alumni alike. Assessment topics include studies of students' basic skills, general education, knowledge in the major, personal growth, and alumni outcomes.

Thus, the course is designed for higher education professionals who seek to a fuller understanding of Student Outcomes Assessment, Program Evaluation, and Institutional Effectiveness. The on-line experiences are aimed at applying the readings, obtaining hands-on experience in analyzing data, and developing reporting skills. Each Unit lists supplementary readings and weblinks where you can find additional information to explore the topic in greater depth. The course has linkages to the other courses in the Institutional Research Certificate program. For example, the opening weeks of HI ED 840 expand upon some of the assessment and evaluation readings and materials covered in selected units of the Foundations course (HI ED 801). Both this assessment course and the course on Studying Students and Student Affairs (HI ED 802) draw upon and discuss relevant literature and theories of student outcomes. Persistence models and theories referred to in these courses are relevant also to Enrollment Management and Forecasting (HI ED 860). The Research Design course (HI ED 830), with its emphasis on measurement issues and survey research, provides an analytical foundation for all these other IR courses.

HI ED 840 summarizes the best of what we know about assessing student outcomes. Few topics are more complicated than outcomes assessment. The needs of students and the areas of their learning vary highly among institutions and degree programs. Students are diverse and the dimensions of the learning processes in American Higher Education are extremely complex. Likewise, assessing student performance is complex and hence difficult to summarize. Moreover, before we travel into the real content of assessment, we need to place our journey within a context, and within an environment that is heavily shaping what we do. Thus, before we focus on evaluation academic programs and assessing student outcomes, we will examine accountability, accreditation, and performance reporting. In recent years, evidence of student outcomes has become one of the key indicators of institutional effectiveness, especially as it is viewed by accrediting associations and many state higher education governing boards.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 850 Analyzing Faculty Workload, Performance, and Compensation (3)** Develop research skills to analyze faculty workload and performance in teaching, research, outreach, and compensation.

### **HI ED 850 Analyzing Faculty Workload, Performance, and Compensation (3)**

This course provides researchers with an overview of faculty issues with the analytical skills and tools associated with analyzing faculty workload and performance in teaching, scholarship, and outreach. The course is designed for those entering careers in institutional research and planning, particularly those whose work supports the Provost, as well as for those whose work is related to faculty analysis and reporting in other higher education settings. Topics include an overview of needed local and existing national databases, measuring faculty workload, evaluating faculty research productivity, using student ratings of instruction, providing support for academic program reviews, conducting salary studies, addressing issues of equity/diversity, and assessing faculty satisfaction, turnover, and flow.

Curricular goals: Upon completion of this course, students will be able to:

- Understand concepts, methodologies, research practices, and information systems that support academic decision making in the Provost's Office.
- Use NSOPF, NSF, IPEDS, HERI, and other national databases that collect faculty information.
- Develop appropriate metrics to gauge faculty work in instruction, research, and service.
- Understand the diversity of academic work-life and labor market issues at national and institutional levels.
- Carryout at a basic level the major Institutional Research faculty-related analyses, including instructional analysis, research productivity, benchmarking, salary equity, and turnover projections.
- Utilize SPSS software, make power-point presentations, and produce effective reports related to faculty issues.

This course has established start and end dates and includes interaction with others throughout the course. The course is structured around learning units, each roughly corresponding to one week of a Penn State semester. Learning units are self-contained and built around a single theme or topic. Each contains an introduction, objectives, reading assignments, professor's content, and learning activities. While it is possible to accelerate or vary the reading and research schedule, the discussion components among peers should adhere roughly to the time frame (the week) within which each Unit is presented. Pre-requisite: Working knowledge of intermediate statistics such as OLS regression.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HI ED 860 Conducting Enrollment Management Studies (3)** Studies three stages of enrollment management: Pre-admission, initial student experience, and student success and completion.

### **HI ED 860 Conducting Enrollment Management Studies (3)**

This on-line asynchronous course summarizes the best of what we know about conducting enrollment management studies, and is designed for higher education students and professionals who seek a fuller understanding of enrollment management (EM) processes and skills. The learning experiences in this course are designed to apply the academic readings and scholarly theories to hands-on analysis of real datasets. Each lesson lists supplemental readings and weblinks for exploring each topic in greater depth.

EM has evolved into a proactive and important campus planning component. Admitting and retaining too few students can threaten the organization's financial health, while enrolling too many students can stretch the institution's resources beyond capacity. Thus, the most basic EM includes attracting, admitting, and enrolling students. Necessary basic tools include admissions marketing, predicting admissions yield, and modeling the impact of financial aid on student experience - orientation, advisement, curricular access, student support services, and remedial work where needed. These activities are designed to ensure the student's successful introduction and integration into the institution, as well as retention through the first year. At the third level, EM focuses on student success (persistence, academic achievement, graduation, and employment). At this third level, analytical studies of student retention, time to degree, graduation rates, and enrollment forecasting are central IR and EM tasks.

The course is divided into 4 clusters. Units 1-5 provide an overview of EM processes and skills. This is not a statistics course; however, every enrollment manager eventually needs a working knowledge of logistic regression and/or discriminant analysis. Thus, Unit 5 provides a primer on statistical techniques commonly used in EM studies. Units 6-8 concentrate on the first stage of the enrollment process (Admissions and Financial Aid). Units 9-10 examine the students' social and academic integration within the institution. The third EM theme of student success, retention, persistence and graduate is covered in units 11-12.

The course assumes that everyone enrolled will arrive at the end of the course in Unit 13 with a concrete EM plan, or at least with an outline of what such a plan should contain. Thus, the course also provides an ongoing multi-week interactive Discussion Forum so that all can share thoughts, experiences, and assessments of various plans.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## History (HIST)

**HIST 400** Research in Ancient Sources (3) Guided research in the literature of ancient Mediterranean civilizations.

### Research in Ancient Sources (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 401** (IL) (J ST 401) Ancient Technologies and Socio-cultural History in the Ancient Levant (3) Social and intellectual development in the Ancient Levant as they affected and were affected by technological development.

### Ancient Technologies and Socio-cultural History in the Ancient Levant (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 402** (IL) The Rise of the Greek Polis (3) Development of the Greek city-state from Homeric times to the fifth century B.C.; special references to Athenian society.

### The Rise of the Greek Polis (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 403** (IL) Alexander the Great and the Hellenistic World (3) The career of Alexander, his impact on his own time, and the Hellenistic legacy.

### Alexander the Great and the Hellenistic World (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 405Y** (IL) The Roman Empire (3) The political and social history of the Roman empire; economic institutions and religious groups which influenced Roman administration.

### The Roman Empire (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 406W** Research in Medieval Sources (3) Guided research in the literature of medieval Europe.

**Research in Medieval Sources (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 407** (IL) Early Medieval Society (3) Rise of European nations and evolution of their social and political institutions from the time of Constantine to the Crusades.

**Early Medieval Society (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 408** (IL) Church and State in the High Middle Ages (3) European political, institutional, and social history in light of church- state tensions from the Crusades to the Renaissance.

**Church and State in the High Middle Ages (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 408U** (IL) Church and State in the High Middle Ages (3) European political, institutional, and social history in light of church- state tensions from the Crusades to the Renaissance.

**Church and State in the High Middle Ages (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 409Y** (IL) (J ST 409Y, RL ST 407Y) European Anti-Semitism from Antiquity to the Present (3) Surveys the history of anti-Semitism in Europe from antiquity through the Middle Ages to the present.

**HIST (J ST) 409Y (RL ST 407Y) European Anti-Semitism from Antiquity to the Present (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course analyzes major episodes in the history of anti-Semitism and tries to clarify the motives and dynamics involved. It seeks to understand what these episodes have in common and what is unique in each case--is there a single universal, eternal antisemitism? Or are there rather "anti-Semitismisms", each belonging to a unique historical context? Is there a single continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates?

We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire's essays, German philosophical texts from Kant to Marx, Wagner's racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher.

The major part of the grade will depend on a short research paper which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 410 (US;IL) (J ST 410, RL ST 410) Jews in the Medieval World (3)** Trends in medieval Jewish society under Islam and Western Christendom.

**HIST 410 Jews in the Medieval World (3)  
 (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The Jews lived in widely scattered communities under Christian and Islamic rule in the medieval period. This course will examine how Jews adapted the traditions they developed in Palestine and Babylonia in the early centuries C.E. to the new conditions they encountered in Europe and the Mediterranean region from the ninth to the fifteenth centuries. It will focus on the general problem of how traditional societies survive in rapidly changing circumstances, particularly when their members are a minority population. The course will aim at developing students' skills in comparative analysis as they compare the adaptive strategies of Jews in different cultural spheres (the Franco-German region versus Spain, for example). They will also be asked to compare the different polemical stances Jews adopted vis-a-vis Christianity, on the one hand, and Islam, on the other. They will be encouraged to understand the ways in which Jews internalized certain aspects of the majority culture and rejected others. It is hoped that they will come to see how deeply Jewish history was intertwined with medieval Christian and Islamic history, despite inter-religious hostilities and the frequent need for Jews to defend against majority aggression.

Students will be evaluated on the basis of two mid-term exams (the first after the survey of the Muslim world, the second after the examination of the Franco-German region) and a comprehensive final exam.

The course will be linked to most of the courses taught in the field of Jewish Studies, especially J ST 111 (Early Judaism), J ST 114 (Modern Judaism), and J ST 118 (Modern Jewish History from 1492). It will also be linked to offerings in Religious Studies: RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), RL ST 107 (Introduction to Islam), RL ST 124 (Early and Medieval Christianity), and RL ST 165 (Introduction to Islamic Civilization). Further, it would complement HIST 001 and 002 (The Western Heritage), HIST 107 (Medieval Europe), HIST 108 (The Crusades), HIST 407 (Early Medieval Society), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), and HIST 471W (Classical Islamic Civilization, 600-1258).

The course will count for 3 credits toward: a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major. It will be offered once a year with an enrollment of approximately 60 students.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 411 (IL) (MEDVL 411) Medieval Britain (3)** Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

**Medieval Britain (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 411U (IL) (MEDVL 411U) Medieval Britain (3)** Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

**Medieval Britain (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 412 (IL) Intellectual History of the Middle Ages (3)** Intensive study of selected topics, such as philosophy, mysticism, heresy, the church, literary and artistic expression, and science.

**Intellectual History of the Middle Ages (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 413 (IL) (MEDVL 413) Medieval Celtic Studies (3)** Celtic civilization from antiquity to the end of the middle ages.

**Medieval Celtic Studies (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 414 (IL) Renaissance and Reformation (3)** The transformation of consciousness from medieval to modern times, with special emphasis on Renaissance Italy and Reformation Germany.

**Renaissance and Reformation (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 415 (US;IL) Race, Gender, and Politics in the United States and South Africa (3)** This thematic course will compare key issues, figures, and events in the historical development of the United States and South Africa.

**Race, Gender, and Politics in the United States and South Africa (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 416 (J ST 416) Zionist History 1890-1948 (3)** History of Zionist thought and politics to the foundation of Esrael 1948.

**Zionist History 1890-1948 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 417 (IL) The Age of Absolutism (3)** Seventeenth- and eighteenth-century royal absolutism in France, Prussia, and Austria; concurrent economic, social, and scientific developments; the Enlightenment.

**The Age of Absolutism (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 418** (IL) The French Revolution and the Napoleonic Era (3) Development of revolutionary France and the First French Empire and their impact on Europe from 1789 to the Vienna settlement.

**The French Revolution and the Napoleonic Era (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 418W** (IL) The French Revolution and the Napoleonic Era (3) Developments of revolutionary France and the First French Empire and their impact on Europe from 1789 to the Vienna settlement.

**The French Revolution and the Napoleonic Era (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 419** (US;IL) The History of Feminist Thought (3) A critical analysis of European and United States feminist thought from the renaissance to the present.

**The History of Feminist Thought (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 420** (IL) Recent European History (3) Impact of two World Wars in twentieth century; social conflict and economic catastrophe; political radicalism; post-1945 recovery and cooperation.

**Recent European History (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 421** (IL) (WMNST 421) The History of European Women (3) European women's lives from the Middle Ages to the present.

**The History of European Women (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 424H** (J ST 424H, RL ST 424H) Monotheism and the Birth of the West (3) The birth of monotheism and its relation to social organization, the idea of individuality, and science.

**HIST (J ST/RL ST) 424H (PHIL 434H) Monotheism and the Birth of the West (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Learn about the formation of Western culture while learning to analyze the texts and other evidence about its formation

from a critical rather than naive viewpoint. The idea of monotheism probably arose very early, and was even briefly implemented as a state cultic policy in Egypt in the 14th century BCE. Why then did it take another seven centuries to become widespread--appearing in ancient Judah, Babylon and Ionia almost simultaneously? To answer this question, the course focuses on several developments through the medium of primary texts and archaeology: the shift from a state hinterland based in extensive agriculture and household processing to one organized for intensive agriculture and industrial processing the rise of recognizably modern science; the promotion of individuation and an international elite culture in the context of Assyrian and Babylonian imperial ambitions; the development of the historical and archaeological arts in the context of archaizing in order to re-invent local traditions; and the socialization of monotheism and of democracy. Students will be evaluated on their discussion of the textual evidence as well as on reports in class and a final paper. This is the sole honors course treating the birth of the West. It expands on knowledge acquired in courses listed as prerequisites and in ANTH/CAMS 012; CAMS 044; ANTH/CAMS 133; CAMS/PHIL 200; HIST 100; HIST/J ST 102; and PHIL 200 and enriches the student experience in CAMS 400, CAMS 440, CAMS 480; HIST 402; J ST 411; PHIL 437; PHIL 453, and PHIL 461. This course counts toward the major in Jewish Studies, History, and Religious Studies and toward the minor in Jewish Studies and Religious Studies.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 427** (IL) Germany Since 1860 (3) Bismarckian power-state; rise to economic dominance; welfare and warfare under Weimar republic and Hitler; post-1945 reconstruction and democracy.

### **Germany Since 1860 (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 427U** (IL) Germany Since 1860 (3) Bismarckian power-state; rise to economic dominance; welfare and warfare under Weimar republic and Hitler; post-1945 reconstruction and democracy.

### **Germany Since 1860 (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 428** (IL) (S T S 428) The Darwinian Revolution (3) The origins and implications of evolutionary theory.

### **The Darwinian Revolution (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 429** Europe in the Age of Nationalism, 1789-1914 (3) Emphasizing the role of nationalism in European cultural, diplomatic and imperial developments; concurrent economic and social changes.

### **Europe in the Age of Nationalism, 1789-1914 (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 430** (IL) Eastern Europe in Modern Times (3) Influence of geography, economic conditions, and nationalism upon the



Eastern European and Balkan peoples; Pan-Slavism, conflicting interests of the great powers.

### **Eastern Europe in Modern Times (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 431 (US;IL) (AF AM 431) Black Liberation and American Foreign Policy (3)** This course deals with American foreign policy and Black liberation in Africa since 1945.

### **HIST 431 Black Liberation and American Foreign Policy (3) (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Black Liberation and American Foreign Policy in Africa since 1945 presents an interdisciplinary approach to the study of American foreign policy in Africa. Course readings will consist of both secondary and primary sources to explore the evolution of American policy toward the continent over the last half-century, and the meaning of the American engagement with Africa for American politics and society.

The course will also examine the reasons that Africa has served as a focus of concern among African Americans both prior to, and, over the period 1945 to the present. Of particular concern will be the ways in which American policy has reflected pressures from African Americans as a constituency in foreign policy.

The focus of the course will be student-centered written research and discussion. Students will be required to select topics from the course outline for presentation in class with the instructor serving as the moderator of discussion and guide to relevant research materials. Students will be encouraged to use both primary and secondary sources for their research. Students will be expected to prepare two individual written presentations which will serve as the basis for class discussion (30% of the grade), a book review (10% of the grade), and a research paper of 15 pages (40% of the grade) on a topic drawn from the areas identified in the course outline. The final 20% of the grade will be awarded for participation in class discussion.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 432 (IL) (AF AM 432) Between Nation and Empire: The Caribbean in the 20th Century (3)** An exploration of the political evolution of the Caribbean Region over the course of the 20th Century.

### **HIST (AAA S) 432 Between Nation and Empire: The Caribbean in the 20th Century (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will explore the political evolution of the Caribbean Region over the course of the 20th century. Its focus will be the ways in which imperial rule and the search for national identity have been the parameters that have shaped Caribbean political history over that period. Students will explore, in written assignments and class presentations, the ways in which the region which has historically been a theatre of confrontation among the major powers in the international system continued to serve that role over the course of the 20th century. The costs that have been borne by the people of the region from these conflicts have been enormous and crippling for several societies, especially Haiti, Cuba, Jamaica, and the Dominican Republic. Among those costs have also been the continued dependence of these societies upon human migration, limited economic strategies of transformation, increasing levels of poverty, and the emergence of a wide variety of political systems that reflect different historical experiences, demographic diversity, varying levels of political autonomy, and a remarkable level of cultural similarities. Evaluation will be based upon two class presentations; one research paper and class participation. The course will be required for students pursuing the African Diaspora minor and for those seeking to broaden their diversity requirements. It can be used to meet non-Western history requirements in the History major.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 433** (IL) Imperial Russia, 1700-1917 (3) Enlightened absolutism, mercantilism, westernization; economic progress, liberal reforms, and revolutionary movement; major intellectual and cultural trends; Russia as great power.

**Imperial Russia, 1700-1917 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 433U** (IL) Imperial Russia, 1700-1917 (3) Enlightened absolutism, mercantilism, westernization; economic progress, liberal reforms, and revolutionary movement; major intellectual and cultural trends; Russia as great power.

**Imperial Russia, 1700-1917 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 434** (IL) History of the Soviet Union (3) Revolution; social, political, economic, and cultural continuity and change in the U.S.S.R. since 1917.

**History of the Soviet Union (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 435** Topics in European History (3 per semester/maximum of 9) Study of a particular period or country in European history, its significance and relation to other areas and the present. (May be repeated for credit.)

**Topics in European History (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 436** (IL) Great Britain Under the Tudors and Stuarts, 1485-1688 (3) Religious, political, and constitutional developments in the British Isles.

**Great Britain Under the Tudors and Stuarts, 1485-1688 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 436U** (IL) Great Britain Under the Tudors and Stuarts, 1485-1688 (3) Religious, political, and constitutional developments in the British Isles.

**Great Britain Under the Tudors and Stuarts, 1485-1688 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 437 (IL)** Great Britain 1688-1867 (3) Social, economic, and political history of Great Britain from late Stuart times until the mid-Victorian era.

**Great Britain 1688-1867 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 438 (IL)** Great Britain 1867-Present (3) Social, economic, and political history of Great Britain from the mid- Victorian era to the present.

**Great Britain 1867-Present (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 440 (US)** Colonial America to 1753 (3) Background, establishment, and growth of the American colonies, including economic, political, social, religious, and intellectual developments.

**Colonial America to 1753 (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 441 (US)** Revolutionary America, 1753-1783 (3) Forces in Great Britain and America causing withdrawal of thirteen colonies from the British Empire and the Revolutionary War.

**Revolutionary America, 1753-1783 (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 442 (US)** The Early American Republic, 1783-1850 (3) Confederation and Constitution; the Federalist and Jeffersonian periods; "the Era of Good Feelings"; "the Age of Jackson."

**The Early American Republic, 1783-1850 (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 444 (US)** The United States in Civil War and Reconstruction--1850-1877 (3) Causes of the Civil War; conduct of the war, North and South; impact of the war; problems of Reconstruction.

**The United States in Civil War and Reconstruction--1850-1877 (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 444W (US) The United States in Civil War and Reconstruction--1850-1877 (3)** Causes of the Civil War; conduct of the war, North and South; impact of the war; problems of reconstruction.

**The United States in Civil War and Reconstruction--1850-1877 (3)**

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 445 (US) The Emergence of Modern America (3)** Economic, social, political history of the United States, 1877-1919, emphasizing growth of industrialism and development as a modern nation.

**The Emergence of Modern America (3)**

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 446 (US) America Between the Wars (3)** The Roaring Twenties, the Great Crash, Depression, and New Deal; war debts, reparations, isolationism, and World War II.

**America Between the Wars (3)**

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 447 (US) (AM ST 447) Recent American History (3)** Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945.

**HIST 447 (AM ST) Recent American History (3)**

This course covers the history of the United States from the end of World War II to the present. Topics include but are not limited to the Marshall Plan, the Cold War, the Korean War, the rise of television, atomic power, the Eisenhower presidency, the Civil Rights and Women's Movements, the Vietnam War and protests, the space race, Watergate, the Reagan presidency, the two Iraq Wars, the Dot-com revolution, 9-11 and the War on Terror, and the Obama presidency. While addressing major historical movements, the course will also explore the culture of the period –art, literature, music, sports, television, religion, and film. Even though the course covers a relatively short span of years, students will see that American society has undergone dramatic changes in this period as the result of social movements, immigration, wars, political scandal, and technological innovation. The course will close by speculating on the current direction of the United States in light of the serious challenges the nation faces.

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 447 (US) (AM ST 447) Recent American History (3)** Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945.

**HIST 447 (AM ST) Recent American History (3)**

This course covers the history of the United States from the end of World War II to the present. Topics include but are not

limited to the Marshall Plan, the Cold War, the Korean War, the rise of television, atomic power, the Eisenhower presidency, the Civil Rights and Women's Movements, the Vietnam War and protests, the space race, Watergate, the Reagan presidency, the two Iraq Wars, the Dot-com revolution, 9-11 and the War on Terror, and the Obama presidency. While addressing major historical movements, the course will also explore the culture of the period –art, literature, music, sports, television, religion, and film. Even though the course covers a relatively short span of years, students will see that American society has undergone dramatic changes in this period as the result of social movements, immigration, wars, political scandal, and technological innovation. The course will close by speculating on the current direction of the United States in light of the serious challenges the nation faces.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 448 (US) America in the 1960s (3)** Social, political, and cultural themes in the United States in the 1960s.

**America in the 1960s (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 449 (US) Constitutional History of the United States to 1877 (3)** Colonial background; framing and adoption of the constitution; development of the court under Marshall and Taney; sectionalism, Civil War, Reconstruction.

**Constitutional History of the United States to 1877 (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 449U (US) Constitutional History of the United States to 1877 (3)** Colonial background; framing and adoption of the constitution; development of the court under Marshall and Taney; sectionalism, Civil War, Reconstruction.

**Constitutional History of the United States to 1877 (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 450 (US) Constitutional History of the United States Since 1877 (3)** Constitutional developments from laissez-faire to the welfare state; imperialism, war, internationalism; the contemporary court, civil liberties, and civil rights.

**Constitutional History of the United States Since 1877 (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 451 (US) The Consumer Revolution (3)** The origins and impact of American consumer society since 1870.

**HIST 451 The Consumer Revolution (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This lecture course shows how the United States became a nation of consumers from 1870 to the present. It is designed both for the business and communications student as well as the liberal arts major. The origins of department stores, name-brand goods, fast-food chains, modern advertising, and mass entertainment show us how American business and culture was transformed by the consumer revolution. We will explore how the automobile became the leading consumer good of the 20th century and analyze its impact on how Americans shopped. The rise of advertising and its linkage to home-based mass entertainment through the radio and TV will interest us. We will also consider how events like the Great Depression, World War II, the counter-cultural movement of the 1960s, the energy crisis of the 1970s, and the economic deregulation of the 1980s and 90s shaped consumer attitudes and advertising. "The Consumer Revolution" also briefly explains how American consumer culture has been globalized (with companies like Coca Cola, Disney, and Ford).

The course also explores how new consumer goods shaped the experience of childhood, youth, family and home life, and retirement. In particular, we will consider how youth-oriented goods in fashion, foods, and entertainment created a unique youth consumer culture. Also important are the intellectual debates about the meaning and value of consumer society: Is mass consumption the real meaning of American democracy or is it a perversion of it? Are consumer needs unlimited and where does the desire for goods come from? Because consumer society seemed to threaten so many traditional values, we will also analyze movements for restricting consumption. We will consider the origins and impact of Prohibition, dieting and health food crazes, and movements to restrict advertising and sale of goods like cigarettes.

In addition to lectures and visual presentations in class, students will read chapters from major studies of the above topics, some of which will be discussed in class. Grades will be based on performance in discussion and essay exams.

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 451U (US) The Consumer Revolution (3)** The origins and impact of American consumer society since 1870.

### **The Consumer Revolution (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 452 (US;IL) History of U.S. Foreign Relations (3)** History of U.S. foreign relations since 1789; emphasis on twentieth century.

### **History of U.S. Foreign Relations (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 453 American Environmental History (3)** The history of the ways Americans have used and thought about the environment since 1500.

### **American Environmental History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Social and Behavioral Sciences  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 454 (US) American Military History (3)** Development of U.S. military policy, 1776 to the present, emphasizing the conduct of our wars, interrelationship of civil and military authority.

### **American Military History (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 456Y (US)** The Social History of American Vernacular Building, 1607-1980 (3) Social, historical, and cultural context of American building including settlements, housing, workplaces, stores, recreational facilities; changes over time.

**The Social History of American Vernacular Building, 1607-1980 (3)**

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 457 (US;IL)** (S T S 457, WMNST 457) The History of Women in Science (3) Critical analysis of the roles women, gender, and minorities have played in natural sciences.

**The History of Women in Science (3)**

General Education: None

Diversity: US;IL

Bachelor of Arts: Humanities

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 458Y (US)** (LER 458Y) History of Work in America (3) A study of selected problems in the history of work in the United States, especially since 1877.

**History of Work in America (3)**

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 459Y (US)** Social and Cultural History of the United States Since 1783 (3) Role of immigration, social reform movements, religion, education, science, literature, and the arts in American history.

**Social and Cultural History of the United States Since 1783 (3)**

General Education: None

Diversity: US

Bachelor of Arts: Humanities

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 460 (US;IL)** United States Foreign Intelligence (3) Aims, methods, and organization of U.S. foreign intelligence from the American Revolution to the Cold War and beyond.

**United States Foreign Intelligence (3)**

General Education: None

Diversity: US;IL

Bachelor of Arts: Humanities

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 461 (US;IL)** The Emergence of the American City: 1100-1880 (3) The growth of American cities from their urban origins in Europe and the Native-American Southwest to 1880.

**The Emergence of the American City: 1100-1880 (3)**

General Education: None

Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 462 (US;IL)** The Twentieth Century City (3) Political, economic, social, and cultural transformations in American cities from 1880 to 2000.

**The Twentieth Century City (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 463 (US)** American Thought to 1865 (3) Introduction to, scholarly commentary on, major documents of American Intellectual history, early colonial period to end of the Civil War.

**HIST 463 American Thought to 1865 (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

To offer such a course without some treatment of race, class, and gender diversity would be undesirable indeed, irresponsible. The movements for the abolition of slavery, for women's rights, and for the rights of workers will receive prominent and necessary attention. The history department does not, however, seek to invade the territories of programs and/or departments that are primarily concerned with women and racial or ethnic minorities. This course will cover such material in ways specifically appropriate to the contacts with American-Indian, Asian-American, African-American and Spanish-speaking populations.

This course will focus on documents produced by men and women of various class and ethnic backgrounds who are assumed to have participated actively in the American intellectual tradition. Discussions of the ideas and publications of well-educated individuals will to some extent dominate the content of the proposed course. Thus, for obvious reasons, it must address the historical importance of documents such as Thomas Jefferson's Notes on the State of Virginia, and Harriet Beecher Stowe's Uncle Tom's Cabin. These documents are of unquestionable importance to American intellectual history, but due to constraints of time, it is not always possible to discuss their historical importance as cultural documents in the existing American history courses. A highly literate African-American essayist like Francis Ellen Watkins Harper is also an obvious candidate for inclusion in this course. A less educated person like Anna Murray Douglass, although she was an important and interesting figure, whose life and values merit serious reflection, could hardly have left behind a body of writings. Francis Harper, on the other hand, commented significantly on the ideological movements of her times. The course is admittedly biased in favor of highly literate historical figures, who interacted with the traditions of American thought and writing.

An example of evaluation methods would be: Students will be expected to write a mid-semester and a final examination, and to prepare a written paper outside of class. Graduate students will be expected to draft a potentially publishable article, which may be archival, historiographical, or interpretive.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 464 (US)** American Thought from 1865 (3) Introduction to, scholarly commentary on, major documents of American Intellectual history from end of the Civil War to the present.

**HIST 464 American Thought from 1865  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

HIST 464 is intended to fill several needs. First, to introduce advanced undergraduates and beginning graduate students to documents of American thought of the sort collected by David A. Hollinger and Charles Capper in the American Intellectual Tradition (New York: Oxford University Press, 1989). Second, to offer a systematic survey of a standard area of American history that students might wish to approach as a coherent field. Third, to provide students with exposure to the bibliography and the historiography of American intellectual history as an established sub-field of American history. It is intended that either semester of the course may be elected independently of the other.

An example of evaluation methods would be: Students will be expected to write a mid-semester and a final examination,



and to prepare a written paper outside of class. Graduate students will be expected to draft a potentially publishable article, which may be archival, historiographical, or interpretive.

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 465 (US) (AF AM 465) Civil Rights and American Politics 1933-1968 (3)** The civil rights struggle and its impact upon American politics.

**HIST 465 Civil rights and American Politics 1933-1968 (3)  
(US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Students will be encouraged to explore the period over which the civil rights of African Americans and other Americans of color emerged as permanent features of American political and social life. They will be asked to think systematically about the transformation of American society over the course of the 20th century from a society based upon the constitutional sanction 'white supremacy' and 'racial segregation' to one in which ethnic pluralism and equality of races have become the principles accorded increasing legitimacy in principle, if not in fact. They will also be encouraged to explore the process of political realignment within the major parties, the Democrats and Republicans, and the ways in which the politics of race have been instrumental in shifting the electoral strategies and ideological debates within and between the parties.

General Education: None  
Diversity: US  
Bachelor of Arts: Humanities  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 466 (US;IL) (WMNST 466) Lesbian and Gay History (3)** Critical exploration of the history of sexuality, focusing especially on the emergence of modern lesbian and gay identities.

**HIST (WMNST) 466 Lesbian and Gay History (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will explore the relationships in different cultures and historical periods between the dominant culture and homosexuals, whom the culture deemed, at different times, sinful, deviant, criminal or, more recently, a minority community. Students will confront the very nature of difference, and how it has been played out in European and American history. The course will challenge students to deal with how societies define difference itself; how they isolate or punish deviants; and how the creation of the "homosexual" helped establish not simply difference but "normalcy" in a highly sexualized modern culture. Finally, the course will explore notions of identity itself, focusing on the creation of a modern gay and lesbian identity and its impact on broader questions of gender, community, civil rights, and political discourse in the United States.

An example of evaluation methods would be: course presented in a seminar format with grades based on class participation, brief analytical papers, and a longer research or historiographic paper. This course will fulfill a requirement for 400-level courses in both History and Women's Studies majors.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 467 (US;IL) (LTNST 467) Latin America and the United States (3)** Historical development of policies of the United States with regard to Latin- American affairs from colonial times to the present.

**Latin America and the United States (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 468 (IL)** Mexico and the Caribbean Nations in the Twentieth Century (3) Political, economic, and social development in Mexico and the Caribbean since 1900. Emphasis on Mexican, Guatemalan, and Cuban revolutions.

**Mexico and the Caribbean Nations in the Twentieth Century (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 469 (CRIMJ 469)** Drugs and Drug Policy in the United States (3) Examines the history and dimensions of drug use and analyzes the impact of drug policy.

**HIST (CRIMJ) 469 Drugs and Drug Policy in the United States (3)**

For nearly a century, the United States has been waging its version of a hundred years' war on drugs, spending billions of dollars and incarcerating thousands of offenders while failing to significantly reduce the use of illicit drugs. This course examines drug use in a historical context while addressing the changing nature and dimension of drug use, including the pharmacology of drugs, patterns of drug use, and sentencing policies. Because drug control is inextricably linked to social, political, and public policy, the course will provide the student with a foundation for critical thinking and rational decision making relative to the efficacy of the various drug control initiatives. Since drugs seemingly permeate every level of American society and directly or tangentially touch most Americans' lives, issues such as drug testing in the workplace, the use of drug courier profiles, legalized medical marijuana, and needle exchange programs are evaluated. Students will be expected to learn the pharmacology of various drugs, the history of drug use in the United States since the colonial era, the evolution of federal drug agencies, and acquire knowledge about contemporary drug issues. They also will be expected to develop and strengthen their critical thinking skills as they assess the consequences of implementing particular anti-drug policies and their impact on reducing the use of illicit drug use. An example of the evaluation methods would be: students will be evaluated on the basis of three exams and four "think pieces" (requiring students' critical responses to an assigned topic) scheduled throughout the semester. Class attendance also will influence the grade.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 470** Modern Bondage: Slavery in the Americas, 1492-1888 (3) The work, culture, ideology, and political economy of slavery in the Americas between 1500 and 1888.

**Modern Bondage: Slavery in the Americas, 1492-1888 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 470H** Modern Bondage: Slavery in the Americas, 1492-1888 (3) The work, culture, ideology, and political economy of slavery in the Americas between 1500 and 1888.

**Modern Bondage: Slavery in the Americas, 1492-1888 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 471Y (IL) (RL ST 471Y)** Classical Islamic Civilization, 600-1258 (3) Pre-Islamic Arabia; Muhammad; Arab conquests; Islamic beliefs and institutions; literary, artistic, and scientific achievements; relations with Europe; breakdown of unity.

**Classical Islamic Civilization, 600-1258 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 472** (IL) The Ottoman Empire and Other Muslim States (3) Turkish and Mongol invasions; Mamluks; Ottoman expansion and institutions; Safavid Persia; disintegration and reform; emergence of modern Turkey and Iran.

**The Ottoman Empire and Other Muslim States (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 473** (IL) The Contemporary Middle East (3) Political, economic, and social changes in Turkey, Iran, Israel, and the Arab countries in the twentieth century; Arab-Israeli conflict.

**The Contemporary Middle East (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 474** (JAPNS 426) Early Modern Japan (3) Japanese history from 1580-1880.

**Early Modern Japan (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 475Y** (IL) The Making and Emergence of Modern India (3) India's transition to social, economic, and political modernity through the experience of British colonial rule and the nationalist struggle.

**The Making and Emergence of Modern India (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 477** American Military History to 1900 (3) Development of United States military policy, 1776-1900, emphasizing conduct of wars, interrelationship of civil and military authority.

**American Military History to 1900 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 478** American Military History Since 1900 (3) Development of United States military policy in the 20th and 21st centuries, emphasizing conduct of wars, interrelationship of civil and military authority.

**American Military History Since 1900 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 479 (IL) History of Imperialism and Nationalism in Africa (3)** Theories and types of imperialism; varied patterns of colonial administration; initial African responses; nationalism; decolonization and independence.

**History of Imperialism and Nationalism in Africa (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 480 (IL) Medieval Japan (3)** An overview of Japan between 1150-1550, a period of political decentralization, cultural efflorescence, and social change.

**Medieval Japan (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 481 (IL) Modern Japan Since 1800 (3)** The transformation of Japan from a pre-modern, isolated, and agricultural nation into a highly industrialized world power.

**Modern Japan Since 1800 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 482 (CHNS 424) Confucius and the Great Books of Early China (3)** This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China.

**Confucius and the Great Books of Early China (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 483 (IL) Chinese Society and Culture to 1800 (3)** The social, political, and cultural issues and developments from ancient to the late-imperial times.

**Chinese Society and Culture to 1800 (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 484Y** (IL) History of Chinese Thought (3) A study of the dynamic historical development of Chinese thought with its diverse expressions from antiquity to the present.

**History of Chinese Thought (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 485Y** (IL) Nineteenth-Century China (3) Ch'ing society and institutions; "opening" to the west; imperialism; domestic upheaval and its effect upon Chinese society; reform movements.

**Nineteenth-Century China (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 486** (IL) Twentieth-Century China (3) China from the Republican Revolution of 1911 to the present; nationalism, cultural change; development of communism.

**Twentieth-Century China (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 487** American Diplomacy, 1776-1914 (3) Developments in the foreign policy of the United States from independence to the eve of World War I.

**American Diplomacy, 1776-1914 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 488** American Diplomacy Since 1914 (3) Developments in the foreign policy of the United States since the eve of World War I.

**American Diplomacy Since 1914 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 489** (IL) (PL SC 486, ASIA 489) International Culture in East Asia (3) Study of the role of culture in East Asian regional and East-West international relations.

**HIST 489 (PL SC 486/ASIA 489) International Culture in East Asia (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will examine the place of culture in international history through a comparative look at the role of cultural circulation and exchange in relations among China, Korea, and Japan (and between East Asia and the West) from the

propagation of Buddhism in the first century A.D. to present-day circulation of popular music, movies, and comics. We will explore the international politics of culture and the politics of international culture, considering questions of what constitutes culture, whether it is ever entirely separate from politics, and how that separation has evolved over time. These larger themes of the course will be tackled by following the historical movement of concrete objects and people throughout the region. This is a course in international history; historical events, problems, and issues will be at the center of our weekly discussions. But it also seeks to explore aspects of international relations.

This course is intended to examine the role of cultural exchange in international relations. The goals of the class are not only to gain an understanding of the uses and impact of culture in international relations, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through readings, discussions, presentations, and the final project, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing.

This course is designed to respond to strong student interest in East Asian international history. This course will complement and extend popular survey and upper-level courses such as HIST 172/174/175/480/481/483/484/485/486.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 490 (L ST 490) Archival Management (1-3)** Introduction to the principles and procedures in the management of archives and historical manuscripts.

#### **Archival Management (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 491 (IL) British Civil Wars and Revolutions, 1639-1651 (3)** This is an advanced course on the history of the general crisis in the British Isles, from the outbreak of war between England and Scotland in 1639 to the securing of the Commonwealth regime following the destruction of the last major royalist army in 1651.

#### **British Civil Wars and Revolutions, 1639-1651 (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 492 (IL) Witchcraft in Early Modern Europe (3)** Survey of the social, economic, political, and religious conditions of accusations and prosecutions of witchcraft in western Europe and north America, from 1500 to 1700.

#### **Witchcraft in Early Modern Europe (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 497A** Radicalism in American History (3) Movements for social change: programs/methods of particular groups, how they understood contemporary problems, possibilities for social change, relationship to American society.

**Radicalism in American History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 497B** (J ST 497B) The Holocaust (3) This course for advanced undergraduate students will focus on the actual history and the historiography of the Holocaust. After discussion some of the most important studies about the Holocaust and the main historiography debates, we will look at the origins and the evolution of the "Final Solution." The class will touch on the function of the "Ghettos," the role of the mobile killing units, the extermination camps, and Jewish resistance. Apart from discussion the historiography, we will work mostly with primary sources: documents created by the perpetrators, bystanders, and victims; files relating to postwar trials of perpetrators; photographs; representations of

objects relating to the Holocaust; memoirs by survivors; interviews with survivors and bystanders. Students are expected to do extensive reading for this class and prepare oral presentations on their respective paper topic. The research paper for this course will be based largely on primary sources.

### **The Holocaust (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 499 (IL) Foreign Study--History (1-6)** Study in selected foreign countries of various periods and topics in history.

### **Foreign Study--History (1-6)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 500 Theory, Method and the Practice of History (3)** An examination of the theory and methodologies of the historical discipline and classic works of historiography.

### **Theory, Method and the Practice of History (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 502 Historiography (3)** No description.

### **Historiography (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 503 Studies in Greek History (3-6)** No description.

### **Studies in Greek History (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 504 Studies in Roman History (3-6)** No description.

### **Studies in Roman History (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 505 (J ST 505) Biblical Historiography in its Ancient Setting (3 per semester/maximum of 6)** Methods of historical



reconstruction in Biblical and other historiography from the earliest Mesopotamian records through those of the 6th century B.C.E.

**Biblical Historiography in its Ancient Setting (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 509** Medieval Civilization (3-9) No description.

**Medieval Civilization (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 511** Topics in Medieval Britain (3 per semester, maximum of 6) Readings and research in major themes of the history of medieval Britain.

**Topics in Medieval Britain (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 512** Church and State in Medieval Europe (3) This course provides students with an overview of the political developments of church and secular government in medieval Europe.

**Church and State in Medieval Europe (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 514** The Early Modern World: Empires, Trade, and Religion (3) This course provides an overview of early modern history, with an emphasis on cultural encounters between the different global regions.

**HIST 514 The Early Modern World: Emphasis, Trade, and Religion (3)**

This course introduces the global history of the Early Modern Period – between the Late Middle Ages and the 18th century. In particular it provides a broad exploration of early modern global history, with an emphasis on the broad currents of political, economic, and cultural encounters between the different global regions. Students will recognize, identify and apply theoretical dimensions of world history in a global context. Students will learn a general history of the political, economic, and cultural encounters between the different global regions between the collapse of the Mongol Empire in the 14th century and the rising global domination of western Europe in the 18th century.

In weekly readings and discussion, this course takes the global history in the aftermath of the collapse of the Mongol Empire as its starting point. After examining the Mongol Empire, the first global political entity in world history, it will investigate the rise of the maritime empires of Spain and Portugal as a means to build an awareness and transition to the dynamic early modern trends in South Asia especially in relation to the interlocking trading entities of the Indian Ocean world. Exploring the concepts of 'World System' and 'Global History', the class will investigate the rise and decline of maritime expansion during the Ming dynasty before turning to an investigation of the rise of Portugal as the first European maritime power. While examining the reasons for the rise of Western Europe (the decline of the Mediterranean, the rise of the Atlantic), this course will also examine the history of trade and cultural contact in South and Southeast Asia before moving on to an examination of the history of the Eurasian steppes between the 17th and 18th centuries. The course concludes with the rising domination of Western Europe.

This is a foundational course in global history for graduate students, not only in the history department, but for all students in the College of the Liberal Arts and the College of Arts and Architecture (primarily Art History), who want a firm

grounding in late medieval and early modern history.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 515 Early Modern Europe (3-6)** A graduate seminar examining selected topics in early modern European history through readings, discussions, and research papers.

**Early Modern Europe (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 516 (WMNST 516) US Women's and Gender History (3)** A critical analysis of gender and theories of gender in selected American historical contexts.

**US Women's and Gender History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 520 Studies in Twentieth-Century Europe (3-6)** No description.

**Studies in Twentieth-Century Europe (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 522 Studies in Modern European Intellectual History (3-6)** A seminar examining developments in modern European intellectual history through readings, class discussions, and research papers.

**Studies in Modern European Intellectual History (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 524 Deviance, Crime and Madness in Modern Europe (3)** Historiography of deviance, crime, and madness in Europe from the late-18th century to the present.

**HIST 524 Deviance, Crime and Madness in Modern Europe (3)**

Historians and social scientists have shown that societies have persistently established certain standards and ideals for human conduct and being. At the same time, the natural variation in human phenotypes has meant that individual, groups, and institutions within these societies have been faced with those deviating from these norms. The deviations may sometimes present themselves physically (e.g., in the form of a somatic lesion or disability), intrapersonally (e.g., in eccentric thinking or affect), or interpersonally (e.g., in criminal or anti-social conduct). As historians, anthropologists, and other have demonstrated, while there are noteworthy continuities in how these deviations have often been manifested (e.g., seizures accompanying epilepsy), there have been considerable differences across time and place in how deviance has been expressed, perceived, understood, and handled.

This seminar examines this constellation of problems as they have emerged in Europe since the 18th century. Posing, as they do, complex human problems, the historical study of deviance, crime, and madness requires paying attention to the scholarly contributions of multiple disciplines beyond the field of history. Thus, the course will attend to both social theory and historiography. Each week, readings from social theory will be paired with a historical work, in order to bring broad theoretical analysis and empirical disciplinary research more deliberately into conversation with one another. Some examples of the course readings include Emile Durkheim's *On Suicide*, Erving Goffman's *Stigma: Notes on the Management of a Spoiled Identity*, Janet Oppenheim's "Shattered Nerves: Doctors, Patients, and Depression in Victorian England," Norbert Elias' *The Civilizing Process*, Reviel Netz's *Barbed Wire: An Ecology of Modernity*, and Jan Gross' *Neighbors: The Destruction of the Jewish Community in Jedwabne, Poland*. Weekly topics will center on key social processes and prominent conceptual frameworks: social control, self-control, marginalization, pathologization, criminalization and de-criminalization, representation, punishment, extermination, and enhancement. Students will be required to write an interdisciplinary research paper (i.e., a paper accessible to multiple scholarly audiences), calling on both theoretical and empirical scholarship from various disciplines. The course will culminate in a seminar conference in which students will present their research and field questions and comments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 525 Imperial Borderlands in Modern Europe (3)** This course provides students with an overview of the processes of constructing borders in a variety of forms, ethnic, religious, trade, and linguistic, in a European imperial context.

### **HIST 525 Imperial Borderlands in Modern Europe (3)**

This course exposes students to the latest developments in colonial studies and new paradigms for considering European imperial history in terms of its borderlands.

Using the methodological tools applied in recent years to the history of Western colonial empires, this course expands the scope of European history to encompass the complex interaction between the conquered peoples and their rulers by broadening imperial history to include the study of ethnic and religious differences that emerged from the European encounter with peoples whose cultures differed profoundly from their own. In particular, the material covered in this course will build an awareness among students of the role of states, and especially imperial states, in confronting the polyethnic/multinational character of populations they sought to rule. The theoretical and historiographical works assigned will focus on how imperial European states crafted or erased cultural differences and how borderlands posed particular challenges in these endeavors.

Building on these insights, students will gain an awareness of imperial policies and conceptions of colonial rule and of the impact of imperial domination on colonial peoples. Students will learn to recognize and identify the means by which Imperial rule brought irreversible changes to the way of life of the borderlands peoples, who adapted to and resisted imperial rule by a variety of means that they had at hand.

Such an approach will yield an awareness of the methods by which historians formulate questions, choose sources, use theory to interpret the material they collect, and the variety of rhetorical and other means available to historians to present findings. Students will conduct their own analyses of scholarship by reflecting on the assigned readings and presenting their thoughts and evaluations in the form of weekly critiques and a final paper. This will be invaluable in helping students to acquire the necessary methodological and theoretical tools to formulate questions for their own research projects.

This course fulfills the requirement of a topical graduate course in History. It is open to students within and outside of the History Department.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 527 Societies, Citizens, and Violence in Modern Europe (3)** The social and cultural history of warfare in modern Europe, with specific emphasis on the First and Second World Wars.

### **Societies, Citizens, and Violence in Modern Europe (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 529** Methods in Modern Social History (3 per semester, maximum of 6) Sources, interpretations, research methods, and current debates in modern social history.

**Methods in Modern Social History (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 530** Methods in the History of Science and Technology (3 per semester, maximum of 6) Modern research methods and historiographical controversies in the history of science and technology.

**Methods in the History of Science and Technology (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 531** Religion and State-Making in the Early Modern World, 1400-1800 (3) This course provides students with an overview of the process of state-making in relationship to religious convictions in the Early Modern era, ca. 1400- 1800.

**HIST 531 Religion and State-Making in the Early Modern World, 1400-1800 (3)**

This seminar exposes students to the current state of scholarship from the standpoint of historical, legal, sociological and literary analyses of the state and religious authority. The inadequacy of long-accepted notions of "secularization" and "modernization" to describe the challenges to both state and religion in the Early Modern era require students to assess the specific value given to notions of the state and religion in specific cultural and historical contexts and what precipitated a crisis of authority in both. The exchanges between European and non-European centers of authority during the Early Modern period helped to shape many of these disputes and scholars' interpretive frameworks. The seminar is intended for graduate students in history and related fields who are preparing for the field in Early Modern studies.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 533** Studies in Russian and Soviet History (3-6) No description.

**Studies in Russian and Soviet History (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 534** The Catholic World 1540-1770 (3) This course examines the relationship between world history and Catholicism.

**HIST 534 The Catholic World 1540-1770 (3)**

One of the prominent themes ignored in the traditional historiography of early modern Catholicism, is the history of non-European Catholicism that is the focus of this course. There is little doubt that the history of Catholic missions constitutes a venerable subject in ecclesiastical history, but this course seeks to shift the focus on the encounter between Christianity and non-European civilizations beyond the perspective of European missionaries. This seminar focuses on the relationship between world history and Catholicism. It will examine the following themes: the responses of Rome to the Protestant challenge, the linkages between early modern state formation and Counter-Reformation, cultural production and confessional conflict, and finally, the relationship between the Iberian maritime empires and Catholic missions beyond Europe. Students will acquire a firm foundation in the history of early modern Europe and a perspective into early modern

global history by focusing on one of the major themes (religion) in the history of global history.

This course takes as its starting point the contention that any history of Christianization in Europe is enriched by investigations into the encounter between European and non-European civilizations during the expansion of Catholic Europe. This course will be a foundational course for graduate students in the field of early modern global history, colonial Latin American history, history of China, and history of the Atlantic world. It will also provide historical background for students in the history of art and the departments of English, German, and Italian.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 535 History of the Body (3)** This course provides students with an overview of the contribution of intellectual and cultural historians to the field of "body history."

### **HIST 535 History of the Body (3)**

This course exposes students to the contribution of intellectual and cultural historians to the field of "body history." Ranging from the late medieval to early twentieth century, the course will focus attention on the early modern period. Inspired by the writings of Ernst Kantorowicz, Norbert Elias, Michel Foucault, Pierre Bourdieu, and Judith Butler, among others, historians have demonstrated that bodies are not exempt from social, cultural, or ideological regimes of power. As a metaphor for the body politic or an instrument of power, the corporeal order is shown to have physical, social, symbolic, and political effects. As historians continue to demonstrate, the body has a history: which involves health, sickness and food, gestures and movement, sartorial codes and sumptuary regulations, gender taboos and sexual prohibitions. Studies of the body demand a multidisciplinary perspective. Thus, this course explores how historians have drawn upon visual as well as textual sources, and crossed disciplinary boundaries in order to better appreciate the entire range of bodily representations in the past.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 537 Studies in British History (3-6)** No description.

### **Studies in British History (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 539 Topics in Military History (3 per semester, maximum of 9)** Studies in the history of wars and of the political, social, economic, diplomatic, and theoretical foundations of warfare.

### **Topics in Military History (3 per semester, maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 540 Studies in Colonial and Revolutionary America (3-6)** No description.

### **Studies in Colonial and Revolutionary America (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 541 War in the Early Modern and Modern World (3)** The study of the causes, conduct, and political, social, diplomatic, cultural, and economic consequences of war from 1500 to the present.

**HIST 541 War in the Early Modern and Modern World (3)**

This course offers an introduction to the complexity of war in the early modern (1400-1850) and modern world (1850 to the present). Since war has been experienced across the entire world, the course will draw readings and examples from North and South America, Europe, Asia, and Africa. It brings together the two major approaches to the study of war, both the traditional emphasis on the battlefield and the more recent consideration of both the battlefield and the political, social, economic, and cultural homefronts. Specifically, this course considers the various methodologies that have shaped the ways in which historians have asked and answered such fundamental questions as how and why wars start, have been averted, and ended. The study of military theory provides the intellectual framework that shaped the study and conduct of war at specific periods of history and in specific cultural context. The evolution of a nation's military theory over time reflects the impact of changes in technology, the changing social composition of its armed forces, the strength of the economic support the national government will supply, and much more. Thus, this course considers issues relevant to armies (technology, soldier experience in battle), to the government (laws of war, revolutions in military affairs, military doctrine, war and national identity), and to the people (issues relating to race, class, and gender; antiwar activism, popular literature) for a fuller understanding of the overarching impact of war in the modern and early modern world.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 542 The United States and Global Migration 1815-1924 (3)** Students study the impact of immigration on American society in a global setting.

**The United States and Global Migration 1815-1924 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 543 Antebellum America 1789-1860 (3 per semester, maximum of 6)** Social, intellectual, and cultural developments from the period after the nation's founding until the start of the Civil War.

**Antebellum America 1789-1860 (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 543 Antebellum America 1789-1860 (3 per semester, maximum of 6)** Social, intellectual, and cultural developments from the period after the nation's founding until the start of the Civil War.

**Antebellum America 1789-1860 (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 544 Topics in the Civil War and Reconstruction (3 per semester, maximum of 6)** Background and impact of the Civil War and the two succeeding decades, with emphasis on historiography and selected topics.

**Topics in the Civil War and Reconstruction (3 per semester, maximum of 6)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 545** Emergence of Modern America, 1860-1919 (3 per semester, maximum of 6) Social, political, economic, and cultural history of the United States from the Civil War through Progressivism and World War I.

**Emergence of Modern America, 1860-1919 (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 545** Emergence of Modern America, 1860-1919 (3 per semester, maximum of 6) Social, political, economic, and cultural history of the United States from the Civil War through Progressivism and World War I.

**Emergence of Modern America, 1860-1919 (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 546** The Rise and Fall of Modern America, 1919 to the present (3 per semester, maximum of 6) Readings and research in major themes of the history of the United States in the twentieth century.

**The Rise and Fall of Modern America, 1919 to the present (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 546** The Rise and Fall of Modern America, 1919 to the present (3 per semester, maximum of 6) Readings and research in major themes of the history of the United States in the twentieth century.

**The Rise and Fall of Modern America, 1919 to the present (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 547** Slavery in the Americas (3) Slavery in South America, the Caribbean, and North America from 16th century European colonization through the 19th century abolition movement.

**HIST 547 Slavery in the Americas (3)**

This course provides a broad exploration of slavery in the Americas from the beginning of European colonization to abolition. From the sixteenth century to the nineteenth century, Spanish, Portuguese, British, and French colonists in the Americas created the largest slave societies the world has ever known. Slaves in the New World produced tropical commodities such as sugar, tobacco, cotton, and coffee that, in turn, contributed to the foundation of capitalist and consumer societies in the Atlantic world. The staple crops produced by slaves were among the first goods to transform elite luxuries into common necessities.

The Age of Revolution was a watershed in the history of slavery in the Americas, transforming the terms of struggle between slaves and slaveholders, of debate about slavery, of the ideology of slavery. While the Age of Revolution catalyzed a century-long process of abolition, it also began a new period in the expansion of slavery. Slaveholders developed new policies, practices, and doctrines to reconcile slavery and liberalism.

The adoption of modern technology and industrial techniques of production resulted in dramatic increases in the productivity and exploitation of slaves, as well as the wealth and power of slaveholders. The simultaneous growth of slavery and antislavery heightened political divisions over slavery and made its destruction a protracted struggle marked by slave rebellion and civil war as well as landmark acts of state. This course investigates the origins of slavery, race, and abolitionism; transformations in plantation production, the culture of Africans in the Americas, and the ideologies of slavery; and the relationships among slavery, liberalism, capitalism, and modernity. Students will apply a range of concepts from the human sciences, such as creolization, ideology, and human geography, to major problems in the history of slavery.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 548** Topics in United States South (3 per semester, maximum of 6) Major themes of southern United States history.

**Topics in United States South (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 549** Topics in African-American History (3 per semester, maximum of 6) Readings, research, and methods in the study of African-American history.

**Topics in African-American History (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 551** The African American Freedom Struggle in the Twentieth Century (3) Theory and history of African American freedom movements for social and political change in the 20th century US.

**HIST 551 The African American Freedom Struggle in the Twentieth Century (3)**

This course focuses on the historiography of the African American Freedom Struggle in the Twentieth Century US. It examines the various debates over the origins of the post-World War II Civil Rights Movement. For years historians studied the civil rights movement in terms of organizations like the National Association for the Advancement of Colored People and the Southern Christian Leadership Conference and its largely male leadership. Historians have looked at the ways that federal court decisions, congressional legislation, and presidential actions shaped the struggle. However, by the 1980s, scholars shifted their focus to the grassroots origins of the movement, to the local people who courageously challenged segregation and disfranchisement in the South, and discrimination and racism in the North. Scholars also recognized that the movement had much earlier roots, that it did not begin with the 1954 Brown Decision. This course therefore takes the long view in terms of understanding the African American freedom struggle. It begins with the 1890s and the creation of white supremacy in the South, with the creation of legal disfranchisement and segregation and the violence and terror that underwrote it. It then covers the various ways that African Americans challenged white supremacy throughout the country. It looks at the role that boycotts, labor unions, civil rights organizations, and the Communist Party played in the fight for equality. It also examines the impact of WWI and WWII, the Cold War, and Vietnam on the struggle for civil rights, as well as the impact of the New Deal and Great Society. It also covers the creation of the Student Non Violent Coordinating Committee and its impact on other social movements. It concludes with a discussion of the post-Civil Rights years, the rise of the New Conservatism and the creation of the post-racial myth, the attacks on Affirmative Action, and the dismantling of the welfare state and growing imprisonment of people of color.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**HIST 552** Late Modern America Society, Culture, and Politics 1975-2008 (3) This course considers the political, cultural and social history of the United States from 1975 to the present.

**HIST 552 Late Modern America Society, Culture and Politics 1975-2008 (3)**

This course provides a broad exploration of the political, cultural and social history of the United States from the mid-1970s through 2008. In particular, it investigates the cultural and political counter-revolution of the 1980s, the social movement that is closely associated with the presidency of Ronald Reagan, and how those trends continued through the subsequent decades. The course will consider the role of terrorism as a factor driving policy-making in US government, and the background and impact of the September 11 attacks. The course culminates with the economic and political crises of 2008, and the historic election of that year.

Other major topics include the origins of modern gender attitudes and assumptions; the importance of changing gender roles in the making of mainstream political life; the changing role of religion in American life and politics; and the continuing power of conspiracy and paranoia in the nation's political culture. The course will also seek to understand the origins of current party political structures and ideologies. A major aspect will be the observation of the critical transition in American politics from the historic emphasis on class and economics to the politics of morality and gender: in short, the end of New Deal alignments. In the process, readings will address whether the old politics were in fact as class-oriented as they are commonly represented; and at the same time, how far social class underlies modern alignments. Finally, the course will stress a fundamental but little noticed rhetorical shift in modern America, namely the shift from moral relativism to absolute moralism, and the emphasis on moral absolutes - in short, the return of evil to political discourse.

Among other sub-topics, the course will explore how popular culture can be used to illuminate themes in social and political history; and at the same time, to understand the interrelationship between popular culture and mainstream politics. The course will use an understanding of political and social realities to illuminate the study of culture, high and low, from film and fiction to the visual arts. Building on these insights, students will explore these diverse themes in detail with specific reference to issues, problems or debates relevant to their own interests.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 555** Topics in American Labor History (3 per semester/maximum of 6) American working-class experience from its artisanal and agricultural roots through the rise, maturation, and transformations of industrial capitalism.

**Topics in American Labor History (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 556** Social Movements in the Twentieth Century US (3) Students study the theory and history of movements for social and political change in the 20th century US.

**HIST 556 Social Movements in the Twentieth Century US (3)**

This seminar examines movements for change in the United States over the course of the twentieth century. It uses the historical and social science literature to explore the attempts of various groups, especially those of less powerful Americans, to press demands on the state, and on economic powers, social institutions, and cultural authorities as well. The course considers the strategic use of mass movement challenges from the disadvantaged employing traditional and innovative weapons of the weak. It also takes up the tactical use of movements by established interests. It focuses on groups whose race, ethnicity, class, or gender generally places them outside the conventional decision-making processes of the polity and society. The course deals with movement initiatives across the ideological spectrum, including conservative efforts to resist change.

The seminar will address numerous major parameters of social movements. These will include interest identification and agenda formulation, social composition, the role of timing and contextual factors in opening opportunities for change, creation and manipulation of legitimating ideas and symbols, formation of collective identities, communication and mobilization processes and their concomitant rhetorical strategies, leadership development, engagement with adversaries in confrontation and negotiation, tactical repertoire of action, organizational evolution, building of relationships with allies and sympathizers, and other dimensions of movement activity.

Students in this course will gain knowledge of major social movements of the twentieth century, such as feminism, environmentalism, the African-American freedom struggle, and the working-class movement. They will have the opportunity to develop analytical skills in understanding the processes of social and political change and the sources of resistance to change. Students will have the option of pursuing original historical research into twentieth-century

movements. They will gain command of concepts and theories potentially useful for comprehending political, social, economic, and cultural forces beyond the realm of movements.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 560** Topics in American Religion (3 per semester, maximum of 6) The social, political, and intellectual contexts of American religious thought.

**Topics in American Religion (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 567** Latin American Social History, 1500-1900 (3) This course provides students with an overview of the social history of Latin America, 1500-1900.

**HIST 567 Latin American Social History, 1500-1900 (3)**

This is a graduate seminar in the field of colonial and nineteenth-century Latin American social and cultural history. It is designed to be accessible and useful not only to Latin Americanists but also to Early Modernists, to students of the early United States, and to Mesoamericanists. The seminar's scope is all of Latin America, but with an emphasis on Spanish America and especially Mesoamerica, in the centuries from the sixteenth through the nineteenth. The seminar is divided into four parts. Part I introduces the field's historiography and explores its newest "school"-the New Conquest History. Part II focuses on the ethnohistory of colonial Mesoamerica and the Andes; "ethnohistory" is used by colonial Latin Americanists to refer to the study of native peoples in the Americas. Part III turns to "Afrohistory," the study of people of African descent in colonial Latin America, which evokes the term "ethnohistory" and thus prompts a comparison of the relative experiences of the two socioracial groups, the nature of their interaction, and the methodologies required and employed to study them. Such methodologies include the recent revolution in ethnohistory centered on the use of native-language sources to study and write about native peoples and the creolization debate in African diaspora studies. Part IV is a brief foray into the nineteenth century, designed to provide a bridge between colonial history and the issues of modern Latin America explored in other seminars within the History Department.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 568** Early Modern Iberia and the Americas (3) This course studies the creation of Portugal, Spain, and their empires in the Americas in the fifteenth to seventeenth centuries.

**HIST 568 Early Modern Iberia and the Americas (3)**

This is a graduate seminar in European and Latin American history, designed to fulfill requirements in the fields of Early Modern European & Global History and Latin American History. Students will master both the history and the historiography of Iberia and Latin America during the period when Spain and Portugal came into being as nation-states and carved out empires in the Americas (fifteenth to seventeenth centuries). The first part of the course explores late-medieval Iberian history, investigating themes of urbanism, religious conflict, regional and community identity, disease and demography; how these led to the formation of Spain and Portugal; and how they have been interpreted in the historiography. The second part covers the history and historical literature on the Spanish explorations, invasions, conquests, and earliest settlements in the Americas, paying particular attention to how traditional narratives of conquest have been challenged in recent decades by revisionist interpretations. The third part looks at the role played by the Portuguese in Iberian expansion, including their activities in Africa, Brazil, South Asia, and East Asia. Emphasis is placed on the contrasts between Spanish and Portuguese imperial development, and on the differences in their historiographies. The fourth and final part of the seminar returns to Iberia to analyze the impact on the peninsula of imperial expansion, transatlantic slavery, and overseas colonization; this part includes attention given to the role played by Spain and Portugal in the larger development of early modern (primarily sixteenth and seventeenth century) Europe and the Mediterranean.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 569 Seminar in Latin-American History (3-6)** No description.

**Seminar in Latin-American History (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 570 Modern Latin American and Caribbean History (3)** This course provides students with an overview of the historiography of modern Latin America and the Caribbean.

**HIST 570 Modern Latin American and Caribbean History (3)**

This course provides a broad exploration of the history of modern Latin America and the Caribbean. It examines the shared histories, as well as alternative experiences, of national case studies, such as Brazil, Mexico, and Cuba. The course surveys the historical cycles of the nineteenth and twentieth centuries, including independence in Latin America and the Atlantic world, nineteenth-century nation-building, turn-of-the-century neocolonial challenges, and twentieth-century nationalist and revolutionary movements. In addition to political and economic histories, the course highlights the social and cultural negotiations on behalf of women and people of color of all classes with the nation and state. While it acknowledges the traditional narratives that shape modern Latin American history, it offers competing perspectives and engages students in critical analysis of historical theories, methods, and sources. For example, the course considers the contribution of non-elite actors to national independence movements, examines how women and people of color challenged traditional social hierarchies and definitions of citizenship in the nineteenth century, and assesses the development of twentieth-century national narratives, such as racial democracy. In particular, the seminar will engage how historians have engaged theories, methods, and sources in the production of historiography.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 571 History of the US-Mexico Borderlands (3)** This course examines the history and historiography of the US-Mexico Borderlands from the mid-nineteenth century to the mid-twentieth century.

**HIST 571 History of the US-Mexico Borderlands (3)**

The U.S.-Mexico borderlands is the among the most often discussed region in North America and yet one of the least understood areas in the Americas. While popular images of the U.S. southern borderlands often imbue stark division between the United States and Mexico, the region's deep history suggests otherwise. This seminar explores the complicated political and cultural evolution of the U.S. southern border through the lens of colonialism, nationalism, sovereignty, global migration, trans-border crossings, and race, gender, and ethnicity. Selected readings address the origins of the modern U.S.-Mexico borderlands as a place wrought from overlapping indigenous and imperial forces and myriad visions of national belonging.

Approaches and arguments in this seminar challenge the intellectual underpinnings of U.S.-Mexico borderlands history from nation-state centered narratives to global and transnational history. In exploring the borderlands as a place of several social and cultural worlds, graduate students will grapple with new theoretical ideas. For example, "borderlands" applied in this seminar designates the boundary between Mexico and the United States as a place that was critically influenced by pressures originating from indigenous peoples and nations and European and Qing empires. By expanding the concept of borderlands in this manner, students will understand that indigenous political and cultural structures and Old World patterns from Britain, Spain, and dynastic China were not easily toppled by the new configuration of the nation-state. This seminar is organized so that students may better understand state makers' and borderlanders' vision of the region, their imperialistic and nationalistic hopes, and responses to these projects on the ground.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 572 Race and Empire in the Americas, Caribbean & Pacific (3)** An overview of the US as an empire in Latin America, the Caribbean and Pacific in the modern era.

**HIST 572 Race and Empire in the Americas, Caribbean & Pacific (3)**

This course exposes students to history and historiography of the US empire in the Caribbean and the Pacific in the nineteenth and twentieth centuries. It examines imperial transitions including the US emergence as an empire in the mid-nineteenth-century in the face of Spanish contraction and British expansion. In addition, the seminar will examine the practices of empire in the colonies from the perspectives of colonial peoples. It privileges the lens of Caribbean and Pacific peoples through the historical literature that examines the intentions and limits of US colonial practices. It covers how colonial responses to US imperialism were varied, ranging from radical nationalism, colonial autonomism, and annexation. It frames the expansion of US empire within a broader conversation about racial ideologies and practices.

The course provides a broad exploration of the history of colonialism, imperialism, and nationalism in the Caribbean and the Pacific. In particular, it investigates the emergence of the US as an empire in the regions. Modern US empire was efficient and malleable. It adjusted colonial policies (legislation) according to the particular value of each colony. The course specifically examines the emergence and practices of US empire from the perspective of the colonies. Therefore, it focuses on the historiography that examines the limitations of empire and the negotiations of colonial peoples from Caribbean and Pacific histories. In particular, the course investigates US empire and colonial engagement through these major topics: imperial transitions; police, prisons, and law enforcement; education; race and imperial identities; imperial medicine and public health; polity, law, and constitution; U.S. military; and environmental management. Students will recognize, identify, and apply the theories of imperialism and nation-building to Caribbean and Pacific examples. More broadly these theories will engage comparatively with other European imperial histories. This course fulfills the requirements of a topical seminar for the Latin American history and Nineteenth-Century US history programs of study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 580 Pre-modern China (3)** This course provides students with an overview of the literature and themes in pre-modern Chinese history.

**HIST 580 Pre-modern China (3)**

This course is part of the curriculum for graduate students seeking a reading and research emphasis in Chinese history. The course offers a foundation in premodern China, which covers the period from the unification of China under the Qin dynasty through the rise of the Qing dynasty in 1644.

Few societies in the world can match China's two thousand yearlong history; however, few pause to consider the structural elements that led to such political, religious and cultural continuity. Students will consider writings on the imperial state and its various apparatuses, as a means to better understand the genesis and nature of empires and imperialist methods of rule in China. By pursuing the overarching roles of the scholar-elite and examination system, students will work to recognize and investigate the central forces embedded within Chinese society and culture. As part of this process, the course will explore the ideological movements and practices associated with Confucianism, Daoism, and Buddhism and learn to demonstrate the ways in which these movements helped create a syncretic cultural sphere of action. In this way, students will emerge with the tools to identify Chinese societal norms and be able to apply these tools in order to form a more gendered, ethnic, religious and intellectual interpretation of China's past.

The course is equally interested in China's role in a global context. The over arching question is how the Silk Road and China's maritime networks helped embed China in a global network of thought, commerce and exchange. Central to this analysis is how such contact with overland and maritime cultures deeply affected mainstream Chinese society. By tracing such interactions, students will be encouraged to recognize, identify, and apply the roles of frontier and borderlands in the creation and reification of Chinese identity and culture.

Through this multifaceted approach to Chinese history, students will come to recognize the strategic role of China within the pan-Eurasian sphere of interactions while also achieve a better understanding of the diverse characteristics of Chinese peoples, societies, and institutions in history.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 581 Late Imperial and Modern China (3)** This course provides students with an overview of the literature and themes

in late imperial and modern Chinese history.

### **HIST 581 Late Imperial and Modern China (3)**

This course surveys the historical scholarship on late imperial and modern China, providing students with an overview of the themes, theories, and debates within the field of late imperial and modern Chinese history. Students will become aware of key historical events of the past 250 years, such as the Opium Wars, the Taiping Rebellion, the fall of the Qing, the rise of the Chinese Communist Party, and the establishment of a socialist state. They will also think critically about the social and cultural shifts that accompanied or caused these well known events, from the changing role of women in Chinese society to the changing relationship of humans to environment, as well as exploring the multiple approaches Chinese historians have taken to reading and presenting historical work, including economic, political, social, and cultural history.

The course will emphasize a set of themes that will be revisited throughout the semester. Students will, for instance, investigate the role that Manchu identity played in the shape and governance of the Qing dynasty and contrast this later in the course to the role of ethnic identities in the People's Republic of China. Governance is another theme of the course, and students will begin by considering the structure of Qing bureaucracy and its relationship to local society; in the middle of the course, students will read about the changes to government administration under the Republic of China that brought local society and central government into increasing conflict, before turning to thinking about the compelling vision of state-society relations that swept the Chinese Communists into power. Other recurring themes include interactions between China and the West, changing gender and family relationships, and rebellion and revolution.

Discussion and analysis of the assigned readings are at the core of this seminar's work. In addition to reading important works in the field of late imperial and modern Chinese history, students will be asked both in class discussions and in written work to analyze and synthesize the contributions these works make to the study of Chinese history; regular additional readings such as book reviews, review essays, and short scholarly articles will help students to place the works in broader context.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 582 Women and Gender in Modern Chinese History (3)** Examines the historical literature on women and gender in late imperial and twentieth century China.

### **HIST 582 Women and Gender in Modern Chinese History (3)**

The roles of women and men have undergone major shifts in late imperial and modern China, affecting all aspects of daily life. Just the titles used to describe feminine ideals give an indication of these shifts—from the “talented women” of the late imperial period to the “new women” and “modern girls” of the early twentieth century to the “iron ladies” of the Communist period to the “factory girls” of the new millennia. Masculine ideals, too, have shifted, from the literary scholar-official of late imperial China to the patriotic worker of the Mao years to the entrepreneurial party member of the late twentieth century. But beyond the ideals, the day-to-day lives of Chinese people have been fundamentally altered as well, changing the way people relate to family and to society.

This course examines the historical literature on these shifts from the late imperial period to the present. Misperceptions and stereotypes about Chinese gender roles and, in particular, the status of women are widespread. In the past several decades, historians of China have sought to place our understanding of these topics on firmer historical ground by exploring topics from homosexuality and law in imperial China to widowhood and the imperial cult of female chastity to new marriage practices in post-economic reform village China and, in doing so, to undermine the “orientalism” that informed, for instance, investigations of footbinding and the “women’s quarters.” Through a wide range of readings, this course will introduce students to the major works and topics in the field of Chinese women’s and gender history, including: women and family, women’s legal history, gender and nationalism, “new women” (xin funü), gender and revolution, gender and demographics, gender and labor, women’s liberation, and love and sexuality.

Students will be expected to demonstrate their familiarity with the major themes and topics for Chinese women’s and gender history through discussion and written work.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 585 Culture and Society in Late Imperial China (3)** This course examines the cultural developments of late imperial China (14th-18th century) in their broad social contexts.

### **Culture and Society in Late Imperial China (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 586 Modern Japan (3)** This course provides students with an overview of the literature and themes in modern Japanese history.

**HIST 586 Modern Japan (3)**

This course explores multiple themes in Japanese history, with a focus on the politics of culture and changing perceptions of Japan's role in the world. There is a close focus on the interplay between domestic politics, foreign relations, and ideas. Through critical reading of major monographs and articles, students will hone their skills in argumentation and the use of evidence. Ideally, this course will stimulate ideas for research projects in other seminars, and it will present students with a variety of approaches to historical problems. Given the close relationship between China and Japan this course is strongly encouraged for those students studying Chinese history at the graduate level. Finally, this course will prepare students to teach a course in modern Japan at the undergraduate level.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 587 Topics in Modern South Asian History (3 per semester, maximum of 6)** Research and readings in the history of South Asia since the late eighteenth century.

**Topics in Modern South Asian History (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 588 Ethnicity and Borderlands in Late Imperial China (3)** An examination and overview of literature and themes related to ethnicity, borderlands, and governance in late imperial China.

**HIST 588 Ethnicity and Borderlands in Late Imperial China (3)**

This course will provide students with a thematic and theoretical foundation for the study and teaching of Qing history. This course seeks to equip students to teach Chinese history with a multi-ethnic dimension while also examining the ethnically diverse borderland regions of Tibet, Chinese Central Asia, Mongolia and Manchuria.

Students will explore administrative policies, imperial rituals, political structures and legal codes related to the non-Han Chinese peoples to shift away from a 'palace view' of the imperial court. In this way, the more traditional notions of Qing diplomacy that highlights tributary states and static notions of center-periphery relations will be infused with a much more nuanced ethnic dimension.

Major topics to be covered will include the expansion of frontier and borderlands policies; how ethnicity was perceived in the borderlands vis-à-vis the imperial court; what recent theoretical concepts have been employed to recast the traditional understanding of Qing borderlands; the evolution of China's governance and indigenous rule within the borderlands; and finally how gender, marriage, and the eroticization of China's borderlands influences China's characterization of the non-Chinese border populations.

The overarching theme will be one that seeks to throw into relief the strong ethnic diversity of late imperial China thus contrasting the notion of China as ethnically monolithic with the reality of an ethnically diverse empire. Students will be asked to explore the power of acculturation, weigh the impact of government-sponsored in-migration of Han Chinese, and develop an awareness of indigenous resistance and autonomy. On a methodological level, the study of China's ethno-history combines several disciplines such as anthropology, political science, and religious studies with different subfields of history, ranging from economic to political, social, and cultural history. The merits and pitfalls of interdisciplinary approaches and the use of theory will be explored. The research papers will take the transnational dimension of late imperial China history into account and will rely on primary material and secondary studies from at least one other discipline.

Students will have the option to use this course as a research seminar, conducting primary document research alongside their historiographic readings. Students who select to do so will produce a research paper during the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 589 World History: Themes and Approaches (3)** This course provides students with the thematic and theoretical foundation for the study and teaching of world history.

**HIST 589 World History: Themes and Approaches (3)**

This course will provide students with the thematic and theoretical foundation for the study and teaching of world history. Because world history is a crucial secondary field for historians, with increasing emphasis on it as a necessary "teaching field," this course seeks to equip students to teach world history at the undergraduate level. The course will be divided into five primary units, each of which will address a major theme in world history, such as the rise of civilizations, great land empires (particularly the Han Dynasty and the Roman Empire), the Silk Road, the spread of world religions, the Mongol invasions, European exploration, the Industrial Revolution, the rise of the nation-state, and globalization (specific units will be determined by the instructor). Within each of these units, students will be exposed to both substantive historical literature on the topic as well as major theoretical works that have influenced historical scholarship. In this way, students will be encouraged to think about the ways historians use theory to frame and inform their scholarship and teaching. By the conclusion of the course, students will be expected to demonstrate the integration of content, theory, and pedagogy.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 591 Archives Practicum (3-6)** Training and supervised work experience in archival activities--Option A: Archival Management; Option B: Oral History.

**Archives Practicum (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 592 Proseminar (3-9)** Readings in fundamental historical works; different sections will treat such topics as United States History and Early Modern History.

**Proseminar (3-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 593 Research Seminar (3)** Seminar in research methods of the discipline.

**HIST 593 Research Seminar (3)**

HIST 593 is a required course for all MA and PhD students in the graduate program in History. HIST 593 sections are paired with sections of HIST 592 and are a prerequisite to taking 593s. CAMS 592 and 593 meet the same requirements.

Each student will produce for every 593 they take a paper of the length appropriate for submission to a scholarly journal (25-45 pages). The use of original sources for the paper is essential, and early class sessions will emphasize the diligent use of intelligent interpretation of such sources (as available and field-appropriate) as manuscripts (such as presidential papers), the government serial set or non-US equivalents, legal records, notarial documents, parish records, diplomatic correspondence, newspapers, census records, and popular prints and photographs. Students (and the instructor, of course) will read and criticize preliminary drafts of the papers. While each 593 will have a single instructor, other faculty will participate as discussants and mentors, according to the needs of the seminar students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

#### **Internship (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Students enrolled will lead discussion sections, grade papers and examinations, given an occasional lecture, and assist instructors in planning survey



level courses.

### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HIST 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Homeland Security (HLS)**

**HLS 558** (PSY 558, PHP 558) Disaster Psychology (3) Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.

### **Disaster Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLS 594** (PHP 594) Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLS 801** (P ADM 801) Homeland Security Administration: Policies and Programs (3) Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management approaches.

**Homeland Security Administration: Policies and Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLS 803** (PHIL 803) Homeland Security: Social and Ethical Issues (3) This course will examine the social, political, legal, and ethical issues that arise in the context of homeland security.

**Homeland Security: Social and Ethical Issues (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HLS 805** (CRIM 805) Violence, Threats, Terror, and Insurgency (3) This course provides overview of the domestic and global issues related to homeland security.

**HLS (CRIM) 805 Violence, Threats, Terror, and Insurgency (3)**

This course will explore key theories and methods of insurgency and terrorism. We will focus on the key why's how's and what's in the study of terrorism and insurgency. The focus in the class is less on a specific geographic and substantive area than on learning the skills to think conceptually and theoretically, with an emphasis on analytical thinking and application of knowledge. Each week we will read foundational works in the field and discuss not only the findings but how they were found. This will be then applied to the ongoing analytical thinking and application of knowledge efforts that students will be making in the class. The students will learn how to apply what they have learned in real world scenarios and learn to assess the long and short term ramifications of policy options.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Horticulture (HORT)

**HORT 402W** Plant Nutrition (3) Mineral nutrition of higher plants, including nutrient acquisition, transport, metabolism, and practical implications.

**HORT 402W Plant Nutrition (3)**

The course considers the mineral nutrition of higher plants from physiological, ecological, and agricultural perspectives. The first part of the course considers factors influencing the acquisition of mineral nutrients and their transport in the plant, including nutrient mobility in the soil, root biology, rhizosphere interactions, membrane transport, xylem, and phloem transport. Root symbioses and metabolic assimilation of N and S will also be discussed. The second part of the course gives an overview of mineral metabolism. The final third of the course illustrates the practical dimensions of plant nutrition. The diagnosis of nutritional disorders, nutrition, and yield, foliar fertilization, genetic aspects of plant nutrition, and nutrient cycling will be covered by lecture and laboratory exercises. Laboratory exercises demonstrate lecture topics and permit a "hands-on" involvement with the subject. Emphasis is placed on concepts and integrating principles rather than memorization of technical details.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 407 Plant Breeding (3)** The scientific principles and techniques of utilizing genetic variability in improving the heredity of plants for specific purposes.

#### **HORT 407 Plant Breeding (3)**

Horticulture 407 is a 3-credit course that is taught every spring semester and is required of horticulture undergraduate students at Penn State. This course also attracts upper-division and graduate students from other departments such as Agronomy, Biology, Forest Resources, Plant Pathology, Biochemistry, and Molecular Biology. The objectives of the course are to 1) develop an understanding of the role of genetics in plant breeding, 2) elucidate the diversity of plant characteristics which are subject to improvement, 3) review conventional and contemporary techniques for the development of new cultivars, and 4) present the opportunity for the student to effectively communicate scientific information in writing and through speaking. Horticulture 407 emphasizes basic principles of plant genetics and breeding and the utilization of molecular biology techniques for crop improvement. It includes two-hours of lecture and a two-hour laboratory-discussion session each week. Major topics of discussion during lecture periods include plant reproduction, genetic variation in plants, review of mitosis and meiosis, Mendelian genetics, linkage, and recombination, qualitative and quantitative traits, population genetics, cytogenetics, theory of selection and response to selection, heritability, review of statistical tools useful in plant genetics and breeding, systems of pollination controls in plants including self-incompatibility and male sterility, breeding methods for self- and cross-fertilized plants, and application of modern technologies, including molecular markers, marker-assisted selection, and genetic transformation, to crop improvement. The laboratory sessions are designed to complement the lectures and provide opportunities for hands-on experience. For example, students practice staining and counting plant chromosomes on microscope slides, self- and cross-pollination of different plant species, linkage mapping and analysis of plants for Mendelian segregation, inoculating plants with fungal pathogens and observing and evaluating plants for disease development, extracting DNA from plant tissue and separating DNA segments on agarose medium using gel electrophoresis, and practicing computer programs for gene mapping and analysis of Quantitative Trait Loci (QTLs). Furthermore, students are mentored to prepare a term paper on a plant breeding/plant genetics subject and to orally present their findings to the class using visual aids.

Student evaluation is based on two mid-term exams (each 100 points), one comprehensive final exam (200 points), 10 weekly homework or laboratory reports (for a total of 100 points), and a term paper (50 points for writing and 50 points for presentation). For the presentation, each student is required to turn in a 3-5 page write-up about a topic of interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 408 Landscape Plant Establishment and Maintenance (4)** The principles and practices involved in the establishment of plants in the landscape, and their subsequent maintenance.

#### **Landscape Plant Establishment and Maintenance (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 410W Issues in Landscape Contracting (3)** This will be a survey of business management, regulatory, and environmental issues facing the landscape contracting profession. Laboratory.

#### **Issues in Landscape Contracting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 412W Post-Harvest Physiology (3)** Harvesting, handling, storage, and transportation of horticultural crops; primary emphasis on physiological response to pre- and post-harvest environmental factors.

#### **Post-Harvest Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 420 Plant Growth Regulators (3)** Plant growth regulators, their chemical and physical properties; general principles, practices, and applications in regulating plant growth and development.

### **Plant Growth Regulators (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 431 Small Fruit Culture (3)** Cultural requirements and production practices of the principal small fruit crops: strawberries, grapes, blueberries, brambles, and cranberries.

### **Small Fruit Culture (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 432 Deciduous Tree Fruits (3)** Science, art, and techniques of regulated cropping; orchard designs and management systems.

### **Deciduous Tree Fruits (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 433 Vegetable Crops (3)** Cultural requirements of important vegetable crops in conjunction with physiological processes and problems related to commercial production.

### **Vegetable Crops (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 445 Plant Ecology (3)** Advanced lectures on plant ecology which stress integration of physiological, population-level and community-level phenomena, and ecology in agriculture.

### **Plant Ecology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 450 Greenhouse Management (3)** Maintenance and manipulation of the greenhouse production systems including structures, covers, light, temperature, carbon dioxide, water, growing media, fertilizer and greenhouse cost accounting.

### **Greenhouse Management (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 453** Flower Crop Production and Management (3) Production of greenhouse flower and foliage plants; development of management skills for a greenhouse business.

#### **Flower Crop Production and Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 455** Retail Horticulture Business Management (3) The nature, operation, and management of retail horticulture business, emphasizing retail greenhouses, nurseries, and flower shops.

#### **Retail Horticulture Business Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 457** Interior Plantscaping (3) Foliage identification, environmental factors affecting plants, concepts of interior plant design, installation and maintenance.

#### **HORT 457 Interior Plantscaping (3)**

Overview of where foliage plants are native will be followed by a discussion of how each environmental factor will affect foliage plant growth as well as how some of the environmental factors can be managed. Those factors will include light, temperature, humidity, growing media, watering, and fertilization. In addition the students will learn to identify 100 plants that are commonly used in interiors. Design principles will be related to interior plants. The process of analyzing the site, creating an interior plant design, installing the plan and maintaining the finished design will be discussed. Then diagnosing plant problems and integrated pest management will be presented as aspects of plant maintenance. Business principles related to the interior plantscaping industry such as management, marketing and selling and personnel management will be discussed. Students will be evaluated based on exams, quizzes and projects. The course will be offered in alternate spring semesters.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 459** (BIOTC 459, BIOL 459) Plant Tissue Culture and Biotechnology (3) Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

#### **Plant Tissue Culture and Biotechnology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 464** Landscape Construction I (4) Standards, processes, and computations for site grading, drainage, earthwork, vehicular circulation, parking; detailing, and finishing of landscape construction materials.

#### **Landscape Construction I (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 466** Landscape Construction II (5) Project scheduling methods, plant installation techniques, and field layout principles and practices. Implications of site preparation.

### **Landscape Construction II (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 468** Landscape Estimating and Bidding (2) Reading and interpreting contract drawings and specifications, quantity take-offs, cost estimating, and bid document preparation.

### **Landscape Estimating and Bidding (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 490** Senior Seminar (1) Exploration of the interrelationships of horticulture, science, and society; evaluation of attributes and abilities related to various career opportunities.

### **Senior Seminar (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 495** Internship (1-13) Supervised off campus experience in a public or commercial horticultural enterprise. Written and oral critique of activity required.

### **Internship (1-13)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject

which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 499C** (IL) (INTAG 499C) Food Security Strategies for Smallholder Agriculture in Southeast Asia (2) This course explores regional food security issues and poverty alleviation strategies for small farms. Requires travel to Southeast Asia between semesters.

### **Food Security Strategies for Smallholder Agriculture in Southeast Asia (2)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 499D** (IL) (INTAG 499D) Food Security Strategies for Smallholder Agriculture in Southeast Asia (1) This course explores regional food security issues and poverty alleviation strategies for small farms. Requires travel to Southeast Asia between semesters.

### **Food Security Strategies for Smallholder Agriculture in Southeast Asia (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 514** (PLBIO 514) Modern Techniques and Concepts in Plant Ecophysiology (2) An intensive introduction to concepts of plant ecophysiology and modern techniques used in this field.

### **Modern Techniques and Concepts in Plant Ecophysiology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 517** Ecology of Plant Roots (2) Form and function of roots from an ecological perspective using examples from both wild and crop plants.

**Ecology of Plant Roots (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 520** Advanced Plant Growth Regulators (2) Advanced topics in plant growth regulators, their chemical and physical properties; physiological, biochemical and molecular regulation of plant growth and development.

**Advanced Plant Growth Regulators (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 524** Experimental Procedures in Plant Science Research (3) Experimental methods, computer techniques, interpretation of statistical analyses, and communication of research results.

**Experimental Procedures in Plant Science Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 596** Individual Studies (1-9) Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for horticulture graduate students to gain experience in teaching under the supervision of a faculty member.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HORT 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Hotel, Restaurant, and Institutional Management (HRIM)

**HRIM 411 Beverage Management and Wine Selection (3)** Management issues in beverage service and products. Students taste wines, brews, and distilled spirits.

### HRIM 411 Beverage Management and Wine Selection (3)

The objective of this course is to acquaint students in the successful management of all beverage products associated with the hospitality industry. Main topics typically include:

- Production
- Purchasing
- Brand recognition
- Marketing and promotion
- Financial control
- Responsible alcohol service

This course is an elective in the Hotel, Restaurant, and Institutional Management program. Students must be at least 21 years old. Evaluation methods typically include examinations, quizzes, short writing assignments, and research projects. This course is offered spring and fall semesters with enrollments of 40 to 60 students. Students in other majors are welcome after all Hotel, Restaurant, and Institutional Management majors have scheduled.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 413 New Product Development for Commercial Foodservice (3)** This course introduces students to a new product development process that requires coordination, communication, and integration throughout the organization.

### HRIM 413 New Product Development for Commercial Foodservice (3)

New product development is a critical business design process that crosses multiple functional areas in a corporation. In today's globally competitive business environment, new product development is not a strategic option; it is a fundamental prerequisite for a company's survival, organizational renewal, and national economic prosperity. In addition, new product development is not the domain of any one function, but a multidisciplinary process that requires coordination, communication, and integration throughout the organization. This course will operationalize the management link by creating cross-disciplinary teams in which students will learn and apply the skills necessary to design and develop a new product prototype.

This course will present and utilize an integrated approach to new product design, development, and marketing. The course will provide a team experience of formulating, designing, and evaluating a new product concept. Students completing this course will have operational knowledge of and competence with a set of tools and methodologies for product design and development. Students will be able to coordinate multiple interdisciplinary tasks in order to achieve a common objective in an action-oriented business setting.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 415 International Cuisine (3)** Cooking and eating practices of cultures around the world, including historical, religious, cultural, geographic, and political influences on each cuisine.

### HRIM 415 International Cuisine (3)

The objective of this course is to expose students to managerial and cultural issues of cuisine and how they influence the development of commercial food and beverage operations. The text and lectures lay the foundation for the understanding of culture and cuisine. Main topics typically include:

- Understanding how cuisine has developed over time
- Variety of foods grown in distant regions and dissemination as adventurers contacted (and often conquered) other people and learned of their cultures
- Involvement of trade that brought exotic foods from distant locales
- Geography's role in defining the types of foods and quantities of crops that can be produced around the globe

## Critical components of the major world cuisines

The course is an elective for Hotel, Restaurant, and Institutional Management students. Prior to taking this professional elective, students must complete the introductory course in food production and management. The course is normally taken in the students' senior year. Students are evaluated based on examinations. The course is offered on an as-needed basis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 430** Advanced Food Production and Service Management (3) Simulation and application of technical, conceptual, interpersonal skills. Emphasis on group dynamics; improvement in managerial skills; management team functions.

**HRIM 430 Advanced Food Production and Service Management (3)**

This course is designed to give students an opportunity to gain experience in the wide range of skills and techniques that are normally associated with the duties of a hospitality manager. The skills and techniques that will be emphasized include, but are not limited to, duties involved in the planning, execution and evaluation of full-service, theme oriented ala carte dining. Students are expected to form a marketable theme and then develop, produce and evaluate an authentic dining experience. A successful dining experience is contingent upon both guest satisfaction and the achievement of financial goals. Main topics typically include:

- Research, describe and produce an authentic restaurant environment from a selected theme
- Demonstration of technical responsibilities involved in the development, production and evaluation of a wide range of food service systems including: sales, menu planning, recipe development and evaluation, pricing, purchasing, facilities management, personnel management and financial management
- Operational needs and potential problems in a food and beverage operation during production and service
- Timely and effective managerial problem identification and decision-making abilities
- Interpersonal and teamwork skills both within a management team and with classmates as employees
- Interaction with guests and evaluation of guests' dining experiences

The course is a capstone management class in the foods sequence and is required of all Hotel, Restaurant, and Institutional Management majors. Students must first complete the introductory food production course. Evaluation methods include a detailed business plan for a working restaurant created in a management team of approximately eight, quizzes, short written assignments, oral presentations, and subjective performance assessments as a manager and a line employee. The course is usually offered in fall and spring semester and summer session, with approximately 30 students in each section.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 435** Financial Management in Hospitality Operations (3) Fiscal techniques in the development, management, and control of hospitality establishments.

**HRIM 435 Financial Management in Hospitality Operations (3)**

Financial management is an integral part of decision-making in the hospitality industry. The study of hospitality financial management helps to insure that hospitality decision-makers understand the principles of value creation and incorporate them into their decision-making. This course gives students the opportunity to gain knowledge of the fundamental concepts, tools, and applications that represent the core of financial management as applied to decision-making and value creation in the hospitality industry. Main topics typically include:

- Introduction to financial decision-making in the hospitality industry
- Agency theory and the decision-making process
- Value creation and the goal of hospitality financial management
- The functioning of financial markets that are relevant to hospitality firms
- Principles and methods of value creation in the hospitality industry
- Applications of financial statement analysis to hospitality finance
- Principles and applications of risk analysis to the value creation process
- Principles and applications of the time value of money to the value creation process
- Capital expenditure analysis in the hospitality industry
- Principles and applications of financing hospitality projects and firms
- Other special topics relevant to current hospitality financial issues

The content of this course is considered fundamental for anyone in hospitality management and, therefore, is required of all Hotel, Restaurant, and Institutional Management majors. Prior to this course, students are required to have taken Financial Accounting in the Hospitality Industry, Managerial Accounting in the Hospitality Industry, and three credits of

economics. Hospitality Decision-Making is also a pre-requisite for the course but may be taken concurrently. This course is a pre-requisite to Strategic Hospitality Management. Evaluation methods usually include examinations, quizzes, problem and paper assignments, and a semester project. The course is usually offered fall and spring semesters with enrollments of about 45 students per section.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 437 Hospitality Project Evaluation and Funding (3)** Current techniques for project evaluation in the hospitality industry; trends in hospitality project funding.

### **HRIM 437 Hospitality Project Evaluation and Funding (3)**

This is an advanced course in the financial evaluation of hospitality projects and the decisions related to their subsequent financing. The selection of value creating projects is integral to the success of hospitality firms. In addition, project financing decisions can have significant impact on the full realization of a project's value creation potential. In order to provide the hospitality managers with state of the art project decision tools, this course examines the theory related to hospitality project selection and financing and applies it to current techniques in the hospitality industry. Main topics typically include:

- Basic principles of hospitality project evaluation
- Present project evaluation techniques in the commercial hospitality sector
- Present project evaluation techniques in the non-commercial hospitality sector
- The use of cap rates in hospitality lodging valuation
- Issues related to incorporating risk assessment in hospitality project evaluation
- Net present value, adjusted present value, and real options in hospitality project evaluation
- Other advanced techniques in hospitality project evaluation
- Basic issues and theory in hospitality project financing
- Trends in commercial and non-commercial hospitality project financing
- Potential interactions between hospitality project selection, project financing, and value creation
- Other special topics relevant to current and future techniques in hospitality project evaluation and financing

This course is an elective course designed for students who desire to gain an in-depth knowledge of hospitality project selection and financing. The course is appropriate for students seeking to obtain the skills necessary for middle or upper management level positions in hospitality organizations. Prior to this course, students are required to have taken Financial Management in Hospitality Operations or its equivalent. Evaluation methods usually include problem assignments, quizzes, examinations, case analyses, and a project. The course is usually offered once a year with enrollments of about 30 students per section.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 438 Cases in Financial Analysis (3)** Financial analysis and decision making is examined through a series of hospitality-oriented cases.

### **HRIM 438 Cases in Financial Analysis (3)**

This is an advanced course in the application of hospitality financial analysis and decisionmaking techniques to real life hospitality operational situations. Decisions of managers in actual and hypothetical situations are critically examined from the perspective of appropriate financial and accounting theory using a case format approach. Discussions include the ramifications of real life complicating factors on theoretical outcomes. Main topics typically include:

- An overview of the principles of financial analysis
- Financial statement analysis: evaluation of performance from a historical, competitive, and industry perspective; effects of alternative accounting techniques
- Alternate forms of operations and their financial and accounting implications: subsidiaries, joint ventures, partnerships, management agreements
- Budgeting processes and procedures, including operational budgeting and the behavioral implications and procedures common in not-for-profit institutions
- Cost allocation in hospitality organizations: techniques and financial implications
- organization of the financial function: alternative designs
- Special topics relevant to current trends in hospitality financial analysis

This course is an elective course designed for students who desire to gain an in-depth knowledge of current and future techniques and applications of hospitality financial analysis. The course is appropriate for students seeking to obtain the skills necessary for middle or upper management level positions in hospitality organizations. Prior to this course, students

are required to have taken Financial Management in Hospitality Operations or its equivalent. Evaluation methods usually include case analyses, presentations, examinations, and quizzes. The course is usually offered once a year with enrollments of about 30 students per section.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 442 Hospitality Marketing (3)** Marketing management in the hospitality industry, including analyzing the market through market research and developing a marketing plan.

### **HRIM 442 Hospitality Marketing (3)**

Marketing in the hospitality industry is distinctly different than marketing in either the manufacturing or the service industries. The hospitality industry - hotels, restaurants, institutional food service, travel and tourism, is a hybrid that constitutes both products and services. The objective of the course is to give an overview of marketing as applied to the hospitality industry, including but not limited to: unique attributes of service marketing; consumer orientation; understanding consumers and consumer behavior; market segmentation principles; target marketing; product planning; promotion planning; market research; and competitor analysis. Main topics typically include:

- The marketing environment
- Social responsibility and ethics in marketing
- Marketing research and information systems
- Target markets: segmentation and evaluation
- Consumer buying behavior and the purchase decision
- Developing and managing products
- Branding and packaging
- Strategic planning
- Integrating marketing communications
- Advertising and public relations
- Personal selling and sales promotion
- Pricing concepts
- Setting prices

This course is required of all Hotel, Restaurant, and Institutional Management majors. Prior to this course, students are required to have taken a principles of marketing course and the decision models in the hospitality industry course. This course is a pre-requisite to the strategic hospitality management course. Evaluation methods usually include case study analysis, marketing plan projects, strategic plan projects, examinations, quizzes, and short writing assignments. Group assignments are often used in a problem based learning environment. The course is usually offered fall and spring semesters with enrollments of about 80 to 100 students divided into two sections.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 443 Sales Planning and Advertising for Hospitality Operations (3)** Elements of sales management, advertising, promotion, and public relations as applied to hospitality organizations.

### **HRIM 443 Sales Planning and Advertising for Hospitality (3)**

The hospitality industry is entering an era in which operational and product parity between organizations and their properties is increasingly likely. This is so because of their shared access to technology, design and training devices. Consequently, it becomes evident that increases in sales will be reliant on the competitive advantages that professionals achieve in marketing strategies, sales management, and especially in marketing communications (MARCOM) tactics and execution. This course exposes students to a wide range of hospitality marketing communications issues. Students gather information from electronic media, trade and travel media, and consumer media. Students explore hospitality MARCOM issues through semester-long individual projects. Main topics typically include:

- Marketing versus selling strategies
- Industry trends that affect advertising and sales especially Internet activities
- Types of advertising media
- Print advertising principles
- Broadcast advertising principles
- Foundations of direct marketing
- Elementals of public relations
- Travel agency relations
- Personal sales

This is an elective course. Students must first take the hospitality marketing course in Hotel, Restaurant, and Institutional Management. Student assessment is accomplished through quantitative objective testing and qualitative subjective exams and quizzes. A portion of the total term assessment is weighted by the student's performance in the individual project mentioned above. The course is usually offered spring semester with an enrollment of 40 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 466 (US) Human Resource Management in the Hospitality Industry (3)** Recruitment, selection, training, performance appraisal, and compensation of hospitality human resources in today's culturally diverse work force.

**HRIM 466 Human Resource Management in the Hospitality Industry (3)  
(US)**

This course builds on students' knowledge of organizational behavior and management. The course discusses human resource (HR) issues in the hospitality industry. The course pays special attention to the changing nature of organizations, the challenges that human resource managers face as a result, and the consequences of HR managers' actions to the organization. Topics typically include:

- Importance of human resources in the hospitality industry
- Processes managers use in recruiting, selecting and training human resources in their organizations
- Legal and social issues that impact human resource management in the hospitality industry
- Roles and responsibilities of a hospitality industry human resources professional

The content of this course is fundamental to understanding how the human resource function operates in hospitality organizations. This is a required course for all Hotel, Restaurant, and Institutional Management majors. Students must first complete the course in hospitality organization behavior. Evaluation methods may include examinations, quizzes, short writing assignments, and case studies. The course is usually offered fall and spring semesters with enrollments of about 45 students.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 467 Management of Hotel and Restaurant Employee Relations (3)** Survey and analysis of managerial strategies for employee relations in hospitality operations.

**HRIM 467 Management of Hotel and Restaurant Employee Relations (3)**

The objective of this course is to provide students with an understanding of labor relations in the hospitality industry. Students need to know about labor laws as they affect the industry and specifically about collective bargaining. Primary emphasis is given to private-sector labor relations, but some consideration is given to the public sector. Main topics typically include:

- Introduction to employee relations in hotels and restaurants
- Economic influences on the hotel and restaurant labor market
- Labor law as applied to the hospitality industry
- Management strategies in collective bargaining
- Administration of labor contracts
- Management and supervisory strategies in labor disputes

The course is an elective in the hospitality program. Students must first complete the course in hospitality human resources. Students are evaluated based on examinations, a paper, and an in-class bargaining simulation. The course is offered on an as-needed basis, with enrollment of about 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 471 New Trends and System Selection in Hospitality Information Technology (3)** This course introduces the student to new information technology in the hospitality industry and to the system selection process.

**HRIM 471 New Trends and System Selection in Hospitality Information Technology (3)**

The purpose of this course is to focus on new IT trends and system selection in the hospitality industry. New trends are topics that have become important or prevalent in the industry and are generally not covered in other courses. Examples include Software as a Service delivery of property management systems, enterprise restaurant management reporting, Web 2-3.0, smart phone applications, Radio Frequency Identification (RFID), ect. The course will attempt to keep the students as updated as possible regarding the industry trends by covering these topics and including a discussion of current events from industry partners, headline news services, and other electronic references. Students gain knowledge that is applicable specifically to the hospitality industry.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 471 New Trends and System Selection in Hospitality Information Technology (3)** This course introduces the student to new information technology in the hospitality industry and to the system selection process.

**HRIM 471 New Trends and System Selection in Hospitality Information Technology (3)**

The purpose of this course is to focus on new IT trends and system selection in the hospitality industry. New trends are topics that have become important or prevalent in the industry and are generally not covered in other courses. Examples include Software as a Service delivery of property management systems, enterprise restaurant management reporting, Web 2-3.0, smart phone applications, Radio Frequency Identification (RFID), ect. The course will attempt to keep the students as updated as possible regarding the industry trends by covering these topics and including a discussion of current events from industry partners, headline news services, and other electronic references. Students gain knowledge that is applicable specifically to the hospitality industry.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 480 Advanced Hotel Management (3)** Advanced hotel operations, internal control systems, and service philosophy. Integrates management, departmental operations, law, technology applications, marketing and managerial accounting.

**HRIM 480 Advanced Hotel Management (3)**

HRIM 480 is designed to provide students with an advanced knowledge of hotel operations. The course focuses on the responsibilities of executive committee members and the general manager of a hotel. As such, the topics are varied and include discussions of current events in the hotel industry. Students participate in a hotel management simulation exercise to help develop strategic decision-making skills. Main topics typically include:

Introduction to types of owners in a hotel transaction

Leading hotel companies and their brands

Management companies and franchise agreements

Technology's impact on the hotel business

Hotel operations in an international environment

Linkage between hotel operating decisions and the service quality experience

Management style and problem solving abilities in a team environment

General management perspective on how various operating aspects of a hotel are related to one another

Individual yield management components' affect on the yield management decision

The course is considered to be a senior-level course and is a required course for all Hotel, Restaurant, and Institutional Management majors. The introductory hotel management course and the hospitality managerial accounting course are prerequisites. The course also builds on knowledge gained in a variety of other hospitality and business courses such as marketing and organizational behavior. Students are evaluated by examinations, written summaries of assigned readings, periodic reports for a simulation exercise, peer evaluations, and simulation performance grades. The course is taught in the technology classroom, 117 Mateer Building (wireless computer laboratory). The course is offered fall and spring semesters with enrollments of about 40 students for each sections.

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 482 Hospitality Real Estate (3)** The course focuses on commercial real estate concepts related to the hospitality industry.

### **HRIM 482 Hospitality Real Estate (3)**

The purpose of this course is to commence the learning process regarding strategic real estate management in the hospitality industry through a process of discovery. Topics include hospitality property development, ownership, asset management, market analysis, legal issues, financing, investment, and appraisal. The course is oriented towards the responsibilities of hospitality industry corporate staff, developers, and owners.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 483 Revenue Management (3)** Students learn how to effectively implement revenue management strategies and techniques in the hospitality industry.

### **HRIM 483 Revenue Management (3)**

Hospitality managers are charged with making strategic and proactive decisions to maximize total revenue for their properties. Issues that managers have to address in this context include: What market segments should we sell to? What price should we sell to the different markets segments at? What sales or distribution channels should we use? In this course, we focus on the application of revenue management to hospitality organizations. This involves setting prices, determining inventory (e.g., guest rooms, function space) availability across various distribution channels, and imposing restrictions on sales in order to best maximize revenue.

This course focuses on several high-impact drivers for maximizing revenue. You will learn how to forecast demand by market segment – a fundamental component of revenue management applications. You will apply linear programming, an optimization technique, to determine guest room rates and availability based on forecasted demand and available capacity. You will also learn how to determine optimal overbooking levels - designed to minimize the risk of having to walk guests or being left with an unsold room. Group business (e.g., tour operators, conferences, corporate accounts) can constitute a substantial amount of a hotel's business. Therefore, you will learn about how to effectively address a number of group-specific issues such as determining the minimum rate to charge a group, forecasting group utilization and managing attrition. Given the substantial amount of data that a revenue manager typically deals with, extensive use of Microsoft Excel will be required in order for you to effectively apply each of the aforementioned tools and techniques. This emphasis on the application of Excel is reflected in a key deliverable for the course being a fully functioning Excel-based revenue management system that you will develop with a group of your peers.

In this course you will also be exposed to a number of key management and marketing issues relating to the effective implementation of revenue management. You will gain an understanding of where revenue management fits within hospitality organizations, the relationship of the revenue management function with other functions or departments in the organization, as well as the role and job responsibilities of a revenue manager. You will also learn about the distribution channels that hospitality organizations can use to distribute their inventory. Issues that you will discuss include the costs associated with using different distribution channels, distribution channel management (e.g., updating rates and availability across various distribution channels) and maintaining rate parity across distribution channels.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 484 Hospitality Entrepreneurship (3)** The course focuses on successfully launching new business ventures in the hospitality industry.

### **HRIM 484 Hospitality Entrepreneurship (3)**

The purpose of this course is to commence the learning process regarding Entrepreneurship in the Hospitality Industry. The course provides the student with a solid foundation of how an idea is generated and taken to market for implementation. The students will examine the characteristics of the entrepreneur and the process followed from generating an idea, to building a business model, preparing a competitive analysis, completing a feasibility study,



reviewing intellectual property, developing a business plan, seeking funding and presenting their idea to potential investors. Topics include idea recognition, feasibility studies, business plans, developing a business model, intellectual property, marketing, financing, organizational growth, and franchising. The course is oriented to the student who would like to own a business.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 486 Casino Marketing (3)** Students will learn marketing techniques for casinos which take into account the external environment, individual consumer choices, and ethical considerations.

### **HRIM 486 Casino Marketing (3)**

The primary objective of this course is to introduce the advanced standing student to the factors affecting the effective marketing of a modern casino. General marketing principles and concepts build the foundation for the study of marketing techniques unique to the casino industry. Consumer behavior and external environments create the context in which all marketing decisions and activities occur. Their study ensures the student has the basics to approach any marketing problem. Before the strategic use of marketing to build brand awareness and to ensure profitability is learned, the impact of social and ethical responsibility is studied including disordered gambling and smoking bans. The need to advertise and promote without exacerbating the incidence of disordered gambling is an increasingly necessary ability required of casinos today. A thorough knowledge of segmentation and positioning are required as well. Extra time is allotted to both social responsibility and segmentation/positioning. Strategic marketing entails identifying the components of a marketing plan, their purpose, and the method of execution. Various concepts such as profit-service chain and revenue management are covered to round out the student's knowledge of marketing. The course spends time on promotions which are unique to the casino industry including, but not limited to professional boxing matches and other special events, slot and players' clubs, special entertainment venues, on-floor promotions, and so on. The student learns the importance of location and transportation issues and how they impact the revenue and profitability of a casino. Meetings and conventions generate revenue during off-peak periods and are significant factors in the revenue stream of a casino. The student must demonstrate their mastery of the material by creating a strategic marketing plan for a hypothetical casino.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:  
 Concurrent: HRIM 487

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 487 Casino Operations and Societal Impact of Gaming (3)** Students will learn the structure, culture, and ethical responsibility toward disordered gambling and other lifestyle issues of modern casinos.

### **HRIM 487 Casino Operations and Societal Impact on Gaming (3)**

The primary objective of this course is to introduce the advanced standing student to the organization structure, the organizational culture, and the ethical responsibility toward disordered gambling and other lifestyle issues of modern casinos. The student will study leaders in the casino industry to gain insight into how they contributed to the growth of their companies and the industry as a whole. Emphasis will be placed on their approach to the ethical issues of their day. The modern day casino is complex and its organizational structure reflects that complexity. The student will study the different structures and reporting relationships of actual casinos to ascertain the factors that impact the level of effectiveness of different organizational charts. The job titles and descriptions of all departments will be examined. The job titles and descriptions of the gaming departments will be studied in greater depth than in Gaming Operations (HRIM388). The lifestyle of customers and employees alike will be examined particularly those issues that impact health and social services. Specific topics include disordered gambling and smoking. Disordered gambling will be studied in greater depth than in Introduction to Casino Management (HRIM386) and will be examined simultaneously with Casino Marketing (HRIM486). The human resources function will be scrutinized as a filtering process for selecting the right employees and for training and reinforcing the organization's commitment to ethical and responsible behavior. The casino design project will take the student's ability to design a slot floor layout, a table games floor layout, to create a list of hotel room amenities, to write a positioning statement for a range of restaurants in a hypothetical casino, to develop a list of multiple entertainment venues and so on to a higher level than previous coursework so that the final product demonstrates the student's knowledge and expertise in casino management.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

Concurrent: HRIM 486

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 490W** Strategic Hospitality Management (3) This capstone writing-intensive class integrates content from throughout the previous curriculum, focusing on strategic application to current industry issues.

### **Strategic Hospitality Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 492** Advanced Professional Seminar in Hotel, Restaurant and Institutional Management (1) Course prepares senior HR&IM students to assume leadership positions in the hospitality industry (Focus on careers, leadership, ethics, lifelong learning).

### **HRIM 492 Advanced Professional Seminar in Hotel, Restaurant and Institutional Management (1)**

The objective of this course is to help students begin their transition from being students to being hospitality managers. With most Hotel, Restaurant, and Institutional Management majors not having yet established careers and having spent most of their lives as students, they need to think systematically about how they will become full-time managers in hospitality. Main topics typically include:

- Career planning and lifelong learning
- Deciding on employers to pursue
- The selection process-getting offers from employers
- Evaluating and choosing between offers
- Negotiating salary, location, benefits, relocation expenses
- Personal budgeting and financial planning
- Balancing work and personal life
- Time and stress management
- Networking and professional associations
- Roles and responsibilities of alumni

This course is required of all hospitality majors. The course is taken after most hospitality courses have been completed and concurrent with other courses that are capstones within various tracks of courses, such as the foods-related courses. The course is usually taken in the final semester of study. As a prerequisite for the course, students must have completed 1,000 hours of work experience in the hospitality industry. Evaluation methods may include quizzes, writing assignments, and class participation. The course is usually offered fall and spring semesters, with enrollments dependent upon the size of the graduating class.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

Prerequisite:

Concurrent: HRIM 430 HRIM 466 HRIM 490

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495A** Hotel Internships-PS Hospitality Services Internship (3) A supervised work experience internship with Penn State Hospitality Services, including weekly class meetings.

### **Hotel Internships-PS Hospitality Services Internship (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495A** Hotel Internships-PS Hospitality Services Internship (3) A supervised work experience internship with Penn State Hospitality Services, including weekly class meetings.

**Hotel Internships-PS Hospitality Services Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495B** Executive Internship-PSHS (3) A project-oriented supervised internship with a Penn State Hospitality Services department head.

**Executive Internship-PSHS (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495B** Executive Internship-PSHS (3) A project-oriented supervised internship with a Penn State Hospitality Services department head.

**Executive Internship-PSHS (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495C** Housing and Food Service Internship (3) A supervised rotational internship with a facility within PSU Housing & Food Service, including a weekly class meeting.

**Housing and Food Service Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495D** HRIM Teaching Assistant (1-6) Student performs as a teaching assistant for an HRIM course. Assists faculty member with class.

**HRIM Teaching Assistant (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495D** HRIM Teaching Assistant (1-6) Student performs as a teaching assistant for an HRIM course. Assists faculty member with class.

**HRIM Teaching Assistant (1-6)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495E** External/Off Campus Internship (1-3) A supervised internship with an approved site participant. Internships are typically one semester or summer in length.

**External/Off Campus Internship (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495E** External/Off Campus Internship (1-3) A supervised internship with an approved site participant. Internships are typically one semester or summer in length.

**External/Off Campus Internship (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495E** External/Off Campus Internship (1-3) A supervised internship with an approved site participant. Internships are typically one semester or summer in length.

**External/Off Campus Internship (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495F** Housing & Food Service Internship (3) Students will participate in a supervised internship with a facility within PSU Housing & Food Service.

**Housing & Food Service Internship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 495G** Supervisory Internship (6) Students will participate in a supervised internship with an approved site location.

**Supervisory Internship (6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497A** Meeting & Events I (3) Students will learn concepts and applications to Event & Meeting Planning.

**Meeting & Events I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497A** Meeting & Events I (3) Students will learn concepts and applications to Event & Meeting Planning.

**Meeting & Events I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497C** Managing Continuing Care Retirement Communities (3) Managing continuing care retirement communities.

**Managing Continuing Care Retirement Communities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497E** Corporate Social Responsibility (3) Examines the role of ethics and corporate social responsibility in the hospitality industry.

**Corporate Social Responsibility (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497F** Hospitality Asset Management (3) This course introduces financial management and related concepts for decision- making to enhance, maintain, monitor value and performance of hospitality assets.

**Hospitality Asset Management (3)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497F** Hospitality Asset Management (3) This course introduces financial management and related concepts for decision- making to enhance, maintain, monitor value and performance of hospitality assets.

### **Hospitality Asset Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 497I** Special Topics in Restaurant Management (3) Students learn about special or current issues in the restaurant and foodservice industry through library research, on-line activities, class presentations.

### **Special Topics in Restaurant Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 498A** International Hospitality Management (2-3) International hospitality management, organization, practices and structures, cultural influences, and managing an international environment.

### **International Hospitality Management (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 498F** International Food Service Management and Cuisine (3) This course is designed to cover major European cuisines and oenology in a European setting.

### **International Food Service Management and Cuisine (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 498G** French Cuisine and Culture (3) Program will including intensive classes on language and culture, products, cuisine, wine, and also design and atmosphere.

### **French Cuisine and Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 498I** International Hospitality Management (3) This course is designed to expose students to international hospitality management, organization, practices, and structures in a European setting.

### **International Hospitality Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 499 (IL)** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 503** Research Methods in Hotel, Restaurant, and Institutional Management (3) An introduction to the process of research; problem-solving approaches; the research proposal and the development of the research question.

### **Research Methods in Hotel, Restaurant, and Institutional Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 511** Services Marketing for the Hospitality Industry (3) Hospitality services marketing.

### **HRIM 511 Services Marketing for the Hospitality Industry (3)**

This course focuses on the unique challenges of marketing hospitality services in the global environment. The attraction, retention, and building of strong customer relationships through quality service and customer knowledge are at the heart of the course content. At the end of this course, students should be familiar with basic techniques and practices used to collect, analyze, and disseminate information for decision-making in hospitality marketing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 585** Seminar in Hotel, Restaurant, and Institutional Management (1-9) This course is a doctoral seminar in HR&IM that addresses the conceptual foundations of the HR&IM knowledge base.

### **Seminar in Hotel, Restaurant, and Institutional Management (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**HRIM 586** Research Methods and Evaluation in Hotel, Restaurant, and Institutional Management (1-9) This course is a doctoral seminar in HR&IM that addresses various research methodologies and evaluation procedures that are applicable to HR&IM.

**Research Methods and Evaluation in Hotel, Restaurant, and Institutional Management (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 597A** Ph.D. Seminar on Interdisciplinary Research in Hospitality Inquiry (3) The objective of this doctoral seminar is to explore conceptual and applied dimensions of interdisciplinary research in hospitality inquiry.

**Ph.D. Seminar on Interdisciplinary Research in Hospitality Inquiry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 597A** Ph.D. Seminar on Interdisciplinary Research in Hospitality Inquiry (3) The objective of this doctoral seminar is to explore conceptual and applied dimensions of interdisciplinary research in hospitality inquiry.

**Ph.D. Seminar on Interdisciplinary Research in Hospitality Inquiry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRIM 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Hum Dim Nat Res Env (HDNRE)**

**HDNRE 574** Integrated Perspectives in Human Dimensions of Natural Resources and the Environment (3) Introduction to the integration and application of interdisciplinary concepts to contemporary natural resource and environmental issues.

#### **Integrated Perspectives in Human Dimensions of Natural Resources and the Environment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HDNRE 575** Ethical Issues in Human Dimensions of Natural Resources and the Environment (3) Introduction to ethical issues in human dimensions of natural resources and the environment.

#### **Ethical Issues in Human Dimensions of Natural Resources and the Environment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HDNRE 590** Human Dimensions in Natural Resources and the Environment Colloquium (1) Professional socialization and training, development, and assessment of meta-theoretical frameworks and cohort building.

#### **Human Dimensions in Natural Resources and the Environment Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HDNRE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HDNRE 600** Thesis Research (1-15 per semester/max of 99) No description.

**Thesis Research (1-15 per semester/max of 99)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Hum Res & Empmnt Rel (HRER)

**HRER 500** Topics in Comparative Industrial Relations (3 per semester/maximum of 6) Similarities and differences of various aspects in industrial relations assessed within the political, economic, and historical contexts.

**Topics in Comparative Industrial Relations (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 501** Labor and Employment Law (3) Legal context of employment in the United States.

**Labor and Employment Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 502** Organization of the Workplace (3) Organization and transformations of the workplace and the labor process, including Taylorism, Fordism, and flexible forms.

**Organization of the Workplace (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 503** Seminar in International Human Resources Studies (3) Seminar course exploring human resource studies from an international perspective.

**Seminar in International Human Resources Studies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 504** Seminar in Employment Relations (3) Theory, process, and issues of employment relations, including collective bargaining and contract administration.

**Seminar in Employment Relations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 505** Seminar in Human Resources (3) Current human resource topics in the context of organizational strategy, planning, and responsibility.

**Seminar in Human Resources (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 510** Introduction to Graduate Studies in Human Resources and Employment Relations (1) An overview of professional development and research activities of scholars of Human Resources and Employment Relations.

**Introduction to Graduate Studies in Human Resources and Employment Relations (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 512** Research Methods in Human Resources and Employment Relations I (3) Research design, sampling design, data collection, and analysis; modeling, means and comparison of means, correlation analysis; and case study.

**Research Methods in Human Resources and Employment Relations I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 513** Research Methods in Human Resources and Employment Relations II (3) Continuation of research design, validity and reliability; experimental design and ANOVA; survey design, and multiple regression models.

**Research Methods in Human Resources and Employment Relations II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 516** Labor Market Analysis (3) Neoclassical, institutional and systemic theories of external and internal labor markets and their dynamics.

**Labor Market Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 536** Diversity in the Workplace (3) Women and minorities in the workplace.

**Diversity in the Workplace (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 597A** Seminar in International Human Resources (3) This course will explore the practice of human resource management in an international context.

**Seminar in International Human Resources (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 597B** Work-Life Practices and Policies (3) Explore the causes and consequences of conflicts between work, family, and other life commitments, and how these may be resolved.

**Work-Life Practices and Policies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at overseas institution with whom linkages have been established.

**Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 610** Thesis Research Off-Campus (1-15) No description.

**Thesis Research Off-Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 800** International and Comparative Employment Relations (3) This course examines employment relations systems in the world today and the influence of globalization on employment relations practice.

**HRER 800 International and Comparative Employment Relations (3)**

This course explores contemporary topics in employment relations in the world. It provides an overview of globalization-understood as an increased economic, political, and social inter-connectedness in the world today. The course then examines seven examples of employment relations systems, each carefully chosen to

illustrate important variations in employment relations practices. The first case is Germany, which provides an example of a country with strong national unions and a highly developed system of works councils. The Swedish case exemplifies a long-tradition of centralized bargaining and tripartite relations that is now in transition. Both Germany and Sweden are also known for having strong social welfare systems. The third case, Japan, illustrates some of the initial experiences with team work, just-in-time production, and employee commitment through job security and training. The next case, China, offers an example of a socialist system in transition that has become an economic powerhouse through massive export processing zones, government controlled unions, and wage competition. Brazil provides an important example of a Latin American country where the employee relations system is characterized by state dominated corporatism. South Africa offers a case of a system in transition from extreme racial segregation to a democracy in which labor unions are active both in the workplace and in politics. Finally, India represents Asia's other economic powerhouse, with an English speaking workforce that is drawn to the booming call center industry and export-oriented production. The second half of the course looks at broader themes related to the topic of globalization. Here the three core actors in the employment relations system are examined in their international context. Instead of domestic employers, we study multinational corporations and their diffusion of employment relations practices. Instead of national governments, we study inter-governmental institutions such as the World Trade Organization, and the International Monetary Fund. And instead of national unions, we look at international union organizations such as the Global Union Federations (GUFs) and the newly formed International Trade Union Confederation (ITUC). The three core employment relations actors work together through the International Labour Organization (ILO). The final unit of this section examines the hot topic of Corporate Social Responsibility (CSR), recent attempts by corporations-at times in coordination with labor unions--to establish basic sets of rules or standards for their employees wherever units of the corporation might be located in the world today.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 802 Organizations in the Workplace (3)** This course provides students with an overview of selected managerial behavior and career topics in modern organizations.

### **HRER 802 Organizations in the Workplace (3)**

Through the case method, students will be challenged to think critically about real-world problems faced by employees, managers, and organizational leaders. Incorporating basic theoretical principles, we will brainstorm and explore possible approaches to diagnosing those problems and implementing solutions. The approach to learning is purposefully interactive and open-ended, although each module will include some readings summarizing relevant current academic research that provide a framework for thinking about the case. Team exercises and a term paper also provide opportunities for more in-depth exploration of one or more issues introduced during the course of the semester. Students should leave the class with (a) practice in critical thinking; (b) tools for analyzing and managing their own careers in organizations; (c) exposure to some basic concepts from organizational and management science; (d) knowledge about several real-world managers, companies and industries. Evaluation will be based on participation in online case discussions (40%) and written case memos (20%), an individual career and network assignment (20%), and an individual or team option final project involving a paper (10%) and presentation (10%). All letter grades will be assigned in accordance with the University's grading policy.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 811 Labor and Employment Law II (3)** Advanced topics in labor and employment law; such areas as immigration, unemployment compensation, and safety/health.

### **Labor and Employment Law II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 816 Labor Market Analysis (3)** Neoclassical economic and institutional theoretical perspectives on labor supply, demand for labor, internal labor markets, wage determination and labor policies.

### **HRER 816 Labor Market Analysis (3)**

Virtually everyone will eventually develop an intimate acquaintance with the domain of labor markets--the job market,

workplace, labor force and household. This course is intended to help students better analyze general issues surrounding work, the market for labor and the employment relationship. It will reveal the interdependence of the economy, workplace structures, labor organizations, household and family structure and public institutions and policies. It will prepare students to more deeply analyze the determination of earnings and employment, and the influence of organizational and individual behavior, government policies and labor relations. The course will examine the structures and processes that comprise the labor market and the range of theoretical perspectives that can be used to understand its operation. It will rely heavily on applying, and critically appraising, the various perspectives from the field of economics, integrated with other approaches. Its scope will include analyzing the level and types of employee compensation, employment opportunities, labor force participation, work and non-work time, earnings inequality, work-life conflict, etc. It also examines how labor markets, employers and workers are affected by interventions such as government regulatory policy, labor unions, discrimination, and technological advancement. Each unit will focus on an issue within labor markets, and how it may be analyzed in a rigorous way,

- *the individual's decision to participate in the labor force and how much time to devote toward paid work as opposed to leisure, studying and family;*
- *the individual and employer decision to invest in their own "human capital" (employees' skills) via payment of training and higher education;*
- *the employer's demand for labor resources in both the short-run and long-run and its determinants such as output demand;*
- *the determination of wages in perfectly competitive or internal labor markets;*
- *the effect of working conditions, such as hazardous or insecure jobs, on pay;*
- *the influence of employee compensation schemes on productivity and turnover;*
- *the effect of labor unions and collective bargaining on levels of pay, productivity, profitability and employment;*
- *the effect of government subsidies, taxes, minimum wage, maximum hours and family leave regulations on labor supply and demand, worker earnings and well-being;*
- *the effect of various types of discrimination present in the labor market on gender, race and age earnings differentials;*
- *the influence of the "new economy" (technology, networking) on unemployment and quality of employment (e.g., temporary jobs, work schedules) and income inequality.*

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 836 Diversity in the Workplace (3)** This course examines workplace diversity, gender and race challenges facing employers and employees, and the skills for managing diversity.

### **HRER 836 Diversity in the Workplace (3)**

This course will examine gender and race issues challenging employers and employees in an age when demographic changes and globalization are significantly increasing the diversity of the U.S. workforce. This course will provide an opportunity for students to explore the various ways in which ethnicity, race and gender, sexual orientation, national origin, and disability impact the workplace. Specific issues to be examined include employment and discrimination laws, work and family policies, human resource practices (such as recruitment and selection), and sexual harassment. The course will also explore various workplace accommodations and strategies for managing diversity in the workplace; sex roles; occupational choices made by women and minorities; and career development. This course is one core requirement for the Masters Degree Program in Human Resources and Employment Relations. It provides graduate course level coverage of topics addressed in L I R 536: Labor Diversity in the Workplace. Mastery of course material will be evaluated through both informal and formal assignments which include case studies, exercises and group activities, participating in on-line discussion, and short essay exams.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 894 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

### **HRER 894 Research Topics (1-15)**

The course presents an opportunity for students to demonstrate that they can apply the principles, theory, and content studied over the course of the degree to an applied issue of importance in the field of human resources and employment relations. In addition to a description, analysis, and interpretation of the project or findings, all papers will require a literature review, explicit theoretical framework, and standard bibliographical format. Each student will have a faculty mentor who will assist the student during the research and writing phases, and who will evaluate the final paper.

General Education: None



Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HRER 897B** Strategic Business Concepts for HRER Professionals (3) Increasingly in most sophisticated organizations, human resources has evolved from an administrative support function to being viewed as a strategic partner along with finance, operations, logistics, etc. - the other main players in most organizations. How has HR achieved this transformation? Primarily by doing two things, which will comprise the two halves of this course. In one half of the course, we will learn to analyze financial statements and to understand common corporate finance concepts. This is crucial for HR management to fully understand and support the business objectives of the organization, which are typically expressed in financial terms. HR managers need to be comfortable talking that talk; and understanding financial concepts such as what line items are involved when the business seeks to increase its gross margins, or which of the organizations's costs are fixed and what are variable?

### **Strategic Business Concepts for HRER Professionals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Human Development (H DEV)**

**H DEV 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**H DEV 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Human Development and Family Studies (HD FS)**

**HD FS 401** Project Planning, Implementation, and Evaluation in the Human Services (3) Exercises and activities related to the design, planning, implementation and management, and evaluation of projects and programs in the human services.

**HD FS 401 Project Planning, Implementation, and Evaluation in the Human Services (3)**

HD FS 401 is part of a sequence of courses that develop skills and competencies of the human services student. The course emphasizes the further development of communication skills, diversity skills, team-building skills, critical thinking skills, and technology and leadership skills. Intended to be completed prior to the internship experience, the course will initially focus students' efforts on the identification of a field-based human services project or program, and a setting within which it could be carried out. Subsequently, students will design and plan the project or program, examine and propose effective implementation and management procedures, and incorporate state-of-the art evaluation procedures into the design.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 402 Human Services Seminar (4)** Presentations and discussion of contemporary human issues by students and visiting professionals.

**Human Services Seminar (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 405 (US) Gender and Social Development (3)** A review of gender-related patterns of social development over the lifespan, as influenced by biological, sociological, and psychological factors.

**Gender and Social Development (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 410 Communities and Families (3)** Family and community interaction, emphasizing strategies for intervention to solve family-community problems.

**Communities and Families (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 411 The Helping Relationship (3)** Theory and research related to interpersonal conditions which facilitate personal growth; intensive interpersonal competency training.

**The Helping Relationship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 412 Adult-Child Relationships (3)** Theories, research, and application of adult behavior for maximizing adult- child relationships and optimizing child socialization and self-development.

**Adult-Child Relationships (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 413** Developmental Problems in Adulthood (3) Analysis of individual developmental problems from young adulthood through old age and their prevention and modification.

### **Developmental Problems in Adulthood (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 414** Resolving Human Development and Family Problems (3) Strategies for, and roles of professional specialists in, the solution of problems in human development and family functioning.

### **Resolving Human Development and Family Problems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 415** Program Development in Family Relationships (3) Methods for planning, developing, and evaluating human service programs for families across the life span.

### **Program Development in Family Relationships (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 416 (US) (SOC 411)** Racial and Ethnic Diversity and the American Family (3) This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States.

### **HD FS 416 (SOC 411) Racial and Ethnic Diversity and the American Family (3)**

During the last several decades, the racial and ethnic composition of the U.S. population has changed dramatically. At end of the 20th century, non-Hispanic whites accounted for less than 75 percent of the U.S. population. While blacks remained the largest minority group, there were nearly as many Hispanics as blacks, and the number of Asians was increasing. Population projections indicate that by the middle of the 21st century, Hispanics will make up nearly one-fourth of the U.S. population. Blacks, Asians, and American Indians together will comprise an additional fourth of the population. The last several decades have also brought significant changes in family life in the United States, including declining rates of marriage, a rising age-at-marriage, an increase in cohabitation, and a dramatic rise in the proportion of births outside of marriage. While these trends in family life have been experienced by all racial and ethnic groups, there is substantial variation in family patterns by race and ethnicity. The course will build on other courses in social inequality and the family. The course does not overlap with any existing courses in the Department of Sociology or with courses offered in other relevant departments.

This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States. The student will read articles from major sociological journals and learn to extract major points and issues. He/she will learn to synthesize and critique various arguments on major issues in the field. The student will acquire skills in summarizing and evaluating arguments in essay form. He/she will also develop oral presentation skills. Final grades for the course will be based on class participation, a brief (approximately 5 pages) paper, a group presentation, a midterm examination (essay format) and a final examination (essay format). The course is not required for the Sociology minor or major. However, the course can count as one of the 400-level elective courses in Sociology for the Sociology minor, B.A. or B.S.

General Education: None  
 Diversity: US

Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 417 (US;IL) Biocultural Studies of Family Organization (3)** Study of variability in family organization with an emphasis on cultural and economic factors influencing household organization and family roles.

**Biocultural Studies of Family Organization (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 418 Family Relationships (3)** Dynamics of family interaction; effects of parenthood, sibling and intergeneration relationships on family solidarity.

**Family Relationships (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 420 Laboratory in Individual and Family Enhancement (3)** Supervised practice in methods of assessment, intervention, and evaluation to enhance individual and family development.

**Laboratory in Individual and Family Enhancement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 424 (US) Family Development in an Economic Context (3)** Economic conditions influencing family functioning; familial effects on the economy; strategies to enhance work-family relations.

**Family Development in an Economic Context (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 425 (US) Work as a Context for Human Development (3)** Theory and research on role of work in adult development; interrelationships between work and family; workplace interventions to enhance development.

**Work as a Context for Human Development (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS (KINES) 427 Developmental Sport & Exercise Psychology (3)** Developmental changes in the antecedents and consequences of physical activity across the lifespan.

**HD FS (KINES) 427 Developmental Sport & Exercise Psychology (3)**

Change is constant with physical activity - our reasons for being active change across the lifespan and our experiences with physical activity change how we view ourselves and those around us. Developmental Sport & Exercise Psychology focuses on developmental changes in the psychosocial antecedents and consequences of physical activity across the lifespan. Specific course objectives include (1) describing theoretical frameworks and methods used to study physical activity-related psychosocial development across the lifespan, (2) describing how self-perceptions develop and influence behavior in movement contexts at different points in life, (3) explaining how contextual factors influence developmental processes associated with physical activity, (4) identifying age-related differences in activity-related antecedents and consequences of physical activity, and (5) developing, reviewing, and critiquing theoretically-grounded interventions to address issues related to developmental processes associated with physical activity across the lifespan. Evaluation will be based on written examinations, submission of a series of reflection papers on reading assignments, a group presentation, and the students' engagement in the class. It extends but does not duplicate existing courses in the Department of Innersole, Human Development & Family Studies, and Psychology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 428** Infant Development (3) Conceptual analysis, assessment, and empirical investigation of normal and deviant development, prenatal through first two years of life.

### **Infant Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 429** Advanced Child Development (3) Processes of development during childhood from birth to adolescence. Emphasis upon theory, method, and empirical research.

### **Advanced Child Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 430** Experience in Preschool Groups (6) Guided practicum experience in planning and facilitating developmentally appropriate activities for young children.

### **Experience in Preschool Groups (6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 431** (SOC 431) Family Disorganization: Stress Points in the Contemporary Family (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

### **Family Disorganization: Stress Points in the Contemporary Family (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 432** Developmental Problems in Childhood and Adolescence (3) Analysis of problems in individual development

from infancy through adolescence; prevention and modification of developmental difficulties.

### **Developmental Problems in Childhood and Adolescence (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 433** Developmental Transition to Adulthood (3) Conceptual analysis and empirical investigation of interrelationships between developmental processes during the period of pubertal growth.

### **Developmental Transition to Adulthood (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 434** (SOC 435) Perspectives on Aging (3) An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

### **Perspectives on Aging (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 440** (SOC 440) Family Policy (3) An in-depth examination of family policy.

### **HD FS (SOC) 440 Family Policy (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is designed to provide an in-depth examination of family policy. Students will identify and critically analyze major issues, controversies, and policies that affect families. Attention will be devoted to recognizing both intended and unintended consequences of family policies and understanding policy challenges and trade-offs. Students will gain an understanding of how policies are shaped by both facts and myths, as well as our values. Students will examine historical and current trends in family patterns (e.g., divorce, women's labor force participation, nonmarital births) to understand the implications they hold for individuals, families and society. Students will gain an awareness of the social, economic, historical, legal, and political contexts within which family policies exist and are proposed. Although the main focus is on U.S. family policy, some time will be devoted to learning about family policies in other countries. We will learn about several specific family policies in-depth (e.g., welfare), but a final goal is to help students develop a general way of looking at family policy that they can then use to understand any issue of family policy that unfolds throughout their lifetime. This course will foster thoughtful reflection and critical thinking, writing skills, research skills, and skills of synthesis, logic, and argument. Course goals will be accomplished through course readings, writing assignments, lectures, class discussions, debates and group projects. Mastery of course material and student evaluation are assessed in several ways. Students will take a midterm and final exam that cover lectures, class discussions, and assigned readings. Two papers are also required. The first paper is based on an analysis of newspaper articles dealing with family policy issues that students will collect and relate to course materials. The second paper is a literature-based analysis of a family policy in a society outside the United States. Class participation is also essential and its evaluation will be based on a combination of class attendance, contributions to class discussions, participation in group debates and projects, and an oral presentation of the final paper on a non-U.S. family policy.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 445** (PSYCH 416) Development Throughout Adulthood (3) Processes of development and change of behavior from early adulthood through old age, emphasizing theory, method, and empirical research.

**Development Throughout Adulthood (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 446** Programs and Services in Gerontology (3) Theoretical and historical views of the conceptualization and delivery of programs and services to older persons within a multidisciplinary developmental framework.

**Programs and Services in Gerontology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 447** Issues in Gerontology (3) Analysis of major issues in adulthood and aging, with an emphasis on integration of theory and research.

**Issues in Gerontology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 450** Developmental Child Programs and Services (3) Current and historical views of the conceptualization and delivery of child programs and services within a multidisciplinary developmental framework.

**Developmental Child Programs and Services (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 452** Child Maltreatment Prevention, Intervention, and Legal Issues (3) Examines causes, correlates, and consequences of child maltreatment, empirically supported prevention/intervention programs, the Child Welfare System and relevant legal issues.

**Child Maltreatment Prevention, Intervention, and Legal Issues (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 453** Family Participation and Involvement in Child Services (3) Current and historical perspectives of roles and functions of family members in designing, delivering, and evaluating of child service programs.

**Family Participation and Involvement in Child Services (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 454** (E C E 454) Development and Administration of Child Service Programs (3) Planning, administering, and evaluating child service programs at several administrative levels using methods from relevant disciplines.

**Development and Administration of Child Service Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 455** Development and Administration of Human Services Programs (3) Fundamentals of program development and administration of human service programs in community settings; emphasis given to program content, strategies, and the overall planning process.

**Development and Administration of Human Services Programs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 468** Biological Bases of Behavioral Development (3) Biological, genetic, and experiential influences in development through the lifespan.

**Biological Bases of Behavioral Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 477** Analysis of Family Problems (3) Analysis of families' behavioral, managerial, interpersonal, and financial problems and their interrelationships.

**Analysis of Family Problems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 490** Introduction to Internship Experience (2) Planning and preparation for field experience in human service setting. Analysis of human service system and arrangement of site.

**Introduction to Internship Experience (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 494H** Senior Honors Thesis (1-6) Independent study under the direction of the thesis advisor of topics related to the interests of the student, culminating in presentation of a thesis.

**Senior Honors Thesis (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 495A** Internship: Advanced Experience (9) Full-time, one semester experiential training in human service settings. Open to HD FS majors only.

**HD FS 495A Internship: Advanced Experience (8)**

HD FS 495A represents a full-time, one-semester internship experience. Its focus is experiential learning accompanied by intensive supervision, provided by one-site personnel, as well as University-based mentoring. Taken within a year of the pre-internship course (HD FS 490), which helps the student with the details of making arrangements for their internship, HD FS 495A, taken during the same semester as HD FS 495B, is considered the capstone of the HD FS undergraduate program. The internship can be taken during the fall, spring, or summer semester. It is one full semester spent working as a human service professional in a setting of your choice. Generally interns will work as a full-time professional (35-40 hours a week) for the semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 495A** Internship: Advanced Experience (9) Full-time, one semester experiential training in human service settings. Open to HD FS majors only.

**HD FS 495A Internship: Advanced Experience (8)**

HD FS 495A represents a full-time, one-semester internship experience. Its focus is experiential learning accompanied by intensive supervision, provided by one-site personnel, as well as University-based mentoring. Taken within a year of the pre-internship course (HD FS 490), which helps the student with the details of making arrangements for their internship, HD FS 495A, taken during the same semester as HD FS 495B, is considered the capstone of the HD FS undergraduate program. The internship can be taken during the fall, spring, or summer semester. It is one full semester spent working as a human service professional in a setting of your choice. Generally interns will work as a full-time professional (35-40 hours a week) for the semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 495B** Internship: Advanced Project (3) Implementation of internship projects or scholarly paper. Open to HD FS majors only.

**HD FS 495B Internship: Advanced Project (4)**

HD FS 495B is taken at the same time as HD FS 495A, and within a year of the pre-internship course (HD FS 490), which helps you with the details of making arrangements for the HD FS internship, HD FS 495B focuses on the academic aspects of the internship experience. This course can be taken during the fall, spring, or summer semester. Currently, HD FS 495B consists of writing three papers; The Organizational Analysis, The Policy Analysis, and The Personal Development Paper. The purpose of the organizational analysis paper is to give the intern an opportunity to learn about his or her internship setting or organization in greater depth than might be possible otherwise. This will necessitate the intern taking an active approach to systematically securing information about the internship organization through the review of relevant documents, conducting formal or informal interviews, and observation. This paper will then be saved at the internship office, without identifying information or grade, to be viewed as a source of information about potential internship sites

by future students who are seeking internships.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 495C** Professional Practicum in Human Services (3-8) Guided professional practicum in human services, usually in the form of a project related to a human services issue.

#### **Professional Practicum in Human Services (3-8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 496B** Infant Temperment (1-3) This class is for students to learn about the research process by getting hands-on experience on a research project examining infant and child development. Students will have the opportunity to collect data, learn coding systems, and do data entry. Discussions about the research process occur during weekly lab meetings.

#### **Infant Temperment (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 496C** Marcellus Shale Family Project (1-3) The Marcellus Family Project involves coding and analyzing data from community leaders and parents regarding the implications of Marcellus Shale development for families. Students will also assist with preparing newsletters for participants.

#### **Marcellus Shale Family Project (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 497A DORA College Program (1)** The DORA College Program is a peer based mental health wellness and suicide prevention program. Students will learn how to be a peer educator and administer the DORA program to small groups of students on campus. Students will meet for 3 sessions to learn how to be group leaders and implement awareness sessions. Following the satisfactory completion of the training program, the students, in pairs, will conduct at least 1 but not more than 3 sessions with groups of students. It is expected that students will develop skills as listeners, as well as speakers, that they will reflect on their experiences, and share their insights with other members of the class via journals, class discussions, and reflection papers.

**DORA College Program (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 497A DORA College Program (1)** The DORA College Program is a peer based mental health wellness and suicide prevention program. Students will learn how to be a peer educator and administer the DORA program to small groups of students on campus. Students will meet for 3 sessions to learn how to be group leaders and implement awareness sessions. Following the satisfactory completion of the training program, the students, in pairs, will conduct at least 1 but not more than 3 sessions with groups of students. It is expected that students will develop skills as listeners, as well as speakers, that they will reflect on their experiences, and share their insights with other members of the class via journals, class discussions, and reflection papers.

**DORA College Program (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 497B Human Development and Family Studies Rwanda Field Experience (0.5)** This is a two week, hands-on learning experience for students working on various child development and education projects at the Star School in Kigali, Rwanda.

**Human Development and Family Studies Rwanda Field Experience (0.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 497C Peer and Consultation (1-3)** Students register for this course if they will be serving as a teaching assistant in HD FS courses.

**Peer and Consultation (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 497H Professional Development (1)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Professional Development (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 499A** (IL) Early Childhood in Italy (3) This course will give students the opportunity to examine the way in which Italians structure the early childhood years, and the social policies that support this structure. Students will observe children in public, as well as having the opportunity to visit preschool and day care programs for young children.

#### **Early Childhood in Italy (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 499B** (IL) Historical Roots of the Modern Italian Family (3) The purpose of this course is to examine the historical roots of the Italian family system as it has evolved from antiquity to modernity. Issues to be explored include the implications of economic, political, religious, and social factors, the status of Italian women over time with regard to legal rights, roles, societal expectations and cultural values, and the attitudes toward and practices regarding child rearing.

#### **Historical Roots of the Modern Italian Family (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 499C** (IL) Italian Relationships: Both Cultural and Familial (3) The purpose of this course is to examine the cultural factors affecting business, friendship, and family relationships in Italy. Issues to be explored include the implications of economic, political, religious, and social factors on Italian families, and the influence of the Catholic Church on family and social roles in Italy.

#### **Italian Relationships: Both Cultural and Familial (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 501** Human Development Across the Lifespan (3) Multidisciplinary study of theories and research on human development across the lifespan.

#### **Human Development Across the Lifespan (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 502** Biological Systems in Developmental Context (3) Discusses the development of key biological systems, and their influences on behavior across the lifespan.

**Biological Systems in Developmental Context (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 503** Human Development Intervention: Analysis of Theories and Approaches (3) Theoretical and empirical analyses of multilevel approaches for enhancing development of individuals and families.

**Human Development Intervention: Analysis of Theories and Approaches (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 504** Consultation in Human Development Intervention (3) Principles of consultative and collaborative practice with human development intervention programs in formal or informal community settings.

**Consultation in Human Development Intervention (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 506** Design and Evaluation of Prevention Programs Across the Life Span (3) An introduction to the theory and application of program evaluation; both process and outcome evaluation strategies are addressed.

**Design and Evaluation of Prevention Programs Across the Life Span (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 507** Women, Families, and Society (3) Analysis and critique of research and theory on women's development and role in family and society.

**Women, Families, and Society (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 508** Best Practices in Preventive Intervention (1-6) Implementing empirically validated preventative programs;

discussion and evaluation of theory and techniques.

### **Best Practices in Preventive Intervention (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 509** Nature-Nurture Issues in Human Development (3) Introduction to nature-nurture interactions in life-span development; biological, psychological, and cultural factors in ontogeny and phylogeny.

### **Nature-Nurture Issues in Human Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 515** Professional Issues in Human Development and Family Studies (1-6) Overview of issues in professional development for careers in human development and family studies.

### **Professional Issues in Human Development and Family Studies (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 516** Methods of Research in Human Development (3) Review of basic research methods and statistics as applied to human development and family studies.

### **Methods of Research in Human Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 517** Multivariate Study of Change and Human Development (3) Models of development and change derived from empirical research utilizing multivariate research design and procedures.

### **Multivariate Study of Change and Human Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 518** Applied Statistics Laboratory (1) This course provides graduate students with practical skills in data entry, data management, and applied statistical analyses.

### **Applied Statistics Laboratory (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**HD FS 519** Methods of Statistical Analysis in Human Development (3) An overview of basic statistical concepts, models, and methods for the analysis of development and change.

**Methods of Statistical Analysis in Human Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 520** Seminar in Prenatal and Infant Development (1-6) Prenatal and infant development, with emphasis on multiple determinants of early development and their relationship to later behavior.

**Seminar in Prenatal and Infant Development (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 522** Risk and Resilience in Human Development: Foundation for Prevention (3) Reviews the concepts of risk, protection, resilience, and competence; examines these concepts in intervention and longitudinal studies.

**Risk and Resilience in Human Development: Foundation for Prevention (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 523** Strategies for Data Analysis in Developmental Research (3) This course provides the skills necessary to confront the data analytic issues presented in the Human Development and Family Studies methodology core curriculum.

**Strategies for Data Analysis in Developmental Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 524** Work as a Context for Human Development (3) The interconnections between work, family life, and individual development.

**Work as a Context for Human Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 525** Introduction to Family Studies (3) Introduction to current theory and research about micro and macro forces related to family relationships and development.

**Introduction to Family Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 526** (PSY 526) Measurement in Human Development (3) Principles and methods for assessment of human developmental processes across the life span.

**Measurement in Human Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 527** Social Epidemiology (3) Application of epidemiological methods to issues in the study of human development.

**Social Epidemiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 528** (PSY 528) Observational Methodologies for Development (3) Design and application of observational methods in developmental research.

**Observational Methodologies for Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 529** (PSY 529) Seminar in Child Development (1-6) Readings and reports on recent findings in child development.

**Seminar in Child Development (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 531** (SOC 531) Family Disorganization: Stress Points in the Contemporary Family (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

**Family Disorganization: Stress Points in the Contemporary Family (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 532** (NUTR 532) Childhood Obesity (3) This course addresses how genetic predispositions, behavioral and environmental factors affect children's obesity risk and examines strategies for obesity prevention.

**HD FS (NUTR) 532 Childhood Obesity (3)**

This course will examine the epidemic of obesity, particularly childhood obesity, and how various behavioral and environmental factors place children at risk of becoming overweight. Sources of influence that will be examined include: children's nutrition and physical activity behaviors, the family environment, the school environment and community characteristics. Media, social policy and economic factors will also be addressed. In addition, the health and psychosocial



consequences of obesity, ethnic and socioeconomic disparities in the prevalence and predictors of obesity among children and adolescents will be addressed. At its conclusion, this course will examine policy initiatives and obesity prevention programs.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 533 (NUTR 533) Adult Obesity (3)** Important current and emerging topics in obesity research relevant to government policy and general public education; emphasis on adult obesity.

**HD FS (NUTR) 533 Adult Obesity (3)**

This course will examine the epidemic of obesity, particularly adult obesity. Obesity: Causes, Consequences and Treatment will provide a forum to introduce and discuss current and emerging topics in adult obesity research, with emphasis on policy, prevention and treatment. Focus will be given to determinants of adult obesity and translation into government policy and efforts to educate the general public on the most effective strategies for body weight regulation, obesity prevention and treatment. Sources of influence that will be examined include: environment, genetics, neural, peripheral and sensory mechanisms, food properties and food supply, and therapies and treatment of adult obesity.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 536 (PSY 536) Research Methods in Developmental Processes (3)** Methodological issues in research on varying stages of development across the individual life span.

**Research Methods in Developmental Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 537 (SOC 537) Biosocial Perspectives on the Family (3)** The implications of knowledge from behavioral endocrinology, behavior genetics, and evolutionary psychology for understanding family relationships and child development.

**HD FS 537. (SOC 537) Biosocial Perspectives on the Family (3)**

Breakthroughs in the way biological variables are measured and modeled have generated new findings that greatly increase our understanding of the reciprocal influences between family relationships, child development, and biological factors. Specifically, advances in the study of hormones, genetics, evolution, pharmacology, and immunology have led to important advances in our knowledge of gender, becoming a parent, early child development, middle child, and adolescent development, parent-child relations, courtship and mate selection, quality of intimate relations, separation and divorce, incest, and dominance and family violence.

Students are required to keep a journal of researchable ideas during the first five weeks of class. The purpose is to give students practice in identifying research needs and opportunities. The journal should include 4-6 research problems, each developed in 2-3 typed pages. The majority of each entry should be a clear statement of what knowledge gains would be realized by conducting the study and why they are important. The remainder of the statement should include consideration of the data you would use, measures of major variables, and analytic strategies. Think of it as a brief portfolio of thesis, dissertation, or research publication ideas.

Entries on research projects in which you are already involved are not eligible for inclusion in the journal. On the last page of the journal, indicate which problem you would like to develop into a more detailed proposal during the remainder of the semester and why. Turn in the journal during week 5. I will evaluate your entries and comment on your selection idea. The rest of the semester will be spent on developing one of the ideas to a full-blown proposal (about 20 pages). You should turn in as many drafts as needed to receive a good grade for this segment of the course. I expect you to turn in three or more before the end of the semester. We will meet about each draft and go over my comments. Proposal drafts should be

spaced out over the semester.

The last week of the semester will be devoted to presentations of research proposals after which class members will offer comments and suggestions. Your grade will be based on the proposal draft you turn in the last week of the class. Twenty-one percent of the course grade is based on the research proposal.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 539 Seminar in Adolescent Development (1-6)** Cultural, psychological, and biological aspects of the developmental transition to adulthood.

#### **Seminar in Adolescent Development (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 544 Seminar in Dysfunctional Patterns in Family Organization (1-6)** Processes of familial dysfunction and disorganization and their explanation in economic, social-psychological, and managerial terms.

#### **Seminar in Dysfunctional Patterns in Family Organization (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 545 Families and Socioeconomic Systems (1-6)** Functional interrelationships between families and social and economic systems.

#### **Families and Socioeconomic Systems (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 546 Seminar in Family Relationships (1-9)** Interpersonal interaction within family systems throughout the life cycle.

#### **Seminar in Family Relationships (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 549 (PSY 549) Developmental Theory (3)** Conceptual frameworks and major contributions to the study of individual development across the life-span.

#### **Developmental Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 565** Developmental Behavioral Genetics (3) Theories and methods of developmental behavioral genetics and their application to human life-span development.

**Developmental Behavioral Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 569** Seminar on Development in Middle Age (1-6) Interdisciplinary approach to study of human development in middle age, including psychological, cultural, and biological aspects.

**Seminar on Development in Middle Age (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 577** Poverty, Policies, and Child Development (3) Focuses on interrelationships among families, poverty, and social policies.

**Poverty, Policies, and Child Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 579** Seminar in Adult Development and Aging (1-9) A seminar dealing with specific topics concerning adult development and aging.

**Seminar in Adult Development and Aging (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 595** Field Projects in Individual and Family Studies (1-9) Supervised research or internship in human services program.

**Field Projects in Individual and Family Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 1990

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1990

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 596A** Graduate Student Orientation (1) This is a continuation of orientation meeting for our first year graduate students.

### **Graduate Student Orientation (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597A** Developmental Cognitive Neuroscience of Adolescence (3) Adolescence is a unique, transitional period of development, often through to begin with the onset of puberty and end with the acquisition of adult social roles. Based on this conceptualization, the study of adolescence necessitates cross-disciplinary inquiry using multiple methodologies as change occurs across numerous domains (biological, psychological, social, etc.). In this course, students will evaluate theoretical and cutting-edge empirical research investigating the varied development changes of adolescence, principally from a developmental cognitive neuroscience perspective. Particular emphasis will be placed on understanding major non-invasive neuroimaging techniques (e.g., functional magnetic resonance imaging) and the role these tools have played in our understanding of adolescent development and brain-behavior relationships.

### **Developmental Cognitive Neuroscience of Adolescence (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597A** Developmental Cognitive Neuroscience of Adolescence (3) Adolescence is a unique, transitional period of development, often through to begin with the onset of puberty and end with the acquisition of adult social roles. Based on this conceptualization, the study of adolescence necessitates cross-disciplinary inquiry using multiple methodologies as change occurs across numerous domains (biological, psychological, social, etc.). In this course, students will evaluate theoretical and cutting-edge empirical research investigating the varied development changes of adolescence, principally from a developmental cognitive neuroscience perspective. Particular emphasis will be placed on understanding major non-invasive neuroimaging techniques (e.g., functional magnetic resonance imaging) and the role these tools have played in our understanding of adolescent development and brain-behavior relationships.

### **Developmental Cognitive Neuroscience of Adolescence (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597B** Quantitative Methods for Intervention Science (3) The purpose of this course is to enable students to learn about and apply innovative quantitative, empirically-based approaches to development of multicomponent behavioral interventions. Here the term "behavioral intervention" is used broadly to refer to any intervention for prevention or treatment of health problems, for educational enhancement, or for promotion of health and well-being, that includes one or more behavioral components. A behavioral intervention may be aimed at any age and delivered in any context, may include medical components such as pharmaceuticals, and may be multi-level. The approaches covered in this course can be used to build a new behavioral intervention or improve an existing one, and can be applied not only to intervention content, but also to implementation fidelity and adherence.

### **Quantitative Methods for Intervention Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597C** Person-Specific and EMA Data Analysis (3) a) To build up a thorough understanding of factor analytic and dynamic systems modeling of multivariate psychological time series obtained with single and multiple subjects, including time series obtained in Ecological Momentary Assessment; b) To learn to independently implement any of these models in commercial structural equation modeling software as well as the special-purpose program MKFM6; c) to learn to apply these models to diverse data sets and correctly interpret the obtained results.

### **Person-Specific and EMA Data Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597D** New Methods for Analyzing Intensive Longitudinal Data (1) There has been a recent increase in the use of the Internet, smart phones, and wearable devices to collect many repeated assessments from participants of studies in behavioral and health research. In addition, many long-term panel studies have matured to the point of yielding many time points. Such data, referred to as intensive longitudinal data (ILD), can be summarized in order to apply standard methods for the analysis of longitudinal data. However, new methods for the analysis of ILD provide the opportunity to address questions about dynamic processes. We will briefly review the use of multilevel models to analyze ILD, and then introduce the time-varying effect models for estimating dynamic associations between variables. The class will include a conceptual introduction to new methods for analyzing ILD, mathematical details of the time-varying effect model for intensively assessed normal, binary, and count outcomes, and time for students to practice applying

### **New Methods for Analyzing Intensive Longitudinal Data (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597E** FMRI Data Analysis (3) To build up a thorough understanding of statistical models used in the analysis of multivariate fMRI time series.

### **FMRI Data Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597F** Electroencephalogram (EEG) Coherency Analysis (1) Topographic analysis of multi-lead EEG often is based on

coherency analysis (correlation analysis in the frequency domain). Coherency analysis also is important in the analysis of several other psychophysiological response systems. Even intensive measurements of social group interactions have been analyzed by means of coherency analysis. In this course the fundamentals of coherency analysis will be presented, starting with a concise introduction in multivariate time series analysis in the time and frequency domain. Special emphasis will be given to alternative ways to estimate coherency matrices, including derived amplitude and phase spectra. The problem of volume conduction in EEG and ways to deal with that will be discussed.

#### **Electroencephalogram (EEG) Coherency Analysis (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 597G** Research and Theory on Contemplative Practices Across the Lifespan (3) This seminar will review current research and theory on Contemplative Practices including forms of meditation, yoga, and other contemplative actions. There will be a special emphasis placed on children, youth, families and schools. However, there also will be some coverage of contemplative practices with adults including the use of contemplative practices with aging and end-of-life processes. The seminar will be held weekly for 3 hours, with part of each class devoted to exposure to different experimental practices.

#### **Research and Theory on Contemplative Practices Across the Lifespan (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

#### **Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

#### **Foreign Academic Experience (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HD FS 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Humanities (HUM)

**HUM 500** Research Methods and Scholarly Inquiry in the Humanities (3) Study of the methods and materials of scholarship, use of reference tools, evaluation of evidence, and writing of research papers.

**Research Methods and Scholarly Inquiry in the Humanities (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 515** Seminar (3 per semester/maximum of 9) A seminar focusing on typical methods and approaches of a single discipline within the humanities.

**Seminar (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 525** Studies in Aesthetics (3) Philosophical investigation into the nature of art, aesthetic experience, artistic meaning, criticism, grounds for judgment, and history of aesthetic theory.

**Studies in Aesthetics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 530** Seminar in Comparative Arts (3 per semester/maximum of 9) A seminar focusing on selected periods or artists in two or more disciplines within the humanities.

**Seminar in Comparative Arts (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 535** Topics in Cultural and Intellectual History (3 per semester/maximum of 9) Study of methods, issues, and selected topics in the history of thought, social values, and creative expression.

**Topics in Cultural and Intellectual History (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 550** Junior College Teaching Internship (3) Teaching humanities courses in a two-year college under a faculty supervisor, who will direct, criticize, and evaluate the intern.

**Junior College Teaching Internship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 560** Interrelations in the Humanities (3) The study and practice of conducting interdisciplinary research and of investigating and supporting inter-art analogies.

**Interrelations in the Humanities (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 580** Master's Production (1-6) An original scholarly master's paper or creative production initiated by the student, supervised by an appropriate professor, and judged by a committee.

**Master's Production (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1981

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Humanities (HUMAN)**

**HUMAN 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HUMAN 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Humanities-Hy (HMN)**

**HMN 713** Medical Humanities (5) Medical Humanities introduces the first-year student of medicine to topics which explore questions of value and meaning in and around medicine.

#### **Medical Humanities (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 740** Folk and Alternative Health Systems (2.5) Critical examination of alternative/folk health systems and some of

the ways in which they influence current health care delivery.

### **Folk and Alternative Health Systems (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 741 Education for Physicians on End of Life Care (EPEC) (2.5)** This course introduces the essential clinical competencies required to provide quality end-of-life care.

### **Education for Physicians on End of Life Care (EPEC) (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 742 Putting It Into Words: A Right-Brain Retrospective of Formative Moments in Medical School (PIW) (2.5)** This creative writing workshop requires MS IVs to convey their reflections as medical students in a variety of genres which, collectively, result in a portfolio and publication.

### **Putting It Into Words: A Right-Brain Retrospective of Formative Moments in Medical School (PIW) (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 743 Graphic Storytelling and Medical Narratives (2.5)** In this course, students will explore the use of graphic storytelling (or Comics) as a medium for communicating medical narratives.

### **Graphic Storytelling and Medical Narratives (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 744 Humanities: Patients as Teachers, Students as Filmmakers Video Project: TheVideo Slam (2.5)** This course teaches medical students about the full impact of illness and serious procedures on patients and their families.

### **Humanities: Patients as Teachers, Students as Filmmakers Video Project: TheVideo Slam (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 745 Medicine and Ethics Under Pressure (2.5)** This course explores situational and systemic challenges to ethical behavior in biomedical research and the practice of medicine.

### **Medicine and Ethics Under Pressure (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 746 CAM and Integrative Holisitic Medicine (2.5)** This course presents current topics in Integrative Holistic Medicine and discusses the transition from Complementary and Alternative Medicine.

**CAM and Integrative Holisitic Medicine (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 747 Contemporary Issues in Bioethics (2.5)** In this course, students will conduct in-depth examinations of current issues in bioethics. Topics will include. Organ transplantation; PVS & the Value of a Human Being; Childhood Immunizations; Mistakes; What Counts as Medically Necessary?; Child Abuse; Physician-Assisted Death; Genetics.

**Contemporary Issues in Bioethics (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 748 Controlling Human Heredity: Lessons From History (2.5)** This course reviews the key steps in the development of our thoughts and practices relating to childbirth and medical genetics over the past 400 years.

**Controlling Human Heredity: Lessons From History (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 749 Sufferers and Healers: Lessons From History (2.5)** This course reviews the key steps in the development of medicine from its supernatural beginnings steeped in magic and religion through the creation of medical science.

**Sufferers and Healers: Lessons From History (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 750 Creativity, Art, and Healing (CAH) (2.5)** This course introduces students to the core components of the creative arts and healing.

**Creativity, Art, and Healing (CAH) (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 751 The Narratives of Aging: Exploring Creative Approaches to Dementia Care (2.5)** This course invites students to examine brain aging in an historical and cultural context, and contrast dominant reductionist understandings of dementia with a more humanistic, biopsychosocial model of care resurgent in recent years that places greater relative emphasis on the remaining strengths, capacities, and creativity of persons with dementia rather than focusing on deficits and losses.

**The Narratives of Aging: Exploring Creative Approaches to Dementia Care (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 752** Chronic Disease and the Self (2.5) Utilizes published autobiographical patient narratives and live patient interviews to explore the impact of illness.

**Chronic Disease and the Self (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 753** Finding 'Right' Answers: Solving Ethical Dilemmas in Medical Practice (2.5) At the end of the four weeks students will be equipped with four cognitive frameworks for thinking about and solving ethical issues in their clinical practice.

**Finding 'Right' Answers: Solving Ethical Dilemmas in Medical Practice (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 754** The Practice of Virtue in Medicine (2.5) This course requires the student to study and recognize the great human virtues and to learn to practice virtue in medicine.

**The Practice of Virtue in Medicine (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 757** "Are You Listening?" Developing Effective Communication With Our Patients (5) Effective communication with patients is a vital skill for every physician. This course will delve into the interpersonal space between physician and patient.

**"Are You Listening?" Developing Effective Communication With Our Patients (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 758** Documentary Filmmaking About Innovations in Patient Centered Care (5) Students make short documentary films about innovations that make care more patient centered.

**Documentary Filmmaking About Innovations in Patient Centered Care (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 796** Individual Studies (1-15) Studies outside the scope of formal courses, supervised on an individual basis.

**Individual Studies (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**HMN 797 Special Topics (1-6)** Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Ihc - Appellate (IHAPP)**

**IHAPP 995 Civil Rights Appellate Clinic (4 per semester/maximum of 8)** This clinical offering will provide intensive training in appellate advocacy by involving students in non criminal civil rights cases before the state appellate courts, federal courts of appeal and the United States Supreme Court. Students will assist in case selection, the development of substantive legal positions, provide research, assist in appellate strategy development and draft briefs. As this is a new clinical offering an initial focus will be an amicus briefs, however the driving decision for case selection will be which cases, during any particular clinic session, offer the best pedagogical value. In working on these cases students will have exposure to top civil rights and appellate litigators in the country.

**Civil Rights Appellate Clinic (4 per semester/maximum of 8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Ihc - Immigration (IHIMM)**

**IHIMM 995 Center for Immigrants' Rights - Course Component (3)** Students will acquire the skills necessary to be an effective immigration advocate and attorney. Students will work on innovative projects relating to U.S. immigration policy and immigrants' rights.

**Center for Immigrants' Rights - Course Component (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IHIMM 995A Center for Immigrants' Rights: Course Component (5)** The course component of the Center teaches students the skills necessary to be an effective immigration advocate and attorney.

**Center for Immigrants' Rights: Course Component (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

## Ihc - Refugee Law (IHREF)

**IHREF 995A** In-House Clinic - Refugee Law Clinic (3) Representation of foreign nationals seeking political asylum or related forms of relief in US Courts.

### **In-House Clinic - Refugee Law Clinic (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Ihc-Art,Sprt,Ent Law (IHASE)

**IHASE 995A** In-House Clinic--Art, Sports, and Entertainment Law (1-2 per semester/maximum of 4) This clinic is designed to acquaint students with the unique yet pragmatic knowledge and skills incident to rendering quality legal service in the art, sports, and entertainment professions.

### **In-House Clinic--Art, Sports, and Entertainment Law (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Ihc-Children'S Advoc (IHCAD)

**IHCAD 995A** In-House Clinic-Children's Advocacy (4 per semester/maximum of 8) The course will provide instruction to students in the legal representation of children in various civil matters, including dependency, adoption and custody actions. Students will be managing a caseload of clients. Students will meet directly with their clients, and correspond with agencies and opposing counsel. Students will appear at all court appearances with a supervising attorney. The supervising attorney will meet with students individually on a regular basis for case reviews. The classroom component of the course will focus on various substantive and skills issues, including lectures on child interviewing skills and lectures from physicians on the medical aspects of child abuse. etc.

### **In-House Clinic-Children's Advocacy (4 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Ihc-Disability Law (IHDIS)

**IHDIS 995A** In-House Clinic--Disability Law (4 per semester/maximum of 8) Up to four students per semester represent indigent persons with disabilities who have legal concerns related to those disabilities. The bulk of the work consists of administrative hearings before the Social Security Administration and judicial review in federal court. Matters handled include Social Security and Supplemental Security Income, special education, disability discrimination, and Medicare and Medicaid claims. Students are obligated to work 12 hours per week in the Clinic, and there are weekly meetings with the supervisor, either individually or as a group. This course is graded.

### **In-House Clinic--Disability Law (4 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Ihc-Family Law (IHFAM)

**IHFAM 995A** In-House Clinic--Family Law (4 per semester/maximum of 8) In this clinic, up to twelve students per semester represent indigent clients, primarily before the Court of Common Pleas of Cumberland County, in domestic matters. Cases include divorce, child support, spousal support, custody and visitation, dependency (neglect), domestic violence, and related matters. Students are required to work 16 hours a week at the Clinic, and there are weekly clinic meetings, either as a group or individually with supervisors.

### In-House Clinic--Family Law (4 per semester/maximum of 8)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IHFAM 995B** Family Law Clinic (5 per semester/maximum of 10) In this clinic, up to seven students per semester represent indigent clients and domestic abuse victims in family law cases. All cases are in the Court of Common Pleas of Centre County. The work includes divorce, child support, spousal support, custody/visitation, domestic violence, and related matters. Students should expect to work as much time as is necessary to represent their clients successfully, which will be an average of twenty hours per week. Students also participate in a weekly clinic seminar which includes skills training, theoretical examination of clinical work, and case rounds. Each student also meets individually with the clinic supervisor to discuss their case work and their progress in the clinic. Only third-year law students are admitted in the Fall Semester. Students earn 5 graded credits.

### Family Law Clinic (5 per semester/maximum of 10)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Immun&Infest Disease (I I D)

**I I D 600** Thesis Research (1-9 per semester/maximum of 36) Laboratory work on thesis project.

### Thesis Research (1-9 per semester/maximum of 36)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## In Hse Rur Econ Dev (IHRED)

**IHRED 995** Rural Economic Development Clinic (4 per semester/maximum of 8) The Rural Economic Development Clinic will provide students with practical legal experience representing individuals and entities in Pennsylvania's rural communities, primarily within the broad fields of agricultural, food, and energy law. Students will work with agricultural producers, businesses, landowners, and nonprofit organizations on specific projects that will involve transactional work such as preparing/reviewing contracts, addressing basic business entity issues, and providing general legal counsel.

### Rural Economic Development Clinic (4 per semester/maximum of 8)

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **In-House Clinic (IHCLN)**

**IHCLN 997** Special Topics (1-8) Faculty approval required.

### **Special Topics (1-8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **In-House Inmate (IHINM)**

**IHINM 995B** In-House Clinic - Inmate Assistance (2) The clinic provides legal advice to inmates in state and county prisons relating to civil and criminal matters.

### **In-House Clinic - Inmate Assistance (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **In-Hse Comm Lw Clinc (IHCLC)**

**IHCLC 995** Community Law Clinic (4 per semester/maximum of 8) A general civil litigation clinic, which includes various forms of medication, negotiation, etc., in addition to civil hearings and traditional courtroom litigation. Due to the litigation component of this clinic, it will serve only students residing in Carlisle. Areas of law which students will be exposed to include: divorce, custody, support, protection from abuse, adoption, social security and supplemental security income claims, guardianships, special education, American with Disabilities Act claims, civil rights actions, and health care directives. Cases will be selected based on educational value to students and expertise of the clinical faculty.

### **Community Law Clinic (4 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Indig Crim Just Clin (IHICJ)**

**IHICJ 995** Indigent Criminal Justice Clinic (5 per semester/maximum of 10) The Indigent Criminal Justice Clinic provides students with the opportunity to represent indigent criminal defendants accused of misdemeanor offenses in the Centre Court of Common Pleas under the supervision of an attorney from the Centre County Public Defender Office. Students learn litigation, negotiation and advocacy skills as they represent defendants through all stages of a criminal case.

### **Indigent Criminal Justice Clinic (5 per semester/maximum of 10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Industrial Engineering (I E)

**I E 402** Advanced Engineering Economy (3) Concepts and techniques of analyses useful in evaluating engineering projects under deterministic and uncertain conditions.

### Advanced Engineering Economy (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 405** Deterministic Models in Operations Research (3) Deterministic models in operation research including linear programming, flows in networks, project management, transportation and assignment models and integer programming.

### I E 405 Deterministic Models in Operations Research (3)

This course will be an introduction to deterministic modeling. In particular, the student will learn to formulate linear programs, network models, and integer programs. The student will also learn solution strategies such as the simplex method and branch and bound. Duality and sensitivity analysis will be covered along with their economic interpretation. Optimization software will be used for solving the formulations. Practical examples along with a detailed case study will be presented to help the student to synthesize the topic. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 405** Deterministic Models in Operations Research (3) Deterministic models in operation research including linear programming, flows in networks, project management, transportation and assignment models and integer programming.

### I E 405 Deterministic Models in Operations Research (3)

This course will be an introduction to deterministic modeling. In particular, the student will learn to formulate linear programs, network models, and integer programs. The student will also learn solution strategies such as the simplex method and branch and bound. Duality and sensitivity analysis will be covered along with their economic interpretation. Optimization software will be used for solving the formulations. Practical examples along with a detailed case study will be presented to help the student to synthesize the topic. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 408** Cognitive Work Design (3) Design and evaluation of cognitive work, including the human/computer interface, visual displays, software design, and automated system monitoring, with emphasis on human performance.

### I E 408 Cognitive Work Design (3)

*Cognitive Work Design* is a senior level course offered in the Department of Industrial and Manufacturing Engineering. It is one of two courses which follow I E 327, Introduction to Work Design. This course focuses on the cognitive part of human factors and work design. It will be offered in fall and spring semesters. This course will enable students to design, implement, and evaluate human-computer interfaces according to principles outlined in foundational human-computer interaction readings. Students will be engaged in the active learning of design, programming, and usability concepts by

way of building interfaces on the personal computer.

Students taking this course should be familiar with computer programming and introduction to work design.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 418 Human/Computer Interface Design (3)** Design and evaluation of the human/computer interface, including human performance, visual displays, software design, and automated system monitoring.

### **I E 418 Human/Computer Interface Design (3)**

The objective of this course is to enable students to design, implement, and evaluate human-computer interfaces according to principles outlined in foundational human-computer interaction readings. Students will be engaged in the active learning of design, programming, and usability concepts by way of building interfaces on the personal computer as well as on the Palm computing platform. A major component of the course is the capstone design project for which student teams will communicate with users to design, implement, and assess interfaces to improve existing work processes in an actual work domain (e.g., safety office, power plant).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 418 Human/Computer Interface Design (3)** Design and evaluation of the human/computer interface, including human performance, visual displays, software design, and automated system monitoring.

### **I E 418 Human/Computer Interface Design (3)**

The objective of this course is to enable students to design, implement, and evaluate human-computer interfaces according to principles outlined in foundational human-computer interaction readings. Students will be engaged in the active learning of design, programming, and usability concepts by way of building interfaces on the personal computer as well as on the Palm computing platform. A major component of the course is the capstone design project for which student teams will communicate with users to design, implement, and assess interfaces to improve existing work processes in an actual work domain (e.g., safety office, power plant).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 419 Work Design - Productivity and Safety (3)** Methods improvement, physical work design, productivity, work measurement; principles and practice of safety.

### **I E 419 Work Design - Productivity and Safety (3)**

*Work Design - Productivity and Safety* is a senior level course offered in the Department of Industrial and Manufacturing Engineering. It is one of two courses which follow I E 327, Introduction to Work Design. This course focuses on the methods improvement physical work design, productivity, work measurement; principles and practice of safety. It will be offered in fall and spring semesters. This course will enable students to perform work measurement: develop an MTM analysis, and carry out a work sampling study.

Students taking this course are expected to understand basic concepts of work design.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 424 Process Quality Engineering (3)** Statistical methods for engineering process characterization and improvement. For non-Industrial Engineering majors.

**Process Quality Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 424 Process Quality Engineering (3)** Statistical methods for engineering process characterization and improvement. For non-Industrial Engineering majors.

**Process Quality Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 425 Stochastic Models in Operations Research (3)** Stochastic models in operations research with real world applications including dynamic programming, Markov chains, queueing models and inventory models.

**I E 425 Stochastic Models in Operations Research (3)**

This course will be an introduction to the modeling of stochastic systems. The student will learn about Poisson processes, Markov Chains, Dynamic Programming, and Queueing systems; both model formulations and solutions strategies. The students will learn several applications of these models in manufacturing and service systems, so that they can synthesize the lecture material. The student will study the topic of inventory theory, including fundamental tradeoffs, EOQ modeling, and stochastic models. Grading will be based on exams and homework. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: I E 405

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 425 Stochastic Models in Operations Research (3)** Stochastic models in operations research with real world applications including dynamic programming, Markov chains, queueing models and inventory models.

**I E 425 Stochastic Models in Operations Research (3)**

This course will be an introduction to the modeling of stochastic systems. The student will learn about Poisson processes, Markov Chains, Dynamic Programming, and Queueing systems; both model formulations and solutions strategies. The students will learn several applications of these models in manufacturing and service systems, so that they can synthesize the lecture material. The student will study the topic of inventory theory, including fundamental tradeoffs, EOQ modeling, and stochastic models. Grading will be based on exams and homework. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: I E 405

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 428 Metal Casting (3)** Application of engineering principles to the design of castings; casting of ferrous and nonferrous alloys; laboratory and simulation projects.

### **Metal Casting (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 433 Regression Analysis and Design of Experiments (3)** Theory and Application of Regression Analysis and Design of Experiments to build models and optimize process and product parameters.

### **I E 433 Regression Analysis and Design of Experiments (3)**

*Regression Analysis and Design of Experiments* is an elective course for the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It will be offered in the spring semester. It exposes students to the two important statistical tools which are regression analysis and design of experiments. The specific topics include simple and multiple regression analysis, 2k full and fractional designs and analysis and Taguchi's orthogona arrays.

Students taking this course should be familiar with the following topics taught in the second course in probability and statistics offered in the department.

Properties of point estimators, sampling distributions, testing of hypotheses, and introduction to linear regression and design of experiments.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 434 Statistical Quality Control (3)** Statistical techniques for univariate and multivariate monitoring of independent and autocorrelated processes; foundations of quality control and improvement.

### **I E 434 Statistical Quality Control (3)**

This course is about the use of modern statistical methods for process and product improvement. The goal is to impart a sound understanding of the principles and basis for applying them in a variety of practical situations in manufacturing and service fields. The course will give an overview of the basic statistical methods and then concentrate on some of the more useful recent developments including univariate and multivariate techniques to monitor autocorrelated data, analyzing process capability, and improving process quality in short-run environments. The course objectives are to: (1) understand the assumptions and theoretical foundations of process monitoring; (2) know how to select, set up, and use monitoring charts effectively depending on the system characteristics; and (3) understand the basic business and economic principles of process monitoring.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 436 Six Sigma Methodology (3)** Techniques for structured problem-solving to improve the quality and cost of products and processes.

### **I E 436 Six Sigma Methodology (3)**

Six Sigma is a structured, quantitative approach to improving the quality and cost of products and processes. It provides a framework for quality improvement that builds upon statistical tools to achieve business results. Although statistical techniques are emphasized throughout, the course has a strong engineering and management orientation that will prepare students for synthesizing the material that comprises the Six Sigma body of knowledge. Important aspects of the

Six Sigma approach include a strong focus on the customer, proactive management, fact-based decision-making, and interdisciplinary collaborations. The course objectives are: (1) to give students a fundamental understanding of and experience with solving a problem using the structured problem-solving approach of Define-Measure-Analyze-Improve-Control (DMAIC); (2) to provide an opportunity for students to solve or be involved with solving business problems with statistical tools; and (3) to help students build confidence in their business sense and statistical skills.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 453 Simulation Modeling for Decision Support (3)** Introduction of concepts of simulation modeling and analysis, with application to manufacturing and production systems.

### **I E 453 Simulation Modeling for Decision Support (3)**

*Simulation Modeling for Decision Support* is a senior level course offered in the Department of Industrial and Manufacturing Engineering. It is the third course in operations research offered to the undergraduate students. The objective of this course is for students to learn to appropriately apply discrete event simulation modeling for decision support in IE problems through developing skills in model building, simulation output analysis, and communication of technical information and conclusions drawn from data analysis.

Students taking this course should be familiar with computer programming and operations research techniques.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 454 Applied Decision Analysis (3)** Theory and practice of decision analysis applied to engineering problems.

### **Applied Decision Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 456 (M E 456) Industrial Robot Applications (3)** Introduction to robotics, with emphasis on robot selection, programming, and economic justification for manufacturing applications.

### **I E (M E) 456 Industrial Robot Applications (3)**

This course is a technical elective, and is normally taken by students in their Senior years. In this course, students learn about present and future status of robot applications, and are required to apply fundamental knowledge of physics and mathematics to develop software to analyze and control robots.

The course deals with mechanics and control of robot manipulators and wheeled mobile robots. First, students are taught to analyze 3-D kinematics, statics and dynamics of robot manipulators. Then, control algorithms for robot manipulators are presented. Sensors, actuators and softwares used in industrial robots are discussed. In the end, kinematics and control of wheeled mobile robots are presented. During this course, application of computer, particularly Matlab, is emphasized as much as possible.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 460 Service Systems Engineering (3)** Use of quantitative models and methods for analysis, design and control of service systems.

**I E 460 Service Systems Engineering (3)**

This course focuses on using operations research methods such as mathematical programming, network analysis and applied probability to solve problems that arise in service systems. The lecture topics will include measuring service quality, methods for evaluating service systems, financial engineering & portfolio optimization, supply chain design & operations, manpower planning & scheduling, and revenue management. Several case studies will be used to illustrate applications. Course grades are based on homework, case studies, mini-project, midterm and final exams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 462 Introduction to Expert Systems (3)** Building expert systems in general; emphasis on knowledge representation and inference mechanisms in the manufacturing domain.

**Introduction to Expert Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 463 Computer Aided Design and Manufacturing (3)** Three dimensional modeling and manufacture of parts and assemblies using Computer Aided Design and manufacturing software, and numerically controlled machines.

**I E 463 Computer Aided Design and Manufacturing (3)**

The objective of this course is to teach the students the fundamentals underlying computer aided design(CAD) and computer aided manufacturing (CAM). The students will learn the drawing elements for CAD, including the coordinate systems, the fundamentals of 3 D modeling techniques and basics such as wireframe models, surface and solid models and parametric modeling. The course will include application of CAM techniques to CNC machines, which consists of programming basics, machine setup and tooling systems. The data issues such as representation formats, data exchange and translation for integration of CAD/CAM will also be addressed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 463 Computer Aided Design and Manufacturing (3)** Three dimensional modeling and manufacture of parts and assemblies using Computer Aided Design and manufacturing software, and numerically controlled machines.

**I E 463 Computer Aided Design and Manufacturing (3)**

The objective of this course is to teach the students the fundamentals underlying computer aided design(CAD) and computer aided manufacturing (CAM). The students will learn the drawing elements for CAD, including the coordinate systems, the fundamentals of 3 D modeling techniques and basics such as wireframe models, surface and solid models and parametric modeling. The course will include application of CAM techniques to CNC machines, which consists of programming basics, machine setup and tooling systems. The data issues such as representation formats, data exchange and translation for integration of CAD/CAM will also be addressed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 464** Assembly of Printed Circuit Boards (3) Manufacturing processes and principles for assembly of printed circuit boards with surface mount and through-hole technology.

**Assembly of Printed Circuit Boards (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 466** Concurrent Engineering (3) Concurrent engineering methods for product/process development, capturing customer requirements, insuring manufacturability and serviceability.

**Concurrent Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 467** Facility Layout and Material Handling (3) Analytical, simulation and computer-aided graphical methods to generate effective layout designs; design and integration of material handling systems and equipment. For Industrial Engineering majors.

**I E 467 Facility Layout and Material Handling (3)**

Students taking this course will learn concepts and methods used to design an effective facility layout and material handling system. Topics include determination of requirements for people, equipment, and space; generation of alternative layouts based on analysis of material flow or qualitative activity relationships; development of concepts for material transport and storage, and evaluation of alternatives using models. Grading is based on homework and exams. Prerequisites for the course are I E 302 which covers methods for analyzing the economic feasibility of technical alternatives, and I E 327 which covers job analysis and physical considerations in design of work. The course is an elective for Industrial Engineering students in the manufacturing systems engineering and engineering service systems specialization tracks.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 468** Optimization Modeling and Methods (3) Mathematical modeling of linear, integer, and nonlinear programming problems and computational methods for solving these classes of problems.

**I E 468 Optimization Modeling and Methods (3)**

This course provides an analytic treatment of optimization models in linear, integer, and nonlinear programming. In particular, the course is concerned with the development of mathematical optimization models and computational solution techniques for solving these problems. The mathematical modeling of real-world applications is complemented with the use of modeling software such as LINGO or GAMS (General Algebraic Modeling System), which allows the user to readily develop large-scale mathematical models. The course also considers solution techniques for solving these optimization problems. Students will develop a basic understanding of the solution techniques through actual implementation of simple algorithms, as well as the use of commercial software such as those provided by LINDO, LINGO, and GAMS.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 469** Global Industrial Engineering Experience (1) Students will learn how to prepare for a short term, professional exchange in a foreign nation. Students will then travel to a designated university within a foreign nation for the purpose of a five day cultural and professional exchange.

**I E 469 Global Industrial Engineering Experience (1)**

This course will teach industrial engineering students how to prepare for a short term, professional exchange in a foreign nation and how Industrial & Manufacturing Engineering education and practice is carried out in a foreign nation. Students will be required to research and report on one or more industries in a designated foreign nation. Their report will focus on the products and/or services produced by these industries, the processes employed, known use of industrial and manufacturing engineers and/or practice, and their domestic and global standing.

Students will travel to a designated university within that nation for the purpose of a one week cultural exchange. The designated university will have an Industrial Engineering, Production Engineering, and/or Manufacturing Engineering program. Information about the international destination and the dates of travel will be provided on the course syllabus each semester.

During this period, students will:

1. tour the department and engineering laboratories to learn about the education and research facilities at their host university
2. attend engineering classes within the host university to learn about the engineering topic matter as well as how foreign engineering classes are conducted
3. give and receive engineering presentations with their host university students
4. tour the local community to learn about their culture
5. tour local manufacturing industries and interact with local Industrial/Manufacturing engineers to learn about the companies as well as how industrial & manufacturing engineering is specifically practiced

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 470 Manufacturing System Design and Analysis (3)** Contemporary design and analysis methodologies used to organize systems for economic manufacture of products.

**I E 470 Manufacturing System Design and Analysis (3)**

*Manufacturing System Design and Analysis* is a senior level course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. Students will be exposed to the contemporary techniques used to design and analyze manufacturing systems for economic manufacture of products. Students will learn to design manufacturing systems (human and automated) to satisfy differing types of product demand.

Students taking this course should be familiar with introduction to manufacturing and product specifications and introduction to manufacturing process design and analysis.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 470 Manufacturing System Design and Analysis (3)** Contemporary design and analysis methodologies used to organize systems for economic manufacture of products.

**I E 470 Manufacturing System Design and Analysis (3)**

*Manufacturing System Design and Analysis* is a senior level course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. Students will be exposed to the contemporary techniques used to design and analyze manufacturing systems for economic manufacture of products. Students will learn to design manufacturing systems (human and automated) to satisfy differing types of product demand.

Students taking this course should be familiar with introduction to manufacturing and product specifications and introduction to manufacturing process design and analysis.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**I E 477 Computer Control of Manufacturing Machines and Processes (3)** Elements of computer control and discrete-time modeling. Design and analysis of digital controls for manufacturing machines and processes.

**I E 477 Computer Control of Manufacturing Machines and Processes (3)**

Objective of this course is to gain physical insight and hands-on experience with modern control engineering. Lectures and laboratory topics will include modeling and simulation of digital control systems, control computers, interfacing, analog-to-digital converters, digital-to-analog converters, programmable logic controllers, sensors and actuators. Lectures will be devoted to case studies in instrumentation for computer control of manufacturing machines and processes. Course includes a significant group project in which students will design and construct a computer controlled machine or process. This course is a senior undergraduate level technical elective course in the manufacturing system engineering track in the Industrial & Manufacturing Engineering Department. This course is also allowed for graduate credit in the Industrial & Manufacturing Engineering Department.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 478 Retail Services Engineering (3)** Introduction to retail services operations, process models, and application of information technologies to enhance productivity and profitability.

**I E 478 Retail Services Engineering (3)**

Objective of this course is to understand modern retail industry with focus on their operations and information technologies that are used in such systems. The course starts with an overview of the basics of types of retailing, their channels, and economics of their operations. Much of the emphasis in the course is on processes and information technologies used in retail industry such as point of sale systems, barcode, RFID/EPC, global data synchronization, EDI, XML, data warehouse, analytics for decision support and supply chain management. Several case studies will be used to draw out the application of tools and techniques covered in the course. Course includes a group project focused on retail industry. Specific topics will include:

- Global retail industry
- Multi-channel retailing
- Performance and metrics
- Pricing
- Layout and workforce
- Information Systems and SCM
- Barcode and RFID
- Data warehouse and analytics
- Case studies

This course is a senior undergraduate level technical elective course in the IT and Service Engineering track in the Industrial & Manufacturing Engineering Department.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 479 (EDSGN 479) Human Centered Product Design and Innovation (3)** Consumer product design for a global market, incorporating human factors principles and user desires in a multicultural perspective.

**I E (EDSGN) 479 Human Centered Product Design and Innovation (3)**

This course will focus on consumer product design for a global market, incorporating human factors and ergonomics principles as well as user needs and emotional desires. The students will be led through product design process, various product design strategies, product planning, managing the development process, product evaluation, decision making tools, and market entry. Special emphasis will be placed on user centered design, incorporating user characteristics, user needs and emotional desires (including Kansei engineering approaches), survey methodology, and usability testing. To emphasize the multicultural perspectives in today's global product design, interdisciplinary teams from two universities on opposites of the globe will apply these principles on actual industrial product designs for leading consumer product manufacturers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 480W** Capstone Design Project (3) Industry-based senior capstone design project emphasizing manufacturing systems, service systems, and information systems in an interdisciplinary setting.

### **I E 480W Capstone Design Project (3)**

Students will develop "real world" engineering project experience through an industry-based project. Projects will focus on manufacturing systems, service systems, and/or information systems. Students will work in teams to complete the projects, where the teams will be interdisciplinary and composed of students from within the major with different areas of expertise and students from other majors as needed. Students interested in taking this course should have senior standing and be familiar with basic principles in manufacturing, operations research, and human factors engineering. Students will be evaluated through in-class participation, and a group project that consists of weekly communication with the project sponsor along with three design reviews, interim written reports and a final report, presentation and poster.

This is a Writing-Intensive course in the department and hence students will be given opportunities to practice writing throughout the semester in multiple writing assignments.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 494H** Senior Honors Thesis (1-9) Students must have approval of a thesis adviser before scheduling this course.

### **Senior Honors Thesis (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 497D** Micro/Nano Fabrication (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Micro/Nano Fabrication (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 499** (IL) Foreign Studies--Industrial Engineering (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies--Industrial Engineering (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 505** Linear Programming (3) An accelerated treatment of the main theorems of linear programming and duality structures plus introduction to numerical and computational aspects of solving large-scale problems.

### **Linear Programming (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 507** Operations Research: Scheduling Models (3) Scheduling models with simultaneous job arrival and probabilistic job arrival, network scheduling, and scheduling simulation techniques.

### **Operations Research: Scheduling Models (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 509** Operations Research: Waiting Line Models (3) Waiting line models including models with infinite queues, finite queues, single and multiple servers under various priorities and disciplines.

### **Operations Research: Waiting Line Models (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1994

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 510** Integer Programming (3) Study of advanced topics in mathematical programming; emphasis on large-scale systems involving integer variables.

### **Integer Programming (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1994

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 511** Experimental Design in Engineering (3) Statistical design and analysis of experiments in engineering; experimental models and experimental designs using the analysis of variance.

### **Experimental Design in Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Fall 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 512** Graph Theory and Networks in Management (3) Graph and network theory; application to problems of flows in networks, transportation and assignment problems, pert/CPM, facilities planning.

### **Graph Theory and Networks in Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 516** (SC&IS 516) Applied Stochastic Processes (3) Study of stochastic processes and their applications to engineering and supply chain and information systems.

### **I E (SC&IS) 516 Applied Stochastic Processes (3)**

This course covers the mathematical fundamentals and tools for analyzing stochastic systems evolving over time, including concepts and techniques related to Poisson Processes, renewal processes, and discrete and continuous time Markov chains. Students will also learn to build probabilistic intuition and insights when thinking about random processes. Additionally, students will learn to apply the essential techniques of stochastic processes to real world problems in the supply chain and information systems area.

This is a prescribed research foundation course for Ph.D. students in SC&IS. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Spring semester to approximately 5-10 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 518** Materials, Forming Processes, and Quality (3) Study of the principles and mechanisms of conventional and developing manufacturing processes and the methods of determining work piece quality and properties.

### **Materials, Forming Processes, and Quality (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 519** (SC&IS 519) Dynamic Programming (3) Theory and application of dynamic programming; Markov decision processes with emphasis on applications in engineering systems, supply chain and information systems.

### **I E (SC&IS) 519 Dynamic Programming (3)**

This course presents the basic theory and applications of dynamic programming. The focus of the course will be on the theory of Markov decision processes (MDP), which provides an analytical tool to optimally control the behavior of a Markov Chain. The students will learn fundamental MDP models, computational methods and applications in supply chain and information systems, including production and inventory control, quality control, logistics, scheduling, queueing network, and economic problems.

Student evaluations are based on class participation, individual and group assignments, and projects. This course will be offered during Spring semester for approximately 5-10 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 520 Multiple Criteria Optimization (3)** Study of concepts and methods in analysis of systems involving multiple objectives with applications to engineering, economic, and environmental systems.

### **Multiple Criteria Optimization (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 521 Nonlinear Programming (3)** Fundamental theory of optimization including classical optimization, convex analysis, optimality conditions and duality, algorithmic solution strategies, variational methods in optimization.

### **Nonlinear Programming (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 522 Discrete Event Systems Simulation (3)** Fundamentals of discrete event simulation, including event scheduling, time advance mechanisms, random variate generation, and output analysis.

### **Discrete Event Systems Simulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 528 Metal Cutting Theory (3)** Study of the theory of metal cutting, contemporary and future problems of metal removal processes; critical analysis of current literature.

### **Metal Cutting Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 530 Financial Engineering (3)** Financial option pricing and portfolio design relevant to investment decision making.

### **I E 530 Financial Engineering (3)**

The objective of this course is to provide students with the basic terminology, concepts, and issues relevant to financial engineering. It serves as an introduction to the investment, financial instruments, and valuation of projects via portfolio theory and option pricing and is primarily for students who have had exposure to multi-variable calculus and probability theory. Students will learn the core concepts and advanced techniques for decision making of capital investment and for managing and valuing risky projects. This course also aims to enable students to effectively use tools in finance and mathematics in order to conduct rigorous research on topics involving the analysis of managing and valuing flexibility and uncertainty. A requisite course in applied stochastic processes will provide the necessary background on probability models needed for this course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 532** Reliability Engineering (3) Mathematical definition of concepts in reliability engineering; methods of system reliability calculation; reliability modeling, estimation, and acceptance testing procedures.

**Reliability Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 540** Manufacturing Systems Simulation (3) Use of simulation in design and process improvement of manufacturing systems. Analysis of simulation language structure. Readings in current literature.

**Manufacturing Systems Simulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 546** (M E 546) Designing Product Families (3) Product families, product platforms, mass customization, product variety, modularity, commonality, robust design, product architectures.

**I E (M E) 546 Designing Products Families (3)**

Designing Product Families is a graduate-level course generally offered in the spring. It is designed for students interested in product realization, engineering design, and manufacturing to gain an understanding of mass customization and methods for designing families of products based on modular and scalable product platforms. The transition from craft production to mass production to mass customization will be covered in this course along with methods and tools for designing robust, modular, and scalable product platforms. Platform leveraging strategies and commonality metrics will be investigated through product dissection activities, which will also be integrated with lectures on evaluating manufacturing and assembly. Several industry case studies will also be discussed in the course to examine the implications of producing a variety of products and strategies for effective mass customization and product postponement.

Students interested in taking this course should be familiar with product design and manufacturing.

Students are evaluated through individual and group homework assignments, in-class participation and activities, and a group project report and presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 547** (EDSGN 547, M E 547) Designing for Human Variability (3) Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.

**Designing for Human Variability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 549** (EDSGN 549) Design Decision Making (3) Complexity of design decision-making; state-of-the-art methods and tools.

**I E (EDSGN) 549 Design Decision Making (3)**

Students in this course will internalize the importance of information and decision-making in design; understand the complexities due to uncertain information, multi-person decision making, technology obsolescence, competitive priorities; become familiar with state-of-the-art methods and tools for design decision-making; and, demonstrate the application of this knowledge in the context of a collaborative design project. Learning in this course will be facilitated in

an "apply what you have learned" fashion with ample opportunities for students to demonstrate their learning through in-class participation, discussion of solved problems, hands-on design projects. Strategies, methods, and means of the design process will be discussed and practiced to include such things as understanding client needs, generating design concepts, and evaluating design ideas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 550 Manufacturing Systems (3)** Fundamental theory for analyzing manufacturing systems including structural analysis, optimization and economics of manufacturing systems, automated and computer-aided manufacturing.

### **Manufacturing Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 551 Computer Control of Manufacturing Systems (3)** Analysis of microprocessor-controlled servo loops, adaptive control, stochastic methods in control; analysis of NC machines, robots, and their controllers.

### **Computer Control of Manufacturing Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 552 (BIOE 552) Mechanics of the Musculoskeletal System (3)** Structure and biomechanics of bone, cartilage, and skeletal muscle; dynamics and control of musculoskeletal system models.

### **I E (BIOE) 552 Mechanics of the Musculoskeletal System (3)**

The course focuses on the upper limbs and its musculoskeletal components, including mechanical properties and models; work-related musculoskeletal injuries, techniques, models, and instruments to measure and quantify the risks for developing such injuries. Specific topics covered in the first third of the course include an introduction to basic biomechanical principles, the anatomical structure of the musculoskeletal system including soft tissue, neuromuscular physiology, and motor control including muscle receptors. The second third covers various muscle models starting from basic mass/spring/dashpot viscoelastic models as in Hill's 3-element model and continuing on to Hatze's multi-element model, frequency analysis, control theory approaches. More complex models include static and dynamic aspects of tendon-pulley models and multiple muscle-tendon systems. The final third covers basic epidemiology as applied to musculoskeletal disorders and risk factors including instrumentation to measure them and various analysis tools (e.g., the PSU CTD Risk Index) to assess the not only the overall risk for injury but the reliability and validity of such assessments. Time permitting applications to hand tools and office environment with computer work stations are examined. Two exams and a modeling project are given. The course is typically offered Spring Semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 553 (BIOE 553) Engineering of Human Work (3)** Physics and physiology of humans at work; models of muscle strength, dynamic movements; neural control; physical work capacity; rest allocation.

### **Engineering of Human Work (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 554** Production, Planning, and Control (3) Analysis of research literature for topics including scheduling, capacity planning, and lot sizing applied to manufacturing and production.

**Production, Planning, and Control (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 555** Statistical Process Monitoring and Analysis (3) Statistical techniques for univariate and multivariate monitoring of dependent and autocorrelated processes; theoretical and numerical approaches for analyzing performance.

**I E 555 Statistical Process Monitoring and Analysis (3)**

This is an advanced course in Statistical Process Control (SPC) techniques for process monitoring, one of the main areas of Quality Engineering (QE) methodology. The aim of QE methods is to improve the quality of products used by our society. The widespread and successful use of basic SPC methods have led to the development of many new techniques and procedures over the past 20 years that contribute to that high purpose.

Students should have a background in basic statistical concepts including sampling and sampling distributions, hypothesis testing, confidence intervals, and analysis of variance (ANOVA). This course will give an overview of the traditional SPC methods and time series modeling background, then concentrate on some of the more useful recent developments including univariate and multivariate techniques to monitor autocorrelated data, detect special causes or out-of-control conditions, and identify process changepoint models. A number of practical applications in manufacturing and service fields including polymer processing, nanotechnology, health care, and global sustainability will be considered.

The course objectives are to: (1) understand the basic business and economic principles of process monitoring; (2) know how to select, set up, and use monitoring charts effectively depending on the system characteristics; (3) understand the assumptions and theoretical foundations of process monitoring; and (4) understand and execute methods for comparing different monitoring strategies based on run length distributions. More broadly, students will also know how to research and critique the relevant literature and understand the needs for future research in the area.

Students will be evaluated based on their performance on homework (25%), a mid-semester examination (25%), presentations (25%), a final course project (25%).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 556** (M E 556) Robotic Concepts (3) Analysis of robotic systems; end effectors, vision systems, sensors, stability and control, off-line programming, simulation of robotic systems.

**Robotic Concepts (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 557** Human-in-the-Loop Simulation (3) Design and programming of simulations that facilitate human control, real-time discrete-event simulation, supervisory control of dynamic system.

**I E 557 Human-in-the-Loop Simulation (3)**

This course is designed to provide graduate students with the capability to develop an interactive, real-life simulation and to create interfaces for an interactive simulation. The course will cover key phases in the life cycle of interactive systems development including design, implementation, and evaluation. Course topics will be explored through application in supervisory control of complex, dynamic systems. Java will be the programming language used for software development in this course.



Students will understand the fundamental concepts in interactive simulation; learn how to implement random variant generation and event handling in a simulation; understand the uses of human-in-the-loop simulation to investigate human performance within the simulated system; and demonstrate the application of knowledge gained in the course in a project.

Human-in-the-Loop Simulation is designed for students interested in human interaction with simulations of dynamic, supervisory control systems. The design and implementation of real-time interactive simulations will be covered. The construction of simulations from basic object-oriented programming concepts will be discussed. The role of the human within a dynamic, supervisory control system and methods of evaluating human performance within the simulated system will be examined.

Students will be evaluated via laboratory assignments, two mid-semester examinations, and a semester project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 558** Engineering of Cognitive Work (3) Information processing and decision making models of the human in the modern workplace, emphasizing visual inspection and other industrial applications.

### **Engineering of Cognitive Work (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 559** Law and Technology: Products Liability (3) A seminar course on one area of law and technology, products liability.

### **Law and Technology: Products Liability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 562** Expert Systems Design in Industrial Engineering (3) Methodological aspects of expert systems design and review of some existing systems with emphasis on manufacturing and industrial engineering.

### **Expert Systems Design in Industrial Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 563** Computer-Aided Design for Manufacturing (3) Study of CAD systems and concepts including 3D wireframe and solid modeling systems, emphasizing manufacturing applications.

### **Computer-Aided Design for Manufacturing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 566** Quality Control (3) Advanced quality assurance and control topics, including multivariate methods, economic design for control and acceptance, dimensioning, tolerancing, and error analysis.

### **Quality Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 567 Distributed Systems and Control (3)** Advances in distributed control and decision-making in enterprises and supply chains with emphasis on computing, algorithms, and dynamics.

**I E 567 Distributed Systems and Control (3)**

Recently several new open architecture standards have emerged for control and information systems in industrial enterprises. These standards have been largely driven by industry to reduce the cost of integrating and configuring manufacturing systems, allowing a new breed of distributed enterprises to be engineered. This course deals with the multidisciplinary aspects of controls, computing, and communication in this rapidly evolving area. The objective of this course is to study current research and engineering challenges in distributed systems and control in the context of manufacturing and service enterprises, and supply chains. Emphasis will be placed on understanding the dynamics and computational aspects of decision making and control algorithms in integrated enterprises. Assignments and projects in this course will include designing, programming, and integrating distributed control systems.

Evaluation will be based on programming and lab assignments, literature review and class presentation, a semester project, and class participation.

This course will be offered every third semester with a maximum enrollment of 18.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 570 (SC&IS 570) Supply Chain Engineering (3)** Use of operations research models and methods for solving problems in supply chain systems.

**I E (SC&IS) 570 Supply Chain Engineering (3)**

The course provides state-of-the-art mathematical models, concepts and solution methods important in the design, control, operation and management of global supply chains. It provides an understanding of how companies plan, source, make and deliver their products to create/or maintain a global competitive advantage. It emphasizes the application of operations research models and methods to optimize the various components of an integrated supply chain. The course is appropriate for graduate students interested in working in the supply chain area in industry as well as those planning to pursue research in supply chain optimization.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 570 (SC&IS 570) Supply Chain Engineering (3)** Use of operations research models and methods for solving problems in supply chain systems.

**I E (SC&IS) 570 Supply Chain Engineering (3)**

The course provides state-of-the-art mathematical models, concepts and solution methods important in the design, control, operation and management of global supply chains. It provides an understanding of how companies plan, source, make and deliver their products to create/or maintain a global competitive advantage. It emphasizes the application of operations research models and methods to optimize the various components of an integrated supply chain. The course is appropriate for graduate students interested in working in the supply chain area in industry as well as those planning to pursue research in supply chain optimization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 582** Information Technology for Industrial and Manufacturing Engineering (3) Students will learn advanced information technology concepts, tools, and techniques for designing and implementing manufacturing systems.

**I E 582 Information Technology for Industrial and Manufacturing Engineering (3)**

This course provides an in-depth understanding of the state-of-the-art IT concepts and techniques which can be used in manufacturing and Service organizations. Students will acquire a thorough understanding of IT implementation aspects as related to both these sectors. The three major course objects are: (1) to give students an in-depth understanding of fundamental IT/Computing concepts as related to manufacturing and service functions, (2) to provide students with a thorough understanding of the implementations aspects of IT concepts as related to manufacturing and service functions, and (3) to foster students collaborative learning and real life implementation experiences through an industry based project.

All the course modules will be introduced through cases. This course will consist of five to six programming homework assignments, two examinations and one industry based project. Java will be used as the implementative vehicle for all homework assignments. The industry based project will be implemented as per the needs of the industry working with the students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 583** Response Surface Methodology and Process Optimization (3) Response Surface Methodologies used for sequential experimentation and optimization of production processes. Statistical design and analysis of such experiments.

**I E 583 Response Surface Methodology & Process Optimization (3)**

This course considers Response Surface Methodology (RSM), a collection of statistical and optimization techniques aimed at improving the quality characteristics of a manufacturing process through the sequential application of statistically-designed experiments and model-building techniques. Optimization techniques for response surfaces, functions that can exhibit large sample variability, are highlighted. Multiple response optimization problems, which occur frequently in practice, are considered, and their relation to Taguchi's Robust Parameter Design problem is emphasized. The course also includes an introduction to the design, analysis, and optimization of mixture problems, which occur frequently in food manufacturing, metallurgy, and semiconductor manufacturing. The practical aspects of RSM are considered through a final project in which the students optimize a (simulated) manufacturing process. For this purpose, a Web-based process simulator has been designed. The Software packages Design Expert, SAS, and Minitab will be used by the students in the class. MATLAB and MAPLE programs will support some of the topics in the class. Recent papers from the technical literature will be covered. The prerequisites of this course are either I E 511, which is an introductory course in Design of Experiments, or STAT 501, an introductory course to linear regression.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 584** Time Series Control and Process Adjustment (3) Design of Time Series-based process controllers for Quality Engineering. Study of the effect of autocorrelation on control chart performance.

**I E 584 Time Series Control & Process Adjustment (3)**

With modern sensor technology, quality control data frequently exhibits dynamics due to the short time between observations. Quality specifications keep "shrinking", and process drift is less tolerated than before. Under these circumstances, Statistical Process Control (SPC) techniques cannot be applied, and the emphasis in quality control moves from monitoring a process to actively adjusting it. Time Series techniques are ideal tools for developing such process adjustment strategies. This course covers topics of recent interest both in academia and in industry, including: integration of feedback adjustment techniques with traditional SPC methods; the "run-to-run" control problem as it occurs in discrete-part manufacturing (e.g., semiconductors); and optimal design of proportional-integral and EWMA controllers. In addition, a detailed treatment of statistical identification and estimation of ARIMA and discrete-time transfer function processes is presented. The effect of data autocorrelation on the performance of SPC control charts is discussed, and process adjustment strategies are presented as an alternative. For this reason, ABIMA modeling is discussed in detail as a

means to represent data autocorrelation. Use of the MATLAB and SAS software packages are encouraged. A book on the course subject matter is under preparation and has been accepted by John Wiley & Sons who will publish it in its Probability & Statistics Series. Given the heterogeneity of the students taking the course, the prerequisites are rather modest, and the course is almost self-contained. The prerequisite is I E 423, or a similar introductory course in statistical process control.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 588 Nonlinear Networks (3)** Foundation in congestion games, including elements of non-cooperative game theory, equilibrium network flows, Braess paradox, and the price of anarchy.

**I E 588 Nonlinear Networks and the Price of Anarchy (3)**

This course examines the theory of congestion games, developed originally to describe flows on congested transport networks but recently embraced to model data networks. Students will learn how to formulate descriptive models of traffic and data network flows in the presence of congestion as Nash games expressed as variational inequalities (VIs). These models will be used to derive theoretical bounds on the price of anarchy (the social costs of not achieving a truly cooperative or system optimal flow). Students will also learn how to formulate normative network design problems and Stackelberg games or so-called mathematical programs with equilibrium constraints (MPECs) to avoid the Braess paradox. Numerical techniques for solving VIs and MPECs will be discussed and illustrated.

The course begins with an introduction to so-called system optimal network flow models that explicitly incorporate network congestion. The study of system optimal flows contains an introduction to nonlinear network optimization algorithms, including feasible direction, gradient projection, simplicial decomposition and affine scaling algorithms.

Following the consideration of system optimal flows, both atomic and non-atomic network equilibrium models in the form of non-cooperative Nash games are discussed in-depth. The price of anarchy is presented as the ratio of the cost of Nash equilibrium flows to the cost of system optimal flows within the network of interest. Various theoretical bounds on the price of anarchy are derived. Numerical experiments to determine the price of anarchy are also described.

The Braess paradox, wherein global congestion can increase when local capacity is added to a nonlinear network, is introduced and its relationship to the price of anarchy demonstrated. Discrete and continuous equilibrium network design models that eliminate any possibility for the Braess paradox to arise are articulated. Each such design model is shown to be equivalent to a Stackelberg game, which is a type of mathematical program with equilibrium constraints (MPEC).

Mechanism design in the form of network congestion pricing to alleviate the effects of congestion is also considered and show to have an MPEC structure as well. Algorithms for solving MPECs to ascertain efficient network topology/efficient tolling will be discussed in detail, including simulated annealing and other types of computational intelligence on the one hand; and duality, penalty, decomposition and other types of nonlinear programming algorithms on the other.

Students interested in taking this course should have completed a course in linear programming (I E 505); a course in nonlinear programming is also recommended.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 588 Nonlinear Networks (3)** Foundation in congestion games, including elements of non-cooperative game theory, equilibrium network flows, Braess paradox, and the price of anarchy.

**I E 588 Nonlinear Networks and the Price of Anarchy (3)**

This course examines the theory of congestion games, developed originally to describe flows on congested transport networks but recently embraced to model data networks. Students will learn how to formulate descriptive models of traffic and data network flows in the presence of congestion as Nash games expressed as variational inequalities (VIs). These models will be used to derive theoretical bounds on the price of anarchy (the social costs of not achieving a truly cooperative or system optimal flow). Students will also learn how to formulate normative network design problems and Stackelberg games or so-called mathematical programs with equilibrium constraints (MPECs) to avoid the Braess paradox. Numerical techniques for solving VIs and MPECs will be discussed and illustrated.

The course begins with an introduction to so-called system optimal network flow models that explicitly incorporate network congestion. The study of system optimal flows contains an introduction to nonlinear network optimization algorithms, including feasible direction, gradient projection, simplicial decomposition and affine scaling algorithms.

Following the consideration of system optimal flows, both atomic and non-atomic network equilibrium models in the

form of non-cooperative Nash games are discussed in-depth. The price of anarchy is presented as the ratio of the cost of Nash equilibrium flows to the cost of system optimal flows within the network of interest. Various theoretical bounds on the price of anarchy are derived. Numerical experiments to determine the price of anarchy are also described.

The Braess paradox, wherein global congestion can increase when local capacity is added to a nonlinear network, is introduced and its relationship to the price of anarchy demonstrated. Discrete and continuous equilibrium network design models that eliminate any possibility for the Braess paradox to arise are articulated. Each such design model is shown to be equivalent to a Stackelberg game, which is a type of mathematical program with equilibrium constraints (MPEC).

Mechanism design in the form of network congestion pricing to alleviate the effects of congestion is also considered and show to have an MPEC structure as well. Algorithms for solving MPECs to ascertain efficient network topology/efficient tolling will be discussed in detail, including simulated annealing and other types of computational intelligence on the one hand; and duality, penalty, decomposition and other types of nonlinear programming algorithms on the other.

Students interested in taking this course should have completed a course in linear programming (I E 505); a course in nonlinear programming is also recommended.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 589** Dynamic Optimization and Differential Games (3) Dynamic optimization and dynamic non-cooperative games emphasizing industrial applications.

### **I E 589 Dynamic Optimization and Differential Games (3)**

This course provides an introduction to dynamic optimization and dynamic noncooperative games from the perspective of infinite dimensional mathematical programming and differential variational inequalities in topological vector spaces. The objective of this course is to give a working knowledge of computational methods for and applications of dynamic games. It builds on two prerequisite courses - introduction to operations research and linear programming - and also on co-requisite course in non linear programming. Coverage includes descent, projection and penalty algorithms for infinite dimensional mathematical programming and their extension to differential variational inequalities and dynamic games. Cournot-Nash-Bertrand and Stackelberg dynamic games are then studied from the point of view of differential variational inequalities and optimal control problems constrained by differential variational inequalities. Manufacturing and service engineering applications are employed to illustrate the tools developed in the course.

Students will be evaluated on the basis of a set of assigned problems (30%), a semester paper (30%), and a final examination (40%).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:  
 Concurrent: I E 521

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 590** I E Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **I E Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 594A** Technical Paper Presentation (1) Preparation of a paper in a technical journal format based upon the student's course work project.

### **Technical Paper Presentation (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597B** Manufacturing with Materials (3) Selection of cost-effective materials and manufacturing methods for manufacturing components.

**Manufacturing with Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597B** Manufacturing with Materials (3) Selection of cost-effective materials and manufacturing methods for manufacturing components.

**Manufacturing with Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597C** Service Networks: Empirical Analysis, Modeling & Management (3) Empirical analysis of contact center and patient flow data, fluid models, asymptotic approximations, system design, staffing, skill-based routing and scheduling.

**Service Networks: Empirical Analysis, Modeling & Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597C** Service Networks: Empirical Analysis, Modeling & Management (3) Empirical analysis of contact center and patient flow data, fluid models, asymptotic approximations, system design, staffing, skill-based routing and scheduling.

**Service Networks: Empirical Analysis, Modeling & Management (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597D** Robust Modeling, Optimization and Computation (3) This is designed for students interested in robust modeling, optimization and computation. The major objective<sup>3</sup> of the course is to teach students modeling and optimization under uncertainty using robust optimization and solving large scale and high dimension problems involving a large number of variables and constraints.

### **Robust Modeling, Optimization and Computation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597E** Advanced Linear Programming (3) Statistical design and analysis of experiments in engineering and experimental design using the analysis of variance and regression.

### **Advanced Linear Programming (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597F** Measurement System Design (3) Theoretical and practical knowledge in discrete part metrology for the validation, monitoring and control of the output of manufacturing processes.

### **Measurement System Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597F** Measurement System Design (3) Theoretical and practical knowledge in discrete part metrology for the validation, monitoring and control of the output of manufacturing processes.

### **Measurement System Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 597I** Advanced Stochastic Processes (3) Study of topics on Markov Processes, Poisson Processes, Renewal and Regenerative Processes, Brownian motions, Martingales and limit theorems.

### **Advanced Stochastic Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Industrial Health and Safety (I H S)**

**I H S 500** Occupational Safety Engineering (3) Provides a basis to assist students in understanding/applying the scientific and engineering principles associated with the field of safety.

**I H S 500 Occupational Safety Engineering (3)**

I H S 500 provides a basis to assist students in understanding and applying scientific and engineering principles associated with the field of safety. Specifically, the course will provide a background in, information on, and application exercises in natural, chemical, and physical laws and forces associated with safe design and implementation of tasks and projects involving soils and excavation, trenching and shoring, permanent and temporary work platforms and scaffolding, cranes, rigging, ropes, slings and chains, fall protection, pressure vessels, confined space entry, energy isolation, and preparation of equipment, hot work, welding, personal protective equipment, and non-destructive testing.

The course will also address safety-related issues associated with building and facility design and layout, job, task, and work setting layout. The course will stress the importance of safety engineering as part of both the corrective process and the design process. At the conclusion of the course, participants should be able to: 1) demonstrate an understanding of the natural laws, chemistry, physics, and design parameters associated with excavation and trenching, confined space entry, hot work, welding, fall protection, rigging, energy isolation, specification of protective equipment, and the use of cranes; 2) quantify critical safety related aspects and parameters associated with excavations, confined space entry, hot work, welding, fall protection, and the use of cranes; and 3) design tasks and projects associated with excavation and trenching, confined space entry, energy isolation, hot work, welding, fall protection, and the use of cranes.



This would include specifying the equipment to be used, assignment of appropriate job positions, specifying all appropriate preliminary analysis and design reviews to be done, establishing an inspection and audit process and specifying all required and recommended protective equipment (based on required noise reduction ratings, impact protection requirements, glove and suit permeability and compatibility requirements, etc.).

Demonstration of competencies will be through acceptable performance on exams, homework problems, class participation, and course design project. The course will be offered once per year, and the enrollment limit is 20 students. The format of the course will be lecture-based with demonstrations and applications exercises.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 510 Occupational Health (3)** Introduction to Occupational Health including history, general concepts, hazardous workplace exposures, occupational disorders, and prevention of occupational disease.

### **I H S 510 Occupational Health (3)**

This course provides an introduction to occupational health with an emphasis on practical aspects that can be applied by industrial health and safety professionals. At the conclusion of the course, it is expected that participants will have an understanding and working knowledge of important occupational health concepts including: the development of occupational health professions in the United States, the roles of different I H S professionals in the workplace, commonly encountered hazardous workplace exposures, types of occupational disease, and techniques for the recognition and prevention of occupational disease. Evaluation will be based on written mid-term examinations and a comprehensive final, homework assignments, and a class project in which teams will be formed to argue opposing sides of selected occupational health topics. The course will be offered annually with enrollment limited to 20 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 520 Contemporary Issues in Industrial Health and Safety (3)** Evaluation of industrial processes, hazards, labor, and corporate structure, so that hazard control programs and implementation plans can be formulated.

### **I H S 520 Contemporary Issues in Industrial Health and Safety (3)**

This course provides students majoring in Industrial Health and Safety an overview of approaches to evaluating the industrial environment, including industrial processes, hazards, labor, and corporate structure, so that hazard control programs and feasible implementation plans can be formulated. The course consists of: (1) presentations by faculty and students on specific topics in industrial health and safety, (2) visits to several different industrial sites, and (3) preparation of individual written reports. Grades will be based on one individual oral presentation describing the occupational safety and health concerns of an industry chosen by the student (30%), and two individual reports (35% each). One written report will be on the same subject of the oral presentation, while the second will focus on one of the site visits. The course will be offered annually with enrollment limited to 20 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 590 (ENNEC 590) Colloquium (1-3)** Continuing seminars that consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

### **I H S (ENNEC) 590 Colloquium (1-3)**

The objective of the course is to expose students through a seminar format to a wide range of topics on energy and mineral engineering. The lectures would be presented by faculty, students and guest speakers. Students would be required to write a short summary of each presentation and provide a critique of the presentation. Seminar topics will cover aspects of energy production, processing, utilization, and conservation, and the associated environmental, health and safety, and policy, economics, and management issues. Students are expected to keep up with current developments on each topic and to actively participate in the discussions. Students will be evaluated based on their class participation, and written summary and critique of each presentation. This is a required course in the energy and mineral engineering graduate program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**I H S 596 Individual Studies (1-9)**

This course is designed to allow students to study independent topics with industrial health and safety faculty. Grades will be assigned by the instructor according to a format agreed upon at the beginning of the period of study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**I H S 597 Special Topics (1-9)**

This course allows students to gain knowledge in rapidly developing fields and in other areas prior to the establishment of a formal graduate class. Grades will be assigned by the instructor according to a format agreed upon at the beginning of the period of study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 600** Thesis Research (1-15) No description.

**I H S 600 Thesis Research (1-6)**

This course comprises the I H S M.S. research project. Grades will be assigned by the instructor according to a format agreed upon at the beginning of the period of study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I H S 610** Thesis Research Off Campus (1-15) No description.

**I H S 610. Thesis Research (Off-Campus) (1-6)**

This course comprises the I H S M.S. research project. Grades will be assigned by the instructor according to a format agreed upon at the beginning of the period of study.

upon at the beginning of the period of study.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Information Science (IN SC)

**IN SC 431** Information Systems Architecture (3) Principles and priorities of enterprise system design, middleware and service-oriented architectures and web services.

### Information Systems Architecture (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 463** Languages of the Web (3) Taxonomy of programming languages and frameworks used in the development of web-based information systems.

### Languages of the Web (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 480** Software Development Lifecycle (3) Modern Software Development Techniques and Processes. Software Paradigms including OO and lifecycle modeling and improvement.

### Software Development Lifecycle (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that they may be topical or of special interest.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 497A** Special Topics: Business Intelligence (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that they may be topical or of special interest.

### Special Topics: Business Intelligence (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 521 Database Design Concepts (3)** The requirements capture, design, and development of relational database applications; analysis of business requirements and development of appropriate database systems.

**Database Design Concepts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 525 Applied Data Mining (3)** Functional overviews of algorithms used in data mining will be presented and contemporary data mining software used to conduct a project.

**Applied Data Mining (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 526 Business Process Management and Integration (3)** Design and development of business processes that align business objectives with Information Technology (IT) systems.

**Business Process Management and Integration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 531 Information Technology Law (3)** Examines the legal concepts/issues applicable to the field of information technology and to information technology, software engineering, and computer professionals.

**Information Technology Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 535 Information Technology: Economic Aspects (3)** Course examines how changes in information technology affect established organizations and the development of new firms, products, and markets.

**Information Technology: Economic Aspects (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 536 Information Technology: Economic Aspects Seminar (3)** Course examines the start up of new technology firms or the transformation of old economy companies into Internet companies.

**Information Technology: Economic Aspects Seminar (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 539** IT Systems Seminar (3) A culminating, integrative capstone experience for IN SC students, including a formal technical paper and in-class presentation.

**IT Systems Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 561** Web Security and Privacy (3) A web-centric look at the latest techniques and practices in computer security as they apply to the Internet.

**Web Security and Privacy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 561** Web Security and Privacy (3) A web-centric look at the latest techniques and practices in computer security as they apply to the Internet.

**Web Security and Privacy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IN SC 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Information Sciences And Technology (IST)**

**IST 402** Emerging Issues and Technologies (3 per semester/maximum of 9) Introduction to emerging issues, technology forecasting and analysis; overview of emerging issues and leading technologies in IST and how they impact information systems, users, the IT labor force and society.

### **IST 402 Emerging Issues and Technologies (3 per semester/maximum of 9)**

Information Sciences and Technology (IST) is a rapidly changing discipline. New issues, methods, tools, applications and terminology appear on a continual basis. A key skill is the ability to analyze new issues and assess new technologies within the context of the information age. This course prepares students to understand the difference between potential technological failures and success, fads and revolutionary technology. It also helps students to view emerging issues as an opportunity rather than a threat. Intellectual tools are provided to assist in understanding issues, assessing and forecasting technological changes for feasibility and planning in real world situations. The course provides students with:

- A process framework for analyzing new issues and a theoretical framework to study technological and social impacts of such issues.
- A process framework for recognizing and understanding new technologies and a theoretical framework to take advantage of such technologies.
- Exposure to new issues and technologies.
- Hands-on experience in studying recent technological advances in detail.

The course will also provide students with the ability to:

- Understand the concept of issue analysis and technology forecasting.
- Recognize the important of new issues and technologies in information sciences.
- Incorporate these new issues and technologies into an existing information systems framework.
- Develop and implement new technology solutions, or discuss policies for addressing emerging issues.
- Predict impacts of issues and technology on information management, users, policies, and the environment.

Each time the course is offered; new issues and/or information technology areas will be explored. Examples of issues and technologies addressed include: wireless communications, security and intrusion detection, intelligent agents, web search, languages, intelligent systems, bio-informatics, advanced visualization and human-computer interactions, ubiquitous-pervasive computing, groupware, computer aided cognition, system design by global IT teams, IT outsourcing, and digital divide.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 411** Distributed-Object Computing (3) Introduction to distributed-object computing and its use in client/server and real-world computing applications.

### **IST 411 Distributed-Object Computing (3)**

This course presents the fundamental concepts of distributed-object computing with applications to client/server computing which is an important platform for real-world computing systems. The course focuses on tools and techniques used in the design, development and deployment of client/server systems, including traditional architectures and also distributed-object technologies. Students will also consider issues of managing client/server systems and the relationships between organizational processes and information-system architectures. IST 411 will be an elective course

for the Baccalaureate degree program in Information Sciences and Technology. It is expected that students completing the Systems Development Option may take this course to fulfill requirements for the option.

No other course offers an introduction to distributed objects and client/server applications. CMPBD 450 covers network operations, but not the problem of distributed computing. IST 311 and 414 provide general introductions to software, object-oriented design, and applications, but do not address problems specific to client/server architecture and distributed computing. CSE 513 covers the fundamentals of distributed systems and is far more advanced and theoretical than is necessary for IST.

Upon completion of this course, students will have a broad understanding of the fundamental concepts of distributed objects and distributed-computing architectures, and have the ability to apply these concepts to real-world applications. They will receive a broad examination of the major issues surrounding the design, development, deployment, and maintenance of client/server applications, and have the ability to construct such systems. The student will also have experience with current software standards, languages, software, and implementation technologies relating to client/server applications, and have the ability to use these in real-world applications. Student performance will be evaluated by means of assignments, examinations and optionally, a project or paper.

IST 411 will be offered every semester at University Park. At every other campus location where the Baccalaureate degree program is offered, the course will be offered 1-2 times annually depending on demand. Student enrollment at University Park will begin at approximately 50-75 in the first year and grow to 200 over a 3-4 year time period. At other locations, enrollment should range from 25-50 annually.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 412** The Engineering of Complex Software Systems (3) Introduction to the engineering of complex software systems including software system specification, design and implementation, integration and test, and evolution.

### **IST 412 The Engineering of Complex Software Systems (3)**

IST 412 will provide the students with the skills needed to design, implement, test, and evolve complex software systems. The course will also give students insight into the complexities of managing complex software system projects. It will also give the students an introduction to the responsibilities of complex software system development including software reliability and software safety. IST 412 will be an elective course for the Baccalaureate degree program in Information Sciences and Technology. It is expected that students completing this Option may take this course to fulfill requirements for the option.

Following IST 311, which is required for the Systems Development Option, IST 412 is one of three 400-level courses that may be taken to fulfill the option requirements. The prerequisite of IST 311 ensures that the student has sufficient background in the use of programming languages.

Student performance will be evaluated by means of written and programming assignments, examinations, and a team-based complex software system project.

Upon completion of this course, the student will have experience with software systems, designing principles, implementation concepts, testing of a complex software system project and management of a team-based project.

IST 412 will be offered every semester at University Park. At every other campus location where the Baccalaureate degree program is offered, the course will be offered 1-2 times annually depending on demand. Student enrollment at University Park will begin at approximately 50-75 in the first year and grow to 200 over a 3-4 year time period. At other locations, enrollment should range from 25-50 annually.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 413** Usability Engineering (3) This course addresses activities in the system development process that ensure usability. It considers the emerging concept of usability, requirements gathering and analysis, activity design, information design, interaction design, documentation design, user testing and usability evaluation.

### **IST 413 Usability Engineering (3)**

The modern system development process includes concurrent engineering of usability - features of a system that make it approachable, learnable, as well as easy and satisfying to use. Topics in the course include the emerging concept of usability, requirements gathering and analysis, the use of scenarios and claims to describe and analyze both current human practices and envisioned practices, activity design, information design, interaction design, documentation design, and user testing, including techniques for formative and summative usability evaluation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 420** Fundamentals of Systems and Enterprise Integration (3) Introductory course on integration of information technology into different venues, including the planning, development, and implementation of the integration.

### **IST 420 Fundamentals of Systems and Enterprise Integration (3)**

IST 420 focuses on introducing the student to the role of information systems and technologies in achieving a variety of system goals. Emphasis will be placed on the theories and skills required for planning, developing, implementing, and managing the integration of information technology and different systems. IST 420 is required of all Information Sciences and Technology (IST) undergraduates who have chosen the Information Technology Integration Option in their baccalaureate degree. It is the prerequisite for IST 421 which is also required for the Option. Upon completion of the course, the student will be able to recognize information technology integration. They will also understand the "business processes and information value chain" within a system, and be able to foster an understanding of the role of IT in system integration. Students will be periodically assessed through examinations, case studies, individual and group assignments and projects, and other performance indicators where appropriate.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 421** Advanced Enterprise Integration: Technologies and Applications (3) Advanced course on the integration of information technology into systems applications.

### **IST 421 Advanced Enterprise Integration: Technology and Applications (3)**

IST 421 expands the knowledge gained in IST 420 on the theories and skills required for planning, developing, implementing, and managing information systems. IST 421 is required of all Information Sciences and Technology (IST) undergraduates who have chosen the Information Technology: Integration and Application Option in their Baccalaureate degree. Upon completion of the course, the student will have expanded knowledge of information technology and systems integration issues across multiple application settings. They will also have a deeper understanding of the specific information technology (both hardware and software) that can serve as the foundation for designing systems within an organization, and have experience that fosters an understanding of the role of IT achieving system performance goals.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 422** Enterprise Architecture Foundations (3) Theoretical foundations and practice of enterprise architecture.

### **IST 422 Enterprise Architecture Foundations (3)**

Enterprise Architecture is the overall framework and set of strategic objectives for the usage of technology over time across an organization. Enterprise Architecture can also be described as the top-down, strategy-driven, integrating framework that brings together and manages the business model, applications and technology. Its primary goal is to facilitate improvement and deliver business-aligned information systems. This course presents the key components and processes involved in the effective creation and governance of enterprise architectures. Students will acquire knowledge about the key foundational aspects of enterprise architecture, learn what decisions need to be made and how to make them, and be able to explain and justify their recommendations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 423 Enterprise Information Management and Storage Architecture (3)** Provide in-depth study of the concepts, issues, and technologies associated with the complex world of enterprise information and storage architecture.

### **IST 423 Enterprise Information Management and Storage Architecture (3)**

This course is designed to introduce students to enterprise information storage and management concepts, issues, trends, and technologies. As a junior/senior level course, the focus will center on applying design concepts and associated technologies to real-world problems in the area of enterprise information storage and management. Existing partnerships with leading information management firms will be leveraged to provide real-world exposure to the complex enterprise information storage and management issues facing all organizations today. This course also focuses increasingly on the critical areas of information security and the emerging field of information storage virtualization. The course will mix technical details, applied value, and organizational insights of enterprise information storage and management through the use of labs, case studies, real-life problems, and team projects. This is a unique course that has generated great industry interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 424 Architectural Modeling of Organizations (3)** Theoretical foundations and practice of enterprise modeling.

### **IST 424 Architectural Modeling of Organizations (3)**

Enterprise Architecture is the overall framework and set of strategic objectives for the usage of technology over time across an organization. Enterprise Architecture can also be described as the top-down, strategy-driven, integrating framework that brings together and manages the organization model, applications and technology. Its primary goal is to facilitate improvement and deliver organization-aligned information systems. Effective modeling is crucial for successful EA. This course provides an exposure to the foundational concepts and practices of effective enterprise modeling for EA.

Students will acquire knowledge about the key foundational knowledge in modeling different layers of the enterprise, learn what decisions need to be made and how to make them, and be able to explain and justify their models and recommendations. This course explores the use and effectiveness of architectural modeling to describe an organization and to integrate and manage IT resources strategically from an enterprise perspective. Hands-on exercises and cases studies are used to illustrate the role and effect of enterprise architecture concepts and methodologies. Emphasis is placed on understanding different architectural approaches, standards, and styles. Students will use enterprise architectural tools to develop descriptive models and understand how to integrate and manage IT within and between organizations.

For each general topic area, core readings are used to define standard vocabulary, concepts and relations, methods and criteria for evaluation, and implications for enterprise architecture. Students participate in class discussions as well as complete written assignments that focus on solidifying the understanding of the course content. Students also complete a team modeling project that is motivated by, and whose outcomes are discussed with respect to, one or more theoretical frameworks covered in the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 425 (MGMT 425, ENGR 425) New Venture Creation (3)** Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors.

### **IST (MGMT/ENGR) 425 Introduction to Entrepreneurship (3)**

The goal of IST (MGMT/ENGR/ENR) 425 is to better prepare undergraduate students to be business leaders in adaptive, globally-minded, technology-savvy companies. The course is structured so students develop skills that are of high value in any workplace: they develop improved leadership skills, higher self-efficacy, creativity and the ability to deal with ambiguity. On course completion, students will have a working knowledge of traditional and non-traditional ways for identifying a new product or business opportunity, quantifying the potential, understanding the key competitive factors, researching the audience and producing a convincing executive summary for internal or external financing and launch.

Students who want to augment the skills and knowledge from their major with the ability to refine a new product/service process in an interdisciplinary team will find IST (MGMT/ENGR/ENTR) 425 a valuable course.

This is a novel problem-based learning (PBL) course, where the learning is student-centered, with faculty acting primarily in the role of facilitators. Active learning happens in this course because students develop ownership in their new business venture concept and are fully responsible for the genesis of the idea. The course leverages the on-line course management system (ANGEL) to define weekly learning objectives, support electronic delivery of assignments, robust video content with entrepreneurs is provided on CD-ROM or via ANGEL, providing additional insights into entrepreneurship. The technology or business segment focus of the class is easily adapted by using different case studies and course mentors.

This will be one of two courses in the new two-course sequence for business students in entrepreneurship. This course will be accepted as a supporting course in the Engineering Entrepreneurship Minor (E-SHIP) and in the Engineering Leadership Development Minor (ELDM). IST (MGMT/ENGR/ENTR) 425 can be used as a technical elective in many of the engineering departments. It will be accepted as a Support of Option course for the Information Sciences and Technology (IST) major.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 426** (ENGR 426, MGMT 426) Invention Commercialization (3) Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology.

### **IST (MGMT/ENGR) 426 Invention Commercialization (3)**

The goal of IST (MGMT/ENGR/ENTR) 426 is to have students understand why invention commercialization is complicated and difficult by participating in the process. For example, the inventor rarely has insights into the markets for his/her invention, is often not interested in the details of commercialization, and can be secretive. In addition, the business and financial communities often do not take the time, or have the resources, to understand new technologies and perform complex due diligence. Thus lack of due diligence often leads to rejection of innovation because existing companies often discount new technologies from outside the company as NIH - "not invented here".

Effective transfer of new invention or innovation to a commercial product requires at least three different functional communities to interface: technical, legal and business. Each uses a different language, comes from different educational and cultural backgrounds, and may have an inherent distrust of the others. These functional barriers are difficult to overcome.

This course teaches how these barriers can be broken down as student teams help bridge the perceived chasm between key players in the invention commercialization process. In these teams, students bring the skills and knowledge from their major to develop an invention commercialization recommendation for the Technology Transfer Office and the inventor. For example, business students focus on finance and market opportunity assessment; engineering and IST students focus on design refinements, prototyping support, and (if appropriate) making technology suggestions to the inventor.

Upon completing the course, the students will have a working knowledge of different university and corporate technology or invention commercialization processes, important intellectual property management tools for inventions (patents, license agreements, option agreements) source of funding to move inventions toward product development, and delivering top quality presentations which outline the recommended commercialization path. Students who enjoy open-ended projects which involve the interplay of business and invention of who wants to work on interdisciplinary teams with the newest inventions will find this course a valuable course. **NOTE:** Because the inventions/products are based on Penn State faculty intellectual property, students must sign the Penn State Special Intellectual Property Agreement For Students - For Use When Assigning Intellectual Property to The Pennsylvania State University. The form can be viewed at <http://guru.psu.edu/policies/RAG13.html>

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 431** The Information Environment (3) Survey of social environment of information technology themes: Community, sovereignty, privacy, ethics, economics, and knowledge management.

### **IST 431 The Information Environment (3)**

The ways that people communicate and utilize information is being changed dramatically by new information technologies. Information and the technologies that are employed by create, organize, transfer, and utilize that information in a networked environment, using such global networks as the internet or internal networks such as intranets, have become a key component of the global economy. This global environment can change the way we interact,

communicate, and function on the job and in our daily lives. The new technologies also raise new economic, legal, ethical, and social issues that are of grave importance to society. IST 431 examines the overall context of the new information environment and new technical issues relating to knowledge management in the global networked environment. IST 431 is a required course in the Information, Society and Public Policy Option.

There may be some overlap of material with COMM 405, COMM 483, COMM 485, PHIL 407, PHIL 423, PHIL 433 and PL SC 460m but none of these courses cover the same material, or approach it in the same manner.

Upon completion of this course, the student will gain an appreciation of the differences between "cyberspace" and the "real" world. The student will also understand that the implementation and modern information technologies has significant social and policy implications that demand appropriate policy issues in several different contexts (global, national, local). The student will also be able to discuss the major themes in information policy studies (e.g., community, privacy, access, economic participation, security) and be able to relate these themes to the applications of particular technologies. They will be able to describe policy frameworks and issues, as well as the ethical and social implications of these choices.

Homework assignments; Socratic dialogue; analysis and write-up of case studies; assessment of group research projects and presentations; participation in on-line discussion groups; two mid-term and one final examination (objective and essay). The precise mix of evaluation components will be determined by individual instructors; a typical weighting might be exams (60%), written assignments and papers (20%), and collaborative projects (20%).

IST 431 will be offered every semester at University Park. At every other campus location where the Baccalaureate degree program is offered, the course will be offered 1-2 times annually depending on demand. Student enrollment at University Park will begin at approximately 50-75 in the first year and grow to 200 over a 3-4 year time period. At other locations, enrollment should range from 25-50 annually.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 432** Legal and Regulatory Environment of Information Science and Technology (3) Legal environment of information technology, constitutional/political issues, intellectual property, management, e-commerce, privacy, access, computer contracting, cyberspace regulation.

### **IST 432 Legal and Regulatory Environment of Information Science and Technology (3)**

The new information technologies are creating a global economy heavily dependent upon networked information, hardware, software, and electronic commerce, which calls for adaptation of existing legal and business practices. In many cases, the new technologies pose problems that existing laws or legislation are inadequate to cope with; but the complexity of the environment makes new solutions elusive. This course examines the legal, regulatory, and political environment within which intellectual property rights and examination of contracting issues, licensing of information and products, data protection, patents, cyberspace regulation, and implications for personal privacy. It also focuses on where technology is making regulation difficult by challenging previous concepts upon which our legal and regulatory systems depend.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 440W** Information Sciences and Technology Integration and Problem Solving (3) Problem-based approach to technology integration by focusing on real-life problems faced by an organization.

### **IST 440W Information Sciences and Technology Integration and Problem Solving (3)**

This course is the undergraduate capstone for Information Sciences and Technology majors in the Baccalaureate degree. It requires students to work collaboratively in teams of 4-6 students, with each team comprised of students from more than one option and, if possible, more than one campus. Each team is given a significant real-world problem or issue in which information technology is part of the solution. Teams will be expected to manage the project effectively and to communicate its results clearly to a variety of audiences within an organization. Major topics include: review of problem-based and case-based learning; overview of project management practices; assessment of organizational and technical issues posed by the scenario; development and testing of work plans and analysis of options; communication within the group; communication within a management environment; and presentation of results to a variety of audiences inside and outside the organization.

IST students need to understand the organizational and social contexts in which technology functions. Indeed, many technology problems are multi-dimensional--they have an economic dimension, a legal dimension, a human resources dimension, and so on. This course will require students to analyze, evaluate, and test alternative solutions and to weigh their advantages and disadvantages for the organization.

Students will be evaluated in three ways: by the effectiveness of their team's solution of the technical or organizational problem; by the quality of the students' written and oral presentations; and by the quality of their project management and internal communication. A substantial written paper will be required of each student and each time; in addition, each team will also construct a Web-site for sharing results. Other technologies will be used as required by the project.

It is expected that membership on teams of students will be drawn from the various options in the Information Sciences and Technology major. At least nine credits (including at least one IST 300-level and one IST 400-level course) in the student's option must be completed before enrollment in IST 440W. This course should be offered every fall and spring semester beginning in the fall semester 2002. It will be taught in sections of 25 and have a total enrollment of approximately 100 per semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 441 Information Retrieval and Organization (3)** Introductory course for seniors and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and nontextual information resources. Introduces students to the principles of information storage and retrieval systems and databases.

### **IST 441 Information Retrieval and Organization (3)**

This is an introductory course for Information Sciences and Technology senior and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and non-textual information resources. This course will introduce students to the principles of information storage and retrieval systems and databases. Students will learn how effective information search and retrieval is interrelated with the organization and description of information to be retrieved. Students will also learn to use a set of tools, such as search engines, and procedures for organizing information. They will become familiar with the techniques involved in conducting effective searches of information resources.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 442 (IL) Information Technology in an International Context (3)** International concepts to improve strategies for the design, dissemination, and use of information technology.

### **IST 442 Information Technology in an International Context (3) (IL)**

IST 442 focuses on the implications of the international context for the design, diffusion and use of information technology. The course will provide students with an understanding of the three crucial IT-related characteristics of the international context: 1. information infrastructure, 2. the economic and policy environment, and 3. social and cultural structures. Students will develop analytic skills that will enable them to predict the implications of the international context for information technology and will apply these skills in a final project that addresses a problem in the areas such as information systems integration, interface design, or management of information technology projects.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 443 IT Professional Services Theory and Practice (3)** Explores and applies the basic concepts, methodologies, tools, and techniques of consulting and professional service organizations in information sciences and technology.

### **IST 443 IT Professional Services Theory and Practice (3)**

This course is designed to introduce students to basic IT professional services theories and practices, including an examination of the professional services industry. A consulting-oriented systems life cycle framework is used as the outline of the course. The phases of this framework include: problem/system analysis and evaluation, requirements definition, solution design, solution development, solution implementation, and on-going evaluation and maintenance. Students will learn how to identify and define client problems, map workflows, develop recommendations, and prototype

solutions. They will be given opportunities to practice the concepts and methodologies they learn by working on real-world problems in teams for corporate clients.

This course is designed around real-world problems and projects involving IT systems development, integration and implementation. In this course, the student will be part of a consulting team that is assigned to work with a real corporate client. The student works with the other team members to define their client's problem, map out appropriate workflows, and make recommendations for a solution. Depending on the project, the recommended solution may be prototyped or fully developed during the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 444** Advanced IT Professional Services (3) Explores advanced IT professional services topics, and the unique application of consulting methods in various industry sectors.

### **IST 444 Advanced IT Professional Services (3)**

This course is designed to allow students to explore in-depth IT professional services issues and strategies. The advanced topics to be covered during the semester include IT strategy consulting, consulting leadership issues, complex and/or strategic consulting methodologies, IT governance consulting, and an in-depth analysis of professional service firm operations and strategies, and the management of multiple, simultaneous projects and initiatives. This course is designed around real-world issues and projects involving problem identification, advanced research methods, IT solution development, integration, and implementation, primarily from a strategic and/or program management perspective. Furthermore, students will explore the culture, operations, and strategies of large, medium and small IT services organizations. The student will understand leadership and managerial issues associated with strategic alignment of IT and business strategies, executive-level stakeholder management, program management, IT strategic planning, and managing the political landscapes of large-scale IT consulting projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 445H** Globalization Trends and World Issues (3) This course covers trends in globalization and their influence on U.S. policy making as well as the role of the U.S. in international issues.

### **Globalization Trends and World Issues (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 446** An Introduction to Building Computer/Video Games (3) An interdisciplinary course that introduces students to process and techniques involved in developing a video or computer game.

### **IST 446 An Introduction to Building Computer/Video Games (3)**

The course is project driven. Students will form teams and collaborate with one another to develop an interactive immersive experience. During the course, students will be exposed to several techniques for building graphical 3D worlds, animating characters, moving the camera and lights in real-time, and building intelligent characters (using state machine-based architectures). They will also learn different techniques of interactive storytelling, such as linear narrative, branching narrative, and adaptive narrative. Furthermore, they will be introduced to several tools that will aid in realizing their own projects and ideas, such as graphic engines (e.g. Wildtangent), and game engines (e.g. Unreal Tournament).

The course is heavily project driven. Students will, in the first half of the course, learn the tools used in the development of interactive 3D environments. They will submit 2 individual assignments using these tools to develop a simple interactive environment. These individual assignments will be graded and critiqued.

In the second half of the course, students will work on a game idea from generation to actual implementation. Students will be grouped in teams of three to develop a project, integrating concepts they learned through the class. They will use one or more of the tools they learned to build this project. Projects will be continuously evaluated and critiqued during game tuning sessions. In addition, projects will be formally evaluated through two prototypes that are critiqued by the class and the instructor. The students will continuously revise their designs and projects through the semester. The final

version of the system is due by the end of the semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 451 Network Security (3)** Fundamental issues and concepts of network security, network security technologies and protocols, and emerging technologies in network security.

### **IST 451 Network Security (3)**

Information technology has become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information/network security a major concern for organizations.

IST 451 focuses on network security. The course will provide the students with a comprehensive understanding of the fundamental issues and concepts of network security, and the mainstream network security technologies and protocols that are widely used in the real world. The course will also address emerging technologies in network security.

A major component of the course will be several team-based hands-on attack-defense projects. Each project has two phases: the attack phase and the defense phase. A group may be asked to defend against the attacks enforced by another group. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 452 Legal and Regulatory Environment of Privacy and Security (3)** Exploration of legal, regulatory, public policy, and ethical issues related to security and privacy for information technology professionals in public institutions, private enterprise, and IT services.

### **IST 452 Legal and Regulatory Environment of Privacy and Security (3)**

Institutional constraints on security historically focused on traditional criminal enforcement and a slow but steady increase in civil remedies through the twentieth century. Professional security protection could satisfy reasonable assurance criteria by managing legal and regulatory risks based on commonly-held understandings of burglary, theft, conversion and widely-understood but related institutional constraints in the protection of physical property. This focus retained effectiveness so long as physical security over tangible property appeared successful, even extending to the maintenance of control over mainframe computers and their peripherals. However, the proliferation of networked computers has made access and storage ubiquitous, vastly increasing the vulnerability of confidential data, private information and critical national security infrastructure. Security and privacy regulation compliance responsibility now falls much more harshly on both organizations and most of their individual personnel. These complex new duties constrain organizations in the data management industry as well as suppliers and users of data and all participants in the information supply chain, including consultants, software suppliers, applications service providers, maintenance, outsourcing and communications providers.

Other factors exacerbate these liability risk management difficulties. Advances in network computer storage and use, the broadening perception of heightened value of information and the pervasive availability of rich data warehousing increase the vulnerability of data management. Risks of information theft and integrity losses as well as the explosion of privacy rights and national security concerns now require pervasive and fuller understanding of liability risk management principles/techniques among all managers and subordinates in the data management industry and in government. Information suppliers, handlers, owners and network service providers are increasingly exposed to civil litigation, regulatory oversight/compliance and criminal prosecution for various information-related wrongs. For example, confidentiality is compulsory for corporate trade secrets, privacy is required for personally identifiable information about individuals and secrecy is mandatory over matters of national security; all of which create complex legal duties that are fundamentally driving the design of information handling processes. This course surveys legal and regulatory constraints on information security and privacy practices.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 453 Legal, Regulatory, Policy Environment of Cyber Forensics (3)** Legal, regulatory and public policy environment of computer and network forensics that constrain investigatory and monitoring activities in computer and network environments.

### **IST 453 Legal, Regulatory, Policy Environment of Cyber Forensics (3)**

This course covers the major legal, regulatory and policy issues in cyber-forensics including, pre-trial discovery, production of electronic documents (electronic data discovery or EDD), custody, EDD cost balancing, admissibility of electronic evidence, "business records," expert witness roles and qualification, constitutional rights to privacy and confidentiality, privilege, litigation support, forensic service providers, document retention standards, legal constraints on electronic records management, EDD employment policies, key EDD laws, civil, criminal and regulatory procedure and evidence, litigation holds, spoliation, obstruction of justice, interaction with inside and outside service providers and counsel, EDD strategy, audit trails, and multi-disciplinary relations with computer and network forensic experts. Students are exposed to the failure and successes of particular cyber forensic techniques in the dominant legal and regulatory forums.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 454 Computer and Cyber Forensics (3)** Fundamental issues and concepts of computer forensics; aspects of computer and cyber crime; methods to uncover, protect, exploit, and document digital evidence; tools, techniques, and procedure to perform computer and cyber crime investigation.

### **IST 454 Computer and Cyber Forensics (3)**

Computer and communication technologies have become the key components to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information and network security a major concern for organizations.

IST 454 focuses on computer and cyber forensics. Students will learn different aspects of computer and cyber crime and ways in which to uncover, protect, exploit, and document digital evidence. Students will be exposed to different types of tools (both software and hardware), techniques and procedure, and be able to use them to perform rudimentary forensic investigations.

A major component of the course will be several hands-on exercises and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

Integrated throughout are perspectives of computer and related legal process, including computer crimes from state and federal law, methods of interaction with law enforcement and prosecutors, admissibility of expert witness testimony and the use of forensic reports in civil, regulatory and internal investigations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 456 Information Security Management (3)** Contemporary Security Issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.

### **IST 456 Security and Risk Management (3)**

Communication technologies have become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information systems and network security a major concern for organizations.

IST 456 focuses on security and risk management. Students will learn contemporary security issues; security management

processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.

A major component of the course will be several case studies and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 456 Information Security Management (3)** Contemporary Security Issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.

### **IST 456 Security and Risk Management (3)**

Communication technologies have become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information systems and network security a major concern for organizations.

IST 456 focuses on security and risk management. Students will learn contemporary security issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.

A major component of the course will be several case studies and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 461 Database Management and Administration (3)** Introduces advanced topics in database management systems that are fundamental to effective administration of enterprise information systems.

### **IST 461 Database Management and Administration (3)**

The objective of the course is to enable a student to comprehend principles of database management and administration. The students will learn how data are stored (indexing), accessed (query processing), shared (currency and transactions), and controlled (security). Students will be creating and using these features in a database in the laboratory. They can then develop, use, and tune database systems and applications, utilizing advanced database management features. This course assumes basic familiarity with relational model, Entity-Relationship diagram, SQL query language, and normalization (as covered in IST 210). It builds the foundation on more advanced concepts of database systems that are fundamental to a career in database administration.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 462 Database Modeling and Applications (3)** This course introduces advanced topics in database modeling and applications.



**IST 462 Database Modeling and Applications (3)**

The objective of the course is to enable a student to comprehend advanced database modeling and their applications. Students will model requirements using the advanced techniques and implement various applications in different domains. This course assumes basic familiarity with relational model, Entity-Relationship diagram, SQL query language, and normalization (as covered in IST 210). This course will cover more advanced topics in database modeling and database applications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 489H** Research Methods for the Information Sciences and Technology (3) Seminar course focused on approaches to studying information and communication technologies and writing theses and other research reports.

**IST 489H Research Methods for the Information Sciences and Technology (3)**

IST 489H provides students the opportunity to learn and experience:

- 1) Conceptualizing what are information and communications technologies.
- 2) Approaches to conducting research on, and reporting results of studies, of ICT.
- 3) The research process and its academic context.

The course is designed around a series of ill-structured, contemporary, problems that require students to develop responses by applying research approaches to ICT. At the end of the course, students will be able to:

- 1) Apply different conceptualizations of ICT to common problems.
- 2) Select and initiate research on ICT.
- 3) Begin writing research-oriented work such as theses and papers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 497B** Social Network Analysis and Social Media Analytics (3) This course will introduce the theories and methods for analyzing the dynamic social networks formed in social media.

### **Social Network Analysis and Social Media Analytics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 497E** Mobile and Ubiquitous Computing (3) Seminar focused on the research themes and hands-on development of mobile & ubiquitous computing applications.

### **Mobile and Ubiquitous Computing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 497K** Innovation & Design in a Digital World (3) This course emphasizes digital design methods and business models. Topics include user experience, prototyping, business model canvas, and design thinking.

### **Innovation & Design in a Digital World (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 501** Interdisciplinary Research Methods for Information Sciences and Technology (6) An interdisciplinary introduction to the research methods for investigating how information technologies are analyzed, designed, and evaluated to meet human needs at multiple levels of analysis.

### **IST 501 Interdisciplinary Research Methods for Information Sciences and Technology (6)**

IST 501 serves as the central foundational course for graduate students who intend to conduct research in IST. Although each student may eventually focus on one or several methods discussed in the course, the College is committed to providing all of its research students an interdisciplinary mindset regarding their own and their peers' research activities. This mindset is a defining feature of IST research training. As a result it is critical to convey this to new students.

The course provides foundational information regarding three contrasting research perspectives of IST: Social Informatics, Human-Centered Design and Computational Informatics. The three perspectives are presented in an interleaved fashion, one week at a time, with gradually increasing complexity and sophistication in the methods used. The methods address requirements for, design of, and impacts of information technologies used to meet people's information needs at multiple levels of analysis, including individuals, groups, organizations and national and global cultures. The technologies investigated are of various types, including algorithms, structured data, user interfaces, and distributed systems. Each one-week methods topic is practiced through an individual homework activity and a team project is used to provide an integrated application activity that cumulates throughout the semester.

Through reading of contemporary and classic literature, demonstrations and practice with specific research techniques, and sharing and reflection on individual and team research activities, students will explore fundamental assumptions, theories and directions in contemporary research methods useful to researchers in IST. The emphasis of this course is on defining and developing conceptual linkages between human behavior, the social, organizational and cultural context of information and technology use, human experience when learning or using information and computing technologies, and the construction of information and computing technologies. The interdisciplinary research methods will operate at individual, group and other units of human, social and organizational analysis, and across a range of information technologies.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 501** Interdisciplinary Research Methods for Information Sciences and Technology (6) An interdisciplinary introduction to the research methods for investigating how information technologies are analyzed, designed, and evaluated to meet human needs at multiple levels of analysis.

### **IST 501 Interdisciplinary Research Methods for Information Sciences and Technology (6)**

IST 501 serves as the central foundational course for graduate students who intend to conduct research in IST. Although each student may eventually focus on one or several methods discussed in the course, the College is committed to providing all of its research students an interdisciplinary mindset regarding their own and their peers' research activities. This mindset is a defining feature of IST research training. As a result it is critical to convey this to new students.

The course provides foundational information regarding three contrasting research perspectives of IST: Social Informatics, Human-Centered Design and Computational Informatics. The three perspectives are presented in an interleaved fashion, one week at a time, with gradually increasing complexity and sophistication in the methods used. The methods address requirements for, design of, and impacts of information technologies used to meet people's information needs at multiple levels of analysis, including individuals, groups, organizations and national and global cultures. The technologies investigated are of various types, including algorithms, structured data, user interfaces, and distributed systems. Each one-week methods topic is practiced through an individual homework activity and a team project is used to provide an integrated application activity that cumulates throughout the semester.

Through reading of contemporary and classic literature, demonstrations and practice with specific research techniques, and sharing and reflection on individual and team research activities, students will explore fundamental assumptions, theories and directions in contemporary research methods useful to researchers in IST. The emphasis of this course is on defining and developing conceptual linkages between human behavior, the social, organizational and cultural context of information and technology use, human experience when learning or using information and computing technologies, and the construction of information and computing technologies. The interdisciplinary research methods will operate at individual, group and other units of human, social and organizational analysis, and across a range of information technologies.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 503** Foundations for IST Research (3) Study of major methodological, normative, and theoretical issues in philosophy of science related to research in information sciences and technology.

### **IST 503 Foundations for IST Research (3)**

This course is a study of major methodological, normative, and theoretical issues in the philosophy of science related to research in information science and technology. A significant part of this course will involve coordinating issues and problems customarily associated with the philosophy of science in general with current research in information science and technology (IST) in particular. In order to achieve this coordination, the study of classical texts in the philosophy of science will be interspersed at appropriate places with lectures and topics that exhibit relevant faculty research in various IST related disciplines.

The course focuses on the main arguments that have been advanced in Anglo-American philosophy of the science for the period beginning about seventy years ago up to the present. The course contradicts the view of a single unitary "philosophy of science." It shows a series of positions and arguments that continue to lead on to still deeper questions. Usually the student will have adopted one of the classical positions without having examined it or defended it rigorously.

Readings will progress in a historical fashion through arguments that attempt to provide a justification for the truth claims of science. The course will begin with a consideration of logical positivism in its early forms, i.e. the ideas of the Vienna Circle, and the early Wittgenstein's theory of meaning. The course will go on to the writings of Karl Popper especially as found in his *Logic of Scientific Discovery*. Continuing the historical development, Kuhn's "The Structure of Scientific Revolutions" will be considered. The discussion will then progress to the Popper-Kuhn debates involving the sophisticated falsificationists (Lakatos) and eclectic approaches like Feyerabend's. Finally, Richard Bernstein's book, *Beyond Objectivism and Relativism* is reviewed summarizing the debate. This final view strives to uncover the strong points in the opposing positions reviewed early in the course. Then it sets a hermeneutical position which he derives principally from the philosophy of Hans Georg Gadamer. This position amounts to a new and interesting view on how knowledge is attained in science and in life in general.

The course relates the debates in the arguments in the philosophy of science to research issues in IST.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

Concurrent: IST 501

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 510** Foundations in Computational Informatics (3) Foundational theories and techniques in general computational informatics.

### **Foundations in Computational Informatics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 511** Information Management: Information and Technology (3) Introduction to theoretical, computational, and practical issues involved in managing textual, spatial, temporal, and multimedia information in a computerized system.

### **IST 511 Information Management: Information and Technology (3)**

The objective of IST 511 is to provide an introduction to the theoretical and computational issues involved in managing textual, spatial, temporal, and multimedia information. The course will survey the nature of information in various application contexts (digital libraries, digital government, healthcare information, environmental information, etc) and seek to understand their generic and specific requirements for information management. Students will be exposed to major principles and technologies for information management that are drawn from database systems, and information retrieval (IR) and spatial/geographical information systems literature. Special emphasis will be given to the problems of managing heterogeneous information sources with different ontology, representation, scales, and error characteristics.

This course is required of all Information Sciences and Technology (IST) graduate students under both research Master and Ph.D. degrees. It is a foundation course that should be taken in the first or second year of graduate study. IST 501 is the prerequisite for this course.

For hands-on practice and demonstration purposes, this course requires student access and use of a database management system (such as ORACLE or SQL server), a geographical information systems (Arc View or MapInfo), a information retrieval system, and/or a ERP (Enterprise Resource Planning) system.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 512** Information Processing Architecture and Technology (3) This course introduces the core theories, concepts, and methods regarding information and technology from an information processing point of view.

### **IST 512 Information Processing Architecture and Technology (3)**

IST 512 provides an introduction to the core theories, concepts, and methods regarding Information & Technology from an information processing point of view, with emphases on information processing architecture and technology at the infrastructure layer and the middleware layer. The course consists of five major components: (1) core theories and concepts about technologies from the perspective of information-centric uses, (2) overview of three layer architecture for information processing systems, (3) infrastructure layer core technologies, (4) middleware layer core technology, and (5) technologies to guarantee the quality of information-centric uses. The detailed content of each component is described in

the previous section.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 515 Information Security and Assurance (3)** This course covers theoretical, conceptual, and methodological foundations of information security and assurance.

### **IST 515 Information Security and Assurance (3)**

IST 515 covers the interdisciplinary theoretical, conceptual, and methodological foundations of information security and assurance, with emphases on information systems security, information assurance, privacy, trust management, database and web security, socio-economic aspects of security, human factors in security, e-commerce security and identity theft, and distributed systems security.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 516 Web and Internet Information Retrieval (3)** The course addresses aspects of searching, retrieving and modeling the Web/ Internet as information repositories using mathematical and probabilistic treatments.

### **IST 516 Web and Internet Information Retrieval (3)**

The learning objective of the course is to prepare graduate students with a solid background to perform information retrieval and database-related research and development. Through this course, students will learn the various aspects of information retrieval, use, and models for Web and the Internet, database-modeling techniques, emerging needs and approaches to data and information integration. Additional topics will be covered based on the interests of the students in the class, the focus areas of the instructor, and the emerging topics and problems in information retrieval and the world-wide web. The course lays a solid foundation for students interested in doing research related to these areas.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 520 Foundations in Human-Centered Design (3)** Foundational theories in Human-Centered Interactions used for Human-Centered Design.

### **Foundations in Human-Centered Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 521 Human-Computer Interaction: The User and Technology (3)** Users, models of users, developing the models, technology for creating interfaces; examples of good research and implications for Human-Computer Interface (HCI) design.

### **IST 521 Human-Computer Interaction: The User and Technology (3)**

This course introduces students to the broad area of human-computer interaction and the idea of a theory driven interface, an underlying concept in HCI. To do this, the course starts by outlining relevant aspects of human behavior with respect to technology and how interfaces are developed, the two raw components. Students are then exposed to a tool

for creating interfaces and a variety of theories of how users interact with technology on a variety of levels. These theories are validated and supplemented by usability studies. The course completes with a group project based on the readings and theories introduced in the first 12 weeks.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 522 Models and Theories of Human-Computer Interaction (3)** This course covers the theoretical foundations of human-computer interaction that prepares students in planning and conducting research in HCI.

### **IST 522 Models and Theories of Human-Computer Interaction (3)**

Human-computer interaction (HCI) is a multi-disciplinary research area within the larger field of information sciences and technology. It draws from a rich body of theoretical work in areas such as psychology, motor behavior, linguistics, computer and cognitive science, engineering, sociology, and anthropology. An essential skill for researchers studying human issues in information technology is the ability to draw concepts and implications from these complementary theory bases and perspective that enrich the analysis or design issues at hand. IST 522 introduces these models and theories to graduate students so that they can incorporate them into their own research activities. It is one of two options for IST graduate students completing their core requirement in HCI.

The theoretical perspectives covered in IST 522 can be organized roughly by their level of analysis: human perception and performance, mental models and cognition, social behavior, and organizational and cultural impacts. For each general topic area, core readings are used to define standard vocabulary, concepts and relations, methods and criteria for evaluation, and implications for the design of interactive systems. The students and professor select complementary readings from current research literature that question, extend, or otherwise refine these basic models and theories. Students participate in class discussions as well as completing written assignments that focus on specific comparisons, contradictions, or tradeoffs among different theory-bases. These discussions and assignments hone the students' analytic skills as well as deepening their understanding of specific theories. Students also complete a research project that is motivated by, and whose outcomes are discussed with respect to, one or more theoretical frameworks covered in the course. A comprehensive exam proves the breadth of students' understanding using the technique of integrative design rationale. Assessment is a combination of class participation, written assignments, research projects (which may be done in pairs), and the exam.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005 Ending: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 525 Computer-Supported Cooperative Work (3)** IST 525 introduces theories, empirical findings, evaluation methods, and design frameworks in computer-supported cooperative work.

### **IST 525 Computer-Supported Cooperative Work (3)**

Students in the course will investigate CSCW challenges and opportunities from the dual perspectives of human-computer interaction and socio-technical systems analysis. They will analyze group interactions and concerns in collaborative activities such as written and spoken communication, design, meetings, education, decision-making, and everyday work activities. They will review and critique state-of-the-art CSCW technologies, including text-based and video communication tools, immersive meeting environments, group decision-making, workflow, and knowledge management. These technologies will provide a context for investigating and synthesizing issues related to individual use (e.g., perceptions of cost-benefit), the context of collaboration (e.g., social and cultural norms embodied in systems), and software architecture (e.g., coupling and consistency management). Students will apply their understanding of these issues in evaluation and design projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 525 Computer-Supported Cooperative Work (3)** IST 525 introduces theories, empirical findings, evaluation methods, and design frameworks in computer-supported cooperative work.

### **IST 525 Computer-Supported Cooperative Work (3)**

Students in the course will investigate CSCW challenges and opportunities from the dual perspectives of human-computer interaction and socio-technical systems analysis. They will analyze group interactions and concerns in collaborative activities such as written and spoken communication, design, meetings, education, decision-making, and everyday work activities. They will review and critique state-of-the-art CSCW technologies, including text-based and video communication tools, immersive meeting environments, group decision-making, workflow, and knowledge management. These technologies will provide a context for investigating and synthesizing issues related to individual use (e.g., perceptions of cost-benefit), the context of collaboration (e.g., social and cultural norms embodied in systems), and software architecture (e.g., coupling and consistency management). Students will apply their understanding of these issues in evaluation and design projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 526** Development Tools and Visualizations for Human-Computer Interaction (3) IST 526 addresses concepts and tools for developing working user interface software and prototypes to provide effective information visualizations.

### **IST 526 Development Tools and Visualizations for Human Computer Interaction (3)**

This is a technical course focused on the different tools for designing and creating working software for the human-computer interface to complex systems. The course builds on the psychological and social theories, usability engineering methods, and computer programming techniques from its prerequisite courses to provide an advanced experience with user interface design and construction. Because of their importance and depth, special consideration is given to the concepts and tools used to develop sophisticated visualizations of complex information.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 526** Development Tools and Visualizations for Human-Computer Interaction (3) IST 526 addresses concepts and tools for developing working user interface software and prototypes to provide effective information visualizations.

### **IST 526 Development Tools and Visualizations for Human Computer Interaction (3)**

This is a technical course focused on the different tools for designing and creating working software for the human-computer interface to complex systems. The course builds on the psychological and social theories, usability engineering methods, and computer programming techniques from its prerequisite courses to provide an advanced experience with user interface design and construction. Because of their importance and depth, special consideration is given to the concepts and tools used to develop sophisticated visualizations of complex information.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 530** Foundations in Social Informatics (3) Foundations in social theories used in the study of the human context within which information and information technology exists.

### **Foundations in Social Informatics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 531** Human Information Behavior: Information and the User (3) Introduction to research into the nature of human information and communication processes at the individual, social, and organizational levels.

**IST 531 Human Information Behavior: Information and the User (3)**

The objective of IST 531 is to provide an introduction to research exploring the nature of human information and communication processes at the individual, social, and organizational level of behavior. This course provides an integrative and interdisciplinary treatment of fundamental research assumptions, paradigms, theories, models, problems, approaches, and significant research examining the role of information in computer supported human information behavior. Students will read and critique research to develop an understanding of the fundamental concepts, theories, models, and approaches. Assignments will include critiquing a research area of their interest to identify new research issues or questions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001 Ending: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 532 Organizational Informatics (3) Researching Information and Information Systems in Organizations.**

**IST 532 Organizational Informatics (3)**

This course provides students the opportunity to learn and experience:

- a) the relationships among ICT and human organizations
- b) the findings, approaches and issues with studying ICT and human organization
- c) developing and initiating research on ICT and human organization

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 535 Information Technology Valuation, Markets and Innovation (3)** This course covers the economic aspects of information technology and innovations.

**Information Technology Valuation, Markets and Innovation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 536 Public and Community Informatics (3) Theories and uses of ICT in public sector and community organizations.**

**IST 536 Public and Community Informatics (3)**

This course provides students the opportunity to learn and experience:

- 1) The relationships among design, take up and uses of ICT in public sector and community organizations.
- 2) The findings, approaches and issues with studying ICT in the public sector and community organizations.
- 3) The ways in which public, private and community spheres interact and how services and provision of services are arranged.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 541 Qualitative Research in Information Sciences and Technology (3)** Assists IST researchers in their efforts to learn about and employ appropriate qualitative methods in their research.

**IST 541 Qualitative Research in Information Sciences and Technology (3)**

As information and communication technologies (ICTs) have evolved, so too has our understanding of the role of the human contexts within which information technologies are situated. This has led to the need for appropriate methods of



studying information systems and technologies in their context of use. There is a growing consensus that qualitative methods offer important research opportunities for this type of study. Therefore, researchers in such fields as the information sciences and technologies, communication technologies and information systems should have an understanding of the various types of qualitative methods so that they can determine ones that are most appropriate for addressing their particular research problems. The course is complementary to quantitative methods courses, in that it addresses problems that are not amenable to those approaches. For example, studies involving very small groups, individuals, societal level concepts and others often lend themselves to qualitative research techniques.

This course begins by considering research topics that lend themselves to the choice of qualitative research methods. It then proceeds to examine the steps involved in conducting qualitative research. These include: developing the research question(s); choosing a particular research method (such as ethnography, case study or action research); making decisions about approaches to data collection (such as interview or focus group) and analysis (such as coding technique); and producing and publishing the results.

This course explores concrete issues that researchers have encountered in their use of qualitative methods. It does this by drawing upon the collective expertise of distinguished scholars who employ qualitative methods in their own research. The course will examine published work that focuses on research findings as well as that which discusses methodological issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 552 Data and Knowledge Management (3)** This course introduces the computational foundations, methodologies and tools for data and knowledge management.

### **IST 552 Data and Knowledge Management (3)**

IST 552 introduces the computational foundations, methodologies and tools in data and knowledge management, so that students can make better strategic decisions on using the technologies for enterprise knowledge management. Emphases will be placed on information and coding theory, data models, knowledge representation, information retrieval and searching techniques, data mining, geospatial applications, and multimedia tools. Relevant social and organizational issues will be discussed throughout the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009 Ending: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 554 Network Management and Security (3)** Essential skills and knowledge for effectively utilizing networks and Internet technologies to facilitate, manage and secure data communications and applications.

### **IST 554 Network Management and Security (3)**

Information technology is an integral part of today's organizations and services. As information systems and networks continue to grow and evolve we are becoming more and more dependent, individually and socially, on them to provide support for the economy, military, education and business. Because of this dependence, network-based information and communication systems are attractive targets for those who would compromise information or disrupt services for economic, social or political purposes.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 555 Intelligent Agents and Distributed Decision Making (3)** Distributed decision making theories and agent-based technologies, models and systems with applications in command and control, emergency and resource management.

### **IST 555 Intelligent Agents and Distributed Decision Making (3)**

This course introduces the theory and design of intelligent agents for distributed decision making with applications in grid computing, command and control, emergency management and sensor management. Emphasis will be placed on

understanding theories of decision making and using them to model and build relevant agent-based distributed systems for supporting decision making.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 557 (STAT 557) Data Mining I (3)** This course introduces data mining and statistical/machine learning, and their applications in information retrieval, database management, and image analysis.

### **IST (STAT) 557 Data Mining I (3)**

With rapid advances in information technology, we have witnessed an explosive growth in our capabilities to generate and collect data in the last decade. In the business world, very large databases on commercial transactions have been generated by retailers. Huge amount of scientific data have been generated in various fields as well. For instance, the human genome database project has collected gigabytes of data on the human genetic code. The World Wide Web provides another example with billions of web pages consisting of textual and multimedia information that are used by millions of people. How to analyze huge bodies of data so that they can be understood and used efficiently remains a challenging problem. Data mining addresses this problem by providing techniques and software to automate the analysis and exploration of large complex data sets. Research on data mining have been pursued by researchers in a wide variety of fields, including statistics, machine learning, database management and data visualization.

This course on data mining will cover methodology, major software tools and applications in this field. By introducing principal ideas in statistical learning, the course will help students to understand conceptual underpinnings of methods in data mining. Considerable amount of effort will also be put on computational aspects of algorithm implementation. To make an algorithm efficient for handling very large scale data sets, issues such as algorithm scalability need to be carefully analyzed. Data mining techniques developed in fields other than statistics, e.g., support vector machine in machine learning will be introduced as well.

Students will be required to work on projects to practice applying existing software and to a certain extent, developing their own algorithms. Classes will be provided in three forms: lecture, case study, and project discussion. In case study, students will be lead through practical problems addressed by data mining techniques. The aim is to provide a detailed view on how to convert real problems into models so that algorithms can be applied appropriately and how to solve possible computational issues. Project discussion will enable students to share and compare ideas with each other and to receive specific guidance from the instructors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 558 (STAT 558) Data Mining II (3)** Advanced data mining techniques: temporal pattern mining, network mining, boosting, discriminative models, generative models, data warehouse, and choosing mining algorithms.

### **IST (STAT) 558 Data Mining II (3)**

This course is the second course in a two-course sequence on data mining. It emphasizes advanced concepts and techniques for data mining and their application to large-scale data warehouse. Building on the statistical foundations and underpinnings of data mining introduced in Data Mining I , this course covers advanced topics on data mining; mining association rules from large-scale data warehouse, hierarchical clustering, mining patterns from temporal data, semi-supervised learning, active learning and boosting. In addition, to computational aspects of algorithm implementation, the course will also cover architecture and implementation of data warehouse, data preprocessing (including data cleansing), and the choice of mining algorithms for applications. In addition to discriminative models such as CRF and SVM models, the course will also introduce generative models such as Bayesian Net and LDA.

A term project will be developed by each student to apply an advanced data mining algorithm to a multi-dimensional data set. Classes will include lectures, paper discussions, and project presentations. Paper discussions will allow students to discuss state-of-the-art literature related to data mining. Project presentations will enable students to share and compare project ideas with each other and to receive feedback from the instructor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 562** Theoretical Foundations of Information Science (3) This course introduces the theoretical foundations of information science, with applications in communication, signal processing, machine learning, and pattern recognition.

### **IST 562 Theoretical Foundations of Information Science (3)**

This course introduces the theoretical foundations of information science, with applications in communication, signal processing, machine learning, and pattern recognition. Emphases will be placed on theories of communications and compression. Theories of probabilities and inference, learning methodologies, and graph theory.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 564** Crisis, Disaster and Risk Management (3) This course examines the fundamental elements of crisis, disaster, risk and emergency management.

### **Crisis, Disaster and Risk Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 594A** Principles of Scholarship (1) Students will address the issues and challenges inherent in pursuing a PhD and in the role of university faculty member, including conducting researching, the craft of teaching, manuscript reviewing, conference presentation, and job hunting.

### **Principles of Scholarship (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis

and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597A** (A ED 597A, WMNST 597A) Gender, Art and STEM (3) This course introduces FemTechNet, a global network of preeminent feminist scientists and artists who collaborate across areas of health, climate change, and information technology.

### **Gender, Art and STEM (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597B** Design-related Research (3) Course provides review of design-related research, including: foundational philosophical positions; empirical and theory-building work in design-related research; with tactics and techniques for conducting such research.

### **Design-related Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597C** IST Integration of Theories and Methods (3) Surveys theories and methods of IST research for application to practical problems.

### **IST Integration of Theories and Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597D** Big Data Fundamentals (3) Foundations and applications of big data science: complexity, cyberinfrastructure, data structures, search security, processing, analytics, visualization, mining, governance and management. Should be familiar with databases and statistics.

### **Big Data Fundamentals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597E** Advanced Topics in Art, Photography, and Information Technology (3) The course will cover some latest research and development advancements in the intersection of art, photography, and information technology.

**Advanced Topics in Art, Photography, and Information Technology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597I** Advanced Topics in Social Network Analysis and Social Media Mining (3) The course will discuss advanced topics in dynamic social network analysis through online interactions in social media.

**Advanced Topics in Social Network Analysis and Social Media Mining (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597J** Web Analytics (3) The course touches on the theoretical and methodological foundations of web data but the major focus will be analytical method.

**Web Analytics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 597K** Online Public Forums (3) This course explores opportunities to enable large-scale civic engagement in online Public Forums through innovative use of social computing and deliberative technologies.

**Online Public Forums (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 610** Thesis Research Off-Campus (1-15) No description.

**Thesis Research Off-Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 815** Information Security and Assurance (3) This course provides theoretical and practical foundations of information security assurance.

**Information Security and Assurance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 841** Search Engines & Information Retrieval (3) Introductory course on search engines and information retrieval. Search, indexing, ranking, and search evaluation are formally defined, explained, and used.

**IST 841 Search Engines & Information Retrieval (3)**

This is introductory course on the principles of information storage and retrieval systems and databases. Students will learn how effective information search and retrieval is interrelated with the organization and description of information to be retrieved. Students will also learn to use a set of open source tools and procedures for organizing information, will become familiar with the techniques involved in conducting effective searches of print and online information resources and will build a vertical/specialty search engine. Search, indexing, ranking, and search evaluation are formally defined,

explained and used.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 852 Knowledge Management (3)** This course provides a foundation in knowledge management concepts and paradigms, emphasizing computational methodologies and tools for supporting data and knowledge management practices.

### **Knowledge Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 868 Topics in Visual Analytics for Security Intelligence (3)** Introduce visual analytic techniques for security informatics and intelligence. Survey technical approaches for data analysis, threats and vulnerability, communicating risk.

### **IST 868 Topics in Visual Analytics for Security Intelligence (3)**

This course surveys techniques for visualizing and analyzing security and risk information and for communicating threats, risk and vulnerability to decision-makers. Students will be motivated by the needs for better intelligence in a broad range of applications such as homeland security, crisis management, and public safety. Through case studies and problem-based learning, students will develop understanding of important concepts and issues, such as data source and data quality, visual thinking associations and integration of incidence, hazards, and risk factors, and the difficulties of analyzing and communicating knowledge. Various visual analytical methods for homeland security intelligence will be discussed, such as: (1) mapping and visualizing patterns of crime and incidence, (2) identifying targets and agents of terrorist attacks, (3) spatial analysis of social, economic and environmental risk indicators, and (4) prediction of threat and risk. It also pays special attention to the interpretation of analytical results for actions. Geographical information systems and associated spatial analytical tools will be used to exemplify the kinds of information environment available to intelligence community. The course will prepare students to become immediate workforce for security-related industries and government agencies.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 868 Topics in Visual Analytics for Security Intelligence (3)** Introduce visual analytic techniques for security informatics and intelligence. Survey technical approaches for data analysis, threats and vulnerability, communicating risk.

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General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 885** Introduction to Multisensor Data Fusion (3) Understanding the concepts, techniques, and issues surrounding the fusion of information from multiple sensors and sources of data.

### **IST 885 Introduction to Multisensor Data Fusion (3)**

Rapid advances in nano and micro-scale sensors, ubiquitous wide-band wireless communications and improvements in computing provide the opportunity to collect and disseminate huge amounts of data and information from sensors, humans acting as observers, and emerging data available on the web. Applications for this data are widespread and include areas such as geospatial intelligence, emergency management, environmental monitoring, epidemiology, and others. This course introduces methods and process models for fusion of the information from diverse sources to achieve inferences that cannot be obtained by using a single source or sensor.

#### Course Objectives:

IST 885 provides an introduction to multisensor information fusion. Multisensor information fusion seeks to combine information from multiple sensors and sources to achieve inferences that are not feasible from a single sensor or source. The proliferation of micro and nano-scale sensors, wireless communication, and ubiquitous computing enables the assembly of information from sensors, models, and human input for a wide variety of applications such as environmental monitoring, crisis management, medical diagnosis, monitoring and control of manufacturing processes. Techniques for fusing multisensor and multi-source information are drawn from a variety of disciplines including statistics, data mining, artificial intelligence, estimation and control theory, pattern recognition, and signal and image processing. While this course is non-mathematical it will help students understand the concepts, techniques and issues associated with developing and using multisensor data fusion systems.

At the end of this course students should be able to:

- \* Explain different models of multisensor data fusion and describe the advantages and limitations of data fusion
- \* Explain the five levels of data fusion in the Joint Directors of Laboratories (JDL) data fusion process model
- \* Assess and characterize a sample information fusion application
- \* Identify various techniques used in multisensor data fusion and indicate the applicability and limitations of the techniques for a selected application
- \* Design a data fusion system including specifying the required functions, applicable techniques, selection/assessment of sensors and information sources, and design of a sample user interface
- \* Discuss current technology trends that affect the implementation of a fusion system.

#### Student activities:

The course consists of ten lessons and one capstone group project that will span either the 15-week semester or the combined 12-week summer session. Each lesson will require approximately 8 hours of student activity. Student activities will include reading lesson text, online quizzes, and discussions about the way in which multisensor information fusion is applied to selected applications such as geospatial intelligence, environmental monitoring, monitoring of complex systems, crisis management or related areas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 896** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IST 898 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Information Systems (INFSY)**

**INFSY 535 Object-Oriented Design and Program Development in Business (3)** Overview of key concepts in object design and the application of these concepts in business software development.

### **INFSY 535 Object-Oriented Design and Program Development in Business (3)**

INFSY 535 will be among the courses making up those prescribed in the MS&IS program and would normally be taken early in the Program. It is a prerequisite to several additional courses that are listed as part of the program. The course is intended to provide students with backgrounds in object-oriented design and to understand the application of these concepts to business problems. Students will learn basic object concepts and develop skills to implement programs utilizing object tools.

As managers in the technology environment, students need to have an understanding of how projects are implemented. To be successful they also need to learn how to work together to design, implement, and manage technology projects.

The goals of INFSY 535 are to:

- 1) Expose students to principles and concepts within the object oriented programming environment,
- 2) Teach students basic principles of project management and to manage a collaborative environment,
- 3) Teach students how to apply an object-oriented language in a business environment,
- 4) Show students how these techniques increase productivity of complex systems,
- 5) Develop team skills when programming complex systems and
- 6) Prepare students to continue in the program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 540 Information Technology and Knowledge Management (3)** Information systems management, enterprise models of information technology, information technology and knowledge management.

### **INFSY 540 Information Technology and Knowledge Management (3)**

INFSY 540, Information Technology and Knowledge Management, is a required course for MBA and MSIS students. Students will be provided an understanding of enterprise resource planning and how it relates to information technology architecture and its impact on modern organizations. Students learn Information Technology and Knowledge Management concepts that may be applied to leverage the benefits, avoid the pitfalls, and overcome the limitations of using information technology in an organization.

Although individual assignments and examinations will occur, INFSY 540 includes project- and team-based assignments where students will actively examine Information Technology and Knowledge Management and its effects on industries and specific organizations. Student performance will be evaluated using both individual and team assignments, individual examinations, case study analyses, and research papers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 543 Electronic Commerce (3)** Overview of key aspects of E-Commerce within an organizational context including coverage of managerial issues and supporting technology.

**INFSY 543 Introduction to E-Commerce (3)**

INFSY 543 provides a survey of E-Commerce topics, and serves as a foundation for further courses on E-commerce. The course is designed to appeal to both MBA and MSIS students. Upon successful completion of this course, the student will have an understanding of the various types of e-commerce, systems used to support e-commerce, applications of e-commerce, and associated managerial issues. INF SY 543 is an elective in the MBA and MSIS programs. INFSY 540, Information Resources in Management, is a required course for MBA and MSIS students and is a prerequisite for INFSY 543. In INFSY 543, students will continue to explore the interrelationship between technology and organizational performance. Although individual assignments and examinations will occur, INFSY 543 includes project- and team-based assignments where students will actively examine e-commerce and its effects on industries and specific organizations. Student performance will be evaluated using both individual and team assignments, individual examinations, case study analyses, and c-commerce project(s). INFSY 543 will be offered once per academic year or more frequently, based on student enrollment and demand.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 544 Design, Development, and Management of E-business (3)** Advanced topics in e-business including effective design, development, and management of E-business.

**INFSY 544 Design, Development, and Management of E-Business (3)**

INFSY 544 provides an advanced exploration of the various options available to construct E-business sites. The course will cover effective design, development, and management of E-business. Issues associated with website layout, user interface design, content management, and web project management will be covered as part of this course.

The course is designed to appeal to both MBA and MSIS students. Upon successful completion of this course, the student will have an understanding of advanced e-business technical and business issues, business models and web-site development.

INFSY 544 is an elective in the MBA, MBA E-business track, and MSIS programs. Students will extend their knowledge from INFSY 543 and continue to explore the inter-relationship between technology and organizational performance.

Although individual assignments and examinations will occur, INFSY 544 includes projects- and team-based assignments where students will actively examine e-business and its effects on industries and specific organizations. Student performance will be evaluated using both individual and team assignments, individual examinations, case study analyses, and e-business project(s).

INFSY 544 will be offered once per academic year or more frequently, based on student enrollment and demand.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 545 Program, Data, and File Structures (3)** Program, data, and file structures are studied as they relate to management of data in information systems.

**INFSY 545 Program, Data and File Structures (3)**

Program, data, and file structures are studied as they relate to management of data used in information systems. This course emphasizes the analysis, design and application of algorithms as they relate to the structure of data. Students will study the underlying concepts of abstract data types, program design, and learn how to analyze systems to better support the software environment. Implementation of the structures studies will be an integral part of the course. Individual projects as well as team exercises are integrated to support the learning process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 547 WEB Enabled Technologies (3)** Integrating design principles and applying technologies that support business related, web-based applications.

**INFSY 547 WEB Enabled Technologies (3)**The objectives of this course are to:

- a) teach students how to manage large WEB projects
- b) teach students a programming language that is used to create complex business projects
- c) make students aware of research issues that apply to WEB development
- d) strengthen collaborative skills related to project development

To accomplish these goals, students will study project management as applied to WEB applications, participate collaboratively in a business project where they apply management and design skills over the course of the semester. Additionally, the latest research will be explored as it relates to the above.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 554 Master's Project (3)** Development of an original master's project in the student's field of interest and preparation of a paper.

**Master's Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 555 Data Management Systems (3)** Concepts and theory of database management systems explored through data modeling and planning techniques.

**INFSY 555 Data Management systems (3)**

This course emphasizes the analysis, design and development of relational database management systems. Students will develop the analysis and design of a relational database for a business application through a series of assignments using ORACLE database software. Students also develop a research paper in database management.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 556 Data Warehousing (3)** The study of the requirements collection, design, and development of data warehouses.

**INFSY 556 Data Warehousing (3)**

This course deals with the collection of requirements, design, and development of data warehouses. Requirements gathering through query graphs, dimensional modeling, online analytical processing (OLAP) tools, metadata, and technical architecture of data warehouses will be the major focus of this course. End user applications pertaining to data warehousing is also included.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 560 Data Communications Systems and Networks (3)** Hardware and software concepts relevant to current communications and networking technology. The importance of telecommunications is emphasized.

**Data Communications Systems and Networks (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 563 Network Security (3)** This is a study of network security concepts, technology and issues. Authentication, privacy and integrity of messages are analyzed.

### **INFSY 563 Network Security (3)**

INFSY 563 is a follow-up course to INFSY 560, Data Communications and Networking. The objective of the course is that students gain an understanding of network security beyond what can be taught in an introductory course. Although the course is designed to appeal primarily to MSIS students, it is expected that the more technically minded MBA will find the course valuable. Upon successful completion of this course, the student will have an in depth understanding of encryption techniques and the use of keys for encryption. Each student will study the appropriate applications to public keys, secret keys, and session keys. They will gain an understanding of the role of certificate authorities and the public key infrastructure. In addition, students will learn about the various architectures available to transmit information securely across the Internet through virtual private networks. Students will be required to complete a research project that synthesizes their knowledge of encryption, keys, and virtual private networks.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 564 Wireless Networks (3)** This course is a study of wireless network standards, technology and applications. Both local and wide area networks are covered.

### **INFSY 564 Wireless Networks (3)**

INFSY 564 is a follow-up course to INFSY 560, Data Communications and Networking. The objective of the course is that students gain an understanding of wireless networks beyond what can be taught in an introductory course. Although the course is designed to appeal primarily to MSIS students, it is expected that the more technically minded MBA will find the course valuable. Upon successful completion of this course, the student will have an in depth understanding of standards and technology and will be able to decide which forms of wireless are appropriate for various applications. The course covers selection of wireless platforms, design methods, potential impairments and methods to evaluate the throughput of the network. Using a wireless lab, the students will be involved in throughput experiments and analysis of errors and the impact of the errors on application throughput. Students will be required to complete a network design that requires synthesis of their knowledge of transmission techniques, equipment location, security concerns and bandwidth requirements.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 565 Intelligent Systems in Business (3)** This course will emphasize the analysis, design, and application of intelligent systems within organizational settings.

### **INFSY 565 Intelligent Systems in Business (3)**

This course emphasizes the analysis, design and application of intelligent systems within organizational settings. Students will study the underlying concepts of intelligent systems such as expert systems and neural networks and learn how these systems support the business environment. A goal of the course is that students learn when and where intelligent systems will benefit an organization.

Students will analyze cases related to intelligent system development, study the issues of knowledge acquisition, and learn about uncertainty in intelligent systems. Actual system applications will be integrated into the course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 566** Data Mining and Knowledge Discovery (3) The study and application of data mining techniques used to mine patterns in large transactional databases.

**INFSY 566 Data Mining and Knowledge Discovery (3)**

This course deals with the advanced study of intelligent data mining tools that are used to mine patterns in very large databases. The focus is on theoretical, mathematical and statistical foundations of data mining as well as the applications of data mining to various business applications. Students taking this course will learn different data mining techniques that can be used to mine patterns in large corporate and transactional databases, will be capable of developing and applying data mining tools, and will be able to do independent research in data mining area.

Specific topics include the process of and statistical perspectives on knowledge discovery in databases, graphical models for discovering knowledge, inductive logic programming and data mining, discovering informative patterns and data cleaning, fast mining of association rules, inductive and deductive reasoning for data mining, and mathematical foundations of data mining. Data mining applications in finance, direct marketing and medicine will be emphasized.

Several projects and a research paper required.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 570** Software Engineering in the Analysis and Design of Information Systems (3) Software engineering concepts, specifically the analysis and design of structured information systems using computer-aided software engineering (CASE).

**Software Engineering in the Analysis and Design of Information Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 575** Seminar in Information Technology Management (3) Examination of selected topics relevant to current and future managerial and organizational issues of information technology.

**Seminar in Information Technology Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 585** Applications in Medical Informatics (3) Analysis of complex systems specific to the support of healthcare management and delivery applications.

**INFSY 585 Applications in Medical Informatics (3)**

The need for and uses of computers in healthcare are presented in the context of patient, clinical, and management support. The course analyzes complex systems ranging from decisions support systems, physician order entry to clinical applications. Issues ranging from the design and implementation of such systems, ethical considerations, and security issues will be presented using a problem-based approach. The integration of data bases and warehouses in health related systems is studied as well as techniques used in computer-assisted decision making to solve healthcare problems, physician portals and clinical and managerial applications of artificial intelligence, including expert systems.

INFSY 585 includes project- and team-based assignments where students will actively examine applications and their effects on the industry and public.

The objectives of this course are:

- a) To provide students with the foundations of healthcare informatics.
- b) To make students aware of the myriad of computer applications used in healthcare today, including administrative systems used for decision making patient care systems, and research based systems.
- c) To make students aware of the ethical and security issues in health informatics from the point of view of the user, patient, administrators, and government regulations.
- d) To make students aware of the infrastructure necessary to support an enterprise information system for patient care.
- e) To strengthen collaborative skills related to project development and management.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 587** Global Information Technology (3) Comprehensive coverage of components, applications, and issues of global information technology management in organizations worldwide.

**Global Information Technology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experience, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INFSY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Instructional Systems (INSYS)

**INSYS 415** Systematic Instructional Development (3) Preparation in the use of a nine-step model for systematically analyzing instructional problems and developing validated, practical solutions.

### Systematic Instructional Development (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 415A** Systematic Instructional Development (3) Preparation in the use of a nine-step model for systematically analyzing instructional problems and developing validated, practical solutions.

### Systematic Instructional Development (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 415B** Systematic Instructional Development for Teachers (3) Preparation of teachers to use a systematic model to design learning environments for K-12 classrooms.

### INSYS 415B Systematic Instructional Development for Teachers (3)

Instructional design (ID) is a systematic approach to designing learning environments. As a systematic process, ID can be viewed as a problem solving approach to identifying and addressing a learning gap. Instructional design is guided by a variety of learning and instructional theories, is governed by techniques such as needs assessment, learner analysis, and content analysis, and is constantly evaluated through formative and summative techniques. Instructional design models include five generic steps, analysis, design, development, implementation, and evaluation.

INSYS 415B introduces the instructional design process and then focuses on each step of the model from the perspective of the classroom teacher. It prepares teachers to use the instructional design process for the creation of instructional materials, or to modify, alter, or re-design existing materials when they do not work in a particular context, or with a particular group of students.

Upon completion of INSYS 415B, students will be able to:

- \* Define instructional design and relate it to curriculum development and other similar activities of teachers.
- \* Describe the professional associations affiliated with Instructional Design and the appropriate journals read by Instructional Designers and evaluate journals for personal use.
- \* Define, write, and classify instructional goals and outcomes.
- \* Write learning objectives for varied instructional goals.
- \* Analyze learner characteristics.
- \* Create assessments aligned with goals and objectives.
- \* Select instructional materials that are aligned with objectives.
- \* Develop instruction plans and activities that are appropriate for given objectives, tests, and types of students.
- \* Select media that are appropriate for given instructional situation.
- \* Create a formative evaluation plan for an instructional activity.
- \* Synthesize instructional design steps into a systematic model.
- \* Apply a systematic process for creating new instructional materials.
- \* Critically analyze the systematic process and compare it to other possible processes (e.g. constructivism, user-design).

A course in the systematic design of instruction is a core requirement in the Instructional Systems Program and therefore a required course for all graduate students in the program. Since INSYS 415B is intended for classroom teachers who are preparing to use the instructional design process to develop technology based instructional materials for implementation in their classrooms, students who wish to prepare for instructional design in a corporate or higher education setting should take INSYS 415A where the activities and examples are geared to the instructional design process in those settings.

**NOTE:** Students should take either INSYS 415A or INSYS 415B. Students who have completed INSYS 415A should not register for INSYS 415B.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 432** Designing Learning Within Course Management Systems (3) Hands-on design of didactic and constructivist instructor-facilitated online lessons within the affordances and constraints of course management systems.

### **Designing Learning Within Course Management Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Concurrent: ADTED 470

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 433** Teaching and Learning Online in K-12 Settings (3) Explores uses of online technologies for K-12 settings including cybercharter and blended settings.

### **Teaching and Learning Online in K-12 Settings (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 441** Design, Development, and Evaluation of Internet Resources (3) Design, production, and evaluation of instructional materials for delivery on the Internet.

### **Design, Development, and Evaluation of Internet Resources (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 442** Innovative Instructional Applications of Microcomputer Technology (3) Educators experience and develop innovative instructional applications of text-processing, database management, spreadsheet, and telecommunication software in their classrooms.

### **Innovative Instructional Applications of Microcomputer Technology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 447** Instructional Design for Multimedia Technologies (3) State of the art multimedia technology hardware such as interactive video, CD-ROM and digitizing audio and video.

### **Instructional Design for Multimedia Technologies (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 471** Introduction to Educational System Design (3) Investigates systems theory and how components of educational systems interact; develops insights on current issues and models in Educational System Design.

### **Introduction to Educational System Design (3)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 497A** Teaching and Learning Online in K-12 Settings (3) Explores uses of online technologies for K-12 settings including cybercharter and blended settings.

#### **Teaching and Learning Online in K-12 Settings (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 497E** Technology in Higher Education (3) An overview of technologies currently implemented in higher education - from LMSs to apps, and corresponding research, theory and critiques.

#### **Technology in Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 521** Instructional Systems Analysis (3) Conducting needs analysis, performance analysis, task analysis, learner

analysis, and environmental analysis in preparation for instructional design.

### **Instructional Systems Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 522** Analyzing Outcomes and Learners (3) Analyzing instructional outcomes, analyzing tasks, and writing objectives for the instructional design; analyzing learners characteristics.

### **Analyzing Outcomes and Learners (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 525** Instructional Design Models, Strategies, and Tactics (3) Application of instructional design models and design of appropriate instructional strategies and tactics.

### **Instructional Design Models, Strategies, and Tactics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 527** Designing Constructivist Learning Environments (3) Designing learning environments based on constructivist principles of learning that provide modeling, coaching, and scaffolding.

### **Designing Constructivist Learning Environments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 544** Designing Video for Instruction and Training (3) The application of theory to the design of visual instruction for multimedia instruction.

### **Designing Video for Instruction and Training (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 545** Research in Instructional Computing (3) The critical analysis of research in instructional computing and the application of research methodologies in instructional computing research.

### **Research in Instructional Computing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**INSYS 549** Current Topics in Emerging Technologies (3) An in-depth seminar on the instructional and training design implications of specific new technologies as they emerge.

**Current Topics in Emerging Technologies (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 551** Performance Technology for Instructional Designers (3) Methods of identifying human performance problems in organizations and developing instructional and non-instructional interventions.

**Performance Technology for Instructional Designers (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 553** Managing and Consulting for Instructional Development (3) Knowledge and skills in managing and coordinating an instructional development project and consulting with subject matter experts and clients.

**Managing and Consulting for Instructional Development (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 574** Applied Qualitative Research for Work Practice, Innovation, and Systems Design (3) Investigates qualitative research paradigms and methodologies; develops skills in use of ethnographic methods in work practice, innovation and systems design.

**Applied Qualitative Research for Work Practice, Innovation, and Systems Design (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2000

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 575** Designing Experimental Research in Instructional Systems (3) Designing research studies in Instructional Systems of a quantitative and experimental nature. Will result in a research proposal.

**Designing Experimental Research in Instructional Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 581** Theoretical Foundations of Instructional Systems (3) Analysis of theoretical foundations of the instructional systems (systems and cybernetics, communications, cognitive psychology, sociological, constructivist, ecological) for doctoral students.

**Theoretical Foundations of Instructional Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 583** Survey of Research in Instructional Systems and Technology (3) Analysis and evaluation of research in domains of instructional systems and technology.

**Survey of Research in Instructional Systems and Technology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 586** Diffusion and Adoption of Innovations (3) Understanding change process in educational contexts, comparing various models, tailoring them to individual needs, and creating personalized model of change.

**Diffusion and Adoption of Innovations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 597A** Integrating Mobile and Everyday Technologies into Learning Environments (3) Integrating Mobile and Everyday Technologies into learning Environments examines how people use and learn with mobile devices in daily life.

### **Integrating Mobile and Everyday Technologies into Learning Environments (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 597B** Design Studio (3) Design Studio is an environment for students to apply the skills, processes, and dispositions of Interaction Design. Too often educational technologies are used for relatively low level tasks. Students will be encouraged to design innovative educational technologies--creative ways of using technology to solve educational problems. Innovative educational technologies help people to solve various authentic educational programs in ways that have not been tried before. Completing Design Studio will also help people to identify research questions that are suitable for dissertation research and will stimulate fundable design projects.

### **Design Studio (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 597B** Design Studio (3) Design Studio is an environment for students to apply the skills, processes, and dispositions of Interaction Design. Too often educational technologies are used for relatively low level tasks. Students will be encouraged to design innovative educational technologies--creative ways of using technology to solve educational problems. Innovative educational technologies help people to solve various authentic educational programs in ways that have not been tried before. Completing Design Studio will also help people to identify research questions that are suitable for dissertation research and will stimulate fundable design projects.

### **Design Studio (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 597C** (HI ED 597C) Online Innovations in Learning and the Future of Education (3) Examines MOOCs, badges, competency-based learning, prior learning assessments, and trends, and extrapolates the future of K-12 and Higher Education.

### **Online Innovations in Learning and the Future of Education (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 601** PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION FULL-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 602** SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) NO DESCRIPTION.

**SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 610** THESIS RESEARCH OFF-CAMPUS (1-15) NO DESCRIPTION.

**THESIS RESEARCH OFF-CAMPUS (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INSYS 611** PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION PART-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Insurance (INS)**

**INS 575** Risk Management (2) Develop an understanding of the risks facing corporations and the methods available to deal with those risks.

**Risk Management (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INS 599** (IL) Foreign Study--Insurance (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

#### **Foreign Study--Insurance (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INS 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INS 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Integrative Biosc (IBIOS)**

**IBIOS 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 511 (BMMB 511, VB SC 511) Molecular Immunology (2)** The study of molecular and biochemical events that influence immune responses and define current questions in immunology.

**IBIOS 511 (BMMB 511, V SC 511) Molecular Immunology (2)**

The goals of the course are to integrate the current questions of immunology with other disciplines, in particular cell biology and biochemistry, and to provide training in critical thinking and evaluation of data and experiments. The course will be approximately 2/3 lecture by the instructor and 1/3 student presentations of papers related to the material. In addition, written critical reviews of recently published papers and a short research proposal will be assigned.

By focusing on the mechanisms involved in immunity and disease, this course complements several existing courses on immunology, virology, and biochemistry. The prerequisites of MICRB 410 and B M B 400 assure that the students enrolling in the course have a general understanding of immunology and biochemistry. This course is projected as a requirement for the Molecular Medicine and Immunobiology options in the IBIOS graduate program and is an elective for the Pathobiology and BMMB graduate programs. The course will be offered in the fall semester with an enrollment limit of twenty students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 530 (VB SC 530) Regulation of gene expression by xenobiotics (3)** The mechanisms by which foreign chemicals alter gene expression and the techniques used to examine this effect are examined.

**IBIOS (VB SC) 530 Regulation of Gene Expression by Xenobiotics (3)**

The goals of the present course are to enhance the students' ability to read, design, implement and discuss studies focusing on how chemicals regulate gene expression. Through the use of current research articles, the students will understand the principles of experimental design. They will learn critical reading skills as well as enhance their own research and problem solving abilities. In addition, an emphasis will be placed on presentation clarity and ability to defend scientific inquiry from peers. Thus students will develop critical communication skills. The grade is determined by presentations (60%) and one oral assignments (40%). Each student will give several presentations during the semester (depending on the number of students enrolled), each based on a current journal article. All students are expected to read the article and participate in in-class discussions. The oral assignment consists of a series of discussion questions, which the student will answer in writing and "defend" in an informal oral presentation. In addition to being a required course in the Molecular Toxicology graduate program (IBIOS), Regulation of Gene Expression by Xenobiotics will complement several life science graduate programs. This course builds upon Molecular and Cellular Toxicology and requires a good understanding of biochemistry and molecular biology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 532 (VB SC 532) Developmental and Reproductive Toxicology (3)** Effects of environmental chemicals, nutrients and drugs on embryo/fetal development and maternal/paternal toxicity.

**Developmental and Reproductive Toxicology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 551 (BMMB 551) Genomics (3)** Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics.

**IBIOS (BMMB) 551 Genomics (3)**

IBIOS/BMMB 551 will deal with the structure and function of genomes including the use of some current web-based tools and resources for studies and research in genomics. The overall objective is to learn current information about the structure and function of genomes, to develop facility in the many web-based tools and resources for further studies and research in genomics, and to appreciate the power and limitations of current resources and knowledge. This course is designed as a basic course for any student in the life sciences who needs to exploit the developments and tools in genomics in their own research and who wants to broaden their understanding of the current knowledge and research in the life sciences that are increasingly drawing on genomics advances. The course will be taught by a team of faculty



(members active in genomics research and will be video-conferenced. Students' grades will be based on take home exams or assignments that require their understanding of the concepts in genomics and the hands-on use of web-based analysis tools, as well as on class discussion participation. Students will be assigned one or more projects, tutorials, problem sets or essays to complete. Reading assignments will further help students explore the materials, do the assignments and participate in classroom discussions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 570 Molecular Toxicology Seminar Series (2)** This course provides an opportunity for students in the Cellular and Molecular Mechanisms of Toxicity program to interact with leading scientists.

#### **Molecular Toxicology Seminar Series (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 571 Current Issues in Biotechnology (2)** Lecture-discussion series by academic and industry experts on the cutting-edge of science, business, intellectual property, legal, social, and ethical issues in biotechnology. The course also requires a group project, involving case studies or market research on various areas of biotechnology.

#### **Current Issues in Biotechnology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 572 Benchmark Papers (2)** Discussion of current literature on molecular, cellular and developmental biology.

#### **IBIOS 572 Benchmark Papers (2)**

This is a required course for all CDB graduate students during their second fall semester. It will be team taught using papers selected by the participating faculty members. One to few paper(s) on a specific topic will be assigned each week prior to the meeting between a faculty and the students. The students will read the papers, and then come to the meeting ready for discussion. The faculty member will moderate and guide the discussion, including asking questions, pointing out key aspects that might be missed by students, and giving time to those students who have not had a chance to speak.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 580 Critical Reading in Immunobiology (1)** Literature review of cellular, molecular, genetic and biochemical analysis of in vitro and in vivo immunology.

#### **IBIOS 580 Critical Reading in Immunobiology (1)**

This course will involve the review of primary literature in topics including immune development and regulation, the phenotype and function of immune cell subsets, autoimmunity, immunodeficiency and the response to bacterial, viral and protozoal pathogens. The major emphasis will be on the critical review of current literature on each subject following an introductory lecture with a view of both broadening the scope of familiarity with immunological topics and to developing the skill of the analytical review of primary literature. Examples of topics to be included are; Natural Killer Cell Biology, Phagocytosis in the Immune System, Biology of Polymorphonuclear Granulocytes, Pattern Recognition Molecules, Mechanisms of Cell-mediated Cytotoxicity, Innate Inflammatory Mediators, Modulation of T cell Function by Antibody, Chemotaxis in the Immune System, Intestinal Immunity, Lung Immunity and Immunity to Intracellular Bacteria. These topics covered in this course will complement, but not overlap with, the topics covered in MICRO 554 and MICRO 560. Topics covered are flexible allowing for change as interests and emphasis in the field shift.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 591** Ethics in the Life Sciences (1) An examination of integrity and misconduct in life sciences research, including issues of data collection, publication, authorship, and peer review.

**Ethics in the Life Sciences (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 592** Current Research Seminar (2) This course uses a weekly biological seminar as a springboard for discussion of a research topic of high current interest.

**Current Research Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 593** Molecular biology Laboratory (3) An intensive laboratory course on the principles and techniques of nucleic acid purification, analysis by restriction enzymes, gel electrophoresis, nucleic acid labeling and hybridization, cloning, sequencing, PCR amplification, and analysis of cloned heterologous gene expression by western blotting.

**Molecular biology Laboratory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 598E** Tutorials in Bioinformatics and Genomics (1) Review of current scientific literature in the area of bioinformatics and genomics.

**Tutorials in Bioinformatics and Genomics (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**IBIOS 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IBIOS 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Intercollege Mba (IMBA)**

**IMBA 501** Markets, Industry Analysis, and Business Strategy (3) How markets determine prices and activity in the business firm; the firm's microeconomic and macroeconomic environments; formulation of competitive strategy.

**Markets, Industry Analysis, and Business Strategy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 502** Financial and Accounting Tools (3) Introduction to financial systems and reports, ability to analyze financial information, apply financial tools, and communicate financial information.

**Financial and Accounting Tools (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 513** Data Analysis Resource Module (2) Applications of statistical methods in business management: selection of methods, interpretation of results, and presentation.

#### **Data Analysis Resource Module (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 515** Accounting for External Reporting (2) Ability to read financial reports and analyze their content.

#### **Accounting for External Reporting (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 516** Organizational Behavior and Performance (2) Analysis of conceptual models, systems, and decision processes consistent with high levels of individual, group, and organizational performance.

#### **IMBA 516 Organizational Performance Management (2)**

The primary objective of this course is to provide an introduction to the research and case study findings relating to the performance of people and groups in organizations. These findings, when taken in the context of contemporary social, ethical, and legal contextual factors, are employed by managers at all levels of high performing organizations to establish, direct, enhance, and deploy desired behavior of individuals, groups, and the organization itself. Course topics will also focus upon mechanisms for continuous system improvement methods such as employee involvement, training, satisfaction, and well-being. Information regarding work system effectiveness, as well as effectiveness of measurement, control, and support systems is also considered.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 517** Corporate Governance (2) Study of interrelationships among shareholders, boards of directors, and managers (owner agents) and other stakeholders in a modern public corporation.

#### **IMBA 517 Corporate Governance (2)**

The subject matter of corporate governance deals with the nature of the interrelationships among shareholders (owners), boards of directors (representatives of the owners), and managers (agents of the owners). These interrelationships form the basis for the modern corporation. As their agents, managers are supposed to run a company in the interest of its shareholders; the board of directors is expected to monitor the performance of managers and to ensure that they do not stray from their primary obligation to the owners. The subject of corporate governance also encompasses the study of corporations' relationships with its employees, creditors, suppliers, and customers. Finally, as corporations are expected to be good citizens of their communities, corporate governance also extends to the study of corporations; relationships with their communities.

Periodic scandals involving major, publicly held companies have underscored the fundamental importance of these relationships. The larger interests of society and of its citizens required that various stakeholders perform their roles in an ethical manner. This course reviews major theories of ethical and moral development, provides cases and exercises to heighten students' awareness of these areas, and reviews heuristics and decisions-models for ethical conduct. This course thus also addresses the emerging area of ethical corporate governance, specifically exploring the how ethical conduct and the ethical underpinnings of corporate governance function to safeguard the interests of all stakeholders.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 520** Managing Culture, Visions, Mission and Values (2) Processes and models related to organizational culture and climate, leadership, and mentoring.

### **Managing Culture, Visions, Mission and Values (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 521** Strategic Analysis (2) Analysis of a company case; development of the ability to draw sound conclusions on business strategies and performance.

### **Strategic Analysis (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 522** Financial Management (2) Analyze capital investment projects, examine the general principles of asset valuation, and study the valuation of stocks and bonds.

### **Financial Management (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 523** Organizational Development, Intervention and Change (2) Analysis and assessment of conceptual models, systems, and decision processes for organizational development, intervention and change; transformation and reengineering processes.

### **IMBA 523 Organizational Development, Intervention and Change (2)**

This course will analyze organizational models using current theory and case study application to discuss the topics surrounding organizational development, intervention and change. The course focuses on the human and social aspects of the organization as a way to improve the "fit" between individuals and the organization and between the organization and the environment. This analysis and assessment helps to improve the organization's overall performance and stakeholder satisfaction. The course emphasizes the use of Organization Development (OD) as one of the most effective approaches to introduce changes to organizations and to facilitate intervention. The course elaborates on knowledge and techniques from the behavioral sciences to create a learning environment through increased trust, open confrontation of problems, employee empowerment and participation, knowledge and information sharing, the design of meaningful work, cooperation and collaboration between groups and the full use of human potential.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 530** Marketing in a Global Environment (3) Global marketing planning and strategic formulation for profit and non-profit firms in creation, promotion, pricing, and distribution of goods and services.

### **Marketing in a Global Environment (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 531 Project Management (2)** A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment.

### **IMBA 531 Project Management (2)**

Project management has been labeled by Fortune Magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, to respond to rapid time-to-market demands. This course would give business majors a competitive advantage in the job market, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential.

The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep to timetables and schedules.

The course will involve semester-long projects, either developed by the instructor or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 543 Accounting for Internal Decision Making (2)** Covers basic concepts, issues, tools, and techniques in the use of accounting information for internal decision making.

### **Accounting for Internal Decision Making (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 544 Managing Human Resources (3)** Processes and issues related to staffing and retaining human resources.

### **Managing Human Resources (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 545 Research for Marketing Decisions (1)** Marketing research concepts/applications dealing with gathering, processing, and interpretation of primary/secondary data in identifying the needs/wants of prospective consumers.

### **Research for Marketing Decisions (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 550 Corporate Information Strategy (3)** Information technology supporting management decision making, operations, and creation of new products and services; electronic commerce in global markets.

**Corporate Information Strategy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 560** Corporate Innovative Strategies (3) Formulation and implementation of a corporate innovation or technology strategy.

**Corporate Innovative Strategies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 561** Global Operations and Supply Chain Management (3) Effective management of the flow of goods and services.

**Global Operations and Supply Chain Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 562** Global Business Management (3) Establishing and expanding businesses in global markets and managing multinational firm strategies and operations.

**IMBA 562 Global Business Management (3)**

This course examines the unique opportunities and problems that confront multinational companies and international managers as they navigate the company through the extreme complex and ever-changing global economic, political-legal, socio-cultural, and technological environments. It studies the decision choices of international managers regarding business strategies for production and marketing of product and services, the modes of entry into foreign markets, the management of such functions as physical and human resources, production of goods and services, financial management, controlling of operations, labor relations, and conducting businesses ethically. It is designed to help students to gain insights into the complexities of managing across borders and cultures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 573** Strategic Planning (3) Application of knowledge in creating and sustaining competitive advantage; development of skills necessary for writing a strategic plan.

**Strategic Planning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 574** Strategic Financial Decisions (3) Advanced capital project analysis; evaluating levered investments; application of option valuation principles to strategic decisions.

**Strategic Financial Decisions (3)**

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IMBA 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Intern Agric Develop (INTAD)**

**INTAD 820** International Agricultural Development Seminar (3-6 per semester/maximum of 6) Students will examine international agricultural development issues through observation of systems, methods, and policies.

### **International Agricultural Development Seminar (3-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **International Affair (INTAF)**

**INTAF 501** Water and Sustainable Development (3) This course addresses the scientific theory and practical considerations necessary to manage water resources in an international sustainable development context.

### **Water and Sustainable Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 502** Science, Technology, and International Policy (3) Examines science and policy communities, importance of science and technology to international affairs, scientific issues likely to affect international policy.

### **Science, Technology, and International Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 503** Hazards, Disasters, and International Affairs (3) Hotspots, tipping points, and international approaches to prepare for, respond to, and recover from hazards, disasters and complex humanitarian emergencies.

**Hazards, Disasters, and International Affairs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 590** Colloquium (3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597A** Development, Growth, and Institutions (3) This course examines the reasons why different national realize diverse long run levels of welfare. Possible determinants of the differential outcomes include different rates of factor accumulation, rates of technological innovation, openness of economies, as well as geographical location. In addition, the course will consider the impact of institutions, including domestic institutions, international institutions, as well as multilateral forms of cooperations between economies. Types of institutions to be considered will include micro-level institutions (those that function most obviously at the individual agent level), as well as institutions that govern at more aggregate levels of society. The course will consider both relevant theory, but will place an emphasis on examining available data sources in order to test alternative explanations.

### **Development, Growth, and Institutions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597A** Development, Growth, and Institutions (3) This course examines the reasons why different national realize diverse long run levels of welfare. Possible determinants of the differential outcomes include different rates of factor accumulation, rates of technological innovation, openness of economies, as well as geographical location. In addition, the course will consider the impact of institutions, including domestic institutions, international institutions, as well as multilateral forms of cooperations between economies. Types of institutions to be considered will include micro-level institutions (those that function most obviously at the individual agent level), as well as institutions that govern at more aggregate levels of society. The course will consider both relevant theory, but will place an emphasis on examining available data sources in order to test alternative explanations.

### **Development, Growth, and Institutions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597B** Role of Intelligence in Contemporary International Relations (3) This course will examine how intelligence is gathered and how it is used in the process of formulating foreign policy. It will consider the various types of intelligence that are gathered, what government agencies are involved, how the intelligence is analyzed and what impact this information has on policy makers.

### **Role of Intelligence in Contemporary International Relations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597B** Role of Intelligence in Contemporary International Relations (3) This course will examine how intelligence is gathered and how it is used in the process of formulating foreign policy. It will consider the various types of intelligence that are gathered, what government agencies are involved, how the intelligence is analyzed and what impact this information has on policy makers.

### **Role of Intelligence in Contemporary International Relations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597C** Dynamics of International Economic Order: Law, Politics, and Power (3) This course examines the cross-cutting relationship between political power and global economic governance. The course considers three inter-related sets of issues: first, how nation-states define international economic order through the creation of legal frameworks and rules-based regimes for cross-border trade, investment, and monetary relations; second, how shifts in the international distribution of economic and political power impact these frameworks and regimes; and third, how great powers-in the contemporary context more specifically, the United States (the emblematic established power) and China (the paradigmatic rising power) - approach global economic governance as part of their grand strategies to advance their interests and enhance their international position.

**Dynamics of International Economic Order: Law, Politics, and Power (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597C** Dynamics of International Economic Order: Law, Politics, and Power (3) This course examines the cross-cutting relationship between political power and global economic governance. The course considers three inter-related sets of issues: first, how nation-states define international economic order through the creation of legal frameworks and rules-based regimes for cross-border trade, investment, and monetary relations; second, how shifts in the international distribution of economic and political power impact these frameworks and regimes; and third, how great powers-in the contemporary context more specifically, the United States (the emblematic established power) and China (the paradigmatic rising power) - approach global economic governance as part of their grand strategies to advance their interests and enhance their international position.

**Dynamics of International Economic Order: Law, Politics, and Power (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597D** Cultural Policy, Cultural Exchange (3) This course looks at two central sources of the production of cultural identity: nation states and globalization. By studying state policy, cultural trade policy, and international agreements related to culture we will understand the various ways that identity has been constructed outside of everyday practice. After establishing this groundwork we will study how cultural identity is a contested terrain for both states and global capital. The cultural form of focus will be cinema but we will also study other media, public art, and education.

**Cultural Policy, Cultural Exchange (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597D** Cultural Policy, Cultural Exchange (3) This course looks at two central sources of the production of cultural identity: nation states and globalization. By studying state policy, cultural trade policy, and international agreements related to culture we will understand the various ways that identity has been constructed outside of everyday practice. After establishing this groundwork we will study how cultural identity is a contested terrain for both states and global capital. The cultural form of focus will be cinema but we will also study other media, public art, and education.

**Cultural Policy, Cultural Exchange (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597E** Law, Politics and the Practice of Diplomacy (3) Diplomacy is an important mechanism for the conduct of relations amongst States. This course will define its structure and methods, as it has been practiced historically, and by reference to the politics and law which support it: such as the notion of the sovereignty, rights and duties of States; the obligation to settle disputes by peaceful means; and the pursuit of the interests of States. Attention will be given, particularly to its working methods: negotiations; the role of Foreign Ministries, Embassies and diplomats; and, international organizations, such as the United Nations and its Agencies. A critical appraisal will be made of: its utility in

the modern era, the mythology which surrounds it; and ways in which it might be adjusted to increase its utility and cost effectiveness in the future. Much attention will be given, in the course, to practical examples of diplomatic actions and experiences.

### **Law, Politics and the Practice of Diplomacy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597E** Law, Politics and the Practice of Diplomacy (3) Diplomacy is an important mechanism for the conduct of relations amongst States. This course will define its structure and methods, as it has been practiced historically, and by reference to the politics and law which support it: such as the notion of the sovereignty, rights and duties of States; the obligation to settle disputes by peaceful means; and the pursuit of the interests of States. Attention will be given, particularly to its working methods: negotiations; the role of Foreign Ministries, Embassies and diplomats; and, international organizations, such as the United Nations and its Agencies. A critical appraisal will be made of: its utility in the modern era, the mythology which surrounds it; and ways in which it might be adjusted to increase its utility and cost effectiveness in the future. Much attention will be given, in the course, to practical examples of diplomatic actions and experiences.

### **Law, Politics and the Practice of Diplomacy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597F** The United States and the Middle East (3) American engagement in the Middle East, one of the world's most important regions, is and will continue to be a powerful factor shaping the character of contemporary international affairs. To help students deepen their understanding of U.S. foreign policy and the modern Middle East, this course explores two related sets of issues: 1) the strategic challenges facing U.S. policymakers in the Middle East and how policymakers have sought to address these challenges; and 2) Middle Eastern responses to U.S. engagement in the region.

### **The United States and the Middle East (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597I** Hazards Disasters & International Affairs (3) This course addresses the scientific and technical background of hazards natural, technical, cultural) and disasters; considers the risk model, examines the disaster management cycle; and discusses costs and benefits of various actions in the international environment. The implications of disasters and complex humanitarian emergencies to national and international stability are considered using case study and theoretical approaches. The national and international hazard management and disaster response communities are examined (government, inter governmental organizations, non-government organizations, private industry). Disaster management plans are considered.

### **Hazards Disasters & International Affairs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 597K** International Environmental Negotiations (3) Major environmental issues with considerable controversy, uncertainty, or immediacy will be examined in detail (for example: climate change, pandemic flu virus, or a major natural disaster, etc.). After extended study in the substance of the topics, various negotiations techniques (positional, principled, and hybrid practical approaches), and the decision-making process in the international community, and a number of short role playing activities and practice negotiations, a simulation game will be conducted based on one of the topics. Teams of students will take on the roles of nations, groups of nations, or extranational organizations (for example USA, China, India, Russia, EU, Group of 77, OPEC, UN, WHO, etc.). They will develop positions based on the most current scientific information, existing policy and their groups' interests. The game will progress through a series of moves to

which they must respond with new policy positions and negotiated agreements.

### **International Environmental Negotiations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 598A** Member Journal of Law and International Affairs (1) See handbook for description.

### **Member Journal of Law and International Affairs (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 598B** Editor Journal of Law and International Affairs (2) See handbook for description.

### **Editor Journal of Law and International Affairs (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 801** Actors, Institutions, and Legal Frameworks in International Affairs (3) Addresses the principal actors, institutions, and legal frameworks which operate in international relations.

### **Actors, Institutions, and Legal Frameworks in International Affairs (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 802** Foundations of Diplomacy and International Relations Theory (3) Addresses the central tenets of diplomacy and international relations and theories and concepts that underpin the study of international relations.

### **Foundations of Diplomacy and International Relations Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 803** Multi-sector and Quantitative Analysis (3) Introduces students to quantitative methods applicable to various

issue areas, including international relations, economics, business, law, education, health, and environment.

### **Multi-sector and Quantitative Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 804 Global Cultures and Leadership (3)** Introduces students to cultural theories and to an understanding of how socio-cultural beliefs may impede or accelerate social change.

### **Global Cultures and Leadership (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 805 International Economics: Principles, Policies, and Practices (3)** Addresses principles, policies, and practices in international trade and finance that are fundamental for understanding international economic relations.

### **International Economics: Principles, Policies, and Practices (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 810 Energy, International Security, and the Global Economy (3)** This course explores the economic, political, and strategic implications of ongoing trends in global energy markets, particularly oil and gas markets.

### **INTAF 810 Energy, International Security, and The Global Economy (3)**

This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy, in contemporary international affairs. They will learn about the historical development and evolution of hydrocarbon-based energy and the international oil and gas industry; about the various types of contractual arrangements for cross-border investment in upstream oil and gas development and what the differences among these types of agreements reflect regarding the shifting balance of power between resource-owning national governments and foreign investors; and about why and how major energy market players shape their interactions on the basis of political and strategic calculations, along with commercial and economic considerations. They will also learn about the economic and political factors affecting the contribution of nuclear energy to the global energy balance; about the major proliferation risks associated with civil nuclear technology; and about the international regime that has been developed to mitigate these risks and the most pressing challenges to this regime.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 811 Estimative Analysis in International Strategy (3)** Analytical methods to estimate future conditions as they might influence international policy, negotiations, or strategic planning.

### **Estimative Analysis in International Strategy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTAF 813** International Environmental Negotiations (3) Major international environmental negotiation issues with considerable controversy, uncertainty, and/or immediacy will be examined in classroom with experiential learning situations.

### **International Environmental Negotiations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **International Bus (INT B)**

**INT B 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INT B 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **International Business (I B)**

**I B 403** International Business and National Policies (3) Evaluation of national economic policies in the light of international economic theory; their impacts on operations of the international business firm.

### **I B 403 International Business and National Policies (3)**

I B 403 integrates macro and micro analyses of the dynamics between international businesses/ multinational enterprises (MNEs) and national Governments. Students who successfully complete I B 403 will acquire knowledge of and tools to understand, analyze and evaluate actions, theories and philosophies that influence home and host Government policies, the roles businesses play in shaping, these policies, and how policies and other factors shape competitive strategies of international business firms in the areas of trade, investment and other international economic activities. Theories, Models and Policies - Country-based advantages Imperfect Competition, Barriers to Entry and Strategic Trade Policy Competitive Analysis: Product Life Cycle and Porter Models Integrating Market and Non-Market Strategy Manipulating and Managing External Stakeholders Across Borders Transitional Economies: Opportunities, Risks and Strategies Strategies for Successful Foreign Direct Investment in China Evaluating Opportunities and Risks in Global Industries Privatization of Telecommunications Economic Integration: the Case of Europe Industrial Policy, Foreign Direct Investment and Economic Growth Foreign Market Entry Strategies for Regulated Industries Industrial Policy and International Competition International Competition in Services Industries Update on U.S. and EU policies in the Airline Industry and Impacts on Industry Structure and Firm Strategy.

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 404 Contemporary Issues in International Business (3)** Investigation of issues in international business practice interpreted from the foundations of the social sciences. Topics will be chosen from contemporary issues in global business and economics.

**I B 404 Contemporary Issues in International Business (3)**

I B 404 enables students to study the most current topics in international and global business from the framework of the social science issues that form the framework for understanding, business decisions. The course provides structured experiences in library research and data gathering, techniques, and builds the habit of reading the international business press daily and analyzing it weekly. The class is typically organized around 3 integrative business topics that represent a spectrum of questions important to business. These include questions about finance and economics in international business, questions about people and organizations in an international environment, and questions about products (development, production, distribution of goods and services) in international business contexts. This is not an introductory course, and as such, the topics chosen should be substantive and nuanced. For example, one topic might be how the structure of franchises must be modified to reflect the property rights in a particular country, and how those property rights laws impact the value of the franchise. The second topic might be how the internationalization of the structure and role of Boards of Directors in multinational firms contribute to globalization, and challenge the cultural norms in those organizations. The third topic might be how North American firms have been forced to adjust their product packaging, in response to environmental impact laws in Germany, and how this shifts the locus of the product message from point-of-purchase to alternative media.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 440 (US;IL) (PL SC 440, AFR 440) Globalization and Its Implications (3)** This course explores the socioeconomic implications of globalization.

**I B (AAA S/PL SC) 440 Globalization and Its Implications (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores the socioeconomic implications of globalization and some fundamental changes that have taken place in the global socioeconomic system. The bipolar configuration of global power has been radically altered, market-state relations have been reformulated, and global systems of production and finance have been reorganized. Given these recent changes in the world's structure, globalization as a socioeconomic force is examined with a special emphasis on its implications on social issues, capital-labor relations, the roles of unions and trans-nationals, unemployment issues, poverty and inequality, gender and ethnicity issues, race relations, and democratization around the world. This course also allows students to explore how different countries, communities, social classes, business firms and even institutions are affected differently by globalization. The implications of globalization on African communities is given special attention.

The course is organized into three parts: A) The first part of the course attempts to define globalization and identify its essential characteristics in light of social and economic change. This part attempts to answer questions such as what constitutes globalization, how do we know if globalization is taking place, and what aspects of it are new. B) The second part of the course attempts to assess the implications of the different aspects of globalization (identified in the first part) on many critical social issues, including capital-labor relations, the roles of unions and transnational corporations, problems of unemployment, poverty and inequality, gender, ethnic, and race relations, and democratization. C) The third part of the course examines the implications of globalization to African communities.

This course exposes students to the economic, social, political, and cultural implications of the unfolding global order. It allows them to explore how different countries, communities, social classes, business firms and even institutions are affected differently by globalization. Evaluation will be based on daily attendance, along with a class presentation of a design of a research paper; an actual research paper, a mid-term exam and a final exam.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 450 The Business Environment of Europe (3)** This course provides an overview of the economic, institutional, and

regulatory environment in Europe at the EU and national levels.

### **I B 450 The Business Environment of Europe (3)**

This course provides an overview of the business, economic, and regulatory environment in Europe at the European Union (EU) and national levels. The course examines how regional integration, through the EU, has shaped industrial, competition, monetary, and related economic policies, and how Europe's international trade and finance capabilities affect the global economy. As a result, a significant part of the course focuses on the evolution of the EU, its institutional structure, and its impact on business (both European and foreign). The course also compares business-government relations, models of capitalism, and corporate governance in individual European countries, using the United States as a basis of comparison. Particular attention is given to France, Germany, Ireland, and the United Kingdom, and how their business environments differ from each other.

While the primary focus of this seminar will be on these themes, we will use articles from the *Financial Times* and similar publications as the basis of discussion in each class for a range of topics related to Europe. The approach taken in this course is a multidisciplinary one, with the assumption that business executives must understand the political, cultural, institutional, historical, and geographic aspects of Europe if they are to be successful in the business environment of Europe.

Students are expected to be active participants in class discussion. Readings usually will include a textbook, readings packet, and a subscription to the *Financial Times*. Evaluation will be based on a combination of participation and attendance, exams, quizzes, a group project, and essay assignments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 460 International Business in Emerging Nations (3)** An overview of international business strategies and economic environments of emerging nations with a specific focus on markets in China, India, and Southeast Asia.

### **International Business in Emerging Nations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:  
Concurrent: I B 303

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 480 (R M 480) International Real Estate Markets (3)** International perspectives on real estate as property, evaluation of land use regulations, and differences in real estate markets across countries.

### **International Real Estate Markets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 494H Honors Research Project (1-3 per semester/maximum of 6)** Supervised honors student research projects identified on an individual or small-group basis.

### **Honors Research Project (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 497** Special Topics (1-9) Formal courses given infrequently to explore in depth, a comparatively narrow subject interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 497A** International Development in African Context (3) Course delves into Africa's development prospects in the 21st Century, past and current issues in international business.

### **International Development in African Context (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 497B** The Global Financial Crisis (3) An overview of the growth of the financial industry in the U.S. economy and the globalization of financial markets. It will look at the role of government, consumers, mortgage companies, the rating agencies and the banking sector in the creation of the housing bubble. The impact of certain financial derivatives on the global economy in general and specific countries in particular will be explored. Through readings of key players involved in the crisis, it will identify risk management issues that are important to this case and look at proposed remedies designed to avoid future problems.

### **The Global Financial Crisis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 500** International Business Management (3) Concepts and institutions affecting the international conduct of business; interface between nations and international firms; alternative policies businesses employ internationally.

**International Business Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 515** (R EST 515) Property Rights in a Global Economy (2) Analysis of economic, financial, legal, and political factors affecting international real estate decision making.

**Property Rights in a Global Economy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 555** (FIN 555) Global Finance (1-3) Analyze international business finance problems, impact of evolving international payment systems on business, financial management in modern multi-national enterprise.

**Global Finance (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**I B 599 (IL) Foreign Study--International Business (1-12)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

### **Foreign Study--International Business (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Internatl & Comp Law (INTER)**

**INTER 950 International Air and Space Law (2)** This course will examine with an international perspective the legal status of national air space and outer space and the legal problems surrounding man's activities in these environments. The law governing international and domestic air transport will be surveyed, and the course will conclude with a look at law on the "high frontier."

### **International Air and Space Law (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 951 Introduction to Transnational Law and Legal Issues (3)** This course will introduce the student to the nature of transnational law and to issues that lawyers will confront when legal issues transcend national borders. The course commences with an examination of the legal complexities of interactions (including economic transactions, civil litigation, and movement of people) in which national law, international law and private law may all simultaneously play a part. It examines the way in which private law, national law and international play a role in a number of different sorts of transactions, from simple organizations in regulating private behavior on a global basis.

### **Introduction to Transnational Law and Legal Issues (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 952 Law of the Sea (2)** Address all central aspects of the law of the sea as a branch of public international law.

### **INTER 952 Law of the Sea (2)**

This course addresses the public law of the sea (as distinct from admiralty law), covering the principal aspects of that subject as follows: historical overview; freedom of the high seas; nationality of vessels; flag State jurisdiction; baselines; boundaries; boundaries of maritime jurisdiction between adjacent and opposite States; internal waters and ports; territorial sea, contiguous zone, straits, and archipelagic waters; continental shelf; exclusive economic zone; deep seabed; marine pollution, living resources of the high seas, and the settlement of disputes, with particular referent to the Law of the Sea Tribunal (Hamburg). From time to time, as appropriate, the instructor may choose individual areas of the world or individual issues of the law of the sea to analyze in special detail within the main subject areas of the course.

The course aims to offer thorough instruction on the foundations and sources of the law of the sea, the principal types of maritime jurisdiction, the principles of resource management, and approaches to the settlement of maritime disputes.

The general historical introduction and subsequent sections are designed to accentuate problems and issues which enable students to master the foundations of the law of the sea.

Accordingly, students of this course should:

- (1) develop a more profound understanding of alternative approaches to legal reasoning and of legal concepts and institutions within the framework of international law;
- (2) enhance their skills of legal analysis
- (3) develop a greater awareness of concepts of legal science and legal system;
- (4) read in some depth on the contemporary relevant principal documents on the law of the sea and appropriate doctrinal writings.

At the end of the course students should"

- (1) have a sound grounding in how the law of the sea has developed;
- (2) be more demanding of rigorous in formulating and evaluating ideas and propositions;
- (3) have a sense of the virtues and limitations of comparison as a method of scientific inquiry in law through the analysis of relevant national legislation;
- (4) have a thorough command of the main principles and rules of the law of the sea;
- (5) give evidence of an ability to understand the other side of an argument, and better appreciate the strengths of an opposing view;
- (6) develop a willingness to question, to prove, to seek further information, and to display initiative in expanding one's knowledge.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 953 Law of Treaties (2)** Treaties are the foundation of public and private international law and national foreign affairs law. This course examines: historical development of law of treaties; concept of treaty; treaty as source of international and national law; stages of concluding treaty; reservations; accession to treaties, functions of depositary; publication of treaties; breach of treaty obligations; invalidity, termination, and suspension of treaties; denunciation and other withdrawal from treaties; treaties and *jus cogens*; treaties and customary rules of international law; treaties and third States; treaties and municipal law; interpretation of treaties; languages and authentic texts of treaties.

### **INTER 953 Law of Treaties (2)**

Treaties are the foundation of public and private international law and national foreign affairs law. This course examines: historical development of law of treaties; concept of treaty; treaty as source of international and national law; stages of concluding treaty; reservations; accession to treaties; functions of depositary; publication of treaties; breach of treaty obligations; invalidity, termination, and suspension of treaties; denunciation and other withdrawal from treaties; treaties and *jus cogens*; treaties and customary rules of international law; treaties and third States; treaties and municipal law; interpretation of treaties; languages and authentic texts of treaties. Texts: A. Aust, *Modern Treaty Law and Practice* (Cambridge University Press, 2000); W. E. Butler, *The Law of Treaties in Russia and the Commonwealth of Independent States*(Cambridge University Press, 2002).

The course aims to offer thorough instruction on the foundations and sources of the law of treaties, the role of treaties as a source of international law, the procedures of treaty-making, the relationship between treaties and customary international law and rules just cogens, and the role of language in treaty-formation.

The general historical introduction and subsequent sections are designed to accentuate problems and issues which enable students to master the foundations of the law of treaties.

Accordingly, students of this course should:

- (1) develop a more profound understanding of alternative approaches to legal reasoning and of legal concepts and institutions within the framework of international law;
- (2) enhance their skills of legal analysis
- (3) develop a greater awareness of concepts of legal science and legal systems;
- (4) read in some depth on the contemporary relevant principal documents on the law of treaties and appropriate doctrinal writings.

At the end of the course students should:

- (1) have a sound grounding in how the law of treaties has developed;
- (2) be more demanding and rigorous in formulating and evaluating ideas and propositions;
- (3) have a sense of the virtues and limitations of comparison as a method of scientific inquiry in law through the analysis of relevant national legislation;
- (4) have a thorough command of the main principles and rules of the law of treaties;
- (5) give evidence of an ability to understand the other side of an argument, and better appreciate the strengths of an opposing view;
- (6) develop a willingness to question, to probe, to seek further information, and to display initiative in expanding one's knowledge.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 954 Foreign Investment in Russia and the CIS (2)** Addresses principal aspects of the legal framework for foreign investment in Russia and other CIS countries.

### **INTER 954 Foreign Investment in Russia and the CIS (2)**

This is a "hands-on" subject which requires students to analyze and negotiate the essential elements of a foreign investment transaction in the Russian Federation, having regard to those elements of Russian law and legal institutions that any foreign investor will have to be familiar with. The course commences with an introduction to the legal foundations of the Soviet State monopoly of foreign trade, an overview of foreign investment laws in the CIS countries, investment guarantees, the investment vehicles of choice in Russia, elements of private international law, the role of legal opinions, and the settlement of commercial disputes, with special emphasis on arbitration. Most of the course is devoted to "negotiating" a draft charter of a joint-stock or limited responsibility society against the background of relevant Russian legislation.

The course aims to offer thorough instruction on the role of the State in foreign investment guarantees, the transaction aspects of foreign corporate vehicles, and the role of arbitration in settling foreign investment disputes.

The general historical introduction and subsequent sections are designed to accentuate problems and issues which enable students to master the framework of foreign investment in Russia and the CIS.

Accordingly, students of this course should:

- (1) develop a more profound understanding of alternative approaches to legal reasoning and of legal concepts and institutions within the framework of investment transactions;
- (2) enhance their skills of legal analysis
- (3) develop a greater awareness of concepts of legal science and legal system;
- (4) read in some depth on the contemporary relevant principal legislation and treaties regulating investment in Russia and the CIS and appropriate doctrinal writings.

At the end of the course students should:

- (1) have a sound grounding in how the law of regulating the framework of foreign investment in Russia and the CIS has developed;
- (2) be more demanding and rigorous in formulating and evaluating ideas and propositions;
- (3) have a sense of the virtues and limitations of comparison as a method of scientific inquiry in law through the analysis of relevant national legislation;
- (4) have a thorough command of the main principles and rules of law regulating foreign investment transactions;
- (5) give evidence of an ability to understand the other side of an argument, and better appreciate the strengths of an opposing view;
- (6) develop a willingness to question, to probe, to seek further information, and to display initiative in expanding one's knowledge.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 958 Comparative Constitutional & Public Law (3)** The principal objective of this course is to provide students with a greater understanding of how their country's body of constitutional law is shaped by history, institutions, and current values. The comparative project, by focusing on narrow differences between two very similar countries, allows students to move beyond an acceptance of basic premises of constitutional law as "natural" or "inherent." As an important dividend, students will gain basic knowledge of foundational concepts in the legal landscape of their country's largest trading partner, hopefully providing students with a comparative advantage in seeking employment with government offices and private firms whose clients engage in substantial cross-border transactions.

### **Comparative Constitutional & Public Law (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 959 Russian Law (2)** This 2-credit course is concerned with the development of the law, legal system, and legal institutions of what is popularly known as Russia but also correctly and officially known as the Russian Federation within the boundaries presently occupied and, historically, within the boundaries of the Russian Empire. By "law" we mean formal legislation, customary rules, relevant international legal rules, legal doctrine, and anything else regarded by the Russian State or by Russian jurists as comprising part of the "law." For our purposes "legal institutions" encompasses all law enforcement agencies or any other agencies of the State or empowered by the state which are concerned with the law in any manner whatsoever, including educational institutions.

### **Russian Law (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 961** Asylum and Refugee Law (3) This class surveys the laws of political asylum and related protection for those fleeing danger in their home countries. It examines asylum and refugee law and policy in the United States, and sets forth the legal grounds for barring someone from asylum. It also explores the politics driving immigration policy, including asylum and refugee policy, and the federal agencies that implement those policies.

### **Asylum and Refugee Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 965** Immigration Law (3) This course is intended to provide the students with a general knowledge of immigration law, including such critical subjects as the constitutional powers of the federal government over immigration matters, admission and exclusion, entry, deportation, and political asylum.

### **Immigration Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 966** International Litigation and Arbitration (3) This course is intended to acquaint students with the impact of globalization upon the process of litigation. It focuses upon the adjudicatory resolution of disputes created by international contracts and global business transactions through the standard legal trial process and arbitration. Various basic topics are treated, including (1) the certification and training of international lawyers; (2) the liability exposure of multinational enterprises; (3) the State as an actor in global commerce; (4) problems of comparative jurisdiction, service of process and evidence-gathering, proof of foreign law, and the enforcement of foreign judgements; (5) the extraterritorial application of national law; and (6) attempts to establish a transborder law and legal process. The course also provides a thorough introduction to international arbitration and investor- state arbitration.

### **International Litigation and Arbitration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 968** Comparative Antitrust Law (3) This course focuses on the antitrust law of the European Union and selected other jurisdictions. It will cover international mergers, monopolies, price fixing cartels, distribution restraints, and related topics. The course examines principles of comity and cooperation among international enforcers investigating cases with a multi-national impact. We also review the antitrust laws of other selected jurisdictions, focusing on proposed and recently enacted competition laws including those of selected new entrants to the European Union and China, and on laws of other jurisdictions with an important impact on U.S. firms such as Japan. Finally, the course will consider issues such as advising multi-national clients, obtaining discovery internationally, and litigating complex cases.

### **Comparative Antitrust Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 969** International Organizations (2) International organizations play an influential role in the world today. Just a few of the fields they address are peacemaking and peacekeeping, labor relations, food production and distribution, education, health, economic development, monetary affairs, international trade, civil aviation, tele- communications, protection of intellectual property and nuclear energy. This course will examine lawmaking and regulation by international organizations, the regulatory impact of governance by these organizations, issues of legal personality, membership, participation, rights of members and termination of membership, as well as enforcement and dispute settlement. Focus will be on the United Nations and its specialized agencies, including the World Health Organization, the Food and



Agriculture Organization, UNESCO and the International Labor Organization.

### **International Organizations (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 971 International Law (3)** This course introduces students to key concepts and doctrines of international law. It examines the sources of international law such as custom and treaty, the bases of international jurisdiction, issues of statehood, recognition and succession, nationality, international agreements, and United States participation in the international legal system. The course provides students with the basics needed for both public and private international law practice.

### **International Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 973 Comparative Corporate Law (2)** This course attempts a comparative analysis of American and European approaches to the regulation of business enterprises operating in corporate form. The goal is to provide the student with a basic understanding of the fundamental, and perhaps fundamentally different, approaches taken by governments in the United States and in the European communities to the regulation of the corporation. The course materials concentrate on the formal sources of law and thereafter highlight some ways in which the difference in approach is manifested in actual regulation.

### **Comparative Corporate Law (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 974 Civil Law From Empire to Union (3)** The most important issue of Civil Law today is its Worldview and its perspectives on Citizenship as well as on International Justice. In other words, particularities of the Civil Law sustain a worldview that stems from Roman Law-traditions and practices of the Roman Empire. These pertain to more recent legal developments taking place in a unifying Europe. The profiles of the major functionaries in today's Civil Law domain: judges, attorneys, EU civil servants and administrators mirror such traditions. This course is not restricted to a traditional comparative perspective. Means are provided for a correct and effective transnational communication between legal professionals. To study Civil Law and EU Law implies an approach, understanding and management of the electronic means to communicate with its citizens, institutions and courts. The EU website is an outstanding instrument to understand the structures within lawyers must operate.

### **Civil Law From Empire to Union (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 975 History of the Western Legal Tradition (3)** This course will provide an overview of Western legal systems in ancient, medieval, early modern and modern times.

### **History of the Western Legal Tradition (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 976** Maritime Law (3) Initial consideration of peculiarly American Admiralty jurisdiction and practice, after which a survey of substantive rules of the general maritime law respected by shipping and trading nations is essayed. Carriage of goods by water (including bills of lading, charter parties, and general average), collisions, salvage, and seafarers' personal injuries are treated as discrete subjects with warranties of seaworthiness, applicability of multilateral treaties, harmonizing effects of worldwide London insurance markets, and modern English precedent being recurring themes.

### **Maritime Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 984** International Commercial Arbitration (3) By some measures up to 90% of all international and transnational contracts include agreements to resolve disputes between the parties through arbitration. For all its success, the international arbitration system is not a simple organism. It is the product of a complex interaction of national laws, contractual agreements, specialized procedural rules, and international treaties, customs and norms. The system is designed to balance party autonomy with the sovereign and transnational regulatory interests that are implicated in disputes. This course explores the amalgam of sources that undergrid the international arbitration system, as well as the strategic considerations, practical skills and policy implications that are involved.

### **International Commercial Arbitration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997A** Transnational Law (3) The course centers on issues that lawyers and policymakers confront when legal and related policy activities transcend national borders and trigger alternative or supplemental governance systems. Students will be introduced to the methodology of transnational law, the sources of law, the system characteristics of transnational law, and specific policy and practice focus of the field, which all touch on emerging issues of globalization. The course commences with an examination of framework issues in transnational law, including distinguishing features of this field and relationship to domestic law, international and comparative law. The bulk of the course then examines transnational public and private law systems, including the Rome Statute (transnational criminal law), transnational constitutional frameworks, international finance, human rights governance systems, international private standard setting, and systems of soft law governance.

### **Transnational Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997A** Transnational Law (3) The course centers on issues that lawyers and policymakers confront when legal and related policy activities transcend national borders and trigger alternative or supplemental governance systems. Students will be introduced to the methodology of transnational law, the sources of law, the system characteristics of transnational law, and specific policy and practice focus of the field, which all touch on emerging issues of globalization. The course commences with an examination of framework issues in transnational law, including distinguishing features of this field and relationship to domestic law, international and comparative law. The bulk of the course then examines transnational

public and private law systems, including the Rome Statute (transnational criminal law), transnational constitutional frameworks, international finance, human rights governance systems, international private standard setting, and systems of soft law governance.

### **Transnational Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997B** Energy, International Security, and the Global Economy (3) This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy and the international oil and gas industry; about the various types of contractual arrangements for cross-border investment in upstream oil and gas development and what the differences among these types of contractual agreements reflect regarding the shifting balance of power between resource-owning national governments and foreign investors; and about why and how major energy market players shape their interactions on the basis of political and strategic calculations, along with commercial and economic considerations.

### **Energy, International Security, and the Global Economy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997B** Energy, International Security, and the Global Economy (3) This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy and the international oil and gas industry; about the various types of contractual arrangements for cross-border investment in upstream oil and gas development and what the differences among these types of contractual agreements reflect regarding the shifting balance of power between resource-owning national governments and foreign investors; and about why and how major energy market players shape their interactions on the basis of political and strategic calculations, along with commercial and economic considerations.

### **Energy, International Security, and the Global Economy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997C** International Dispute Resolution Colloquium (2) While the proliferation of international courts and tribunals has been well documented, most study of this phenomenon has been truncated or partial. This colloquium will explore the development, system design, function, and effect of the full range of international tribunals and courts, including the International Court of Justice, regional international courts (such as the European Court of Justice, the European Court of Human Rights, and the Inter-American Court of Human Rights, international criminal tribunals, international investment and commercial arbitration, state-to-state arbitration, international claims tribunals (such as the Iran-U.S. Claims Tribunal and the Holocaust claims tribunals), as well as international claims in national courts. The format for the course will be as a colloquium, with guest speakers for each topic, with background reading and discussions developed and led by students.

### **International Dispute Resolution Colloquium (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTER 997C** International Dispute Resolution Colloquium (2) While the proliferation of international courts and tribunals has been well documented, most study of this phenomenon has been truncated or partial. This colloquium will explore

the development, system design, function, and effect of the full range of international tribunals and courts, including the International Court of Justice, regional international courts (such as the European Court of Justice, the European Court of Human Rights, and the Inter-American Court of Human Rights), international criminal tribunals, international investment and commercial arbitration, state-to-state arbitration, international claims tribunals (such as the Iran-U.S. Claims Tribunal and the Holocaust claims tribunals), as well as international claims in national courts. The format for the course will be as a colloquium, with guest speakers for each topic, with background reading and discussions developed and led by students.

### **International Dispute Resolution Colloquium (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Intl Prop/Media Law (INTPR)**

**INTPR 950** Communications Law (2) This course will explore current issues in communications law including First Amendment constraints on the regulation of the content of telephone calls and television advertising, cable TV monopolies, and telecommunications regulations and deregulation. Course materials explore regulatory, constitutional, and antitrust law principles as they apply to broadcast, cable, and telecommunications activities.

### **Communications Law (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 951** Internet Law (3) This course presents the range of legal issues arising from the emergence of cyberspace. The course considers how the law has reacted to challenges posed by the Internet as well as how the law is shaping its future. Specific areas covered include jurisdictional analysis, First Amendment/free speech, digital copyrights, trademarks and domain names, electronic privacy, e-commerce, and Internet governance.

### **Internet Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 960** Copyrights (3) The course addresses the legal protection afforded to authors and artists under common law and statutory copyright. It considers the rights granted, procedure for their procurement, and protection through litigation. The course also deals with international rights, conveyancing, and interface with the antitrust laws.

### **Copyrights (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 980** Patent Law (3) This course is an examination of the legal requirements for obtaining patent protection for an invention. The statutory foundations of United States patent law are examined through an analysis of patent prosecution practice and patent litigation. The course also considers United States patent practice in the context of international intellectual property law.

### **Patent Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 982** Licensing of Intellectual Property (3) The retention of the intellectual property or the absolute transfer of such interests to other for purposes of economic exploitation is, however, declining in use and popularity. Rather, it has evolved that maximization of the holder's value in the intellectual property may, in some circumstances, be better achieved by sharing some of the rights, while retaining others. This is the topic of the course in the licensing of intellectual property. The offering explores the myriad business, legal, and negotiating issues involved in the drafting and use of intellectual property licensing agreements.

### Licensing of Intellectual Property (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 985** Trademarks (2) The law of trademarks is central to the concept of fair dealing in the commercial environment. The history of common law and statutory trademarks is explored as well as registration, conveyancing and foreign rights. The course deals with the duty of the merchant to compete honestly and remedies for failure to do so.

### Trademarks (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**INTPR 997A** Introduction to Intellectual Property Law (3) This course will survey the protection of proprietary rights in inventions, writings, creative expression, trade secrets, and other intangible intellectual products by federal patent, copyright, trademark and unfair competition law, and by state trade secrecy and unfair competition law. A central theme will be the challenges to traditional legal paradigms posed by new technologies and the shift to an information-based economy. The course is intended for all students who anticipate having corporate clients and seek a basic understanding of the laws applicable to key assets of most businesses, as well as for students interested in becoming intellectual property specialists. This course does not replace (and is not a prerequisite for) Copyrights, Patent Law, Trademarks, or any other intellectual property course.

### Introduction to Intellectual Property Law (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Intl Sust Dev Prj (IHSDP)

**IHSDP 995** International Sustainable Development Project Law Clinic (1-3 per semester/maximum of 7) The Clinic will partner with, among others, university-sponsored humanitarian engineering (HE) and social entrepreneurship (SE) programs, like Penn State's multidisciplinary HESE program, and with foreign entrepreneurs with sustainable business

objectives (economic, environmental and social). Clinic students will work collaboratively in multidisciplinary teams with HESE students to develop, design, and implement humanitarian ventures in the developing world.

**International Sustainable Development Project Law Clinic (1-3 per semester/maximum of 7)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Italian (IT)

**IT 412** Theory and Practice of Translation (3) Advanced practicum in Italian explores the technical, artistic, and practical applications of translation between Italian and American cultures.

**IT 412 Theory and Practice of Translation (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores the technical, artistic, and practical applications of translation between Italian and American cultures in wide variety of contexts: literature, technical writing, film subtitling, etc. Taught in Italian. Evaluation consists of reading quizzes, short translation assignments, class presentation, longer (roughly 10-page) individual final translation project. Prerequisite: Any 300-level course in Italian.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 415** Dante (3) Readings in the Divina Commedia and the related lesser works of Dante Alighieri.

**Dante (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 422** Topics in the Italian Renaissance (3) Topics vary by year and may include "Theories of Love," "Magic, Witchcraft, Alchemy, and the Emergence of Modern Science," etc.

**IT 422 Topics in the Italian Renaissance (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In this course students develop their advanced language skills while pursuing study of Italian Renaissance and/or Humanist topics. Topics in Italian Renaissance literature vary by year and may include "Theories of Love," "Magic, Witchcraft, Alchemy, and the Emergence of Modern Science," etc. Check with faculty for current topic. Course may only be taken once for credit. Course counts toward the Italian major and minor. Course taught in Italian. Evaluation methods include two midterms, short reading response papers, class presentation, and final exam. Prerequisite: any 300-level Italian course.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 450** Nineteenth-Century Italian Literature (3) Italian romanticism, Verismo and neoclassicism, their origin and development in the novel, poetry, and drama.

**Nineteenth-Century Italian Literature (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 460** Twentieth-Century Italian Literature (3) Modern and contemporary Italian prose, drama, and poetry.

**Twentieth-Century Italian Literature (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 475** Modern Italian Literature and Cinema (3) Focus on silent films, fascism, WWII, Resistance, Neorealism, and reactions against Neorealism.

**IT 475 Modern Italian Literature and Cinema (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will explore the literary, cultural, and historical backdrops behind a variety of films from Fellini's *The Road*, to one of the greatest spaghetti westerns ever made (Leone's *Once Upon a Time in the West*), to the Oscar winner for Best Foreign Film (Benigni's *Life is Beautiful*). Selected 19th and 20th-century prose texts also trace such issues as the individual's role in society and the use of the imagination in the representation of history. This course aims to provide students with the fundamental tools to read texts and watch films critically and intelligently while presenting an overview of some major themes of Italian culture. Students will be evaluated on three in-class exams, paper outline, final paper, and participation in class discussions/activities/debates. IT 475 is the first interdisciplinary course taught in English at the IT 400 level. The course helps satisfy the Italian minor requirement. It is also good for students who have taken IT 130 and want to know more about 20th-century Italian lit/film/culture without having to do course work in Italian. IT 475 may also be of particular interest to students of film and media studies, English or comparative literature, religious studies, and history. This course satisfies the Italian minor or bachelor of arts humanities requirements. IT 475 will be offered once a year with 40 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 480** Italian Women Writers Through the Centuries (3) Analysis of the works of women authors in their historical and literary contexts.

**IT 480 Italian Women Writers Through the Centuries (3)**

Italian women have been stereotyped as the "mamma" or grandmother who cooks, prays, and idolizes her sons. Such an image does not accommodate the wide variety of experiences, perspectives, and contributions of Italian women throughout history. This seminar will explore the writings of female authors from delimited historical periods (alternating among Renaissance, 19th and 20th Centuries). Depending on time period, genres will include autobiography, poetry, historical novel, drama, film, nonfiction. Throughout the course we will consider the political and social developments in Italy with an emphasis on issues of special relevance to women. As we approach each text, we will examine such questions as: the significance of its form; the author's use of language; the ways in which masculinity and femininity are constructed; intersections with the text's historical moment; the political, philosophical and/or theological questions posed by the text; the ways in which the text inserts or distances itself from the Italian literary canon; and the text's depictions, re-evaluations and uses of history. Through their journal assignments in class discussion, students will be encouraged to reflect upon the implications of course concepts in their own culture and historical moment. Evaluation methods include participation in class discussion, journal entries, short analysis papers, and a longer (8-10 page) research paper. In Italian. Prerequisite: any 300-level Italian course. This course is conducted in Italian and counts for the Italian major and minor. The ability to screen VHS and DVD videos is necessary. Enrollment is limited to 20, and the course will be offered at least once every four semesters.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 485 Italian-American Cultural Studies (3)** In-depth exploration of Italian-American cultural contributions.

### **IT 485 Italian-American Cultural Studies (3)**

Italian-American Cultural Studies explores the representation of self-representation of Italian-Americans that have been produced over the past century in a variety of aesthetic forms. Through analysis of literary and cinematic works, informed by readings in history and sociology, students will refine their critical reading and writing skills, come to a deeper understanding of important currents in 20th-century American history, gain a more informed appreciation of the contributions of Italian-Americans to the arts, engage critically with concepts such as "identity," "ethnicity," "gender," and "heritage." This course fulfills requirements for the major and minor in Italian, and allows students interested in Italian-American culture to undertake more in-depth and specialized study than is possible in the 100-level General Education survey offered by the department in English. Evaluation methods include participation in class discussion, short analysis papers, and a longer (8-10 page) research paper. The ability to screen VHS and DVD videos is necessary.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 490 Dante in Translation (3)** The reading of Dante's Divine Comedy and selected minor works.

### **Dante in Translation (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Fall 1983



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 600 Thesis Research (1-15)** No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 610 Thesis Research Off Campus (1-15)** No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**IT 801 Fundamentals of Reading Italian for Research (3)** This course provides the fundamental skills for reading Italian prose to graduate students with special interests in conducting research using Italian materials.

**Fundamentals of Reading Italian for Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Japanese (JAPNS)

**JAPNS 401** (IL) Level Three Japanese A (4) Further acquisition of the four language skills in Japanese--reading, writing, speaking and listening comprehension.

### **JAPNS 401 Advanced Conversation (4)** (IL)

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course aims to enhance students' abilities in speaking, listening, reading, and writing. The objectives in this course are: 1) to review, reinforce, and expand the basic grammar; 2) to expand knowledge of Kanji, vocabulary and idioms; 3) to be able to speak not only in single sentences, but in dialogues to perform basic communicative functions; 4) to be able to read and understand simple essays and stories; 5) to be able to write a short composition; and 6) to be able to type Japanese on the computer.

General Education: None  
Diversity: IL  
Bachelor of Arts: Second or Beyond 12th Level Foreign Language  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 402** (IL) Level Three Japanese B (4) Exclusively for study abroad returnees. To further develop Japanese proficiency in speaking, listening, reading, and writing.

### **JAPNS 402 Advanced Reading (3)** (IL)

**(BA) This course meets the Bachelor of Arts degree requirements.**

This class is offered exclusively to students who have studied abroad in Japan. Only primary multimedia sources (i.e., not a text book) will serve as course materials. Five classes a week will consist of reading session, multimedia presentation, and high level discussion. Intensive analysis and class discussion of multimedia materials will provide the student the opportunity to develop advanced ability to understand, construct, and express opinions and complex verbal concepts in appropriate contextual forms/modes.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language and Other Cultures  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 403Y** (IL) Level Four Japanese A (4) Continuation of JAPNS 402. Aims to improve students' proficiency in all four language skills, with a special emphasis on writing.

### **JAPNS 403Y Level Four Japanese A (4)** (IL)

This is a four credit course designed for those who have completed Level Three Japanese B or the equivalent. The course aims to further develop students' proficiency in all four language skills, with a special emphasis on writing. Students will study several topics such as Japanese society and Japanese literature for content-based language learning throughout the semester. For each topic variety of media will be used—newspaper articles, essays, short stories, TV programs, movies, etc. The majority of reading and writing assignments will be done outside class, with some guidance from the instructor. That will help students become more independent in studying Japanese. They will use appropriate resources such as dictionaries, reference books, online dictionaries and other online resources depending on their individual needs. Class time will be used mainly for discussions of content, feedback on writing, and presentations by students. All class activities will be conducted in Japanese.

Writing exercises include short response papers on topics and summaries of literary pieces or audio visual materials. In the response papers students will reflect more deeply on certain topics, synthesize information from course materials, express their opinions, and support ideas by referring to and citing from source texts. This will help students be prepared for a longer thesis in the next course in the sequence. Discussion on the summaries will cultivate sensitivity toward words and expressions.

The course will help students start building their career in Japanese. Students will familiarize themselves with and if they wish study for the Japanese Language Proficiency Test (Level N2). They will also write a resume and formal letters that

could be used in job applications and practice formal spoken communication in business settings.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 404 (IL) Level Four Japanese B (4) Continuation of JAPNS 403Y.** Aims to improve students' proficiency in all four language skills through content-based language learning.

**JAPNS 404 Level Four Japanese B (3)  
(IL)**

This is a four credit course designed for those who have completed Level Four Japanese A or the equivalent. The course aims to further develop students' proficiency in all four language skills. Students will study several topics such as Japanese popular culture and issues in contemporary Japan for content-based language learning throughout the semester. For each topic variety of media will be used—newspaper articles, essays, short stories, TV programs, movies, etc. The majority of reading and writing assignments will be done outside class, with some guidance from the instructor. That will help students become more independent in studying Japanese. They will use appropriate resources such as dictionaries, reference books, online dictionaries and other online resources depending on their individual needs.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 404 (IL) Level Four Japanese B (4) Continuation of JAPNS 403Y.** Aims to improve students' proficiency in all four language skills through content-based language learning.

**JAPNS 404 Level Four Japanese B (3)  
(IL)**

This is a four credit course designed for those who have completed Level Four Japanese A or the equivalent. The course aims to further develop students' proficiency in all four language skills. Students will study several topics such as Japanese popular culture and issues in contemporary Japan for content-based language learning throughout the semester. For each topic variety of media will be used—newspaper articles, essays, short stories, TV programs, movies, etc. The majority of reading and writing assignments will be done outside class, with some guidance from the instructor. That will help students become more independent in studying Japanese. They will use appropriate resources such as dictionaries, reference books, online dictionaries and other online resources depending on their individual needs.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 410 (IL) Japanese Through Manga (3)** The course aims to expand students' knowledge and application of Japanese language beyond elementary and intermediate textbooks through the use of manga (graphic novels).

**JAPNS 410 Japanese Through Manga (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is a three credit course designed for those who wish to expand their knowledge in Japanese and application of it beyond typical elementary and intermediate textbooks. The course will use manga, the format of which helps students understand the story line, the setting, and the thoughts and emotions of the main characters. Given quick interactions between manga characters and onomatopoeia that accompany pictures, students will learn natural daily communications of Japanese. Class discussions will also cover relevant customs, manners, cultural values, socio-historical context, and social perspectives along with language use. The exact texts will vary from instructor to instructor, and may include film and new media in addition to a primary focus on manga.

The course will serve as a gateway to the further exploration of Japanese authentic texts and audio visual materials.

The prerequisite is JAPNS 110. Students who have successfully completed JAPNS 110, JAPNS 401, or JAPNS 402 are encouraged to take the course. Students who have finished JAPNS 403Y or JAPNS 404 may also take the course.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Foreign Language  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 421 (IL) Courtly Japan (3)** Focused study of aristocratic society and culture of Heian period Japan.

**JAPNS 421 Courtly Japan (3)**  
**(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The Heian period of Japanese history saw the apex of a refined court culture. Through readings of primary and secondary sources, this seminar-style course will explore the activities, norms, and structures of courtly society in Japan, from the centralization of imperial power in the 8th century through the court's political marginalization in the late 12th century. We will pay particular attention to religion, the arts, politics and governances, gender, and the gradual rise of samurai power in the shadows of the court.

This course is intended to provide an introduction to the political, social, economic, and cultural life of the Heian court of ancient Japan. The goals of the class are not only to gain an understanding of a time and place far removed from our own, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian or literary critic themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through readings, discussions, presentations, and the final project, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing.

Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen student's appreciation of the assigned readings, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytic and expressive abilities. The details of evaluation will vary depending on the instructor. In general, the emphasis will be on student performance on a day-to-day basis and as expressed in a final research project.

The course is designed to be suitable for all students generally interested in Japan, or interested in various fields of humanistic study. This course is recommended, but not required, of the Japanese major. It is designed to count as a B.A. "Other Cultures" course, and as an IL "International Cultures" course.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 422 (IL) War and the Warrior in Japan (3)** Survey of the role of warfare and the warrior in Japan, with attention to changing cultural settings. Taught in English.

**JAPNS 422 War and the Warrior in Japan (3)**  
**(IL)**

This course is intended to provide an introduction to the social and historical roles of warfare, and the changing cultural figure of the warrior, in Japan. Some prior study of Japan (JAPNS 120 or JAPNS 121 or HIST 172) is required. All materials will be available in English. Students will learn about subjects like the causes of violence, culturally acceptable ways of resolving conflict, obligations of victor toward vanquished, expectations regarding the memory of the war dead, the ideal of the warrior as a cultural figure, and historical roles that Japanese warriors have played in ages of peace. Readings and screenings will cover several genres, such as film, historiography, history, documentary, classical epic, modern novel, and excerpts from Japanese history textbooks (in translation). The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the cultural contexts that have generated attitudes toward war and the warrior in Japan. In addition, students will learn to think critically about various media's techniques and aesthetics of representation, and will become more engaged, critical investigators of literature and related media. Readings and in-class discussion will focus on the image of the warrior as a cultural icon, exploring the many ways in which popular understandings of the warrior have changed over time, for instance, as popularized dramatics began to idealize warriors as moral exemplars in the late medieval period, and then as historical realities made the position of the warrior itself redundant in the early modern era.

Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student

presentations. This participatory approach is intended to deepen students' appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities. Through critical reading, group discussion and interpretive writing, students will hone skills for evaluating modes of cultural production and consumption in premodern and modern Japan. Evaluation will be through means such as in-class presentations, short writing assignments, midterms or quizzes, one analytic paper (3-7 pages), and in-class/on-line participation and discussion.

The course is designed to be suitable for all students generally interested in Japan, or interested in various fields of humanistic study.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 423 (IL) Men, Women, and Animals (3)** Japanese history and culture through the lens of relations between men and women and between humans and animals.

**JAPNS 423 Men, Women, and Animals (3)  
(IL)**

Through readings in primary and secondary sources, and to a lesser extent through the evaluation of visual images, this seminar-style course will examine relations between men and women in changing social contexts over time in Japan. We will also investigate human-animal interactions, in the realms of literature and symbolism, religion, and food production and other aspects of economic production. The course will address issues fundamental to every society past and present. Therefore, it will not only deepen students' knowledge of Japan but it will also provide a solid basis for comparative study of other societies.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 424 (IL) Traveling Voices (3)** Transnational Writings of Japan: from Modern to Contemporary Eras .

**JAPNS 424 Traveling Voices (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Through literary and visual texts from modern to contemporary eras, this seminar-style course will explore a wide range of narrative voices of Japan, created by writers who are physically or figuratively dispersed in many directions within, towards, and away from Japan, and who therefore problematize "Japanese-ness" by dealing with cultural situations (e.g. identities, marginality) in their writings. Some Prior Study of Japan (JAPNS 120, JAPNS 121, or HIST 172) is required.

Students will explore the rich cultural diversity in Japan and the Japan diaspora, and develop a further understanding of historical border crossers between Japan/East Asia and Americas/the West. They will become more aware of the reciprocal and transformative cross-cultural interactions in languages, literature, religions, economics, ideas, or political formations. They will learn how to think critically, in speech and writing, and develop writing analytic skills appropriate to their final paper project.

Evaluation will depend on specific instructor practice, but will certainly emphasize guided discussions, some student presentations (alone or/and group), and writing exercises (especially final research project). A sample guideline might look like this:

Class Participation/discussion  
Response papers  
Informal Presentation (pair or group up to three)  
Mid-term exam  
Final paper presentation  
Final Project

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures  
Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 425 Beyond Anime (3)** Selected works from the history of illustrated narrative from scrolls to chapbook, through film and anime; topics may vary. This seminar-style study of Japanese visual culture will help students see Japanese visual arts in terms that are local to Japanese aesthetics and through those that transcend local cultures.

**Beyond Anime (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 426 (HIST 474) Early Modern Japan (3)** Japanese history from 1580 to 1880.

**Early Modern Japan (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 450 (IL) Introduction to Classical Japanese (3)** Basic patterns and structures of Classical Japanese from its development in the 6th century through usage in the 20th century.

**JAPNS 450 Introduction to Classical Japanese (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is an introduction to the basic grammar and stylistic idiosyncrasies of classical Japanese (bungo). Students will be guided through an examination of key syntactical structures and will be asked to apply their knowledge in order to read, translate, and discuss various texts from the classical, medieval, and early modern periods. In addition to gaining familiarity with standard reference materials (such as dictionaries of classical Japanese), students will also gain a working knowledge of the styles and themes of major works of pre-modern Japanese literature. Successful completion of this course will give students the fundamental skills necessary to read texts composed prior to the 1900's and to engage in research in the field of pre-modern Japanese studies. With this training and knowledge concerning the development of the Japanese language, students will increase their proficiency in modern Japanese and their overall knowledge of Japanese culture and literature.

Prior study of modern Japanese is required (with proficiency equivalent to successful performance in JAPSN 402).

The purpose of the course is to make bungo ("literary Japanese) accessible to as many students as possible. Classical Japanese first appeared in the 6th and 7th centuries and was used to write a wide variety of texts up until the mid-20th century. Knowledge of it is very useful to anyone interested in studying Japanese history, literature, philosophy, politics, art, or culture. The course offers a systematic introduction to the grammar of Classical Japanese, while also presenting Classical Japanese and Modern Japanese as part of a linguistic and cultural continuum.

General Education: None

Diversity: IL

Bachelor of Arts: Foreign Language

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 452 (IL) Contemporary Japan: Cultures, Lifestyles, Trends (3 per semester/maximum of 6)** Survey of aspects of modern Japanese society; includes readings from Japanese newspapers, magazines, and fiction; topics may vary each semester.

**JAPNS 452 Contemporary Japan: Cultures, Lifestyles, Trends (3 per semester/maximum of 6)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course orients students to cultural issues and trends in contemporary Japan, and the way that those issues and trends are explored in literature, film, newspapers and magazines. The course examines a selection of

Japanese-language materials from an array of genres, modes of representation, and historical settings. Focusing on the postwar era to present (1945-), this course introduces various aspects of contemporary Japanese culture, from literary works of the postwar experience to recent popular culture, including anime (animated movies) and manga (graphic novels). Each work is discussed in terms of its own literary or artistic merit, the social context that produced it, its position within the larger trends of literary development in Japan, and its relevance for the modern reader. This course is designed for (prospective) Japanese major or minor students interested in broadening their knowledge of Japanese culture and society as well as for students who wish to compare other cultures and literatures they have studied with those of Japan.

General Education: None

Diversity: IL

Bachelor of Arts: Second or Beyond 12th Level Foreign Language

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 453 (IL) Japanese Film (3 per semester/maximum of 6)** Selected films and directors representing various aspects of Japanese culture and cinema; topics may vary each semester.

**JAPNS 453 Japanese Film (3 per semester/maximum of 6)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This class will be a seminar-style study of Japanese culture, texts, and language as seen through the lens of Japanese cinema. The goal is to deepen the students' understanding of diverse aspects of Japanese life, history, and culture while developing language skills. Typical class sessions may involve watching sections of film (with or without English subtitles); working with listening comprehension; engaging with student presentations (in Japanese) on studios, directors, or actors; discussing Japanese film history; and analyzing film stills for aesthetic qualities.

Participants will be required to view and discuss films in Japanese (with or without English subtitles). Viewing's will be accompanied by secondary readings (at least some of which may be in Japanese). We will also be discussing the films and readings in the context of nation, identity, history, sociology and culture. Exercises will range from group discussion, web-based research in Japanese and English, presentations, essays and film analysis. Students must prepare for class by reading the material carefully, taking notes, writing down questions, and being ready to take part in lively conversations. Course discussion will take place primarily or exclusively in Japanese.

This course satisfies the International Cultures requirement.

General Education: None

Diversity: IL

Bachelor of Arts: Second or Beyond 12th Level Foreign Language

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 454 (IL) Japanese Literature (3 per semester/maximum of 6)** Selected works from important Japanese texts representing genres such as autobiography, poetry, fiction, and drama; topics may vary each semester.

**JAPNS 454 Japanese Literature (3 per semester/maximum of 6)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This class will be a seminar-style study of contemporary Japanese literature. The goal of the course is to help students move from grammar-assisted reading assignments (which may provide vocabulary lists, grammar notes, and cultural notes) to reading 'raw' materials in Japanese, where students are responsible for knowing how to use the appropriate reference materials so that they can compile vocabulary lists, grammar notes, and cultural notes on their own. Students will be reading selected works from an array of genres such as autobiography, poetry, fiction, drama and essays, with topics and thematic focuses varying from semester to semester.

Typical class sessions may involve reading aloud from a literary work; engaging with student presentations (in Japanese) on authors, genres, thematic elements, and relevant historical or cultural events; discussing Japanese literary history; analyzing short passages for their aesthetic qualities; and working with specific items of grammar or vocabulary. Participants will be required to read and discuss Japanese literature in Japanese. Exercises will range from group discussion, web-based research in Japanese and English, presentations, essays, quizzes and tests. Students must prepare for class by reading the material carefully, taking notes, writing down questions, and being ready to take part in lively conversations. Course discussion will take place primarily or exclusively in Japanese. This course satisfies the International Cultures requirement.

General Education: None

Diversity: IL

Bachelor of Arts: Second or Beyond 12th Level Foreign Language

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 496A** Japanese through Manga (3) Expand students' knowledge and application of Japanese language beyond elementary and intermediate textbooks through the use of manga (graphic novels).

**Japanese through Manga (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 499** (IL) Foreign Study--Advanced Japanese (1-15) Small group instruction in spoken and written modern Japanese at the advanced level.

### **Foreign Study--Advanced Japanese (1-15)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**JAPNS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Jewish Studies (J ST)**

**J ST 401** (IL) (HIST 401) Ancient Technologies and Socio-cultural History in the Ancient Levant (3) Social and intellectual development in the Ancient Levant as they affected and were affected by technological development.

### **Ancient Technologies and Socio-cultural History in the Ancient Levant (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 405** (IL) (RL ST 405) Ancient Jewish Traditions and Modern Food Movements (3) Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times.

### **J ST (RL ST) 405 Ancient Jewish Traditions and Modern Food Movements (3) (IL)**

This course examines Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. These tenets of the Jewish tradition presently underwrite modern movements concerned with land use and food sustainability, as well as ethical behaviors in food production. The goal of the course is to understand how Jewish tradition can inform and contribute to improvements in the modern food system. The starting point is the ancient world of the Israelites,. Students will study agrarian interpretations of the Hebrew Bible as well as extra-biblical sources and archaeological data. The biblical attitudes toward food, eating, and agricultural practices are then traced into the post-biblical period and rabbinic periods. The course then jumps ahead to the present

day, to shed light on a number of modern Jewish agricultural and food initiatives concerned with issues such as healthy land use, sustainability, and justice in food production and distribution. These movements proceed from various interpretations of Jewish law and custom, and illustrate how some modern Jewish attitudes toward food and eating are responsible for reimagining, and in some cases reinvigorating, biblical ideas and practices. At the conclusion of this course, students will be able to identify and understand the historical and theological significance of diet and eating practices of ancient Israelites and will understand the development of Jewish food laws and practices in the post-exilic and early rabbinic eras. Students will be able to evaluate the extent to which ancient Jewish thought has influenced modern Jewish attitudes and actions regarding food and social responsibility, and will be able to envision the ways in which Jewish tradition, both ancient and modern, can contribute to current progress and future improvement in our systems of food production, distribution and consumption. While a wide variety of derivative topics will be discussed, this course is particularly appropriate for students pursuing programs of study dealing with the biblical world, the development of early Judaism, Jewish ethics, and/or modern Jewish thought, as well as those studying agriculture and food systems who are interested in how Jewish tradition addresses these universal concerns. Evaluation will be based on weekly 1-2 page written responses to the assigned readings (45%), a midterm exam (15%), final project (30%), participation (10%). No special facilities are required. Course will be offered each term, enrollment limited to 20 students.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 409Y (IL) (HIST 409Y, RL ST 407Y) European Anti-Semitism from Antiquity to the Present (3)** Surveys the history of anti-Semitism in Europe from antiquity through the Middle Ages to the present.

**J ST (HIST) 409Y (RL ST 407Y) European Anti-Semitism from Antiquity to the Present (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course analyzes major episodes in the history of anti-Semitism and tries to clarify the Motives and dynamics involved. It seeks to understand what these episodes have in common, and what is unique in each case. Is there a single universal, eternal anti-Semitism? Or are there rather anti-Semitisms", each belonging to a unique historical context? Is there a single continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates?

We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire's essays, German philosophical texts from Kant to Marx, Wagner's racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher.

The major part of the grade will depend on a short research paper which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category. This course is offered once every other year with 25 seats per offering.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 410 (US;IL) (HIST 410, RL ST 410) Jews in the Medieval World (3)** Trends in medieval Jewish society under Islam and Western Christendom.

**J ST 410 Jews in the Medieval World (3) (US;IL)**

The Jews lived in widely scattered communities under Christian and Islamic rule in the medieval period. This course will examine how Jews adapted the traditions they developed in Palestine and Babylonia in the early centuries C.E. to the new conditions they encountered in Europe and the Mediterranean region from the ninth to the fifteenth centuries. It will focus on the general problem of how traditional societies survive in rapidly changing circumstances, particularly when their members are a minority population. The course will aim at developing students' skills in comparative analysis as they compare the adaptive strategies of Jews in different cultural spheres (the Franco-German region versus Spain, for example). They will also be asked to compare the different polemical stances Jews adopted vis-a-vis Christianity, on the one hand, and Islam, on the other. They will be encouraged to understand the ways in which Jews internalized certain aspects of the majority culture and rejected others. It is hoped that they will come to see how deeply Jewish history was intertwined with medieval Christian and Islamic history, despite inter-religious hostilities and the frequent need for Jews to

defend against majority aggression.

Students will be evaluated on the basis of two mid-term exams (the first after the survey of the Muslim world, the second after the examination of the Franco-German region) and a comprehensive final exam.

The course will be linked to most of the courses taught in the field of Jewish Studies, especially J ST 111 (Early Judaism), J ST 114 (Modern Judaism), and J ST 118 (Modern Jewish History from 1492). It will also be linked to offerings in Religious Studies: RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), RL ST 107 (Introduction to Islam), RL ST 124 (Early and Medieval Christianity), and RL ST 165 (Introduction to Islamic Civilization). Further, it would complement HIST 001 and 002 (The Western Heritage), HIST 107 (Medieval Europe), HIST 108 (The Crusades), HIST 407 (Early Medieval Society) HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), and HIST 471W (Classical Islamic Civilization, 600-1258).

The course will count for 3 credits toward:

- a) the 22 credits required for the minor in Jewish Studies
- b) the 33 credits required for the major in Jewish Studies
- c) the 30 credits required for the major in Religious Studies
- d) the 36 credits required for the History major

It will be offered once a year with an enrollment of approximately 60 students.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 411** (US;IL) (RL ST 411) Jewish Studies (3) Study of the life and thought of a particular period or movement in the history of Judaism.

#### **Jewish Studies (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 412** (RL ST 412) American Judaism (3) The development of Jewish religion and culture in America from the colonial era to the present.

#### **American Judaism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 416** (HIST 416) Zionist History 1890-1948 (3) History of Zionist thought and politics to the foundation of Israel 1948.

#### **Zionist History 1890-1948 (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 420** (ANTH 420) Archaeology of the Near East (3) Culture of the Near East and India from Paleolithic times through the Bronze Age.

#### **Archaeology of the Near East (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 424H** (HIST 424H, RL ST 424H) **Monotheism and the Birth of the West (3)** The birth of monotheism and its relation to social organization, the idea of individuality, and science.

**J ST (HIST/RL ST) 424H (PHIL 434H) Monotheism and the Birth of the West (3)**

Learn about the formation of Western culture, while learning to analyze the texts and other evidence about its formation from a critical, rather than naive, viewpoint. The idea of monotheism probably arose very early and was even briefly implemented as a state cultic policy in Egypt in the 14th century BCE. Why, then, did it take another seven centuries to become widespread--appearing in ancient Judah, Babylon, and Ionia almost simultaneously? To answer this question, the course focuses on several developments, through the medium of primary texts and archaeology: the shift from a state hinterland based in extensive agriculture and household processing to one organized for intensive agriculture and industrial processing the rise of recognizably modern science; the promotion of individuation and an international elite culture in the context of Assyrian and Babylonian imperial ambitions; the development of the historical and archaeological arts in the context of archaizing in order to reinvent local traditions; and the socialization of monotheism and of democracy. Students will be evaluated on their discussion of the textual evidence as well as on reports in class and a final paper. This is the sole honors course treating the birth of the West. It expands on knowledge acquired in courses listed as prerequisites and in CAMS/J ST/RL ST 012; CAMS 044; ANTH/CAMS 133; CAMS/PHIL 200; HIST 100; HIST/J ST 102; and PHIL 200 and enriches the student experience in CAMS 400, CAMS 440, and CAMS 480; HIST 402; J ST 411; PHIL 437, PHIL 453, and PHIL 461. This course counts toward the major in Jewish Studies, History, and Religious Studies and toward the minor in Jewish Studies and Religious Studies. This course will be offered once every other year with 35 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 427** (ENGL 427) **Topics in Jewish American Literature (3 per semester/maximum of 9)** An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.

**J ST (ENGL) 427 Topics in Jewish American Literature (3)**

This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider the constitution, origin, and development of Jewish America's wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. Through short writing exercises, in-class projects, essay examinations, and a longer research paper, students will respond to, integrate, compare, and analyze these materials. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and -literature.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 427** (ENGL 427) **Topics in Jewish American Literature (3 per semester/maximum of 9)** An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States.

**J ST (ENGL) 427 Topics in Jewish American Literature (3)**

This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider

the constitution, origin, and development of Jewish America's wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. Through short writing exercises, in-class projects, essay examinations, and a longer research paper, students will respond to, integrate, compare, and analyze these materials. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and -literature.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 433** Introduction to Jewish Music and Art (3) Introduction to the study of Jewish music and art from antiquity to the present.

**J ST 433 Introduction to Jewish Music and Art (3)**

The course will provide an introduction to the importance of art (including architecture) and music to Jewish civilization from the ancient world to the present. The course stresses the way in which Jews have adapted techniques from the peoples around them, and how their art and music have developed under circumstances ranging from almost complete toleration to extreme persecution. Important periods covered including synagogue art and architecture from late antiquity to the Middle Ages; illuminated manuscripts, decorative arts, and songs from the Middle Ages; the emergence of important professional Jewish artists and musicians in the nineteenth century in Europe; Jewish artists in the forefront of political protest art in the early twentieth century; art and music during the Holocaust and to memorialize it; the flourishing of Jewish art and music in both traditional and new forms since World War II. The historical, social, and intellectual contexts of the development of music and art, rather than technical aspects of musical and artistic creation and perception, will be emphasized. In particular, the role of music and art in preserving Jewish pride and identity under two threatening circumstances – periods of persecution where survival was threatened and periods of toleration where conversion and conformity become alluring – will be considered. In addition to looking at and listening to works of art and music, written texts describing the historical and social contexts and providing information about the works and their creators will be discussed.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 434** Media and the American Jewish Experience (3) Study of United States Jewish history through film and accompanying written text.

**J ST 434 Media and the American Jewish Experience (3)**

The course examines theater, radio, television, and film as important sources for understanding the Jewish experience and its impact on American culture more generally since the late 19th century. The role of Jews as prominent directors, producers, actors, and writers will be considered in their social-historical context in addition to the subjects covered in the works and programs they have created. Among the topics discussed will be Jewish life in late 19th-early 20th century Europe; immigrant life in turn of the century America and questions such as assimilation, preservation of tradition, family life, social mobility, and male/female relations; Jews in show business, organized crime, and sports; American Jews and the Holocaust; American Jews and Israel; Jews in the modern age; generational and denominational differences among Jews; and Jews and anti-semitism.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 457 (US;IL) (ANTH 457, SOC 457)** Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3) Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.

**J ST (ANTH/SOC) 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3)**

**(US;IL)**

This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State's Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research. The course will be offered approximately once a year. Enrollment will be limited to 30 students in order to promote active, engaged learning. Evaluations will be based on short papers and outlines that will prepare students for their final, term papers.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 468 Modern Jewish Philosophy (3)** Explores the major figures in modern Jewish philosophy and their influences on contemporary philosophy.

**J ST (PHIL) 468 Modern Jewish Philosophy (3)**

The primary objective of this course is to encourage students to have a reflective stance on Jewish thought. Students will learn what comprises Jewish thought and how it is distinguished from theology. They will learn what role religion plays in philosophical thought and what is at stake for a philosophy that emerges from a particular religion. This course will give students perspective on how Judaism links to other philosophical movements, for example, the enlightenment of the modern period. It will enable to think about Judaism from a theoretical perspective, adding a new dimension to what they might study from historical, sociological, or literary viewpoints. Some questions we will consider include: In what ways does it converge/diverge, with the philosophical strains that influence it? In what ways have particular events in history shaped Judaic thinking? Does Judaism, or Judaic thinking, have an essence? If so, what is it? What does Judaism mean for the Jews, and what does it mean for others? And finally, what role does mysticism have in the play between religion and philosophy? Students will be evaluated by written work (short papers and a longer seminar paper) and a class presentation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 478 (RL ST 478) Ethics After the Holocaust (3)** Explores the philosophical effects of the Holocaust for thinking about the primary question: Is ethics possible?

**J ST (PHIL/RL ST) 478 Ethics After the Holocaust (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is an examination of ethical theories before the Holocaust and how those theories have failed, philosophically and empirically. Course topics will include the history of ethical theory, the nature and problem of evil, goodness and suffering, witnessing and testimony, and the promise of an ethics. This course provides students with philosophical approaches to the issues that emerge out of the events of the Holocaust. The course will help students expand their knowledge of the events of the Holocaust through a philosophical approach that does not merely expose them to what happened, but asks them to think about the implications of what happened: most specifically, how do we understand ethical life, if it cannot stop or confront evil? This course provides students with the philosophical approaches to the issues that emerge out of the events of the Holocaust. It will encourage them to think critically, write effectively and

express their thoughts logically. Student evaluation will be based on weekly reaction papers, group presentations, and a final seminar paper. This course covers material in the history of philosophy, contemporary philosophy, and writings pertaining to the Holocaust in various forms (historical, literary documentary, and so forth). It provides links to other major areas in the history of philosophy, postmodernism, ethics, philosophy of religion, and Jewish history. It will be offered every other year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 480** (CAMS 480) Greeks and Persians (3) Development and achievements of the Achaemenid kingdom; relationships between Persians and Greeks.

### **Greeks and Persians (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 494** Research Projects (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Projects (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 494H** Research Projects (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Projects (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 497A** (CAMS 497A) Paul the Apostle (3) Intensive study, in historical, literary, and religious contexts, of the life and writings of one of the founders of Christianity. Considerable attention will be focused on the impact of Paul and his writings on the evolution of early Christianity.

**Paul the Apostle (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 497A** (CAMS 497A) Paul the Apostle (3) Intensive study, in historical, literary, and religious contexts, of the life and writings of one of the founders of Christianity. Considerable attention will be focused on the impact of Paul and his writings on the evolution of early Christianity.

**Paul the Apostle (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 497B** (HIST 497B) The Holocaust (3) This course for advanced undergraduate students will focus on the actual history and the historiography of the Holocaust. After discussion some of the most important studies about the Holocaust and the main historiography debates, we will look at the origins and the evolution of the "Final Solution." The class will touch on the function of the "Ghettos," the role of the mobile killing units, the extermination camps, and Jewish resistance. Apart from discussion the historiography, we will work mostly with primary sources: documents created by the perpetrators, bystanders, and victims; files relating to postwar trials of perpetrators; photographs; representations of objects relating to the Holocaust; memoirs by survivors; interviews with survivors and bystanders. Students are expected to do extensive reading for this class and prepare oral presentations on their respective paper topic. The research paper for this course will be based largely on primary sources.

**The Holocaust (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 499** (IL) Foreign Studies (12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 505** (HIST 505) Biblical Historiography in its Ancient Setting (3 per semester/maximum of 6) Methods of historical reconstruction in Biblical and other historiography from the earliest Mesopotamian records through those of the 6th century B.C.E.

### **Biblical Historiography in its Ancient Setting (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**J ST 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Kinesiology (KINES)**

**KINES 400** Adapted Physical Education (3) Basic concepts of planning and conducting physical education programs for children with physical, sensory, and/or intellectual impairments.

### **KINES 400 Adapted Physical Education (3)**

This is an undergraduate level course teaching students the basic concepts of planning and conducting physical education programs for children with physical, sensory, and/or intellectual impairments. This course will help the student to become more aware of the physical needs of children with disabilities and of the possibilities to professionally deal with these needs. The course requires the student to complete a 10-hour practicum, providing the opportunity to work with children with a disability. The practicum will be conducted in cooperation with physical education staff members working with various schools in State College. The children's difficulties may range from emotional problems to severe physical and mental handicaps. Students are free to identify alternative practicum sites (e.g., work with a friend or family member with a disability). The requirements for the practicum may include: select a child who has a physical, sensory, or intellectual disability; write an Individualized Education Program (IEP) using the guidelines presented in the textbook; implement the IEP in a two-on-one teaching situation (two students, one child); keep a log of all the practice sessions; after completing the 10-hour practicum, write a final report based on the IEP, this final report should state the definition of the problem, the etiology, the general characteristics, the teaching techniques specific to the disability, an evaluation of the actual

teaching strategies and an evaluation of the outcome of the practice (did it work?); and, present the findings orally (10-15 minute talk).

The student will generally be evaluated by exam, teaching activity, an oral presentation, and a final report.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 403** Emergency Medical Technology (4) Theoretical and practical aspects of emergency medical techniques as applied in the pre-hospital environment.

#### **Emergency Medical Technology (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 404** Emergency Medical Technology Instructor (2) Educational concepts and skills necessary to present instruction in emergency care; lesson planning, methods of instruction, and evaluation techniques.

#### **Emergency Medical Technology Instructor (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 410** Physical Growth and Motor Development (3) Study of biologically programmed growth processes and environmental influences leading to attained adult form and biomechanical function.

#### **Physical Growth and Motor Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 411** Introduction to Musculoskeletal Injury and Rehabilitation (3) This course is designed to provide an overview of common musculoskeletal injuries and rehabilitation for pre-allied health and fitness professionals.

#### **KINES 411 Introduction to Musculoskeletal Injury and Rehabilitation (3)**

This course is designed to provide an overview of basic orthopaedic injuries and related musculoskeletal system dysfunctions as well as rehabilitation of those injuries and dysfunctions. Common orthopaedic injuries of all major musculoskeletal structures and tissues are discussed moving up the kinetic chain from the feet up the lower extremities, through the spine and out the upper extremities to the hands. Common injuries such as sprains, strains, fractures, tendinopathies, disc herniations, spinal stenosis, compartment syndromes, neural compression, carpal tunnel syndrome and thoracic outlet syndrome will be discussed. Anatomy and function of each body region will be reviewed prior to the discussion of injuries. Mechanisms of injury, tissue pathology and the tissue healing processes are reviewed. The role of inflammation in the healing of injured tissues will be explored and the variations in healing processes between tissues explained. Common surgical procedures for major injuries like anterior cruciate ligament tears will be presented. A general rehabilitation process is discussed and rehabilitation concepts unique to specific injuries are explored. Basic principles of the major components of a rehabilitation program are explained. These major components include the protection of healing tissue, pain control, swelling resolution, restoration of range of motion, facilitation of volitional control, enhancement of muscular strength and endurance, improvement of neuromuscular control, training of functional movement patterns and return to functional activities. The RICE (Rest, Ice, Compression, Elevation) method of treating pain and limiting swelling will be presented. Manual therapy, stretching and exercise activities used to regain range of motion will be explained. Exercises used to improve muscular strength and endurance will be discussed for each region of the body. Methods of facilitating balance and neuromuscular control will be demonstrated. Finally, the benefits of functional exercise in terms of three-dimensional exercise requiring the use of groups of synergistic muscles in a

coordinated manner will be presented. In addition, return to sport programs that gradually reintroduce the patient to the real life stresses placed on their injured body part will be explained. Prioritization of addressing the different components of a rehabilitation plan will be discussed and differences between surgical and non-surgical rehabilitation plans presented. Criteria used to make return to play decisions for injured athletes will also be outlined. Modifications of common exercises to accommodate for injuries and allow continued participation in exercise routines will be presented. This course is appropriate for pre-allied health professionals and fitness professionals with an interest in orthopaedic injuries, musculoskeletal system rehabilitation and the construction of exercise programs that prevent, or accommodate for, musculoskeletal problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 420** Psychosocial Dimensions of Physical Activity (3) Discussion of theoretical and empirical findings, structuring a frame of reference for exploring man's involvement in physical activity.

### **Psychosocial Dimensions of Physical Activity (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 421** Exercise Psychology (3) Psychological antecedents and consequences of physical activity behaviors.

### **KINES 421 Exercise Psychology (3)**

Exercise Psychology is designed to introduce students to the psychological antecedents and consequences of exercise behaviors. The antecedents of exercise behaviors are the psychosocial and cognitive factors (e.g., beliefs, attitudes, personality traits) that facilitate and/or inhibit exercise behaviors. The consequences of exercise behavior are the physical, psychosocial, and cognitive outcomes (e.g., self-efficacy, body image, mental health) of exercise participation. The antecedents and consequences of exercise behaviors will be presented within the context of contemporary conceptual and theoretical models in exercise psychology. This course is designed to provide students with an overview and foundation of the important psychosocial phenomena related to these antecedents and consequences of exercise behaviors. Students will have the opportunity to apply their knowledge in selected areas within exercise psychology through class discussions and assignments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 421** Exercise Psychology (3) Psychological antecedents and consequences of physical activity behaviors.

### **KINES 421 Exercise Psychology (3)**

Exercise Psychology is designed to introduce students to the psychological antecedents and consequences of exercise behaviors. The antecedents of exercise behaviors are the psychosocial and cognitive factors (e.g., beliefs, attitudes, personality traits) that facilitate and/or inhibit exercise behaviors. The consequences of exercise behavior are the physical, psychosocial, and cognitive outcomes (e.g., self-efficacy, body image, mental health) of exercise participation. The antecedents and consequences of exercise behaviors will be presented within the context of contemporary conceptual and theoretical models in exercise psychology. This course is designed to provide students with an overview and foundation of the important psychosocial phenomena related to these antecedents and consequences of exercise behaviors. Students will have the opportunity to apply their knowledge in selected areas within exercise psychology through class discussions and assignments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**KINES 422** Physical Activity Interventions (3) Principles of designing, planning, and implementing theory- and evidence-based physical activity interventions.

**KINES 422 Physical Activity Interventions (3)**

This course is designed to acquaint undergraduate students with the application of major theories and models used to design and guide the development of contemporary physical activity interventions. Students will be familiarized with empirically-supported principles of behavior change and will gain an understanding of the basic strategies and methods used in designing, planning, implementation, and evaluation of physical activity interventions. The course will cover a variety of approaches to physical activity promotion, ranging from clinical and community-based interventions to population-based approaches, while discussing practical strategies and concrete examples of contemporary, evidence-based physical activity interventions. The goal of the course is for students to demonstrate the ability to formulate well-conceived physical activity interventions across a variety of settings and participant populations and learn how to apply theoretical principles and research findings to intervention development.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 422** Physical Activity Interventions (3) Principles of designing, planning, and implementing theory- and evidence-based physical activity interventions.

**KINES 422 Physical Activity Interventions (3)**

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General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 423** Psychology of Sports Injuries (3) Psychological causes and consequences of sports related injuries in athletes.

**KINES 423 Psychology of Sports Injuries (3)**

Using lectures/whole class discussion formats, this course is intended to provide the students with the basic knowledge regarding psychological causes and consequences of sport-related injuries, including concussions. Specific course objectives include: (1) developing the proficiency in initiating interviews and observations of athletes suffering from sport-related injuries; (2) assessing psychological impact of injury on athletes; (3) developing critical-thinking skills related to the probability of developing of psychological trauma in athletes with injuries; (4) developing specific skills of psychological assessment of injured athletes; (5) stimulating thinking about temporary research questions as related to psychology of injury. Evaluation will be based on active engagement in class discussions and administration of quizzes and written examinations according to course syllabus. This class extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 424** (US) (WMNST 424) Women and Sport (3) An interdisciplinary approach to contemporary issues related to women and sport from historical, physiological, psychological, and sociological perspectives.

**Women and Sport (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 425W** Physical Activity in Diverse Populations (3) An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations.

**Physical Activity in Diverse Populations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 427** (HD FS 427) Developmental Sport & Exercise Psychology (3) Developmental changes in the antecedents and consequences of physical activity across the lifespan.

**KINES (HD FS) 427 Developmental Sport & Exercise Psychology (3)**

Change is constant with physical activity - our reasons for being active change across the lifespan and our experiences with physical activity change how we view ourselves and those around us. Developmental Sport & Exercise Psychology focuses on developmental changes in the psychosocial antecedents and consequences of physical activity across the lifespan. Specific course objectives include (1) describing theoretical frameworks and methods used to study physical activity-related psychosocial development across the lifespan, (2) describing how self-perceptions develop and influence behavior in movement contexts at different points in life, (3) explaining how contextual factors influence developmental processes associated with physical activity, (4) identifying age-related differences in activity-related antecedents and consequences of physical activity, and (5) developing, reviewing, and critiquing theoretically-grounded interventions to address issues related to developmental processes associated with physical activity across the lifespan. Evaluation will be based on written examinations, submission of a series of reflection papers on reading assignments, a group presentation, and the students' engagement in the class. It extends but does not duplicate existing courses in the Department of Innersole, Human Development & Family Studies, and Psychology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 428** Motivation and Emotion in Movement (3) Theories of motivational and emotional processes and their applications in movement settings.

**KINES 428 Motivation and Emotion in Movement (3)**

Motivation & Emotion in Movement will focus on the psychological processes underlying human motivation and emotion in movement settings. Special attention will be directed to social manipulations that can enhance motivation and emotion, and the consequences thereof. This course will be valuable for students whose career goals relate to education, personal training, rehabilitation, coaching, or psychology. Specific course objectives include (1) distinguishing between motivation and emotion, (2) understanding psychological mechanisms underlying common motivational and emotional processes in movement settings, (3) identifying existing applications of motivation and emotion theories in movement settings, and (4) developing, reviewing, and critiquing theoretically-grounded interventions to address issues related to motivational and emotional processes in movement contexts. It extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 428** Motivation and Emotion in Movement (3) Theories of motivational and emotional processes and their

applications in movement settings.

### **KINES 428 Motivation and Emotion in Movement (3)**

Motivation & Emotion in Movement will focus on the psychological processes underlying human motivation and emotion in movement settings. Special attention will be directed to social manipulations that can enhance motivation and emotion, and the consequences thereof. This course will be valuable for students whose career goals relate to education, personal training, rehabilitation, coaching, or psychology. Specific course objectives include (1) distinguishing between motivation and emotion, (2) understanding psychological mechanisms underlying common motivational and emotional processes in movement settings, (3) identifying existing applications of motivation and emotion theories in movement settings, and (4) developing, reviewing, and critiquing theoretically-grounded interventions to address issues related to motivational and emotional processes in movement contexts. It extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 429 Psychology of Sport Performance (3)** Psychological theories of talent development and performance enhancement in sport.

### **KINES 429 Psychology of Sport Performance (3)**

Psychology of Sport Performance will provide a psychological perspective on the phenomenon of superior motor performance. The course will cover nature of superior performance, talent development processes, sources of performance crises, and self-regulation strategies used by athletes, coaches, and psychologists to enhance performance. This course will be valuable for students whose career goals involve training athletes or other performers involved in socially-evaluative performance domains. Specific objectives include (a) distinguishing the antecedents and consequences of subjective and objective performances, (b) conceptualizing motor performance and performance problems in a psychological context, and (c) matching psychologically-based performance problems with theoretically-based intervention strategies. It extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 429 Psychology of Sport Performance (3)** Psychological theories of talent development and performance enhancement in sport.

### **KINES 429 Psychology of Sport Performance (3)**

Psychology of Sport Performance will provide a psychological perspective on the phenomenon of superior motor performance. The course will cover nature of superior performance, talent development processes, sources of performance crises, and self-regulation strategies used by athletes, coaches, and psychologists to enhance performance. This course will be valuable for students whose career goals involve training athletes or other performers involved in socially-evaluative performance domains. Specific objectives include (a) distinguishing the antecedents and consequences of subjective and objective performances, (b) conceptualizing motor performance and performance problems in a psychological context, and (c) matching psychologically-based performance problems with theoretically-based intervention strategies. It extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 434 Rehabilitation of Injuries to the Lower Extremities (3)** Theoretical foundation and laboratory experience in manual therapy techniques and therapeutic exercises for the lower extremities.

### **KINES 434 Rehabilitation of Injuries to the Lower Extremities (3)**

Rehabilitation of Injuries to the Lower Extremities is a 3-credit course offered each fall semester with an enrollment limit of 40 students. The course provides students who have been accepted into the undergraduate athletic training option in the Department of Kinesiology with the theoretical foundation for application of manual therapy techniques and therapeutic exercises in the treatment of musculoskeletal injuries sustained by physically active individuals. Laboratory instruction and guided practice in performing manual therapy techniques and therapeutic exercises will also be provided. At the end of this course students: 1) can identify five components of a comprehensive plan of care for an injured athlete; 2) have a working knowledge of the effects of therapeutic exercise on tissue repair and return to activity; 3) have a working knowledge of the impact of pain on programs and therapeutic exercise; 4) are able to perform selected manual therapy techniques and integrate them into a comprehensive plan of care; 5) understand the psychological response to injury and therapeutic exercise; 6) can develop a plan of rehabilitation utilizing principles of tissue healing, therapeutic exercise and manual therapy; and 7) instruct patients in home programs of therapeutic exercise. This course will focus on the basic principles of therapeutic exercise and rehabilitation of injuries to the lower extremities.

This course will be offered every Fall semester with an anticipated enrollment of 25. Evaluation includes quizzes, rehabilitation plan of care, proficiency notebook, mid-term and final practical exams, and written mid-term and final exams.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:  
 Concurrent: KINES 335 KINES 395F

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 435** Rehabilitation of Injuries to the Trunk and Upper Extremities (3) Theoretical foundation and laboratory experience in manual therapy techniques and therapeutic exercises for the trunk and upper extremities.

#### **KINES 435 Rehabilitation of Injuries to the Trunk and Upper Extremities (3)**

Rehabilitation of Injuries to the Trunk and Upper Extremities is a 3-credit course offered each fall semester with an enrollment limit of 40 students. The course provides students who have been accepted into the undergraduate athletic training option in the Department of Kinesiology with the theoretical foundation for application of manual therapy techniques and therapeutic exercises in the treatment of musculoskeletal injuries sustained by physically active individuals. Laboratory instruction and guided practice in performing manual therapy techniques and therapeutic exercises will also be provided. At the end of this course students: 1) can identify five components of a comprehensive plan of care for an injured athlete; 2) have a working knowledge of the effects of therapeutic exercise on tissue repair and return to activity; 3) have a working knowledge of the impact of pain on programs of therapeutic exercise; 4) are able to perform selected manual therapy techniques and integrate them into a comprehensive plan of care; 5) understand the psychological response to injury and therapeutic exercise; 6) can develop a plan of rehabilitation utilizing principles of tissue healing, therapeutic exercise and manual therapy; and 7) instruct patients in home programs of therapeutic exercise. This course will focus on review of the basic principles of therapeutic exercise and rehabilitation on injuries to the trunk and upper extremities.

This course is offered every spring semester with an anticipated enrollment of 25. Evaluation methods include quizzes, written and practical exams, rehabilitation plan of care and proficiency notebook.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:  
 Concurrent: KINES 336 KINES 435 KINES 395G

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 436** Therapeutic Modalities in Athletic Training (4) Lecture and laboratory course exploring physiological principles and clinical evidence to the use of therapeutic modalities in athletic training.

#### **KINES 436 Therapeutic Modalities in Athletic Training (4)**

Introduction to Therapeutic Modalities is a 4-credit course offered each spring semester with an enrollment limit of 40 students. The course provides students who have been admitted into undergraduate athletic training option in the Department of Kinesiology with the theoretical foundation for the application of contemporary therapeutic modalities in the treatment of musculoskeletal injuries sustained by athletic individuals. At the end of this course students will: 1) have a working knowledge of the inflammatory response to tissue injury, pain perception and the body's analgesic mechanisms; 2) understand the physical principles of thermal, acoustic, electrical, light and mechanical modalities; 3) understand the physiological response to thermal, acoustic, electrical, light and mechanical modalities; 4) be able to search for and appraise clinically relevant trials involving modality application and; 5) apply these understandings and thermal, acoustic, electrical, light and mechanical modalities in the safe and effective manner. Students are evaluated through written examinations, laboratory examinations and submitted written reviews.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:  
 Concurrent: KINES 336 KINES 435 ; KINES 395G

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 438W** Administration and Issues in Athletic Training (3) Theoretical and practical aspects for management of an Athletic Training professional practice and identifying contemporary issues related to the profession.

### **KINES 438W Administration and Issues in Athletic Training (3)**

This course is designed to instruct students in the concepts and skills required for successful administration of an athletic training program and to understand and discuss contemporary professional issues attendant to the Athletic Training profession. General topics to be covered include theoretical basis of management, program management, human resource management, financial resource management, facility design and planning, information management, athletic injury insurance, legal aspects of sports medicine, ethical considerations in sports medicine, preparticipation physical and drug-testing, professional preparation issues, professional practice issues, and clinical practice issues. Experts from the community are brought in to lecture on several of the topics. The course meets for three hours per week and utilizes both lecture and discussion formats. Student assessment includes written examinations, written homework assignments, class participation and debates. This is a writing intensive course. Writing will be used to facilitate critical thinking about course material. Written assignments are based on the technical writing requirements of an athletic training administrator and are graded on both their content and quality.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:  
 Concurrent: KINES 395I

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 439W** Ethics in Sport and Sport Management (3) Analysis of moral dilemmas in sport and sport management utilizing the tools of ethics.

### **Ethics in Sport and Sport Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 440** Philosophy and Sport (3) An examination of human nature from the perspective of our participation in sport.

### **Philosophy and Sport (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 441 (US) (AM ST 441)** History of Sport in American Society (3) Background, establishment, and growth of sport in America from colonial times to the present.

### **KINES (AM ST) 441 History of Sport in American Society (3)**

Study of the background, establishment, and growth of sport in America from colonial times to the present, and the role of American sports in American culture and society. The course will examine the ways that sports have operated in the United States as the country has developed into a modern, mass society. Issues of national identity, commercialism, race, ethnicity, class, and gender will be discussed in relation to the popularity of sports. Another set of issues will center on language and media; students will employ methods of analysis such as ethnography and rhetorical criticism that emphasize the multiple layers of meaning inherent in sports culture. The course satisfies the "area" requirement in "society" for American Studies majors. It is offered once every two years and enrolls approximately 30 students.

General Education: None  
 Diversity: US



Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 442 (IL) (CAMS 442) Sport in Ancient Greece and Rome (3)** An examination of the continuity of sport in ancient Greek and Roman societies.

**KINES (CAMS) 442 Sport in Ancient Greece and Rome (3)  
 (IL)**

This course examines the continuity of sport in ancient Greek and Roman societies. It investigates the role of athletic festivals in both cultures as well as the value placed on physical activity as part of the educational process.

The objectives of the course are to enable students to gain an appreciation for the continuous involvement of the ancient Greeks in the areas of competitive athletics and gymnastics[Kinesiology] as an important part of their value system. Moreover, the course will provide a comparison of Greek and Roman attitudes of athletics and gymnastics.

Typical topics include athletics during the Minoan /Mycenaean Bronze Age, Athenian and Spartan philosophies regarding education, the importance of spectator sports in Roman society and their link to politics.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 443 (IL) The Modern Olympic Games (3)** An analysis of the modern Olympic Games from their inception through the current festival.

**The Modern Olympic Games (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 444 (US) History of Athletics in Higher Education (3)** Origin and development of athletics in American higher education from colonial times to the present.

**History of Athletics in Higher Education (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 445 Alcohol and Drug Education (3)** Principles of integration and coordination of alcohol and drug education programs for health education and other health related professions.

**Alcohol and Drug Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 446 (IL) History of Sport in the Modern World (3)** History of sport in modern world, ca. A.D. 1500 to present; concentrates on role of sport in societies outside United States.

**KINES 446 History of Sport in the Modern World (3)  
 (IL)**

The History of Sport in the Modern World introduces students to the connections between sporting practices and the

broader cultural, political, intellectual and economic patterns that shape societies during the modern period in world history (ca. A.D. 1500 to the present). The course begins with a foray into the transition from traditional to modern forms of sport and society and covers the development of a wide variety of athletic games and pastimes from the sixteenth through twentieth centuries. Students will encounter a variety of historic conceptions of sport and explore the role of sport in the development of European, North American, Latin American, Asian, African and Pacific cultures. Students will learn how sports have been shaped by and have shaped by multiple factors, including modern ideas, science, class structures, gender roles, constructions of race, urbanization, nationalism, political conflicts, international relations, and economic institutions.

This is a senior-level course that fills an important historical gap in the Kinesiology Department's sequence of offerings on the history of sport. Other courses in the sequence cover ancient sport, sport in American society, and the Olympic Games. While crucial American developments that impact sports in the modern world are incorporated into this course, this class offers students a global focus that concentrates on the role of sport in societies beyond the borders of the United States. This course also relates to the offerings in the philosophy of sport program by exploring the history of ideas about sport in modern thought. Additionally, the course connects to the science-based offerings in Kinesiology by providing students with an introduction to the history of the scientific study of human performance.

The course introduces students to basic readings and knowledge of the history of sport in the modern world. The class provides opportunities to practice the critical reading and thinking techniques that shape the historian's approach to knowledge. This course will be taught once every year with an anticipated enrollment of 50 students. Evaluation methods that test reading and critical thinking skills are employed. No special facilities are required.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 447W** Representing Sport in Popular Film (3) Critical, contextual, and theoretical analyses of sport films focusing on popular narratives of social inequalities.

### **Representing Sport in Popular Film (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 448** Coping with Life After Sport (1) Psychosocial concerns affecting student-athletes as they enter the transition period following sport disengagement, focusing on coping interventions.

### **KINES 448 Coping with Life after Sport (1)**

KINES 448 is designed for student athletes who have exhausted their eligibility for or will no longer be participating in their respective sport due to injury or other issues. It is also relevant for students in athletic training or those who plan to pursue a career in coaching. The focus of the course is on the identification of issues and stressors affecting the transition and the development of strategies and coping skills to deal with life after sport. This can often be a very emotional and difficult time for student athletes. Discussion is focused on intervention and coping strategies, goal setting, decision making, career planning, and transferable skills. Student athletes will be able to recognize how their athletic experience has helped them to acquire numerous skills and characteristics highly valued in the workplace. Two sections of the course will be offered each semester. Students will be required to submit a weekly reaction paper, do a review of literature, and compile a comprehensive career plan. The class will be highly interactive with regular in-class assignments and projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 452** Applied Cardiovascular Physiology (3) In-depth study of cardiovascular regulation during postural, environmental, and exercise stress.

### **KINES 452 Applied Cardiovascular Physiology (3)**

First, the course begins with an intensive review of hemodynamics and basic cardiovascular control mechanisms (neural, hormonal, and local regulation).

Second, students compare and contrast these general principles in six important circulations: splanchnic, renal, cerebral, coronary, cutaneous, and muscle.

Third, they examine the three stresses which affect the circulation: posture (gravity), environment (especially heat) and exercise. For each stress, students identify the regional circulation(s) most affected and how they contribute to an integrated (systemic) cardiovascular response that is unique for each stress.

Finally, combinations of posture, heat, and exercise stress are considered to illustrate competing cardiovascular control mechanisms.

At each step students are introduced to seminal research papers illustrating the concept being studied.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 453 Environmental Physiology (3)** This course examines physiological function of humans at rest and during prolonged or maximal exercise in conjunction with environment stress (heat, cold, altitude, hyperbaria).

### **Environmental Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 454 Women's Health and Exercise Across the Lifespan (3)** In-depth study of the physiological role of exercise in modulating the health of girls and women during different phases of the lifespan.

### **KINES 454 Women's Health and Exercise Across the Lifespan (3)**

First, the course begins with a review of general principles of research conduct and publication, themes that will be carried throughout all material covered in this class. A review of the historical aspect of women's health research and a review of the state of knowledge in women's health in the wake of the contemporary scientific endeavors such as the Women's Health Initiative will also be explored. Second, students will learn physiology of puberty, menstrual function and bone health and the impact of exercise on these processes. Third, students will learn current concepts of exercise related to the female athlete and clinical implications of alterations in normal physiology. The impact of oral contraceptives on health and exercise performance will be also discussed. Fourth, students will learn menopausal physiology, alterations in clinical status associated with this life stage, and review current research related to the Women's Health Initiative. Finally, a discussion of the effects of gender differences on health and exercise will be discussed. At each step students will be exposed to relevant research methods issues, and introduced to seminal research papers illustrating the concept being evaluated.

This course is designed for students who wish to develop a richer understanding of the physiological role of exercise in modulating the health of girls and women during different phases of the lifespan. Particular attention will be given to the physiological role of exercise in modulating the health of girls and women during different phases of the lifespan, including but not limited to childhood, adolescence, adulthood and later adulthood.

The course will expose students to the rich research literature in women's exercise and health across the lifespan. Students will improve their ability to read and summarize original research literature through in depth presentation and discussion of seminal studies. Moreover, students will develop an understanding of how research has informed the state of knowledge on issues covered in this class and students will develop "language understanding" appropriate for interpreting and reading research papers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 456 Physical Fitness Appraisal (4)** The basic components of physical fitness, how it can be measured, and how it can be developed.

### **Physical Fitness Appraisal (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 457** Exercise Prescription and Case Studies (3) Principles of exercise prescription; application of fitness appraisal based on current practices using evaluation and discussion of case studies.

### **KINES 457 Exercise Prescription and Case Studies (3)**

The major purpose of this course is to provide those students interested in allied medical careers (e.g., cardiac rehabilitation, hospital testing, wellness centers, corporate fitness centers, physical therapy) with skills and practical knowledge regarding exercise diagnostics and prescription. Particular emphasis is placed on clinical diagnostic procedures, interpretation and terminology and this course directly contributes to the knowledge base expected for future employment in this area. At the conclusion of KINES 457, the students will be able to demonstrate on written examinations and in discussions, a knowledge and understanding of basic exercise prescription principles for apparently healthy, at risk and diseased populations, with special- emphasis on the cardiac patient. Inherent in the course goals is an understanding of the chronic physiological adaptations that occur as a result of programs of endurance and resistance exercise in apparently healthy, at risk and diseased populations.

This course includes lectures as well as hands-on laboratory sessions. Evaluation is based on student performance on written examinations, written and oral case study presentations, and written assignments. This course will be taken after students have completed KINES 456 and will complete the learning scheme involving fitness appraisal and subsequent prescription of exercise programs.

The course is offered fall and spring semesters with an enrollment of 35 students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 460** Movement Disorders (3) Major peripheral and central movement disorders and methods of their treatment.

### **Movement Disorders (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 461W** Preparation for Research Project (2) Planning and preparation for research project.

### **KINES 461W Preparation for Research Project (2)**

This course prepares students to conduct a research project in KINES 462W. Students will begin by critically examining different research approaches. They will explore the development and assessment of research topics paying special attention to both scientific and philosophical justifications. They will learn how to identify research populations and how a human subjects review protects those involved in research studies. They will identify and critique the various inventories and assessment tools available for the kind of research they propose. Students will complete a research proposal including review of literature and method section, and submit an application to the Institutional Review Board. These goals will be achieved through a series of writing assignments.

Students are expected to demonstrate the following outcomes:

- 1) Communicating and writing ideas relevant to the field of Kinesiology.
- 2) Understanding and describing the major issues in the field.
- 3) Understanding the principles of how to conduct research in wellness, fitness and/or associated practice.
- 4) Understanding and communicating the methods of scientific discovery.

Students are evaluated on their research proposal (50% of final grade) which is drafted and revised during the semester. Further writing assignments (50%) assess and enhance student's competency in research methods and statistics. The course is offered every fall semester with a total enrollment of 25 each semester.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 462W** Research Project (2) Completion of research topic.

**KINES 462W Research Project (2)**

During this course students will collect and analyze data for a research project. They will trouble shoot any data collection problems and learn how to use computerized programs for statistical analysis of data. They will learn about various presentation modes relevant to the written and oral presentation of research data. Students will prepare and be evaluated on a research paper that reports on their research project. In addition, they will present their work orally in showcase sessions to which fellow students and faculty members are invited. The goal is for students to produce as close as possible to publishable papers. This course is part of a two-course sequence and can only be taken upon successful completion of KINES 461W. It, along with the internship experience, are the culminating experiences in the Exercise Science - Science Emphasis. Facilitates needed will be determined based on the individual research project. This course will be offered only in the spring semester of each year. Enrollment will vary from 1 to 25.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 463** Acquisition of Motor Skills (3) Examination of principles of motor learning; the application of strategic factors such as: practice types, schedules, augmented information, and motivation.

**KINES 463 Acquisition of Motor Skills (3)**

This course is intended for students interested in the principles of motor learning (learning, retention and transfer) and the application of specific learning strategies such as, practice, feedback, demonstrations, and instructions. Through lectures, discussions, and course readings in addition to writing assignments, the goal is for students to develop a unified conceptual framework for motor learning and its facilitation through intervention strategies.

The evaluation for the final grade will be based upon a synthesis of assessment in three areas: a) Term Project (30% of final grade) - a report on a learning experiment or a synthesis paper on a learning principle or a learning strategy; b) Mid-Term Exam (30% of final grade) - questions requiring short 2-3 sentence answers; and, c) Final Exam (40% of final grade) - requiring essay length answers to selected questions that integrate key issues from all the course material.

This course will build on the concepts outlined in KINES 171 and 360. It will represent the culminating upper level undergraduate course in motor learning. This course will be an elective available to students who have completed the required KINES 360 course. It can be used to fulfill requirements for the Kinesiology major and the Movement Science, Teacher Preparation, and Athletic Training Options.

This course will be available to students outside of the Kinesiology major who may, upon approval, substitute the KINES 360 prerequisite requirement. The course will be offered every spring semester.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2000

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 464** Children's Physical Education Curriculum and Practicum (3) Curriculum for elementary school physical education emphasizing the skill theme approach.

**KINES 464 Children's Physical Education Curriculum and Practicum (3)**

The purpose of this course is to introduce teacher candidates to the skill theme approach and developmentally appropriate physical education for children. Appropriate planning, instruction, and assessment make-up the foundation of this course. These techniques are then applied when they teach small groups of children from a local elementary school. Specifically, students will develop and implement developmentally appropriate lesson plans with children and then analyze and reflect on their teaching effectiveness. A primary focus of the class is using the skill theme approach to guide children to reach appropriate cognitive, affective and motor objectives as stated in state and national standards. Students also develop curricular scope and sequence overviews that are used to guide curriculum and lesson development from grades K-5.

Assessment of student performance in the course includes entrance and exit slips based on assigned readings, class lectures and discussion, and laboratory experiences. Students are also graded on their planning, analysis and reflection of their teaching in elementary schools. There is also a final exam that requires students to translate theory into practice as applied to elementary school physical education.

Assessment:

Entrance and exit slips 15%

Teaching in the schools 40%

Final exams 15%  
 Project 15%  
 Laboratories 15%

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 465 Neurobiology of Sensorimotor Stroke Rehabilitation (3)** This course is designed to expose students to the recent topics in motor stroke rehabilitation research through literature.

### **KINES 465 Neurobiology of Sensorimotor Stroke Rehabilitation (3)**

This 3-credit course is designed to expose students to the most recent topics in motor stroke rehabilitation research through reading of current literature. The course addresses the neurobiological foundations of motor deficits in stroke, including contralesional and ipsilesional effects, current research on mechanisms of motor recovery, and the most current research on intervention strategies, such as constraint induced therapy, robot aided rehabilitation, virtual reality therapy, and sensory motor interventions. The purpose of the course is to provide an understanding of the neurophysiological and biomechanical foundations of motor deficits that occur with stroke, and of current treatment approaches.

Stroke presents a significant social problem that is emphasized in current statistics reported by the American Heart Association indicating that each year, about 780,000 people in the United States experience a new or recurrent stroke. While stroke can produce deficits in perceptual, cognitive, and motor processes, this course is focused on sensorimotor deficits and associated rehabilitation interventions that tend to be employed by physical and occupational therapists in the rehabilitation environment.

Sensory-motor strokes often result in weakness and deficits in voluntary movement of the limbs on the opposite side of the body as the damaged hemisphere (Contralesional). These motor deficits currently receive primary focus in occupational and physical therapy treatment for stroke. However, regardless of improvements in contralesional arm function, most patients also show deficits in coordination of the ipsilesional arm that is on the same side of the body as the damaged hemisphere. For many hemiparetic patients, functional recovery relies heavily on this arm. This class will focus on understanding both ipsilesional and contralesional motor deficits in stroke. Physiological and biomechanical mechanisms of dysfunction will be emphasized. Recovery of function will be addressed through analysis of physiological and biomechanical measures that are used to track changes in neural function. In addition, current research that is focused on developing rehabilitation intervention protocols that systematically address remediation of dysfunction, and facilitation of recovery will be discussed.

Students will be guided in reading, critiquing, and presenting primary scientific manuscripts and review articles. Active discussions of presented material are encouraged, and grades are based on presentations, quizzes, and participation in class.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 466 Assessment and Evaluation in Physical Education and Health Education (2)** Explores measurement as an important and distinct component in a variety of physical education and health education contexts.

### **KINES 466 Assessment and Evaluation in Physical Education and Health Education (2)**

This course addresses measurement as an important and distinct component of other processes such as assessment and evaluation in a variety of physical education and health education contexts (i.e. student performance, teacher performance, program outcomes). Teacher candidates will explain the inter-relationships among objectives, learning activities, and measurement strategies. They will design performance-based and standards-based measurement plans and tools that are necessary when assessing, evaluating, researching or making decisions about performances in physical education and health education. These plans will be performance-based, include select response and constructed response measurement instruments; measure what matters most in all learning domains; and demonstrate that instruction and assessment are seamless. These performances can range from constructed-response or non-traditional performance tasks like motor skill performance, fitness assessments, oral presentations, written reports, portfolios, program evaluation, and teaching effectiveness. Teacher candidates will be expected to recognize many and develop a few authentic and traditional measurement techniques/tools (including peer and self-assessments). These techniques and tools will assess student understanding and performance, provide feedback, and communicate student progress. These tools will measure what matters most and be valid and reliable. These tools are to be embedded with instruction and used by self, peer and instructor. When available, these tools will be integrated with technology to enhance the management of data. In this course, teacher candidates will recommend strategies for implementing results of a measurement by identifying implications from findings for future curricula, instructions, and other activities. They will differentiate between

formative and summative measurements and describe ways the lesson/unit/curricula can be improved based on measurement results. Teacher candidates will also demonstrate their ability to interpret results and infer implications from the findings. For example, identifying instructional gaps between learning activities and objectives and using learning and performance data to make informed curricular and/or instructional decisions. In doing so, teacher candidates will contrast the results of norm- and criterion-referenced evaluation. This course will complement existing Methods courses (field experiences) in our teacher preparation curriculum by aligning instructional planning and implementation with measurement of these learning experiences. Teacher candidates will be evaluated with quizzes, assessment plans, measurement tool development, data collection and data interpretation. One section of this course will be offered each semester with a projected enrollment of 25 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 468** Health Instruction in the School--Content and Method (3) Methods, materials, and units of instruction.

### **KINES 468 Health Instruction in the School-Content and Method (3)**

This course is designed to prepare future middle and secondary school health and physical education teacher candidates in teaching health by providing a framework for comprehensive school health education, up-to-date health knowledge in ten areas of health, and designing the classroom as a laboratory in which students develop and practice teaching skills for health.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 469W** Curriculum Development in Health and Physical Education (3) The content and process of K-12 school health and physical education curriculum development for public school students.

### **KINES 469W Curriculum Development in Health and Physical Education (3)**

The purpose of this course is to prepare prospective health and physical education teachers to plan and design curricular content that meets the needs of students in grades K-12 and aligns with state and national standards. The philosophical and theoretical basis for curricular decision--making will be explored.

Instructional Objectives:

1. design a physical education curriculum outline for a selected school setting (elem, middle, secondary)
2. design a health education curriculum outline for secondary or middle school health
3. assess a current HPE program and the extent to which the program is consistent with good practices, national standards, and state standards

Relationship of course to other courses:

This is the only course that addresses Health and Physical Education Curriculum Design. Students take this course after or concurrently with three-- methods--intensive courses. This course serves as the capstone course in the Teacher Preparation option. It applies pedagogical content knowledge in health and physical education to curriculum models and design. Students take this course the semester before student teaching.

Projected offering and enrollment: this course is offered every semester and has an enrollment limit of 30

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 481W** Scientific Basis of Exercise for Older Adults (3) Study of age-associated physical changes and the effects of exercise on the aging process.

### **Scientific Basis of Exercise for Older Adults (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 483** Motor Patterns of Children (3) Development of motor patterns. Fundamentals of movement, basic motor skills, and adaptation of the body to external forces.

### **Motor Patterns of Children (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 484** Advanced Biomechanics (3) The use of advanced biomechanics to provide an in-depth understanding of the principles which underpin human movement.

### **Advanced Biomechanics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 485** Science of Training Athletes (3) Application of scientific data knowledge to analyze sport training.

### **Science of Training Athletes (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 486** Legal Issues in Sport (3) Contemporary legal issues in sport and their implications for sport managers.

### **Legal Issues in Sport (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 488** Mechanics of Locomotion (3) This course examines the forces and motions characteristic of locomotion, with emphasis on walking, the most common human activity.

### **KINES 488 Mechanics of Locomotion (3) (GHA)**

Walking has been described as the most commonly performed human activity. Diseases or injuries that reduce the ability to walk independently and efficiently are especially likely to adversely affect quality of life. Kinesiology 488 introduces students to the elements of normal walking and how walking motions are affected by changes in age, walking speed, and pathological conditions. Advanced topics covered in this course include other forms of locomotion, including running and cycling, and the use of mathematical models to understand phenomena related to locomotion.

Students enrolled in this course learn the particulars of human locomotion, but in so doing they also gain an understanding of kinematics and kinetic analysis, joint mechanics, and the clinical treatment of movement disorders. Basic principles of mechanics are applied to establish how walking motions result from forces produced by muscles, gravity, and contact with the ground. Students planning to pursue graduate study in movement biomechanics or in clinical areas such as physical therapy are especially likely to benefit from the focus on these areas.

The requirements for Kinesiology 488 include two mid-term tests and a final examination, four laboratory reports, and a literature review. Laboratories (held during regularly scheduled class periods) introduce students to current experimental methods used to measure motions, forces, and muscle activity during locomotion. Completion of several case studies



during the semester gives students practical experience with the interpretation of motion analysis data, the factors that influence clinical decisions in the treatment of movement disorders, and ethical considerations in biomechanics research.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 492W** Programming for Business and Agencies (3) Fundamentals of program development applied to corporate and private physical fitness businesses.

### **KINES 492W Programming for Business and Agencies (3)**

This course will use an experiential approach to acquire knowledge and skills necessary to assess, plan, implement and evaluate health/wellness/fitness programs within a business/corporate setting. Students will actively participate in a process-oriented, student-centered learning environment that includes cooperative learning, critical thinking, effective communication, assessment, and problem solving. Students will assess, plan, implement and evaluate a health-related program (i.e., wellness fair, career fair, road race, fitness programs). Students will write business letters, operating plans, mini-grants, budgets, flyers, press releases, newspaper articles, surveys, and other written communication projects relevant to the fitness/wellness business. Students will access and evaluate health/wellness resources (i.e., agencies, Internet, media, speakers).

As indicated by the "W", this is a writing intensive course and will follow university guidelines for such courses. Most of the assignments will involve group-based problem solving. This course is offered Spring Semesters with a maximum enrollment of 35.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 493** Principles and Ethics of Coaching (3) Integration of the practical and theoretical knowledge necessary for effective coaching through classroom and field experiences.

### **KINES 493 Principles and Ethics of Coaching (3)**

The Principle and Ethics of Coaching examines the challenges of today's coaching profession through societal norms and expectations from the past and present. The course begins with a study of the coaching profession covering past and current coaches who have experienced success and failure in the profession. Students learn how the profession has developed as a result of changing values, demands, emphasis and expectations in the athletic world. Students will learn how to work with Title IX, parents, high school and collegiate regulations, season structures and the various roles and responsibilities of today's coach. The course is a senior-level course providing students in Kinesiology with an in depth study of the profession that has historically been associated with careers in Kinesiology. This course relates to other courses in sport ethics, sport philosophy and history of sport as they provide the theoretical background for coaching decisions. In addition, this course demonstrates practical implementation of theories from nutrition as well as activity courses. The course offers students an in depth study of sport and gender specific differences as they relate to the coaching profession. The students observe, question and study current coaches while examining their own backgrounds to develop set of principles to handle today's coaching issues. A coaching experience is an optional opportunity afforded to students while writing skills must be demonstrated by all students through written exams, papers and/or projects. Enrollment is optimal at 20-25 students, however, larger numbers may be accommodated. The course will be taught during Fall and Summer semesters. The emphasis on class discussion and interaction with various athletic coaches introduces students to realities of today's coaching profession and the challenges of the 21<sup>st</sup> century coach. Video and power point enhance the multi media approach to this course and further enhance the learning environment. Evaluation of the students requires an understanding of assigned readings, class discussion, and the student's ability to demonstrate critical thinking skills.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 494H** Senior Honors Thesis (1-6) Independent study directed by a faculty supervisor that culminates in the production of a thesis.

**Senior Honors Thesis (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 495A** Practicum in Student Teaching (12) Supervised teaching of health and physical education in K-12 public schools with seminars focused on transition from student to professional.

**KINES 495A Practicum in Student Teaching (12)**

The teacher candidate will be placed in either an elementary or secondary school setting for the first 8 weeks of the student teaching experience, followed by placement in the level not selected first for the last 7 weeks. The teacher candidate will be teaching both health and physical education during each placement. The teacher candidate will be assigned on-site cooperating teachers will be supervised by a university faculty member who makes a minimum of four on-site visits, plus review of teaching via two videotape.

During the 15-week semester, there are four seminars of approximately 5 hours each, during which all teacher candidates meet with the coordinator of the student teaching program to discuss topics related to the multiple roles of teachers in public schools and the transition to becoming a professional teacher. In addition, some time in each seminar is devoted to experience sharing and collaborative problem solving. The following topics are covered during the seminars: legal liability and sexual harassment, electronic portfolios, resume and cover letter writing, health and physical education professionals, preparation for employment, interviewing, best teaching practices and sharing, classroom management, and technology in physical education. In addition, the student teachers are required to complete a variety of assignments including: a professional portfolio, unpaid service activity reflection, daily notebook, videotapes and reflection, and Pennsylvania teaching application and essay.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 495B** Field and/or Research Practicum in Kinesiology (6) Participation under supervision in a field or research practicum.

**KINES 495B Field and/or Research Practicum in Kinesiology (6)**

This course places students in the workplaces or research settings with the expectation that these experiences will allow them the opportunity to apply and integrate content from all their courses in the program. They will be placed at a variety of sites, including but not limited to research laboratories, professional fitness centers, rehabilitation facilities, senior centers, community health and wellness programs, and hospitals. They will learn the day-to-day requirements of being "on the job" or "in the lab," including professional management practices and ethical considerations. Practicum work will be evaluated on an ongoing basis with the student intern, work place supervisor, and faculty member involved in the process. The course will take place off campus as work sites and no special on-campus facilities are required. It will be offered annually as the last course in the major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 495C** Exercise Science Practicum (3 per semester/maximum of 6) Participation under supervision in a health and fitness setting.

**KINES 495C Exercise Science Practicum (3 per semester/maximum of 6)**

This course places students in the work place with the expectation that the experience will allow them the opportunity to apply and integrate content from all the courses in the program. They will be placed at professional fitness centers, rehab facilities, senior centers, and wellness centers. They will learn the day-to-day requirements of being "on the job" such as time management, record keeping, client interactions, feedback delivery, fitness program establishment and implementations, business and management practices as well as ethical considerations. Their field experience will be focused on four in-class days during which students will collectively explore work place issues. Practicum work will be evaluated on an ongoing basis with the student intern, work place supervisor, and faculty member involved in the process. The course will take place off campus as work sites and no special on-campus facilities are required. It will be offered

annually as the last course in the major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 495D** Expanded Field and/or Research Practicum in Kinesiology (1-6) Additional participation under supervision in a field or research practicum.

### **KINES 495D Expanded Field and/or Research Practicum in Kinesiology (1-6)**

This course, in combination with KINES 495B, places students in the workplaces or research settings with the expectation that these experiences will allow them the opportunity to apply and integrate content from all their courses in the program. They will be placed at a variety of sites, including but not limited to research laboratories, professional fitness centers, rehabilitation facilities, senior centers, community health and wellness programs, and hospitals. They will learn the day-to-day requirements of being "on the job" or "in the lab," including professional management practices and ethical considerations. Practicum work will be evaluated on an ongoing basis with the student intern, work place supervisor, and faculty member involved in the process. The course will take place off campus at work sites and no special on-campus facilities are required. It will be offered annually as the last course in the major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

Concurrent: KINES 495B

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 495F** Field Practicum in Athletic Training (3) Participation under supervision in a field practicum.

### **Field Practicum in Athletic Training (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496A** Independent Study Athletic Training (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Study Athletic Training (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496A** Independent Study Athletic Training (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Athletic Training (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496A** Independent Study Athletic Training (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Athletic Training (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496B** Independent Study Biomechanics (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Biomechanics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496B** Independent Study Biomechanics (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Biomechanics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496B** Independent Study Biomechanics (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Biomechanics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496C** Independent Study Exercise Physiology (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Exercise Physiology (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496C** Independent Study Exercise Physiology (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Exercise Physiology (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496C** Independent Study Exercise Physiology (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Exercise Physiology (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496D** Independent Study History and Philosophy of Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study History and Philosophy of Sport (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496D** Independent Study History and Philosophy of Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study History and Philosophy of Sport (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496D** Independent Study History and Philosophy of Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study History and Philosophy of Sport (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496E** Independent Study Motor Control (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Motor Control (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496E** Independent Study Motor Control (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Motor Control (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496E** Independent Study Motor Control (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Motor Control (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496F** Independent Study Psychology of Movement and Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Psychology of Movement and Sport (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496F** Independent Study Psychology of Movement and Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Psychology of Movement and Sport (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496F** Independent Study Psychology of Movement and Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Psychology of Movement and Sport (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496G** Independent Study Teaching and/or Coaching (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Teaching and/or Coaching (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496G** Independent Study Teaching and/or Coaching (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Teaching and/or Coaching (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496G** Independent Study Teaching and/or Coaching (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Teaching and/or Coaching (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496H** Kinesiology Honors Independent Study (1-9 per semester/maximum of 18) For non-thesis independent study/research by Schreyer Honors College scholars.

**Kinesiology Honors Independent Study (1-9 per semester/maximum of 18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496K** Independent Study Applied Kinesiology (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Applied Kinesiology (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496K** Independent Study Applied Kinesiology (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Applied Kinesiology (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 496K** Independent Study Applied Kinesiology (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Applied Kinesiology (1-18)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497A** Application of Math to Movement Science (3) This course is to introduce you to the following: How mathematics can be used to provide insight into the movement sciences; and how various mathematical techniques can be used to analyze data from the human movement sciences.

### **Application of Math to Movement Science (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497A** Application of Math to Movement Science (3) This course is to introduce you to the following: How mathematics can be used to provide insight into the movement sciences; and how various mathematical techniques can be used to analyze data from the human movement sciences.

### **Application of Math to Movement Science (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497A** Application of Math to Movement Science (3) This course is to introduce you to the following: How mathematics can be used to provide insight into the movement sciences; and how various mathematical techniques can be used to analyze data from the human movement sciences.

### **Application of Math to Movement Science (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497B** Exercise Medicine (3) Reviews the scientific evidence underlying the need for and effectiveness of exercise/physical activity in preventing, treating/managing several of today's most prevalent chronic diseases.

### **Exercise Medicine (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**KINES 497B** Exercise Medicine (3) Reviews the scientific evidence underlying the need for and effectiveness of exercise/physical activity in preventing, treating/managing several of today's most prevalent chronic diseases.

**Exercise Medicine (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497C** Physical Activity in Diverse Populations (3) An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations. Includes examination of issues related to race, ethnicity, geography, income status, and other social factors across the lifespan for promoting physical activity through public health strategies. This is a writing intensive class.

**Physical Activity in Diverse Populations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497C** Physical Activity in Diverse Populations (3) An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations. Includes examination of issues related to race, ethnicity, geography, income status, and other social factors across the lifespan for promoting physical activity through public health strategies. This is a writing intensive class.

**Physical Activity in Diverse Populations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497C** Physical Activity in Diverse Populations (3) An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations. Includes examination of issues related to race, ethnicity, geography, income status, and other social factors across the lifespan for promoting physical activity through public health strategies. This is a writing intensive class.

**Physical Activity in Diverse Populations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497D** Special Topics in Kinesiology (3) This course is designed as a capstone experience in junior and senior kinesiology majors who have completed most of their core kinesiology coursework. Students in this course will apply knowledge gained in earlier courses to analyze and draw conclusions about challenging and sometimes controversial topics related to the study of human movement.

**Special Topics in Kinesiology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497D** Special Topics in Kinesiology (3) This course is designed as a capstone experience in junior and senior kinesiology majors who have completed most of their core kinesiology coursework. Students in this course will apply knowledge gained in earlier courses to analyze and draw conclusions about challenging and sometimes controversial

topics related to the study of human movement.

### **Special Topics in Kinesiology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497E Ergogenic Aids (3)** Students will describe and evaluate the evidence base for agents and practices used to improve aerobic power, strength, body composition, metabolism and thermoregulation as they relate to exercise and physical activity.

#### **Ergogenic Aids (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497E Ergogenic Aids (3)** Students will describe and evaluate the evidence base for agents and practices used to improve aerobic power, strength, body composition, metabolism and thermoregulation as they relate to exercise and physical activity.

#### **Ergogenic Aids (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497F Physical Activity and Public Health (3)** An examination of the role of physical activity in public health. Includes introduction to basic epidemiology, measurement, dose-response relationships, chronic disease prevention, and population level strategies for promoting physical activity in communities through policy and environmental strategies.

#### **Physical Activity and Public Health (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497F Physical Activity and Public Health (3)** An examination of the role of physical activity in public health. Includes introduction to basic epidemiology, measurement, dose-response relationships, chronic disease prevention, and population level strategies for promoting physical activity in communities through policy and environmental strategies.

#### **Physical Activity and Public Health (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 497G Motor Control (3)** Within this course, the students will get an in-depth knowledge of the mechanisms underlying the neural control and coordination of voluntary movements. The course will include lectures on the history of movement studies, classical research, and main current theories in the field of motor control. These will include theories based on ideas of motor programming and internal models, control with muscle activation patterns, equilibrium-point control, optimization dynamics systems, and theory synergies.

#### **Motor Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498A** EMS Assistant Instructor (1) This course is designed to prepare students to assist in teaching practical sessions of an EMS course. Students should understand that experience is desirable when teaching EMS students. No amount of book knowledge can replace real life experience in the EMS setting.

#### **EMS Assistant Instructor (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498B** EMS Teaching Practicum (1-2) This course is intended to allow the student to experience of a precepted teaching challenge in EMS training programs. The student will experience the rewards of planning, preparing, demonstrating and evaluating the knowledge, skills and aptitudes learned in the EMS Assistant Instructor or EMT Instructor Course. Upon completion the student should be able to teach any of the curriculum packages in which they are clinically competent.

#### **EMS Teaching Practicum (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498C** Introduction to Ambulance Operations (1) This course is designed to train volunteer members of the University Ambulance Service (UAS) in the policies, procedures, and protocols of UAS, EMS Department, Seven Mountains EMS Council, and the Centre County Emergency Communications Centre as they apply to the working EMT. The course is meant to act as a continuity of training specific to UAS and will require on-the-job training to supplement the course. Students are responsible for having a working knowledge of all UAS policies and procedures, and state EMS protocols, including those not expressly covered in class.

#### **Introduction to Ambulance Operations (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498D** EVOC (1) Within the context of presenting a comprehensive emergency vehicle driver training program, this course is designed to present the necessary classroom, competency course training, and testing for new and existing emergency vehicle drivers. The program will verify proficiency in the knowledge and understanding of, as well as the practical application to, emergency vehicle driving.

#### **EVOC (1)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498E** EMS Field Practicum (1-2) This program is intended to provide the newly certified EMT or end of course EMT student an opportunity to apply and build upon their EMS systems knowledge to function effectively within local, out of hospital care systems. The student will function as an EMT in a controlled environment paired with a preceptor through all aspects of the nine phases of an EMS call.

#### **EMS Field Practicum (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 498F** ALS Assistant Technology (1) This course focuses on the skills necessary to recognize mechanisms of injury, perform an organized time-efficient assessment, prioritize and perform critical interventions, appropriately package, and transport the trauma patient.

#### **ALS Assistant Technology (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 530** Experimental Design and Methodology in Kinesiology (3) Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in Kinesiology.

#### **Experimental Design and Methodology in Kinesiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 531** Issues in Athletic Training (3) Analysis of professional/academic issues related to athletic training; includes medical considerations, legal and professional developments, and current research.

#### **Issues in Athletic Training (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 532** Pathoetiology of Musculoskeletal Injuries (3) In-depth study of physiological, mechanical, and neuromuscular

mechanisms of common musculoskeletal injuries with applications for injury prevention, evaluation, and treatment.

### **KINES 532 Pathoetiology of Musculoskeletal Injuries (3)**

This course is designed to provide the student with an in-depth understanding of the Pathoetiology of common musculoskeletal injuries. The pathoetiology of injuries will be approached from physiological, mechanical, and neuromuscular perspectives. The pathoetiology of injuries to bone, cartilage, ligament, muscle, tendon, and nerve will be explored, as will the processes of inflammation, tissue healing, and pain perception. Mechanisms of injuries to specific structures (lateral ankle sprains, ACL ruptures, intervertebral disc herniations,...) will also be studied extensively. Analysis of normal and abnormal movement mechanics as they relate to injury mechanisms will be discussed related to common athletic endeavors such as running and throwing. Clinical applications relating the pathoetiology of injuries to injury prevention, evaluation, and treatment strategies will also be explored. In addition to course lectures, an extensive reading list will be used to facilitate students' knowledge with the current literature related to injury mechanisms. Evaluation of student achievement will be based on written examinations, a literature review paper, and an oral presentation. This course is targeted towards athletic health care professionals (athletic trainers, physical therapists,...) and those interested in orthopedic injury research. A thorough background in gross musculoskeletal anatomy and common musculoskeletal injuries are prerequisites for this course. The course is expected to have an enrollment of approximately 10-15 students and will be offered every other spring semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 551 Seminar in Motor Control (3)** The course will address contemporary theories and methods in motor control as reflected in recently published scientific papers.

### **Seminar in Motor Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 565 Neurophysiological Basis of Movement (3)** The basic understanding of neurophysiological structures and mechanisms involved in the generation of human voluntary movement.

### **Neurophysiological Basis of Movement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 566 Psychophysiology of Movement (3)** Basic concepts and principles of psychophysiology and their application for analyses of human movements.

### **Psychophysiology of Movement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 567 (PHSIO 567) Advanced Exercise Physiology (3)** Physiological changes during exercise with emphasis on the effects of physical conditioning and training.

### **Advanced Exercise Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 574 Modeling in Biomechanics (3)** Examination of the philosophies and tools used in biomechanical modeling and the insights into the musculo-skeletal system these provide.

**KINES 574 Modeling in Biomechanics (3)** It is the objective of this course to introduce the student to the following:

- the philosophical principles which underpin modeling in biomechanics
- the tools used in biomechanics for modeling
- key models developed in biomechanics explaining aspects of human movement

At the end of the course students should have a good understanding of how models are used in biomechanics, and how they contribute to a greater understanding of the mechanisms underpinning human movement. Students should have attained the skills that are necessary for them to start formulating their own models of aspects of human movement.

The course will provide an introduction to the relevant philosophical issues when using models to analyze human movement. The software tools which can be used for the development of models will be studied. The basis for simulation models are the equations of motion of the system being studied, techniques for deriving and solving these equations will be reviewed. Muscles provide the forces which generate human movement, so the properties of muscles and their modeling will be examined. The control of simulation models relies on theories from optimization, and these techniques and their implementation will be studied. Human movement can take many forms, and models which cover various aspects of human movement will be examined including walking, running, reaching, throwing, and jumping.

The course is intended for graduate students and is well suited for students specializing in biomechanics or bioengineering, but may also be relevant to students studying motor control, and sports medicine. Students will be evaluated via three tests, presentations made in class, a project, and a final examination.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 575 Experimental Methods in Biomechanics and Motor Control (3)** Introduces the theory and practice behind the primary experimental methods used in biomechanics and motor control.

### **KINES 575 Experimental Methods in Biomechanics and Motor Control (3)**

Biomechanics and motor control share a common methodology for recording and analyzing human movement. This course is designed to introduce students to the theory and practice behind the primary experimental methods used in biomechanics and motor control. At the end of the course students should have an increased understanding of the experimental methods used in biomechanics and motor control, and experience at implementing these methods. Topics to be covered include: signal processing, electromyography, motion analysis, force measurement, anthropometry, joint kinematics in two- and three-dimensions, joint kinetics, modeling, error propagation, and scaling and dimensional analysis.

Lectures will be used to introduce students to the theory behind a measurement technique. Readings will be used to provide supplementary examples of how these techniques are applied in the analysis of human movement. The techniques will be illustrated with MATLAB routines, with data sets provided so the students can experience how the data must be manipulated to provide meaningful results. Assessments will focus on students' understandings of the techniques, their implementation, and interpretation of their output.

The course will provide a solid foundation for students wanting to understand how the data they are reading about has been produced, and the limitations in such data. Students will also have the background required to become independent in their data collection and processing in the analysis of human movement in both biomechanics and motor control.

Evaluation will include exams, class presentations and a portfolio. It is anticipated that this course will be offered every spring semester with a maximum enrollment of 15.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 577 (PHSIO 577) Cardiovascular Physiology (3)** In-depth study of the heart and circulatory system with emphasis on the effects of exercise on cardiovascular function.

### **Cardiovascular Physiology (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 578** (PHSIO 578) Physiology and Mechanical Behavior of Skeletal Tissues (3) In-depth examination of the structure, composition, and material behavior of the basic skeletal tissues, including bone, cartilage, tendon, and ligament.

**Physiology and Mechanical Behavior of Skeletal Tissues (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 579** Advanced Biomechanics of Human Motion (3) Biomechanical foundation of human movement and injury prevention.

**Advanced Biomechanics of Human Motion (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 588** Scientific Writing in Kinesiology (3) Instruct students in writing grant proposals, abstracts, manuscripts, and effective presentations in their respective scientific fields of study in Kinesiology.

**KINES 588 Scientific Writing in Kinesiology (3)**

This course is intended to assist graduate students in writing grant proposals, abstracts, and manuscripts, as well as preparing effective presentations in their respective scientific field of study within the discipline of Kinesiology.

Course objectives are to:

1. Increase technical proficiency in scientific writing vice a vers a grammar, sentence structure, formatting, etc.
2. Promote the ability to write effective specific aims, hypotheses, and background statement portions of a grant proposals
3. Understand the formulaic approach to writing effective scientific abstracts and manuscripts
4. Expand the ability to prepare and present effective oral communications using a Power Point format
5. Develop an understanding and appreciation for the peer review process associated with grant proposals and manuscripts

Evaluation will be based on grading of the following brief writing assignments: a manuscript abstract, the Introduction section of a manuscript, the Specific Aims page of an NIH-style grant proposal, and a set of Power Point slides for an abbreviated oral presentation.

The course is to be offered every fall semester. Enrollment is limited to Kinesiology Department graduate students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 590B** Exercise Physiology Colloquium (1 per semester/maximum of 4) Continuing colloquia in exercise physiology which consists of individual lectures by outside speakers, students and faculty.

**Exercise Physiology Colloquium (1 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 594F** Research Readings - Psychology of Movement and Sport (1) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Readings - Psychology of Movement and Sport (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 594F** Research Readings - Psychology of Movement and Sport (1) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Readings - Psychology of Movement and Sport (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596** Individual Studies (1-9) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596A** Individual Study Athletic Training (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Study Athletic Training (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596A** Individual Study Athletic Training (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Study Athletic Training (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596A** Individual Study Athletic Training (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Study Athletic Training (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596B** Independent Study Biomechanics (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Biomechanics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596B** Independent Study Biomechanics (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Biomechanics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596B** Independent Study Biomechanics (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Biomechanics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596C** Independent Study Exercise Physiology (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Exercise Physiology (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596C** Independent Study Exercise Physiology (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Exercise Physiology (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596C** Independent Study Exercise Physiology (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Exercise Physiology (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596D** Independent Study History and Philosophy of Sport (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study History and Philosophy of Sport (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596D** Independent Study History and Philosophy of Sport (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study History and Philosophy of Sport (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596D** Independent Study History and Philosophy of Sport (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study History and Philosophy of Sport (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596E** Independent Study Motor Control (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Motor Control (1-18)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596E** Independent Study Motor Control (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Motor Control (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596E** Independent Study Motor Control (1-18) Creative projects, nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Study Motor Control (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596F** Independent Study Psychology of Movement and Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Psychology of Movement and Sport (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596F** Independent Study Psychology of Movement and Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Psychology of Movement and Sport (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 596F** Independent Study Psychology of Movement and Sport (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Study Psychology of Movement and Sport (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 597B** Skeletal Muscle Form and Function (3) Examination of muscle structure, physiology, and mechanics at levels ranging from proteins to whole muscle to multi-joint systems, with emphasis on muscle adaptation and models of muscle force generation.

**Skeletal Muscle Form and Function (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 597G** Gender and Sport (3) A critical analysis sport and physical culture, specifically as they relate to gender, sexualities, and active bodies. Students will consider contemporary and historical issues informed by a range of theoretical groundings.

**Gender and Sport (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 597K** Advanced Theories of Games and Play (3) To critically evaluate classical and contemporary philosophic literature in the nature and value of games and play.

**Advanced Theories of Games and Play (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 602** Supervised Experience in College Teaching (1-2 per semester, maximum of 6) Preparation and presentation of

materials in lecture and laboratory classes under the supervision of a full time faculty member.

### **Supervised Experience in College Teaching (1-2 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KINES 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Labor & Employment Law (LABOR)**

**LABOR 962** The Employment Relationship (3) This course covers common law employment doctrines (at-will employment, contract and tort erosions of at-will employment, employee duties, including the duty of loyalty and trade secrets), noncompetition agreements, and employee rights in inventions, and workplace injuries (including workers compensation, OSHA, and criminal and tort approaches to promoting a safe workplace.)

### **The Employment Relationship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 962** The Employment Relationship (3) This course covers common law employment doctrines (at-will employment, contract and tort erosions of at-will employment, employee duties, including the duty of loyalty and trade secrets), noncompetition agreements, and employee rights in inventions, and workplace injuries (including workers compensation, OSHA, and criminal and tort approaches to promoting a safe workplace.)

### **The Employment Relationship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 963** Workplace Regulation (3) This course covers workplace privacy issues, including free speech and political protections, and defamation and related torts; anti-discrimination laws; and wage, hour, and benefits legislation, including unemployment compensation; the WARN Act, the Family and Medical Leave Act; and NLRA issues commonly encountered in the unorganized workplace.

### **Workplace Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 963 Workplace Regulation (3)** This course covers workplace privacy issues, including free speech and political protections, and defamation and related torts; anti-discrimination laws; and wage, hour, and benefits legislation, including unemployment compensation; the WARN Act, the Family and Medical Leave Act; and NLRA issues commonly encountered in the unorganized workplace.

### **Workplace Regulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 964 Employment Discrimination (3)** This course will provide an overview of significant doctrinal issues in employment discrimination law, and will seek to develop students' skills through a rigorous examination of statutory law, regulations and court decisions. It will introduce students to the fundamental legal theories underlying the substantive coverage of the most significant federal equal employment opportunity laws, and legal issues regarding their application.

### **Employment Discrimination (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 965 Worker's Compensation Law (3)** This course will explore the history and development of, public policy considerations for, and state and federal systems for delivery of medical and wage benefits to injured workers.

### **Worker's Compensation Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 966 The Law of Employee Benefits (3)** Employee-provided pension and health care programs play a critical role in the lives of individuals, families, and communities. They also affect corporations, financial markets, and the economy as a whole. Employee benefit programs are, in short, an important staple of modern law practice. This course surveys the Employee Retirement Income Security Act and relevant portions of the Internal Revenue Code. Classes examine what benefit plans must do regarding reporting and disclosure, accrual, vesting, funding, and fiduciary standards. The course covers health care reform, the shift from defined benefit to defined contribution programs, and the effect of stock market volatility on benefit programs. Throughout the semester, students examine the policy goals underpinning federal benefits law. The course surveys major issues in ERISA litigation, including that statute's claims and remedies provisions, as well as its preemption of state law.

### **The Law of Employee Benefits (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 970 Labor Law (3)** This course is an extended study of the federal National Labor Relations Act focusing on the right to form and join labor organizations, strikes, boycotts and picketing, collective bargaining, and the enforcement of collective bargaining agreements.

**Labor Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LABOR 997A** Survey of Employment Law (3) This course presents a broad survey of both the common law rules and major statutes that govern the relationship between employers and employees. Students will learn about the evolution of the law governing the workplace, and about the interplay of State and Federal laws and regulations commonly encountered by attorneys practicing employment law. The topics covered include the legal nature of the employment relationship, employment at-will and its limitations, compensation for workplace injuries, worker safety, wage and hour laws, employee privacy, noncompetition agreements, the protection of trade secrets, and the arbitration of employment related disputes.

**Survey of Employment Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Labor and Industrial Relations (L I R)**

**L I R 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**L I R 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Landscape Architecture (LARCH)**

**LARCH 400** Introduction to Design and Theory (IUG) (5) Introductory landscape architectural design and applied theory for IUG students.

**Introduction to Design and Theory (IUG) (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998  
 Prerequisite:  
 Concurrent: LARCH 400A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 414** Design and Theory V: Advanced Landscape Architectural Design (5 per semester/maximum of 15) Review of landscape architectural theories and issues; supports development of comprehensive design study and/or independent honors (Thesis-Based) design projects. LARCH Majors only.

**LARCH 414 Design and Theory V: Advanced Landscape Architectural Design (5-15)**

Fourth- and fifth-year design studios are designated "depth" studios. Each studio is aligned with one of the department's associated research centers or pursues special topical content and continues the development of site-scale planning and design skills for landscape architecture students with larger and more complex sites and programs. Students select a topic from the range of options. Students may choose to take a given topic on a maximum of two occasions.

Topics are related to issues that have been introduced in previous studios and are as varied as possible from studio to studio. This allows students to select a topic of interest to explore with great intensity and detail. The studio alternatives offered each year are based on faculty expertise and student interest, and are chosen by the department head's review of faculty proposals. To date, studio topics have ranged from historic preservation to recreational landscapes, urban ecology to community planning. The type of project is determined on an individual basis, and will be rigorous and require a high level of depth of thought and a sophisticated product.

Project types include regional master planning, large-scale site planning and medium-scale community/housing design. The design issues emphasize urban form, community identity and open-space systems in the United States as a follow-up to urban patterns experienced during the student's previous study abroad. The project types may include such topics as inner-city locations with mixed-use and complex programs that progress from research and planning to site-scale design. Often, students work with an actual client, such as an urban planning commission or a city economic development entity, etc. Issues of urban form as a setting for significant practice opportunities are emphasized. Locations such as brown fields, urban entertainment districts, waterfronts, housing infill, etc., form the basis for design response in context.

**Course Objectives:**

- To develop an in-depth understanding of one or another aspect of landscape architecture.
- To be exposed to the rigor and challenges of developing and implementing one's own design expertise in the context of a specific environmental concern.
- To exercise the design principles, technological tools and communication strategies developed during the course of the specific design studios.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 424** Design Theory Seminar (3 per semester/maximum of 9) Inquiry-based reading and discussion of design theory literature relevant to contemporary landscape architecture issues. Topics vary each semester.

**LARCH 424 Design Theory Seminar (1-3)**

LARCH 424, Design Theory Seminar, is a companion to the depth studios, LARCH 414. However, unlike the seminars offered during second and third years, LARCH 424 is not tied topically to any particular depth studio. Instead, this seminar provides a vehicle for rigorous and structured exploration of the theoretical and philosophical issues that face landscape architectural designers and planners. The seminar is a small group setting where directed readings, independent research and reflection are employed to explore the context of contemporary design.

These seminars, offered to fourth- and fifth-year students, enable professors and students to take their investigations to greater depth. Seminars are offered by different professors each semester and the content is expected to be somewhat aligned with the faculty member's research and scholarship or pursues special landscape architectural topical content of the faculty's choosing. Students select seminars from the range of options offered. This allows students to select a topic of interest to explore with great intensity and detail. Students are required to take up to three seminars to achieve a minimum of three credits.

Topics are related to issues that have been introduced in previous studios and seminars and the department ensures that students have access to the widest range of topics. The seminar alternatives offered each year are based on faculty



expertise and student interest, and are chosen by the department head's review of faculty proposals. Seminar topics related to our research centers include historic preservation, urban ecology, community planning and watershed stewardship. From time to time topics independent of our research centers, such as the impact of technology on design or the impact of public policy on design and planning, will be addressed. The type of seminar outcome is determined by instructors on an individual basis, and will be rigorous and require a high level of depth of thought and a sophisticated product.

**Course Objectives:**

- To further develop an in-depth understanding of the theoretical or socio-political context for one or another aspect of landscape architecture.
- To challenge students to articulate their own values in the context of a specific environmental concern.
- To examine the means by which designers reconcile their own, their clients', and society's values in the pursuit of particular design or planning goals.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 431 Landscape Architectural Design Implementation III (3)** Introduces the principles and techniques of stormwater management and drainage design, including instruction in proper construction documentation, calculations and estimations. For Landscape Architecture majors only.

**Landscape Architectural Design Implementation III (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 450 Geodesign: Geospatial Technology for Design (3)** Interactive geodesign and digital design studio.

**LARCH 450 Geodesign: Geospatial Technology for Design (3)**

This course addresses the role of continually evolving information technologies in landscape architectural research and practice by reference to long legacy of theoretical contributions from the field that have sought to reconcile and benefit from integrating the sciences of society and environment with art, design, and planning. This interactive digital design course is an advanced geodesign methods and principles class that applies digital tools to landscape research, modeling, analysis and design. This course presents a digital process for analyzing, managing, and ultimately designing landscape systems by allowing students to inventory, analyze and evaluate complex spatial datasets. Students will learn to critically evaluate and implement the interplay between various factors and design alternative futures.

Lectures will introduce key geodesign principles and techniques. The goal is to investigate an array of geospatial software as a powerful design tool in a broad and integrated manner for all the activities of the landscape architect, designer, planner and architect. Using a variety of geospatial and digital tools, students will develop a process to study, analyze, and plan landscape systems. They will utilize activities from each lesson to develop primary and alternative strategies for their proposed project. The problem-based approach used by this course will encourage cross-cultural contexts for student projects.

Geospatial design computing technology enables many alternate approaches to problem-solving, so that students will customize their own learning experiences within the concrete structure of the course. This course brings advanced geospatial and digital analysis and evaluation into the design process, where concepts and ideas are vetted for suitability against a wide array of physical and social, place-based information. This on-the-fly suitability analysis provides a framework for design, giving landscape architects, architects, land-use planners, and others involved with design the tools to directly leverage geospatial information within their design workflows.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 494H Research Projects - Honors (1-12 per semester/maximum of 12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Projects - Honors (1-12 per semester/maximum of 12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 495** Internship (1-13) Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.

**Internship (1-13)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1981  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 496H** Independent Studies - Honors (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies - Honors (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499A** (IL) Design Theory Seminar (1) Inquiry-based reading and discussion of design theory literature relevant to

the focus and content of the associated design studio course, LARCH 499B. LARCH majors only.

### **Design Theory Seminar (1)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:  
 Concurrent: LARCH 499B LARCH 499C LARCH 499D

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499B** (IL) Design and Theory VI: Contemporary/International Landscape Architectural Design Issues (5) Study of and design for sites, programs, and social groups associated with ongoing contemporary landscape architectural concerns. LARCH majors only.

### **Design and Theory VI: Contemporary/International Landscape Architectural Design Issues (5)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:  
 Concurrent: LARCH 499A LARCH 499C LARCH 499D

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499D** (IL) Contemporary/International Special Topics (3) Special topics related to, and study in conjunction with 499B. Landscape Architecture majors only.

### **Contemporary/International Special Topics (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:  
 Concurrent: LARCH 499B

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499E** (IL) People and Protected Areas (3) LARCH 499E is a three-credit seminar that aims to introduce students to key issues associated with communities, community design, biodiversity conservation, and the interface of people and conservation in the vicinity of Udzungwa Mountains National Park in south-central Tanzania. The format of the course is reading and discussion, where students read assigned literature and then contribute to discussions led by faculty, both to demonstrate their understanding of the reading assignments and to begin to explore key issues introduced by those readings. Students also write two papers, the first examining the interface of rural land use planning, community design, and biodiversity conservation; and the second focusing on biodiversity conservation in the context of human settlement near Udzungwa Mountains National park. Student evaluation is based on seminar participation and the two papers.

### **People and Protected Areas (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499F** (IL) Studio: Community Design in the Vicinity of Udzungwa Mountains National Park (5) LARCH 499F is a five-credit course that focuses on student research projects associated with communities along the eastern boundary of Udzungwa Mountains National Park. We have purposefully maintained a general definition for the course to allow students to design projects that best suit their interests and skills. For example, some students may focus on evaluating existing village configurations and propose new designs that help villagers better meet their daily needs. Other students, in turn, may focus on developing a more marketable park that attracts larger numbers of visitors who stay in or near the park for longer periods of time - generating more income that ultimately will find its way, in part, to local communities.

### **Studio: Community Design in the Vicinity of Udzungwa Mountains National Park (5)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 499G** (IL) Colloquium: The Contribution of Service-Learning to Students and Community (1) LARCH 499G is a one-credit course designed to enable students to reflect on what for most will be their first opportunity to visit and work in rural East Africa. It involves the development of daily journals to record reflections on their evolving awareness of Tanzania and the challenges that people and conservation face in this less-developed country. The journals provide a foundation for reflections about one or more issues that interest each - maybe (though not necessarily) something close to the focus of the specific education abroad experience involved (e.g., the relationship between people and protected areas in south-central Tanzania), maybe international development in general, or maybe another topic. The journals also should be important personally: in all likelihood, this six-week period will expose students to places, people, and challenges that they have never seen in person.

**Colloquium: The Contribution of Service-Learning to Students and Community (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 500** Environmental and Ecological Conditions in Regional Landscape (1) Landscape architectural field trips within the Centre Region.

**Environmental and Ecological Conditions in Regional Landscape (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 501** Research and Writing in Landscape Architecture (3) Landscape architectural research methods and writing techniques.

**Research and Writing in Landscape Architecture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 502** Intellectual History and Theory of Landscape Architecture (3) Introductory theory seminar covering the intellectual history of landscape architecture and theoretical contributions from related disciplines.

**LARCH 502 Intellectual History and Theory of Landscape Architecture (3)**

LARCH 502 is an introduction to the key intellectual themes in contemporary landscape architecture. The seminar provides a vehicle for rigorous and structured exploration of the theoretical and philosophical issues that face landscape architectural designers and planners. Specifically designed as a gateway graduate course, this course serves as an introduction to the disciplines at a graduate level and as means for new graduate students to develop independent research.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 510** Graduate Seminar in Landscape Architecture (3) Landscape architectural theory exploration through readings and discussions.

**Graduate Seminar in Landscape Architecture (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 515 Design and Theory I: Introduction (5)** Introductory landscape architectural design and applied theory for MLA students.

**LARCH 515 Design and Theory I: Introduction (5)**

LARCH 515 is the first of a four-class sequence of design studios at the core of the professional MLA design program. The design studio is an active learning setting where principles discovered in lecture or seminar classes are subject to experiments in the form of design projects. It is a class setting where solutions to complex problems are synthesized and tested based on information gathered in earlier and concurrent classes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 520 Design and Theory II: Introduction to Issues of Place (5)** Studio design with a focus in addressing issues of nature and culture.

**LARCH 520 Design and Theory II: Introduction to Issues of Place (5)**

LARCH 520 is the second of a four-class sequence of design studios at the core of the professional MLA design program. The course follows LARCH 515 and continues to develop the fundamental concepts and basic skills of landscape architectural design. The particular emphasis of this class is an introduction to site analysis encompassing both natural and cultural elements of place. The studio project types are small to moderate in scale and have basic programs. In many cases, site design projects include community projects (i.e. parks) with real human issues and sites. Group discussions and critiques will be important activities in the studio.

This course builds upon two previous classes: the ideas explored in LARCH 515 such as the basic design elements (landform, vegetation, structures), and the issues in LARCH 241 of landscape design and the ecology of site, via a series of studio projects, charrettes (intensive applied workshops) and field trips. LARCH 520 will engage students with design challenges on real sites in the State College/University Park community. Students will be challenged to develop the comprehensive understanding of site and activities (program) required to become an effective landscape architect. Included in the most important parts of that comprehension are natural, social, historical, and aesthetic site conditions; functions, activities and program requirements; site and community context; and relevant design concepts, theories and examples.

The subsequent challenge for students will be the development of design processes necessary to integrate site and program understandings into unified, successful design.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 530 Design and Theory III: Landscape Systems (5)** An introduction to regional planning, management, and design.

**LARCH 530 Design and Theory III: Landscape Systems (5)**

LARCH 530 considers the broader landscape and systems within the landscape. There are two very good reasons to learn to work at the broader landscape scale: to make informed planning, design and management recommendations at that level, and to enlighten site-scale design with a regional perspective. Students begin exploring ways to understand and address issues of regional context before focusing on local-scale site design in the spring semester. Projects include an emphasis on regional analysis, site and program analysis, and site design in the regional context. Studio work involves research and report writing and medium- to large-scale projects where site design and program are directly influenced by regional factors. Topography, geomorphology, land use, transportation, regional ecology, demographics, landscape history, visual analysis, etc., are introduced, all bound into current technological formats using such tools as Geographic Information Systems.

Students explore ideas about landscape-scale conservation, linkages and recreational programming - important types of regional-scale work with which landscape architects are involved. They apply knowledge of the landscape in considering public planning, design and management interventions, including exploration of alternatives for landscape conservation and recreation. Students become involved, through community outreach projects, with interactive and real (e.g. sometimes messy) public dialogue that may help build community-wide enthusiasm for a landscape project of regional significance.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 531 Option Studio I (4)** Studio inquiry in community and urban design.

**LARCH 531 Option Studio I (4)**

Studio-based inquiry in a selected area of community and/or urban design. The course is structured as either group or individual work, as coordinated through the Hamer Center for Community Design Assistance. Requirements of the course are the development and submission of one or more independent or team design projects and/or reports; this studio may form part of the basis for subsequent work in LARCH 541 (Options Studio II).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 540 Design and Theory IV: Site and Community Design (5)** Large site and Community Design.

**LARCH 540 Design and Theory IV: Site and Community Design (5)**

LARCH 540 directly references the understanding of the regional context from the preceding studio courses to take students into community master planning issues. An introduction to those issues and the issues of sprawl and landscape history then allows a transition to community form and housing-type topics. In this class, students gain an understanding of designing communities and everyday human habitat - at several scales, including the interrelationships of natural, cultural and economic factors on the past, present and future development of communities. They develop awareness that even small, individual site design requires an understanding of larger environmental and cultural contexts. To this end, they learn to assess physical and cultural geographies at regional and local scales and their implications for community design at the site scale.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 541 OPTION STUDIO II (4)** Continued studio inquiry in community and urban design.

**LARCH 541 Option Studio II (4)**

Continued studio-based inquiry in a selected area of community and/or urban design. This course is structured as either group or individual work, as coordinated through the Hamer Center for Community Design Assistance. Requirements of the course are the development and submission of a major studio project and related exercises that build upon the understanding and skills acquired in LARCH 531, and may form part of the basis for the subsequent LARCH 552 (Option Inquiry III).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 550 Master of Landscape Architecture Project Studio (6)** The final capstone studio for students completing the Master of Landscape Architecture.

**Master of Landscape Architecture Project Studio (6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 550** Master of Landscape Architecture Project Studio (6) The final capstone studio for students completing the Master of Landscape Architecture.

**Master of Landscape Architecture Project Studio (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 560** Landscape Architecture Inquiry (1-9) Research, planning, and/or design inquiry into landscape architectural issues.

**Landscape Architecture Inquiry (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 590** Colloquium (1-3 per semester/maximum of 6) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 596** Independent Studies (1-9) Independent study opportunities open for graduate students covering topics which fall outside the scope of formal courses (non thesis).

**Independent Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 599** Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 599E** People and Protected Areas (3) LARCH 599E is a three-credit seminar that aims to introduce students to key issues associated with communities, community design, biodiversity conservation, and the interface of people and conservation in the vicinity of Udzungwa Mountains National Park in south-central Tanzania. The format of the course is reading and discussion, where students read assigned literature and then contribute to discussions led by faculty, both to demonstrate their understanding of the reading assignments and to begin to explore key issues introduced by those readings. Students also write two papers, the first examining the interface of rural land use planning, community design, and biodiversity conservation; and the second focusing on biodiversity conservation in the context of human settlement near Udzungwa Mountain National Park. Student evaluation is based on seminar participation and the two papers.

### **People and Protected Areas (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 599F** Studio: Community Design in the Vicinity of Udzungwa Mountains National Park (5) LARCH 599F is a five-credit course that focuses on student research projects associated with communities along the eastern boundary of Udzungwa Mountains National Park. We have purposefully maintained a general definition for the course to allow students to design projects that best suit their interests and skills. For example, some students may focus on evaluating existing village configurations and propose new designs that help villagers better meet their daily needs. Other students, in turn, may focus on developing a more marketable park that attracts larger numbers of visitors who stay in or near the park for longer periods of time--gathering more income that ultimately will find its way, in part, to local communities.

### **Studio: Community Design in the Vicinity of Udzungwa Mountains National Park (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 599G** Colloquium: The Contribution of Service-Learning to Students and Community (1) LARCH 599G is a one-credit course designed to enable students to reflect on what for most will be their first opportunity to visit and work in rural East Africa. It involves the development of daily journals to record reflections on their evolving awareness of Tanzania and the challenges that people and conservation face in this less-developed country. The journals provide a foundation for reflections about one or more issues that interest each--maybe (though not necessarily) something close to the focus of the specific education abroad experience involved (e.g., the relationship between people and protected areas in south-central Tanzania), journals also should be important personally: In all likelihood, this six-week period will expose students to places, people, and challenges that they have never seen in person.

### **Colloquium: The Contribution of Service-Learning to Students and Community (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 600** Thesis Research (On Campus) (1-15) No description.

### **Thesis Research (On Campus) (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Opportunity for students to obtain supervised and graded teaching experience.



**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LARCH 610** Thesis Research (Off Campus) (1-15) No description.

**Thesis Research (Off Campus) (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Language and Literacy Education (LL ED)**

**LL ED 400** Teaching Reading in the Elementary School (3) Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development.

**LL ED 400 Teaching Reading in the Elementary School (3)**

LLED 400 is intended to help teacher candidates become knowledgeable users of theory and language about language, literacy and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. Dealing specifically with reading, we recognize that text goes beyond print texts to include multimodal visual, auditory, digital, movement, and artifactual texts. In LLED 400, candidates learn to understand how children develop as readers and users of literacies in and out of school. Candidates learn how to teach in ways that support children's successful development and uses of multiple kinds of literacy, including reading. Literacy teaching is both an intellectual and practical matter in which teachers work with students in ways that recognize the complexities of language and its social uses, learning and its cultural contexts, and schooling as organizational phenomena. Children enter schools with multiple types of literacy knowledge and cultural experiences. Coming to understand these complexities requires the coordination of both theoretical awareness and applied knowledge. Candidates' practice is developed as they learn to address the puzzles children present as they construct their knowledge of language, literacy, and literature in various social situations. Developing practical strategies to teach literacy requires a dedication of head, hand, and heart to treat all people with dignity, acknowledging the contributions of all cultural groups and respecting diversity as it honors ideals of social justice.

In LLED 400, teacher candidates develop a repertoire of organizational, instructional, and evaluative strategies that are based on research and best professional practices. Candidates work on projects independently and in collaborative groups. Content is presented by the instructor through a combination of lectures, weekly readings and reflections on readings, class discussion, activities and demonstrations, and viewing and analyzing video. Projects include an analysis of children as readers and curriculum planning.

LLED 400 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: LL ED 401 LL ED 402 for CEAED majors

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 400** Teaching Reading in the Elementary School (3) Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development.

**LL ED 400 Teaching Reading in the Elementary School (3)**

LLED 400 is intended to help teacher candidates become knowledgeable users of theory and language about language, literacy and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. Dealing specifically with reading, we recognize that text goes beyond print texts to

include multimodal visual, auditory, digital, movement, and artifactual texts. In LLED 400, candidates learn to understand how children develop as readers and users of literacies in and out of school. Candidates learn how to teach in ways that support children's successful development and uses of multiple kinds of literacy, including reading. Literacy teaching is both an intellectual and practical matter in which teachers work with students in ways that recognize the complexities of language and its social uses, learning and its cultural contexts, and schooling as organizational phenomena. Children enter schools with multiple types of literacy knowledge and cultural experiences. Coming to understand these complexities requires the coordination of both theoretical awareness and applied knowledge. Candidates' practice is developed as they learn to address the puzzles children present as they construct their knowledge of language, literacy, and literature in various social situations. Developing practical strategies to teach literacy requires a dedication of head, hand, and heart to treat all people with dignity, acknowledging the contributions of all cultural groups and respecting diversity as it honors ideals of social justice.

In LLED 400, teacher candidates develop a repertoire of organizational, instructional, and evaluative strategies that are based on research and best professional practices. Candidates work on projects independently and in collaborative groups. Content is presented by the instructor through a combination of lectures, weekly readings and reflections on readings, class discussion, activities and demonstrations, and viewing and analyzing video. Projects include an analysis of children as readers and curriculum planning.

LLED 400 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: LL ED 401 LL ED 402 for CEAED majors

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 401 Teaching Language arts in Elementary School (3)** Principles, problems, materials, and techniques involved in teaching speaking, listening, writing, and reading in the elementary school.

### **LL ED 401 Teaching Language Arts in Elementary School (3)**

The purpose of LLED 401 is to acquaint teacher candidates with theories and practices of teaching writing. Candidates are immersed in the study and experience of workshop and strategic models of writing instruction. Basic goals of this course are to help candidates to use language well and thoughtfully concerning writing instruction, literacy, literature and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles which culture plays in literacy practices, literature, identifications of "ability," and schooling; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and evaluative strategies.

LLED 401 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: LL ED 400 LL ED 402 for CEAED majors

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 401 Teaching Language arts in Elementary School (3)** Principles, problems, materials, and techniques involved in teaching speaking, listening, writing, and reading in the elementary school.

### **LL ED 401 Teaching Language Arts in Elementary School (3)**

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LLED 401 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: LL ED 400 LL ED 402 for CEAED majors

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 402 Teaching Children's Literature (3)** Survey of children's literature with an emphasis on the importance of literature in the development of the elementary school curriculum.

### **LL ED 402 Teaching Children's Literature (3)**

The purpose of LL ED 402 is to familiarize teacher candidates with different theories and practices of teaching literature. Candidates are immersed in the study and experiences of literature and strategic models of literature instruction. Understanding that belief systems inadvertently determine the models of literature instruction educators adopt, LLED 402 asks candidates to be mindful of the diverse nature of our communities, and encourages them to strive to create literary communities that respect, value, and encourage multiple modes of expressions. The basic course goals are to help candidates to understand the importance of story in all human lives; to exhibit a wide repertoire of flexible strategies for interpreting literature; to understand socio-cultural influences upon writing and literature; to know and be able to use basic reference tools and selection guides for research; to become familiar with different genres, diverse texts, and styles; to read for sequence and for secrets; to articulate responses to literature across a variety of media; to weave into the exploration of each of these goals a struggle to understand and to accept human difference; and to understand the role that literature plays in the school curriculum.

The course presents theories of teaching literature and models of literature instruction that place at the center socio-cultural practices typical of democratic literary communities. This requires knowledge of how literature and texts work in real life and in a variety of social and cultural contexts. Informed by research, standards and current practices, LLED 402 exhibits the power of literature, the complexities of students' learning and experiences with texts, and the problem solving character of teaching.

LLED 402 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: LL ED 400 LL ED 401 for CEAED majors

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 402 Teaching Children's Literature (3)** Survey of children's literature with an emphasis on the importance of literature in the development of the elementary school curriculum.

### **LL ED 402 Teaching Children's Literature (3)**

The purpose of LL ED 402 is to familiarize teacher candidates with different theories and practices of teaching literature. Candidates are immersed in the study and experiences of literature and strategic models of literature instruction. Understanding that belief systems inadvertently determine the models of literature instruction educators adopt, LLED 402 asks candidates to be mindful of the diverse nature of our communities, and encourages them to strive to create literary communities that respect, value, and encourage multiple modes of expressions. The basic course goals are to help candidates to understand the importance of story in all human lives; to exhibit a wide repertoire of flexible strategies for interpreting literature; to understand socio-cultural influences upon writing and literature; to know and be able to use basic reference tools and selection guides for research; to become familiar with different genres, diverse texts, and styles; to read for sequence and for secrets; to articulate responses to literature across a variety of media; to weave into the exploration of each of these goals a struggle to understand and to accept human difference; and to understand the role that literature plays in the school curriculum.

The course presents theories of teaching literature and models of literature instruction that place at the center socio-cultural practices typical of democratic literary communities. This requires knowledge of how literature and texts work in real life and in a variety of social and cultural contexts. Informed by research, standards and current practices, LLED 402 exhibits the power of literature, the complexities of students' learning and experiences with texts, and the problem solving character of teaching.

LLED 402 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: LL ED 400 LL ED 401 for CEAED majors

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 411 Teaching Language Arts in Secondary Schools I (3)** Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools.

### **Teaching Language Arts in Secondary Schools I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994  
 Prerequisite:  
 Concurrent: LL ED 420

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 412W Teaching Language Arts in Secondary Schools II (3)** Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools.

### **LL ED 412W Teaching Language Arts in Secondary Schools II (3)**

This three-credit course addresses the theory, practice, and implications of teaching the English language arts at the secondary level. The course is the discipline-specific component of the Secondary Education block taken by majors in Secondary Education prior to student teaching. In this course, students explore issues in language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools. Through in-class and out-of-class activities completed both independently and in collaboration, students read about, talk about, and practice teaching all of the language arts—reading, writing, speaking, listening, and thinking. Activities highlight ways of planning for instruction and ways of assessing student learning as teachers implement those plans. In addition, students will take up the professional issues facing beginning teachers of the English language arts—issues of professionalism and the teaching role, relationships with students, and how teaching can fit into a life. The course builds upon content developed in other courses in the major, including theories of reading, composition, media literacy, and pedagogy. Students engage in a variety of writing tasks both in support of developing course content and as a means of making their work public. This writing includes (but is not limited to) lesson planning, reflective writing on experiences both in the course and in related field experience, and the development of a professional portfolio. During class sessions, informal writing is used for a variety of purposes such as brainstorming, facilitating collaborative work, or framing discussion. Throughout the semester, students draft and receive feedback on a variety of portfolio components, which are revised and incorporated into a final version of the portfolio due at the end of the course. Portfolio contents vary according to instructor, but examples might include statements of educational philosophy, analysis of student writing from field experience, commentary on unit and lesson materials, reflective writing on reading and writing processes, and professional documents such as lesson plans and letters to mentors and potential employers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: C I 412W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 412W Teaching Language Arts in Secondary Schools II (3)** Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools.

### **LL ED 412W Teaching Language Arts in Secondary Schools II (3)**

This three-credit course addresses the theory, practice, and implications of teaching the English language arts at the secondary level. The course is the discipline-specific component of the Secondary Education block taken by majors in Secondary Education prior to student teaching. In this course, students explore issues in language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools. Through in-class and out-of-class activities completed both independently and in collaboration, students read about, talk about, and practice teaching all of the language arts—reading, writing, speaking, listening, and thinking. Activities highlight ways of planning for instruction and ways of assessing student learning as teachers implement those plans. In addition, students will take up the professional issues facing beginning teachers of the English language arts—issues of professionalism and the teaching role, relationships with students, and how teaching can fit into a life. The course builds upon content developed in other courses in the major, including theories of reading, composition, media literacy, and pedagogy. Students engage in a variety of writing tasks both in support of developing course content and as a means of making their work public. This

writing includes (but is not limited to) lesson planning, reflective writing on experiences both in the course and in related field experience, and the development of a professional portfolio. During class sessions, informal writing is used for a variety of purposes such as brainstorming, facilitating collaborative work, or framing discussion. Throughout the semester, students draft and receive feedback on a variety of portfolio components, which are revised and incorporated into a final version of the portfolio due at the end of the course. Portfolio contents vary according to instructor, but examples might include statements of educational philosophy, analysis of student writing from field experience, commentary on unit and lesson materials, reflective writing on reading and writing processes, and professional documents such as lesson plans and letters to mentors and potential employers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: C I 412W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 420** Adolescent Literature and Literacy (3) Exploration of adolescent literacy and curricular designs for using the diversity of cultural voices in adolescent literature in secondary schools.

### **Adolescent Literature and Literacy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

Concurrent: LL ED 411

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 445** Teaching English in Bilingual/Dialectal Education (3) Theories, techniques, materials for teaching English speaking, reading, and writing to bilingual and nonnative speakers in elementary and secondary schools.

### **Teaching English in Bilingual/Dialectal Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 450** Content Area Reading (3) Study of reading skills and materials for specific content areas; diagnostic and instructional procedures for classroom teachers.

### **LL ED 450 Content Area Reading (3)**

LLED 450 is designed to explore the roles of texts and literacies within the daily lives of middle school age students. We will examine both in-school and out-of-school literacy practices related to meaning-making in specific communities of practice. In doing so, we will work from a broader definition of "text" that includes print, images, sound, hybrid combinations and artifacts from popular culture. In school, we examine how literacies are involved in the learning of content, emphasizing how social practices of thinking in different ways about the world have been organized into school subjects and how teachers can help students to engage productively in those practices. Out of school, we look at the ways in which this age group uses text and other forms of literacy to make sense of and in their lives. Toward that end, we look closely at the media that they use and the types of texts that are produced for and by them. Although we honor the traditional practices of academic disciplines, we recognize how new texts and tasks ford those boundaries in order to pose and address school and everyday problems.

The basic goals of this course are to help teacher candidates to use language well and thoughtfully concerning literacy, text, and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles that culture plays in literacy practices, texts, schooling and assessments of "ability"; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and assessment strategies.

This course considers how intermediate grades and middle schools are communities of practice that connect disciplines through the use of language and texts to make sense of the world. The communities surrounding schools influence these uses, and this course follows the students' learning outside the classroom and schools as well as within.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 450** Content Area Reading (3) Study of reading skills and materials for specific content areas; diagnostic and instructional procedures for classroom teachers.

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This course considers how intermediate grades and middle schools are communities of practice that connect disciplines through the use of language and texts to make sense of the world. The communities surrounding schools influence these uses, and this course follows the students' learning outside the classroom and schools as well as within.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 462** The Art of the Picturebook 3 An in-depth study of picturebooks as art objects providing aesthetic experiences and contributing to our aesthetic development in literacy education.

### **LL ED 462 The Art of the Picturebook (3)**

The Art of the Picturebook explores a wide range of picturebooks with the idea that illustrations are visual art evoking thoughts and feelings. Because picturebooks provide aesthetic experiences and contribute to aesthetic development, they are rich and important sources for literacy education. This course provides opportunities to extend students' repertoire of strategies for making sense of picturebooks, to deepen knowledge about picturebooks and the artists who create them, and to consider ways to help children become more sophisticated readers of picturebooks.

While picturebooks are often emphasized as integral to the literacy development of young children, they can be engaging and desirable for older children as well. Course topics include picturebooks for the very young, as well as picturebooks that could appeal to elementary and middle school children. Whether picturebooks appear relatively simple and straightforward or contain innovatively complex or metafictional design elements, close readings of them with an understanding of terminology offer opportunities to express and discuss reactions and interpretations. The Art of the Picturebook provides students a forum for exploring preferences, ideas, insights, and questions about selected picturebooks, along with curricular and pedagogical considerations. Course readings include interviews with illustrators, selections about creating picture compositions, and scholarly essays presenting theoretical perspectives and ideas about picturebooks as literature and art for children's literacy development.

This course emphasizes that reading and interpreting picturebooks is an active, creative process that is socially, culturally, and historically situated. Authors and illustrators are influenced by culture, so their art reflects values of that culture, consciously or unconsciously. A reader's experience with a picturebook is also influenced by cultural and social contexts in a given moment. Because engaging in aesthetic experiences is an active, creative process, reading picturebooks is, as Jane Doonan (1993), author of *Looking at Pictures in Picture Books*, asserts, a form of play. The Art of the Picturebook approaches picturebooks as sources of deep play.

The course also provides opportunities to research selected illustrators, both for class discussions and an illustrator study project (e.g., a Wiki page). The culminating illustrator study project involves an in-depth investigation of a key children's book illustrator and a process of sharing works-in-progress with classmates for collaborative editing.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 465 Fantasy Literature for Children (3)** A study of fantasy literature for children looking at a variety of fantasy stories and examining them from different perspectives.

### **LL ED 465 Fantasy Literature for Children (3)**

Fantasy Literature for Children explores a range of fantasy literature including literary fairy tales, toy fantasies, ghosts/horror/suspense, science fiction, reworked fairy tales, low fantasy, and high fantasy. This course will consider different rationalizations for fantasy literature and will examine some of the key stories that illustrate fantasy from different perspectives, such as literary, social, and psychological angles.

This course will look at, first, the beginnings of modern fantasy with the fairy tales of Hans Christian Andersen and Carlo Collodi's classic, Pinocchio. Then the course reading will include ghosts and other supernatural fantasy stories, and "reworked" fairy tales, a current trend in fantasy literature. Despite of some scholarly debates on science fiction, that is, whether it should be categorized into fantasy or not, this course will consider science fiction as being similar enough to fantasy for it to be included. The course will also include a study of fantasy books currently popular with school-age readers.

Fantasy can be divided into two main groups: low fantasy and high fantasy. Several of the stories to be read in the course are perhaps best categorized as low fantasies, not because of what they are, but because they are not high fantasy, which has a mythic quality to it. High fantasy seems to go beyond the particulars of its story to explore the nature of good and of evil. Though high fantasies can be humorous at times, the overall tone is serious. Often characters are on quests and the stakes of success or failure usually involve saving the world from some great evil or preventing the tyranny of some powerful and evil ruler.

Reading the different types of fantasy literature and the literary critiques and analyses of those works, this course will be wrestling with the overall importance of those books in the lives of children by pondering imagination and its role in the lives of children throughout the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 480 Media Literacy in the Classroom (3)** Exploration of media languages and literacy in classrooms, learning in an electronic age; issues, ideas, and teaching strategies.

### **Media Literacy in the Classroom (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

Concurrent: LL ED 411 LL ED 420

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 495 School Practicum in Reading (1-18)** Supervised practicum providing field experiences at any grade level, with opportunities to assume various teaching roles.

### **School Practicum in Reading (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497A** CEAED PK-4 Literacy Block (15) Course serves as block until CEAED students are registered by Department for appropriate section of LL ED 400, 401, 402, A ED 303 and MUSIC 241.

**CEAED PK-4 Literacy Block (15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497A** CEAED PK-4 Literacy Block (15) Course serves as block until CEAED students are registered by Department for appropriate section of LL ED 400, 401, 402, A ED 303 and MUSIC 241.

**CEAED PK-4 Literacy Block (15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497A** CEAED PK-4 Literacy Block (15) Course serves as block until CEAED students are registered by Department for appropriate section of LL ED 400, 401, 402, A ED 303 and MUSIC 241.

**CEAED PK-4 Literacy Block (15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497B** CEAED 4-8 Literacy Block (9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**CEAED 4-8 Literacy Block (9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497C** Elementary Education Literacy Block (15) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.



**Elementary Education Literacy Block (15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 497F** Spelling Development and Word Study (3) Exploration of spelling development, vocabulary, phonemic awareness, word study and how the integration of these facilitate fluent reading and writing.

**Spelling Development and Word Study (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 498C** Meeting the Needs of Culturally and Linguistically Diverse Students (3) The focus is to implement methods consistent with critically reflective practices that support effective teaching and enhance student learning.

**Meeting the Needs of Culturally and Linguistically Diverse Students (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 500** The Reading and Writing Classroom (3) Analysis of reading and writing processes and the development of integrated language arts programs for elementary schools.

**The Reading and Writing Classroom (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 501** Teaching Writing in Elementary and Secondary Schools (3) In depth examination of writing development and the development of writing components of language arts programs K-12.

**Teaching Writing in Elementary and Secondary Schools (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 502** Studies in Literature for Children (3) Study of various genres of children's literature from various critical perspectives; emphasis on role of literature in children's lives.

**Studies in Literature for Children (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 503** (ENGL 503) Research Methods in Composition (3) Introduction to the issues and methods of empirical research in composition.

**Research Methods in Composition (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 512** Teaching Language, Literacy, and Literature in Secondary Schools (3) Collaborative inquiry into the curricular design and experience of language, literacy, media, and literature in adolescents' personal and social lives.

**Teaching Language, Literacy, and Literature in Secondary Schools (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 520** Literature for Adolescents (3) Critical study of adolescent literature, its diversity of cultural voices, and designs for its use in secondary school classrooms.

**Literature for Adolescents (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 541** Adolescent and Children's Literature Related to Ethnic and Social Issues (3) Literature, K-12; study of literary symbolism, ethnic literature, issues, e.g., sex, death, adoption, divorce in trade books.

**Adolescent and Children's Literature Related to Ethnic and Social Issues (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 542** (CI ED 542) Issues in Literacy Education (3 per semester/maximum of 6) Discussion of philosophical, sociological, historical, and curricular issues in literacy education.

**Issues in Literacy Education (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 544** Cross-Cultural Research in Bilingual Education (3) Analysis of cross-cultural research methodology in bilingual education.

**Cross-Cultural Research in Bilingual Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 545** LITERACY AND LANGUAGE ASSESSMENT FOR INSTRUCTIONAL DECISIONS (3) Diagnosis of reading difficulties; genesis of reading problems; achievement, diagnostic, and capacity tests; application in simulation activities.

**LITERACY AND LANGUAGE ASSESSMENT FOR INSTRUCTIONAL DECISIONS (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 550** Theory and Practicum in Assessment and Remediation of Reading Difficulties (3) Links theory and practice in supervised practicum involving design and analysis of appropriate assessment and instructional procedures for elementary and secondary students.

**Theory and Practicum in Assessment and Remediation of Reading Difficulties (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 560** (ADTED 560) Teaching Reading to College Students and Adults (3) Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

**Teaching Reading to College Students and Adults (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993 Ending: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 561** Cultural Pluralism in Children's and Adolescent Literature (3) Reading/discussing literature from multicultural/critical multicultural lenses and how this impacts literacy.

**LL ED 561 Cultural Pluralism in Children's and Adolescent Literature (3)**

LLED 561 is a critical exploration of literature that addresses multicultural issues and their functions in the classroom. Emphasis is on cultural diversity in children's lives. The course focuses on four main areas. The first of these areas revolves around the concepts of multiculturalism and critical multiculturalism and how they serve as lenses through which students can ask questions about society as represented in literature. It addresses what multicultural literature is, who writes multicultural literature, and how this genre of literature serves as a window into and a mirror of culturally diverse societies. Race/ethnicity, gender, class, disability and cultural authenticity in multicultural literature are discussed. The primary objectives of the course are to enable students to expand their strategies for reading culturally diverse literature, become familiar with resources related to multicultural literature, explore cultural, literacy and socio-political issues related to children's/adolescent literature and to consider the role that multicultural literature plays in a literacy curriculum.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 563** Myths and Folktales in Children's Literature (3) An in-depth study of myths and folktales shared with children and how these stories are remade and disseminated today.

### **Myths and Folktales in Children's Literature (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 565** Analysis of Theory and Practice in Bilingual Education Program (3) Classroom analysis, observation, and research of instructional procedures, materials, and evaluation strategies used in bilingual education.

### **Analysis of Theory and Practice in Bilingual Education Program (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 566** Bilingual Education and the Hispanic Child (3) Analysis of the research and literature related to teaching bilingual Hispanic students; examines problems, issues, and strategies.

### **Bilingual Education and the Hispanic Child (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1993

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 567** Politics of Bilingual Education (3) To critically analyze the contemporary and historical political context of an education that is bilingual and bicultural.

### **Politics of Bilingual Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 568** Doing Research in Children's Literature (3) An examination of research traditions used to frame research in children's literature studies and preparation to write the master's paper.

### **Doing Research in Children's Literature (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 577** (C I 577) Multicultural Issues in Literacy Education (3) Explores research questions, and theoretical frameworks, and analyzes multicultural issues in popular media in the context of American schools.

### **Multicultural Issues in Literacy Education (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 580** (C I 580) Media Literacy, Language, and Literacy in Schools (3) Theories of media literacy, issues of non-print technology in language and literacy.

**Media Literacy, Language, and Literacy in Schools (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 594** Research in Language and Literacy Education (3) Cooperative design and study of research in language and literacy education.

**Research in Language and Literacy Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 595A** Practicum: Remedial Procedures and Diagnosis (3-6) Advanced practicum; diagnostic testing and remedial instruction of more severe types of reading disability; supervisory experiences, if appropriate.

**Practicum: Remedial Procedures and Diagnosis (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 595B** Advanced Practicum in Bilingual Education (1-6) Advanced internship in curriculum, supervision, and instruction in a bilingual education setting.

**Advanced Practicum in Bilingual Education (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 597G** Write for Children (3) Course in creative writing for those who wish to write for children. Workshop style class provides opportunity to discover, explore, experiment and develop skills for writing in a variety of genres for young readers.

### **Write for Children (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LL ED 597G** Write for Children (3) Course in creative writing for those who wish to write for children. Workshop style class provides opportunity to discover, explore, experiment and develop skills for writing in a variety of genres for young readers.

### **Write for Children (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Languages (LANG)**

**LANG 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LANG 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LANG 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LANG 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Latin (LATIN)**

**LATIN 402** Republican Literature (3-12) Selected works by Plautus, Lucretius, Catullus, Cicero (content varies).

### **Republican Literature (3-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Summer 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 403** Augustan Age Literature (3-12) Selected works by Virgil, Horace, Propertius, Tibullus, Ovid, Livy (content varies).

### **Augustan Age Literature (3-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Summer 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 404** Silver Age Literature (3-12) Selected works by Petronius, Seneca, Tacitus, Juvenal, Martial, Pliny the Younger (content varies).

### **Silver Age Literature (3-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language

Effective: Summer 1995

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 420** Medieval Latin Literature (3-6) Survey of Medieval Latin literature.

### **Medieval Latin Literature (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 450W** History of Latin (3) History of the Latin language and its speakers, from their origins to the 2nd century C.E.

### **History of Latin (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**



General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 510** Latin Seminar (3-6) No description.

### **Latin Seminar (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LATIN 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

### **Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Law (LAW)**

**LAW 903** Visiting Away Semester (1-17) Student approved by the law school to visit away for the semester. Course work successfully completed will transfer as progress toward the law degree.

### **Visiting Away Semester (1-17)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Law Research Doctora (SJDLW)**

**SJDLW 900** SJD Dissertation (1-12) SJD Dissertation.

### **SJD Dissertation (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Ldrshp Development (LEAD)

**LEAD 501** Leadership Across the Lifespan (3) Analysis and application of models, theories and strategies for developing an individual's full leadership potential at different life stages.

### **LEAD 501 Leadership across the Lifespan (3)**

LEAD 501 explores and analyzes the requirements for positive leadership of the self and others, recognizing the way people change along the way from early adulthood to old age. Students will be introduced to the various components of the self-leadership, including personal meaning, optimal experiences (flow), emotional intelligence, moral development, how a leader's (and his/her followers') life stream of biographic and deomgraphic elements influence leadership processes, and followers' perceptions the leader's behavior. Students will learn how to display psychologically empowering positive leadership based upon information obtained through discussions, 360-degree and moral development leadership assessments, participation in field projects observing leadership "in vivo," analysis of relevant popular movies by applying theories of leadership and adult development, and readings. Emphasis in this course is placed on learning from the life streams of "real world" leaders to bring t life the material covered in the course. As the course progresses, new knowledge and skills are integrated into a more sophisticated framework for understanding positive leadership across the lifespan.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 519** (BUSAD 519) Developing Creative High Performance Organizations (3) This course focuses on how to create high performing organizations based on models provided by business, science and the arts.

### **LEAD (BUSAD) 519 Developing Creative High Performance Organizations (3)**

#### Overview:

This course focuses on how to create high performing organizations based on models provided by business, science and the arts. We will examine the key assets that these disciplines bring and show how to apply them to business activities. For example, it has been shown that improvisational models from music are highly relevant to new product development.

Course activities will include a discussion of the readings from relevant academic research in the business field. We will discuss the philosophy of aesthetics, analyze cases, and review original works. We will also listen to short lectures by practicing artists, musicians, actors, scientists, and writers. Together, these activities will help students to develop strategies to help their organizations attain higher levels of performance. This course is a graduate elective for MBA students and could also be taken by other students (such as Leadership students) if it meets their degree requirements.

#### The way the course will run:

This course will be run as a graduate seminar designed to maximize the learning of the members of the group including the instructor's. We will learn about each of the topics noted above through a variety of means. Our interaction will include general discussions, lectures, case discussions, exercises, small group meetings, and on-line chats. We will have invited speakers for the class representing the arts, music, science and business.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 555** (BUSAD 555) Full Range Leadership Development (3) Development of behavioral skills associated with outstanding leadership of individuals, teams, and organizations through advanced information technology, experimental exercises, and case analysis.

### **LEAD (BUSAD) 555 Full Range Leadership Development (3)**

Leadership is one of the world's oldest preoccupations. Since the beginning of civilization, prophets, kings, rulers and managers have struggled to find answers to an important question: Why do most leaders or managers elicit merely competent performance from their followers, while a select few inspire extraordinary achievement? Given increased

globalization, diversity, restructuring, e-business and innovation in today's business environment, finding answers to this question is important for maintaining organizational competitiveness.

The purpose of this course is to provide answers to this question by identifying traits and behaviors associated with outstanding leaders, explaining how they get results, and why their leadership often exceeds all expectable limits. This course is designed to introduce students to a) behaviors associated with outstanding leadership, b) social learning and cognition in organizations as a context to promote outstanding leadership, and c) leadership development as a strategic intervention to enhance individual, group, and organizational motivation and performance.

The course will be run as a graduate seminar. We will interact through Web site technology, general group discussions, team projects, lecturettes, case discussions, exercises and videos. Class sessions will focus on issues raised by the readings, cases, and issues relevant to students' organizational experiences. A portion of the class time may be set aside for the coordination of team projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 556 (BUSAD 556) Diversity Leadership (3)** Analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

### **LEAD (BUSAD) 556 Diversity Leadership (3)**

In this course students will explore the theory and practice of diversity leadership through experiential exercises, video and didactic presentations, small group and class discussions, and the analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 557 Leadership Models and Methods (3)** Design, analysis and application of leadership models and research methods for solving organizational problems.

### **LEAD 557 Leadership Models and Methods (3)**

LEAD 557 provides masters'-level graduate students with an initial understanding of the process of research methods, particularly within leadership and management-related disciplines and in organizational contexts. Students will survey a variety of leadership models and their application to leadership research and practice. They will learn how to evaluate and design research studies and apply them in organizational context in their consulting work, debate ethical and philosophy of science issues, and solve focused organizational problems by applying the scientific method. Emphasis in this course is placed on "learning by doing" in order to gain knowledge of how leadership theories are formulated, how data are analyzed to test theories, and how conclusions about data and theory are drawn. Students learn by critiquing a variety of key leadership models, identifying real organizational problems and applying the skills of theory and hypothesis formulation, measurement, sampling, and study design.

Students learn techniques of data collection and analysis using SPSS (Statistical Package for the Social Sciences), and how to write clear and concise research papers. As the course progresses, new knowledge and skills are integrated into a more sophisticated framework for understanding how leadership models and methods can solve organizational problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 561 Dynamic Communication in Leadership Contexts (3)** Articulating and promoting a vision; facilitating interaction and communicating with groups; theory and techniques of persuasion.

### **LEAD 561 Dynamic Communication in Leadership Contexts (3)**

LEAD 561 is an advanced communication course that emphasizes leadership development and communication competency. Theories and models of interpersonal communication, transformational and charismatic leadership, group dynamics

persuasion, and creativity and innovation are addressed in relation to communication practice. Student evaluation methods will include individual and team projects, presentations, and essays. The course will be offered annually and is a required course in the Master of Leadership Development program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 562 Strategic Leadership (3)** Executive-level leadership of larger systems and organizations. Impact of developing human, intellectual, social, structural, financial and reputational capital as strategic tools.

### **LEAD 562 Strategic Leadership (3)**

LEAD 562 explores and analyzes the requirements for effective strategic leadership in organizations operating in today's technology-driven environments. Students will be introduced to the various elements of the strategic leadership system, including organizational context/environment, leader's life stream of biographic and demographic elements influencing leadership, and followers' perceptions the leader's behavior. Students will learn how to display outstanding strategic leadership based upon information obtained through discussions, field-based case studies, and readings. Discussions will be conducted face-to-face, email and/or on-line ANGEL bulletin board discussions. Emphasis in this course is placed on learning from "real world" senior managers/administrators to enhance the practicality and usefulness of the material covered in the course. As the course progresses, new knowledge and skills are integrated into a more sophisticated framework for understanding strategic leadership.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 582 (BUSAD 582) Social Entrepreneurship and Community Leadership (3)** This course will provide an opportunity for students to explore concepts of developing and leading businesses that create social value.

### **LEAD (BUSAD) 582 Social Entrepreneurship and Community Leadership (3)**

This course uses entrepreneurial and leadership skills to craft innovative responses to social needs. Entrepreneurs are particularly good at recognizing opportunities, exploring innovative approaches, mobilizing resources, managing risks, and building viable, sustainable enterprises. Entrepreneurial skills are just as valuable in the social sector as they are in business. Social Entrepreneurship aims at social impact but does not exclude economic wealth creation. Therefore it is not limited to the non-profit sector. Despite a sustained economic boom in this country, numerous social problems remain and some seem to be getting worse. The course will focus on introducing business leadership and entrepreneurship principles to both profit and non-profit organizations whose products and services are designed to create social value.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LEAD 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Linguistics (LING)

**LING 402 Syntax I (3)** Principles of grammatical analysis in the generative framework; an overview of syntactic structures across languages.

### **LING 402 Syntax I (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The aim of this course is to provide students with the background needed to understand advances in modern generative syntactic theory and to encourage them to do creative and informed research in this area on English or other languages that they might know. The course provides a historical overview of the development of generative syntax. We explore in depth a number of topics that challenge any syntactic theory and we attempt to propose testable hypotheses concerning language structure.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 404 Phonology I (3)** The analysis of the sound systems of human languages; focus on common phonological processes across languages and on phonetics-phonology interface.

### **LING 404 Phonology I (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is about sound patterning in language. In particular, we will learn how human speech sounds are produced and how they function together as a system. We will learn the International Phonetic Alphabet applied to English. We will discuss phonological data from many different languages to seek common phonological processes that occur despite the apparent surface diversity of languages. We will do extensive work on phonological problems in order to master basic phonological analysis.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 429 (PSYCH 426) Language and Thought (3)** Relations between language and cognition; cognitive implications of normal and impaired language development; cognition and bilingualism.

### **LING (PSYCH 426) 429 Language and Thought (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Is language a special and uniquely human ability that develops and functions independently of other cognitive processes? Do individuals who speak different languages also have different concepts about the meaning of objects and ideas? Does language development depend on exposure to spoken language? In this course we will examine the relation between language and thought by considering evidence on language and cognition in both children and adults. Topics to be covered include the typical development and use of language as well as language and cognition in individuals whose language and/or cognition is impaired in some form. The latter include individuals with aphasia who have sustained brain damage following stroke or head injury, schizophrenics whose language reflects aspects of their disorder, children diagnosed with Williams Syndrome who appear to have good or even precocious language abilities in the face of severe cognitive impairment, and Alzheimer's patients in whom semantic memory has begun to deteriorate. The course will also discuss the acquisition of sign language among deaf individuals and the consequences of bilingualism for children raised with two languages and for adults with proficiency in more than a single language.

The purpose of this course is to provide a survey of current scholarship on the relation of language and thought, including a review of recent developments in the primary literature. The necessary background is covered in introductory Psychology and Linguistics courses, which serve as alternative prerequisites. Students will learn about the consequences of typical and impaired development for relations between cognition and language ability. It is distinguished from PSYCH

457, Psychology of Language, by a focus on the implications of language, language development, and language impairment, for cognitive processes. It covers some topics also addressed by current courses in Linguistics and in Communications Sciences and Disorders, but is distinguished from those courses by its focus on perspectives and theories from cognitive psychology. This course may be used toward the 400-level PSY requirements of the PSYBA and PSYBS majors, and toward the PSY minor. Students typically will be assessed on the basis of class participation and discussion (20%), four papers (total 60%), and an in-class presentation based on reading original research literature (20%). The course typically will be offered once each year at the University Park campus with an enrollment limit of 50.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 446 (PSYCH 427) L1 Acquisition (3)** How children learn their first language; psycholinguistic aspects of lexical, syntactic, semantic, and phonological development.

**LING 446 (PSYCH 427) L1 Acquisition (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course focuses on how children learn their first language from the theoretical perspectives of imitation theories, social construction theories, and innateness theories. In addition, the course covers the various stages of language acquisition including phonological (sound system), morphological (word meaning), syntactical (grammar) and semantic (meaning) development from birth to adulthood. Other related subfields covered in the course include the acquisition of Pidgin and Creole languages, bilingual and multilingual acquisition, and language acquisition and linguistic change.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 447 Bilingualism (3)** Explores the social and psychological aspects of bilingualism; topics include languages in contact, transference, maintenance, and loss.

**LING 447 Bilingualism (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course presents a panoramic view of the major questions, research methods and results in bilingualism research. We will cover the following topics, in addition to those topics that emerge from students' research: bilingualism in society; political and social results of language contact; effects of social attitudes on bilinguals; how bilingualism affect language; transfer, code-switch, language contact and language change; the bilingual brain, psycholinguistic effects of having two grammars in sentence production, phonological perception and lexical storage; childhood bilingualism; developmental and educational consequences of bilingualism.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 448 Sociolinguistics (3)** Issues in the study of language in its sociocultural context; analysis of social dialects and speech styles.

**LING 448 Sociolinguistics (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course investigates sociolinguistics variation and linguistic change. We will be concerned with identifying the mechanisms by which changes come about and are transmitted within a linguistic system. The course contrasts traditional studies of change and variation which concentrate on linguistic internal factors to those that are based on sociolinguistic factors. Research from a wide variety of languages and cultures will be examined.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 449 Semantics I (3)** The study of meaning in human language; methods of analysis; study of sense, reference, compositionality, quantification, presupposition, and sentence-level meaning.

**LING 449 Semantics I (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course examines our best understanding of how humans produce and understand utterances to have particular meanings. This course examines lexical semantics, which is concerned with word meaning, phrasal semantics, which examines phrase meanings and with pragmatics, the study of meaning in contexts. Because meanings cannot always be built up or deduced from the combined meaning of smaller elements, students will attempt to divulge the semantic principles at work in human language through a wide variety of problems and activities.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 457 (PSYCH 457) Psychology of Language (3)** Overview of psychological research and theory on language processes, including speech perception, word recognition, meaning representation, comprehension, and language acquisition.

**Psychology of Language (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 493 Field Methods (3)** Primary linguistic investigation of a language different from English; field work with a native speaker; data gathering; linguistic analysis.

**LING 493 Field Methods (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In this course, students work directly (in groups) with a native speaker of a foreign language with which no one in the class has any prior familiarity. The students will work to uncover the set of sounds relevant to the language in question by winnowing down possible sound contrasts made in human languages. They will begin to construct a lexicon (vocabulary) built with a phonetic alphabet to discover how words are formed in the language. They will refine their techniques of questioning their research participant based on principles of linguistic field work. Finally, groups will present their findings for discussion and revision.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or

small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 500** Syntax II (3) Advanced topics in syntactic analysis and theory.

### **LING 500 Syntax II (3)**

The aim of this course is to provide students with the skills necessary to contribute to our understanding of modern generative syntactic theory (although other theories may be introduced by professors from different theoretical backgrounds). An overview of the theory of early generative grammar and its attendant problems will be presented in this course. Attempts to resolve these issues in contemporary syntax via the minimalist program will be covered in as much depth as possible. Using the skills and arguments developed in this course, students will be required to do original research on a particular problem of syntax.

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 502** Historical Linguistics (3) Principles of comparative linguistics; language families; reconstruction of lost languages.

**LING 502 Historical Linguistics (3)**

The goal of this course is to engage graduate students in an analysis of the competing theories of the methods for classifying the world's languages. The course will provide an historical overview of the field with a major emphasis on contemporary debates. At issue will be whether all languages can be reconstructed to a common source. Is there possible evidence for such a reconstruction?

Can the methodology faithfully extend to the very remote past?

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 504** Phonology II (3) Advanced topics in phonological analysis and theory.

**LING 504 Phonology II (3)**

Students in this course will examine the shift from rule-based to constraint-based theories of phonology with an emphasis on analyzing the shortcomings and paradoxes inherent in earlier approaches. At issue will be the search for a better understanding of how the phonological component continually interacts with phonetics and morphology in order to create optimal outputs. Students will analyze particular problems through reading various journal articles treating the same topic from different approaches. They will then evaluate the various approaches systematically. The goal of this course is to prepare students to do close readings of advanced research.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 520 (PSY 520)** Seminar in Psycholinguistics (3 per semester/maximum of 9) Consideration of theoretical and research issues relevant to psychological aspects of language sounds, syntax and semantics, and other cognitive support.

**LING (PSY) 520 Seminar in Psycholinguistics (3 per semester/maximum of 9)**

In this seminar, psycholinguistic approaches to bilingualism will be examined. Bilingualism is of interest for a number of reasons. First, despite the prevalence of monolinguals in the United States, most people of the world are bilingual. To have a genuinely universal account of human cognition will therefore require a detailed understanding of the relations between language and thought in individuals who speak and understand more than one language. It will be essential that research on basic cognitive functions in bilinguals examines both the course and the consequence of second language acquisition. Second, bilingualism provides a unique vantage point from which the relations between thought and language may be viewed. Historically, this issue was the focus of the debate over the Whorfian hypothesis (i.e., does language determine thought?). In contemporary psychology, it has emerged as a central issue in the debate over modularity. Understanding the form of language and memory representation in the bilingual may provide an important set of constraints in modeling the fundamental categories of the mind. Finally, bilingualism can provide a research tool for examining cognitive functions that are sometimes impenetrable within an individual's first language. The examination of the mapping of form to meaning in constructing syntactically well-formed sentences in two languages with contrasting syntax, or in understanding the meaning of words that have similar form but differ in meaning in two languages, provides a tool for developing converging sources of evidence to test theories of language comprehension and memory. Topics to be covered include second language acquisition in children and adults, language comprehension and memory in second language, code switching and language mixing, the consequences of bilingualism, and the neuropsychology of bilingualism.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**LING 521** Proseminar in the Language Science of Bilingualism (3) This course provides a cross-disciplinary overview of language science approaches to bilingualism and second language learning.

**Proseminar in the Language Science of Bilingualism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 522** Proseminar in Professional Issues in Language Science (3) This course addresses issues of professional development in the language sciences with special attention to cross-disciplinary research.

**Proseminar in Professional Issues in Language Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 525** Experimental Research Methods in Psycholinguistics (3) This course provides an overview of experimental research techniques used in language science.

**Experimental Research Methods in Psycholinguistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 548** Sociolinguistics (3) Study of social and linguistic aspects of language change, varieties, policy, social inequality, language communities, language, society, and thought.

**LING 548 Sociolinguistic (3)**

This course investigates the sociolinguistic bases of linguistic diversification. Linguistic diversity, that is, the process by which a single linguistic system spreads and changes over time into regional and social varieties, is found in all societies. It is through the study of linguistic variation that linguists gain access to issues in language change, dialects, language policy, social inequality, language communities, and language, society, and thought. The course contrasts traditional studies of linguistic change, which concentrate on system-internal factors, with sociolinguistically based approaches, which investigate factors from outside the linguistic system. The key to the approach is that the study of linguistic variation and change in real time allows a unique view of the system as it has developed and as it is currently structured. This is because linguistic variation can be viewed and studied as change in progress, and quantitative and qualitative methods have been developed which allow changes to be isolated and identified, and to which social significance can be attributed. A basic assumption behind the content of this course is that linguistic variation is the starting point of most linguistic change and that useful insights into the past can be achieved by exploring present-day linguistic systems. Students will be evaluated by data analysis assignments (30%), review of research literature (30%) and databased research project (40%). LING 548 Sociolinguistics will be a core requirement of the proposed Ph.D. in Applied Linguistics. In addition, LING 548 will be a required course for the Departments of German and Spanish Ph.D. options in Applied Linguistics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LING 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Lit/Dispt Res/Skills (SKILS)**

**SKILS 950L** Advocacy I (4) Advocacy I teaches pretrial and trial skills through a combination of lecture, written and oral courtroom exercises, and videotape review.

#### **Advocacy I (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 950R** Advocacy I Advocacy I teaches pretrial and trial skills through a combination of lecture, written and oral courtroom exercises, and videotape review.

#### **Advocacy I**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 951** Advocacy II (3) Students synthesize the individual trial skills learned in Advocacy I by preparing and conducting

an entire case, from the initial interview of the client through a trial on the merits. Each case is tried before a jury and judge from a Pennsylvania or federal court. All trials are videotaped in their entirety.

### **Advocacy II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 952 Strategic Legal Research (3)** This course is designed to provide students with an advanced understanding of ways lawyers use primary and secondary legal research sources and finding tools to successfully represent their clients. An emphasis is placed on the development of effective legal research strategies that take into account choice of format (e.g., the relative advantages and disadvantages of print and electronic sources), cost/benefit analysis of format choice, evolving approaches by law firms and private practitioners to billable research hours, use of computerized tools to organize research results, and presentation of research results to case supervisors. Course content will be presented in a hybrid format consisting of two hours per week of in-class meetings with the remaining credit to be completed by coursework outside scheduled class time through online and written assignments.

### **Strategic Legal Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 954 Pretrial Advocacy (2)** Students work with case files through written exercises and classroom simulations to gain a thorough understanding of the procedural rules and advocacy tools used in the pretrial stages of litigation. The course grade is based upon class participation and the written exercises.

### **Pretrial Advocacy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 955 Evidence (3)** This course presents evidence in trials under the Federal Rules of Evidence, at common law and in equity and with reference to administrative bodies. The reasoning from which rules arise in areas including relevancy, competency, privilege, examination of witnesses, writing, the hearsay rule and its exceptions, burden of proof, presumptions, judicial notice, and constitutional evidence problems is also addressed.

### **Evidence (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 957 Client Counseling (2)** This course introduces students to the dynamics of a productive attorney- client relationship, the goals of interviewing and counseling, and structures and techniques that can be used to achieve those goals. The focus is on developing students' skills in interviewing and counseling. Instruction consists of assigned reading, problem-solving exercises, group discussion, and practice through simulations. Client Counseling is one of the core courses for the Certificate in Dispute Resolution and Advocacy. Preference is given to students seeking the Certificate in Dispute Resolution and Advocacy.

### **Client Counseling (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 958** Conflict of Laws (3) How do we resolve problems when the substantive law or procedural rules of states or nations conflict? For example, if Hawaii enacts a statute permitting same-sex marriages, must other states recognize such a marriage? If an American-owned factory explodes in India, may the injured pursue claims under American tort law? The course will provide a review of jurisdictional concepts introduced earlier in first-year courses, introduce choice of law issues for multistate or multinational transactions or events, and examine the influence of the United States Constitution on the reach of a state's judicial decisions or legislation outside the state.

### **Conflict of Laws (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 959** Mediation (3) This course examines the legal and ethical issues involved in mediation and develops students' skills as mediators and as attorneys representing clients in the process.

### **Mediation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 960** Negotiation/Mediation (3) This course combines the law and ethics of negotiation, mediation and settlement with economic and psychological bargaining theory and regular hands-on practice in representing clients in negotiation and mediation. Bargaining theory (including distributive and integrative bargaining), relevant socio-psychological research, negotiation and mediation ethics, the law of settlement, and the basics of contract drafting are all introduced. Instruction consists of assigned reading, a series of simulations and exercises (including drafting a resulting contract), written negotiation planning and self-evaluation, feedback, and group discussion.

### **Negotiation/Mediation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 962** The U.S. Law of Arbitration (3) This course provides an introduction to the domestic law and practice of arbitration. It assesses the statutory and decisional law basis for arbitration, especially the provisions of the Federal Arbitration Act. It investigates the central doctrinal issues in the field: the enforceability of unilaterally-imposed arbitration agreements, the arbitrability of statutory rights - in particular, civil rights matters, and the use of contract to establish the law of arbitration between the arbitrating parties. Emphasis is placed upon practical problems that have emerged in the practice of arbitration law: the selection of arbitrators, the use of discovery and evidence-gathering in arbitral proceedings, and the content of arbitration agreements. The course also addresses the new uses of arbitration in the consumer, health, and employment fields.

### **The U.S. Law of Arbitration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 964** Intensive Legal Writing and Drafting (2) This course develops students' skills in common legal writing formats other than memos and briefs. Not intended as a remedial course, this course rather provides an opportunity for students to sharpen legal writing skills with an emphasis on clarity and precision of expression. Weekly writing assignments include a few fully drafted documents (e.g., short will, a short contract, a statute), as well as letters, short pleadings, jury instructions, and other short pieces. Students will concentrate on re-writing and editing their work.

### **Intensive Legal Writing and Drafting (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 965** Federal Courts (3) This course addresses the relationship of federal courts to administrative agencies and state courts.

### **Federal Courts (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 966** Arbitration Workshop (3) The first part is the drafting of arbitral clauses in a variety of circumstantial settings (maritime, labor, commercial, consumer, and employment) in regard to CPR best practices standards and addressing the authority of the arbitrators and the configuration of the arbitral procedure. This process would take several sessions. The second branch would be to view and then construct an arbitration pursuant to one or several of the arbitral clauses. This would require the conduct and architecture of an arbitral trial along with the protocol for its management, both with the arbitrators and the parties. This would take some time as well. Third, the students would be asked to participate in a statutory drafting workshop that reflects their experiences in the two previous branches. They would be asked to evaluate the UNCITRAL Model Law and several national laws of arbitration and arrive at a new and better model law.

### **Arbitration Workshop (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 967** Federal Court Practice (2) This course introduces contemporary issues in several topical areas of particular interest to litigating in federal courts. The course topics are varied, with the unifying theme being that each topic possesses either particular prominence or exclusive jurisdiction within the country's federal court system. These topics include: the history and organization of the federal courts, the courts' relationship with Congress, the practical dynamics of federal procedure, strategic considerations involved in a litigant's choice of federal court, employment discrimination, federal criminal matters, sentencing, civil rights cases, and habeas.

### **Federal Court Practice (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 968** Written Advocacy and Judicial Opinions (3) The bulk of advocacy is in the form of written submissions to the courts, and the vast majority of judicial decisions are written. In order to advocate effectively, lawyers must communicate their arguments clearly and persuasively to the courts. In order to resolve cases and establish useful precedent, judges must communicate their reasoning clearly and authoritatively. This course will explore both forms of written communication and develop the writing skills associated with each.

### **Written Advocacy and Judicial Opinions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 969** Legal Journalism (2) Students will learn journalistic writing styles to prepare them to contribute accurate and

accessible legal information and analysis to general interest and legal trade media as legal analysts or professional journalists. For legal trade publication work, the emphasis will be on readability and appropriate depth for a professional audience. Students will learn journalistic standards of truth and interviewing techniques for print and broadcast media. Live broadcast techniques, including live interview hosting, will also be covered.

### **Legal Journalism (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 971** Scholarly Writing Workshop (1) This course provides students with the framework for developing a thesis, conducting research, and producing a significant scholarly paper. In an interactive workshop setting, students will discuss progress and receive feedback from faculty and fellow students on: (1) identification and refinement of a thesis; (2) developing and implementing a research plan; (3) appropriate use of authority, including legal citation form; and (4) developing and refining a critical perspective and scholarly argument. Students must be concurrently enrolled in a seminar (SEM) course or an independent study (PERSP 996) of at least two credit hours.

### **Scholarly Writing Workshop (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2014 Future: Fall 2014

Concurrent: SEM course at least 2 credits or PERSP 996 for at least 2 credits

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 982** Pennsylvania Practice (2) This class will acquaint the student with civil procedure at the state trial court level. Using Pennsylvania as the model, the course traces a civil case from service of process to trial and includes discussion of venue, pleadings, discovery and dispositive motions. The course also deals with other important aspects of civil practice including statutes of limitation, comparative negligence, compulsory arbitration and settlement.

### **Pennsylvania Practice (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 983** Writing and Editing for Lawyers (2) The goal of the course is to improve the legal reading, writing, and editing skills of students. The course will reinforce rules of grammar, punctuation, sentence structure, usage, voice, tone, style, and organization. The emphasis will be on the application of these rules in the context of legal writing. Students will learn how to craft sentences that are accurate, brief, clear, precise, and sometimes persuasive.

### **Writing and Editing for Lawyers (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 983** Writing and Editing for Lawyers (2) The goal of the course is to improve the legal reading, writing, and editing skills of students. The course will reinforce rules of grammar, punctuation, sentence structure, usage, voice, tone, style, and organization. The emphasis will be on the application of these rules in the context of legal writing. Students will learn how to craft sentences that are accurate, brief, clear, precise, and sometimes persuasive.

### **Writing and Editing for Lawyers (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 986 Remedies (3)** Remedial devices focusing on the theory and application of legal and equitable relief are analyzed comparatively. The course covers the procedural and substantive law elements of damages, specific performance, injunctions, declaratory judgments, reformation, rescission, and restitution.

### **Remedies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 987 Writing Workshop (2)** The goal of this course is to improve the legal writing and editing skills of students. By engaging in the process of directed writing and editing, students will learn to write clearly, succinctly, precisely, and sometimes persuasively. Emphasis will be given to organization and integration of procedural and substantive aspects of cases.

### **Writing Workshop (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 988 Legal Problems of Indigents (2)** This course is an introduction to law relevant to assisting people in poverty including law addressing public benefits, housing, consumer issues, custody, domestic violence, and private rights of action. It will also address realities of existence for people in poverty and consider historical and policy perspectives. Finally, the course will focus on some practical skills, and students will participate in mock hearings and/or mock interviews.

### **Legal Problems of Indigents (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 997 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SKILS 997A Spanish and Bilingual Communication in Law Practice (2)** Designed for students who want to improve their ability to understand and communicate with native Spanish-speaking colleagues and clients in a legal setting. Includes practical reading, speaking, and writing exercises using real documents from Spanish-speaking courts, practicing attorneys, and statutory law. Also encompasses an introduction to research resources, citation norms, and other tools related to practicing law in Spanish, and will include discussions of regional variations in law and language in the Spanish legal world and the ethics and responsibilities for non-native speakers practicing law in Spanish.

### **Spanish and Bilingual Communication in Law Practice (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**SKILS 997A** Spanish and Bilingual Communication in Law Practice (2) Designed for students who want to improve their ability to understand and communicate with native Spanish-speaking colleagues and clients in a legal setting. Includes practical reading, speaking, and writing exercises using real documents from Spanish-speaking courts, practicing attorneys, and statutory law. Also encompasses an introduction to research resources, citation norms, and other tools related to practicing law in Spanish, and will include discussions of regional variations in law and language in the Spanish legal world and the ethics and responsibilities for non-native speakers practicing law in Spanish.

### **Spanish and Bilingual Communication in Law Practice (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Literature (LIT)**

**LIT 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LIT 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Lithuanian (LITH)**

**LITH 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LITH 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Man-Environment Relations (M E R)

**M E R 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E R 600** Thesis Research (1-15) No description.

### Thesis Research (1-15)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E R 601** Ph.D. Dissertation Full-Time (0) No description.

### Ph.D. Dissertation Full-Time (0)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E R 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provide an opportunity for a supervised and graded experience for graduate students in teaching undergraduate courses in man-environment relations.

### Supervised Experience in College Teaching (1-3 per semester/maximum of 6)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E R 610** Thesis Research Off Campus (1-15) No description.

### Thesis Research Off Campus (1-15)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E R 611** Ph.D. Dissertation Part-Time (0) No description.

### Ph.D. Dissertation Part-Time (0)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Management (MANGT)

**MANGT 510** Project Management (3) A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment.

### **MANGT 510 Project Management (3)**

Project Management has been labeled by *Fortune* magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, to respond to rapid time-to-market demands. This course would give business majors a competitive advantage in the job market, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential.

The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep to timetables and schedules.

The course itself would be set up around semester-long projects, either developed by the instructor, or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 515** Cost and Value Management (3) A problem-based course that emphasizes project cost control and teaches students to apply techniques to control projects in business.

### **MANGT 515 Cost and Value Management (3)**

Project management has been labeled by *Fortune* magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. At the same time, however, substantial interest has been generated in the methods for effective cost control in the project environment. How can an organization implement projects while maintaining control of its costs and value?

The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include the ability to understand "cost" and "value" as these terms apply to project management, to understand the nature of budgeting and financial analysis for project selection and control, and the ability to interpret control information as it allows for change (configuration) management of mid-stream projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 520** Planning and Resource Management (3) A problem-based course that addresses techniques for planning the project development process, including securing resources and resource management.

### **MANGT 520 Planning and Resource Management (3)**

Project management has been labeled by *Fortune* magazine the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. The key "front-end"

processes associated with successful project management consist of planning and resource management--in effect, the need to first plan the work, ensure necessary resources are available, and thoroughly understand the components of the project plan, including activities and their interrelationships.

The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include the ability to understand planning and resources as these terms apply to project management, to understand the nature of developing comprehensive plans and schedules, manage resources for their maximum effect, and learn how to respond to crises or unanticipated events in terms of adjustments to plans and resource requirements.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 525 Commercial Law and Project Procurement (3)** A problem-based course that addresses elements of commercial law and procurement practices and their implications for project management.

### **MANGT 525 Commercial and Procurement (3)**

Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course looks at the key issues in contracts, contract law, negotiation, and procurement. In developing projects for external clients, it is vital that organizations and project team members understand some of the basics by which contracts are negotiated and enforced. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include the nature of contracts and contract law, the use of contracts as a procurement strategy, how to understand the nature of contracts, their use as a negotiation tool, and the use of bidding and negotiation in relationships between project organizations and their customer base.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 531 Organizations (3)** An examination of organizational theories and processes of organizational behavior.

### **Organizations (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 535 Interpersonal and Group Behavior (3)** A human relations-based course that identifies the significant challenges that managing individuals on project teams represents.

### **MANGT 535 Interpersonal and Group Behavior (3)**

Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course serves as an important linkage between the technical demands of project management and the behavioral challenges that await project teams in the form of interpersonal behavior and group interactions. The role of the instructor in this course is to promote student learning of a wide variety of behavioral knowledge and skills required for successful project management. These include understanding the impact of interpersonal behavior and team-based performance on project success as well as recognizing the impact of issues such as motivation and negotiation skills for managing projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 540 Strategy: Corporate, Business and Project (3)** A problem-based course that focuses on linking projects to overall corporate strategy.

**MANGT 540 Strategy: Corporate, Business and Project (3)**

Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course provides a conceptual grounding in the role that projects play in furthering an organization's strategic goals. Projects are, in effect, the building blocks of strategy because they represent the operationalization of strategic plans. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include understanding the complex, widely diverse nature of the skills and knowledge required of modern project managers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 545 Project Team Leadership (3)** This course focuses on development of team leadership skills and the ability to solve team problems related to human interaction.

**MANGT 545 Project Team Leadership (3)**

The first half of this course consists of self-paced assigned readings which cover basic concepts of team leadership. Students will complete quizzes over each chapter which they read and begin writing a personal case analysis. The second half of the course utilizes case studies of project teams and includes extensive class and small group discussions. In addition, each student will present a case analysis to the class. Students will have the opportunity to develop basic team leadership skills and the ability to solve team problems as they arise.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 575 Management of Projects (3)** A problem-based capstone course that integrates the themes necessary to appreciate the overall challenge of project management.

**MANGT 575 Management of Projects (3)**

Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course serves as a capstone experience intended to require students to be able to integrate the various elements from the previous set of project management courses they have covered. The course requires all other courses as prerequisites or co-requisites so that students may be sufficiently knowledgeable to synthesize all prior material. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include understanding the complex, widely diverse nature of the skills and knowledge required of modern project managers. In order to cover sufficiently the capstone material, students must have a thorough background in the various issues that comprise this capstone experience.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MANGT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Management (MGMT)**

**MGMT 400** Organization Development (3) A study of organizational change and methodologies related with change and improvement. Examination of planned change on processes, strategies, people and culture in organizations.

#### **Organization Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 401** Contemporary Issues in Management (3) Advanced treatment of topics of current managerial significance. Issues examined will differ by instructor, section, and semester. Consult departmental office.

#### **Contemporary Issues in Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 402** Experiences in Organizational Relations (3) An experiential approach to study of behavior in organizations, applying concepts and theories of management to interpersonal situations.

#### **Experiences in Organizational Relations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 409** Project Management for Engineers (3) The course provides a real-time experience to students in engineering and engineering technology in project management with a focus on leadership behavior and decision making.

**Project Management for Engineers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 410 Project Management (3)** A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment.

**MGMT 410 Project Management (3)**

Project Management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course would greatly aid business majors, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential.

The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep timetables and schedules.

The course itself would be set up around semester-long projects, either developed by the instructor, or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 415 Project Portfolio Management and Organizations (3)** An advanced course in project management focusing on portfolio planning and control within the context of specific organizational challenges.

**MGMT 415 Project Portfolio Management and Organizations (3)**

Project Portfolio Management (PPM) is a strategically-focused course on the management of projects, programs, and portfolios in organizations. The management of individual projects is a complex, multi-level challenge involving myriad issues of planning, organizing, and controlling all project elements. Project portfolio management addresses a more strategic need; namely, the process of project selection in order to develop a balanced portfolio of projects designed to support organizational initiatives. As a result, this course addresses the critical issues of maximizing value in a portfolio, linking projects to organizational strategy, understanding the critical organization effects of structure, environment, and culture on project success, and creating a coherent PPM framework for the firm.

Because the focus is more strategic, the role of the instructor in this course is to go beyond the mechanics of planning and controlling a single project to training students how to think strategically where projects and programs are concerned; to recognize their role in creating a PPM plan for an organization, selecting projects for value, rebalancing a project portfolio, and maintaining this focus within the organization.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 418 Project Planning and Resource Management (3)** Advanced course in project management focusing on a more in-depth approach to project planning and scheduling and resource management.

**MGMT 418 Project Planning and Resource Management (3)**

Project Planning and Resource Management is a more in-depth look at some of the most important aspects of project management; the ability to accurately plan and schedule projects using the latest and most accurate methods. Further, the course addresses resource management within the context of planning, noting the important linkage between these

two elements. Accurate planning can be done through a variety of techniques, including CPM, PERT, simulation, linear programming and other optimization methods. Students will learn when each of these methods are most useful, benefits and drawbacks of various planning and resource management techniques, and how to apply these techniques to their projects. In addition, students will learn about different types of project risks, and techniques for analyzing and managing these risks.

Because the focus is hand-on and problem-based. The role of the instructor in this course is to demonstrate these analytical techniques through classroom exercises and assignments and software packages, including MS Project, simulation, and Analytic Hierarchical Process (AHP).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 420** Negotiation and Conflict Management (3) An exploration of the sources of interpersonal conflict and strategies of resolution in the managerial context.

### **Negotiation and Conflict Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 424** Interpersonal Relationships in Organizations (3) Developing individual skills in interpersonal and group settings and experience-based and conceptual training in relating effectively to other people.

### **Interpersonal Relationships in Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 425** (IST 425, ENGR 425) New Venture Creation (3) Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors.

### **MGMT (IST/ENGR) 425 Introduction to Entrepreneurship (3)**

The goal of MGMT (IST/ENGR/ENTR) 425 is to better prepare undergraduate students to be business leaders in adaptive, globally-minded, technology-savvy companies. The course is structured so students develop skills that are of high value in any workplace: they develop improved leadership skills, higher self-efficacy, creativity and the ability to deal with ambiguity. On course completion, students will have a working knowledge of traditional and non-traditional ways for identifying a new product or business opportunity, quantifying the potential, understanding the key competitive factors, researching the audience and producing a convincing executive summary for internal or external financing and launch. Students who want to augment the skills and knowledge from their major with the ability to refine a new product/service process in an interdisciplinary team will find MGMT (IST/ENGR/ENTR) 425 a valuable course.

This is a novel problem-based learning (PBL) course, where the learning is student-centered, with faculty acting primarily in the role of facilitators. Active learning happens in this course because students develop ownership in their new business venture concept and are fully responsible for the genesis of the idea. The course leverages the on-line course management system (ANGEL) to define weekly learning objectives, support electronic delivery of assignments, robust video content with entrepreneurs is provided on CD-ROM or via ANGEL, providing additional insights into entrepreneurship. The technology or business segment focus of the class is easily adapted by using different case studies and course mentors.

This will be one of two courses in the new two-course sequence for business students in entrepreneurship. This course will be accepted as a supporting course in the Engineering Entrepreneurship Minor (E-SHIP) and in the Engineering Leadership Development Minor (ELDM). MGMT (IST/ENGR/ENTR) 425 can be used as a technical elective in many of the engineering departments. It will be accepted as a Support of Option course for the Information Sciences and Technology (IST) major.

This course will be offered each Fall and Spring semester with two sections each semester. Class enrollment per section will be set at 60 total.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 426** (ENGR 426, IST 426) Invention Commercialization (3) Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology.

### **MGMT (IST/ENGR) 426 Invention Commercialization (3)**

The goal of MGMT (IST/ENGR/ENTR) 426 is to have students understand why invention commercialization is complicated and difficult by participating in the process. For example, the inventor rarely has insights into the markets for his/her invention, is often not interested in the details of commercialization, and can be secretive. In addition, the business and financial communities often do not take the time, or have the resources, to understand new technologies and perform complex due diligence. Thus lack of due diligence often leads to rejection of innovation because existing companies often discount new technologies from outside the company as NIH - "not invented here".

Effective transfer of new invention or innovation to a commercial product requires at least three different functional communities to interface: technical, legal and business. Each uses a different language, comes from different educational and cultural backgrounds, and may have an inherent distrust of the others. These functional barriers are difficult to overcome.

This course teaches how these barriers can be broken down as student teams help bridge the perceived chasm between key players in the invention commercialization process. In these teams, students bring the skills and knowledge from their major to develop an invention commercialization recommendation for the Technology Transfer Office and the inventor. For example, business students focus on finance and market opportunity assessment; engineering and IST students focus on design refinements, prototyping support, and (if appropriate) making technology suggestions to the inventor.

Upon completing the course, the students will have a working knowledge of different university and corporate technology or invention commercialization processes, important intellectual property management tools for inventions (patents, license agreements, option agreements) source of funding to move inventions toward product development, and delivering top quality presentations which outline the recommended commercialization path. Students who enjoy open-ended projects which involve the interplay of business and invention of who wants to work on interdisciplinary teams with the newest inventions will find this course a valuable course. NOTE: Because the inventions/products are based on Penn State faculty intellectual property, students must sign the Penn State Special Intellectual Property Agreement For Students - For Use When Assigning Intellectual Property to The Pennsylvania State University. The form can be viewed at <http://guru.psu.edu/policies/RAG13.html>

The course will be offered both Spring and Fall semesters with an enrollment of 40 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 427** Managing an Entrepreneurial Start-Up Company (3) Exploration of the tensions and experiences of starting and growing a new company.

### **MGMT 427 Managing an Entrepreneurial Start-Up Company (3)**

Start-up companies have a high failure rate. Acquiring and balancing limited resources, changing direction quickly, building a coherent team, managing intellectual property, and creating new markets all test a wide range of managerial skills not usually demanded in one person within a larger organization. Whereas a large company has a strong and well-defined structure and ample resources to deal with unexpected challenges, a start-up usually has insufficient resources, or management experience and yet must deal with daily important and often unpredictable forces. It is the tenacity of an entrepreneur that can take a company through the valleys of despair to eventually succeed.

Students will be exposed to these tensions and experience through problem-based learning methods what it is like to start and grow a new company. The course will provide students with knowledge and experience to increase the likelihood of success whether as a principal in a small company or an investor representative.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 431** Entrepreneurship and Small Business Management (3) Entrepreneurship, new ventures, and management of small firms.

**Entrepreneurship and Small Business Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 432** Small Business Field Study (3) Supervised field study with a small firm.

**Small Business Field Study (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 433** Leadership and Team Building (3) Team-based learning approach to developing conceptual knowledge, skills sets, and personal competencies needed for leading and managing organizations.

**MGMT 433 Leadership and Team Building (3)**

To lead effectively and to manage others in contemporary work contexts requires mastery not only of conceptual knowledge, but also of the intra- and inter-personal competencies and skills sets that are vital to successful performance in a work environment. This course emphasizes an experiential-based learning approach that is designed to impart skill sets and competencies in areas such as leadership, teambuilding, negotiating, communicating, valuing diversity, managing conflict, and more. The course thus uses assessment exercises, role playing techniques, group problem solving exercises, and other experiential-based learning techniques in order to provide students with a framework for better understanding their own strengths and weaknesses, to enable them to practice, enhance, and to gain confidence in their competencies in these various areas, as well as to enable students to better appreciate when and how to effectively apply these skills sets and competencies in the workplace.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 440** Advanced Human Resource Management (3) In depth study of human resource management and personnel administration functions and processes.

**Advanced Human Resource Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 441** Organizational Staffing and Development (3) This course focuses on the skills and methods managers need to manage staffing and development activities in organizations.

**MGMT 441 HRM Professional Seminar (Part 1): Staffing and Development (3)**

The purpose of this course is to give students the skills and knowledge they need to contribute to organizational staffing and development activities. Students will learn technical and organizational aspects of making hiring decisions, designing and implementing training programs, and developing career management initiatives. Topics include strategic human resource management, HR planning, the contingency workforce, HR information systems and technologies, job design, recruitment, selection, employment legislation, diversity, training, management development, career planning, and the like. This course is normally taken in the first semester of the senior year. It builds on information introduced in MGMT 341 (Human Resources Management) and moves beyond survey-level material to more specialized knowledge and skill. The course is taken concurrently with MGMT 442 (HRM Part One) and is typically taken as a precursor to MGMT 443 (HRM Proseminar, Part Two) and 444 (HRM Practicum, Part Two). These courses together constitute the core of the HRM Option

for Management majors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 443 Performance Management (3)** This course focuses on skills and methods managers need to enhance the contribution of employees to organizational performance and effectiveness.

**MGMT 443 HRM Professional Seminar Part Two: Performance Management (3)**

The purpose of this course is to give students the skills and knowledge they need to enhance the contribution of employees to the performance and effectiveness of the organization. Students will learn technical and organizational aspects of performance planning, goal setting, performance and feedback, compensation and reward systems, incentive systems, high performance work organizational change, and the like. This course is normally taken in the second semester of the senior year. It builds on information introduced in MGMT 341 (Human Resources Management) and moves beyond survey-level material to more specialized knowledge and skill. The course is taken concurrently with MGMT 444 (HRM Practicum, Part Two) and is typically taken after students have completed MGMT 441 (HRM Proseminar, Part One) and MGMT 442 (HRM Practicum, Part One). These courses together constitute the core of the HRM Option for Management majors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 445 (US) Managing Differences in Organizations (3)** This course focuses on developing knowledge and skills for dealing with demographic, functional, occupational and identity-based differences within and among organizations.

**MGMT 445 Managing Differences in Organizations (3)  
(US)**

This course focuses on developing knowledge and skills for dealing with differences within and among organizations. It provides an in-depth look at the sources of diversity-related conflicts in organizations, constructive approaches for dealing with these conflicts, and how corporations can leverage diversity for competitive advantage. The overall objective is to provide students with an understanding of the business case for diversity, the legal requirements surrounding the management of diversity in organizations, the structural dimensions of implementing diversity programs, skills for dealing with diversity in teams, as well as a general sensitivity to the kinds of issues that create conflicts within and between firms. Students will explore legal requirements including: EEOC, affirmative action, and the Americans with Disabilities Act and the implications of these for selection, compensation, promotion and dismissal. Examples of specific steps corporations have taken to address demographic, functional, occupational, and identity-based differences will be provided. Through the use of interactive case studies and experiential exercises, students will be given opportunities to learn about and appreciate their own and others' cultural heritages, reflect on constructive approaches for handling diversity-related conflicts (including those stemming from functional, occupational and identity-based differences as well as demographic ones) and for designing human resource management systems that capitalize on diversity. Evaluation of students will be done using several possible methods including: exams, case analyses, reflection papers and class participation. B A 304 and MGMT 341 are prerequisites for the course. The course is offered for Management majors who are taking the Human Resources Option. It may be made available to other Smeal students if space permits.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 450 Labor Management Relations (3)** Study of the key concepts and processes involved in current American labor/management relations.

**Labor Management Relations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 451W** Business, Ethics, and Society (3) Advanced examination of social, ethical, legal, economic, equity, environmental, public policy, and political influences on managerial decisions and strategies.

**MGMT 451W Business, Ethics, and Society (3)**

Focuses on the knowledge, skills, and perspectives that a manager must have in order to deal with the social, legal, ethical, and political demands in society. Ecological, ethical, and public policy dimensions of various managerial decisions are examined.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 453** Creativity and Innovation (3) Analysis of the process of innovation in organizations and of how creativity and other variables influence the process.

**MGMT 453 Creativity and Innovation (3)**

Creativity and Innovation analyzes the process of innovation in modern business organizations and the variables that influence the process. The relationship between creativity and innovation is investigated and individual, organizational and environmental influences on both the creative and innovation processes are examined. Special attention is given to organizational architectures that are conducive to innovation. A major objective of the course is to help students develop the competencies necessary for managing innovative organizations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 461** (IL) International Management (3) Examines issues of nations and cultures including motivation, communication, negotiation, leadership, ethics and social responsibility, and women in management.

**International Management (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 466** Organizational Learning and Knowledge Management (3) Examination of the social processes through which organizations continuously develop, acquire, interpret, and apply information and knowledge for performance enhancement and continuous improvement.

**MGMT 466 Organizational Learning and Knowledge Management (3)**

The primary focus of this course is to examine critically the social structures and processes through which organizations continuously acquire, develop, organize interpret, distribute and apply information and knowledge for performance enhancement and continuous improvement. Topics such as single-loop learning, double loop learning, and deuterolearning (i.e., learning how to learn) are considered, particularly as they apply to self managed work teams, process-based and network structural design, employee involvement approaches, impact of organizational culture and leadership practices. A second focus of the course is to examine the social processes and structures through which the key outcome of the learning process -- organizational knowledge -- usually expressed in terms of improved core competencies, and intellectual capital, can be leveraged across products, functions, business units, geographical regions, and competitive environments to improve organizational performance and competitive advantage and provide added value for customers. Particular emphasis is placed on knowledge management in support of the organization's competitive strategy, with a focus on the exchange of tacit, person-to-person knowledge that is difficult to codify and store. Additional emphasis is placed on the mechanisms available for organizational members to gain access to needed knowledge.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 471 Strategic Management (3)** Issues that influence the competitive performance of the firm are identified and examined.

### **MGMT 471 Strategic Management (3)**

This course focuses on the management of the firm using a strategic perspective. The strategic perspective emphasizes the firm as the unit of analysis (e.g., analyzing how a firm competes in its industry), and it addresses key decisions that have a long-term impact on the structure and performance of the organization (e.g., diversifying into a new business or changing the company's strategy). The course draws heavily on prior business courses in accounting, marketing, finance, and international management. Key topics include industry analysis, competitor analysis, company analysis, corporate-level strategy, business-level strategy, strategy implementation, and firm performance. The course is normally taught using the case methods, but the course may include a computer simulation and/or oral group presentations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 471W Strategic Management and Business Policy (3)** Study of strategic management and business policy formulation and implementation processes.

### **Strategic Management and Business Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 475W Strategic Product Development (3)** Study of an organization, industry, and evaluation of the introduction to a new product. Preparation of proposal for industry product.

### **MGMT 475W Strategic Product Development (3)**

This course is the first of a two course sequence that will provide a capstone experience for the Interdisciplinary Business and Engineering BS degree. The tools of strategic management and cross-functional collaboration will be introduced and serve as a background for the design, development, and implementation of a new product within an existing corporation. Student teams will be provided with an industry concept and work toward the objectives of a firm sponsoring the product concept. During the first semester, the evaluation of the product including feasibility of the product, design, manufacture, and intellectual property will be evaluated by student teams and presented to the firm. The final document will include a complete written assessment of each of the components of feasibility.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 476 Product Realization Capstone (3)** Study of an organization, industry, and evaluation of the introduction of a new product. Preparation of proposal for industry product.

### **MGMT 476 Product Realization Capstone (3)**

This course is the second of a two course sequence that will provide a capstone experience for the Interdisciplinary Business & Engineering BD degree. The tools of strategic management and cross-functional collaboration will be used to design, develop, and implement a new product within an existing corporation. Student teams will be provided with an industry concept and work toward the objectives of a firm sponsoring the product concept. During the second semester, the evaluation of the product including feasibility of the product, design, manufacture, and intellectual property will be used by student teams and a final presentation and written assessment will be prepared for the firm.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 483 Compliance and Fairness in Organizations (3)** Compliance with employment laws with respect to managing human resources and fair treatment in employer-employee relationships.

### **MGMT 483 Compliance and Fairness in Organizations (3)**

This course is intended for undergraduate students who want to learn more about the laws governing the employment practices introduced in the survey course in human resource management. This course will clarify the legal context within which businesses in general, and managers in particular, manage their employees. Students will learn about the legal rights and responsibilities of both employers and employees. Objectives of the course include learning how to comply with workplace laws and regulations, learning how to legally and effectively implement these requirements in an organization, and, as managers of human resources, knowing how to run a safe and fair workplace. To accomplish these objectives, students will evaluate and analyze federal employment laws and regulations, state employment laws (where applicable), and U.S. Supreme Court rulings. The emphasis will be on providing an informed legal context for managerial behavior. Student achievement of these learning objectives will be evaluated using several methods: students will summarize, interpret, and analyze employment law cases, write and develop a portfolio of critical essays of corporate employment practices, research and present (with team members) a project analyzing a current legal challenge to a specific company employment practice, and prepare a comprehensive written examination of material covered in the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 489 Seminar in Management (3)** A capstone course in management for students of high academic achievement. Emphasis on in-depth research of current interest.

### **Seminar in Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 496A** Contemporary Issues in Management (1-6) Develop short reports on contemporary issues importing the management function including employee segmentation analysis the impact of health care reform act, H.R. compliance and technology.

#### **Contemporary Issues in Management (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 496B** Advanced Human Resources Management (1-6) Strategic Compensation: A human resource management approach. Three exams will constitute final grade.

#### **Advanced Human Resources Management (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 496C** Supply Chain Business Process Analysis with ERP Technologies (3) Research business process analysis technologies which enable corporations to report, analyze, predict and improve their supply chain processes.

#### **Supply Chain Business Process Analysis with ERP Technologies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 496D** Introduction to Human Resources (1-6) Introduction to the strategic planning and implementation of human resource management, including staffing, development, and appraisal and rewards.

#### **Introduction to Human Resources (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 496E** Organizational Theory (1-6) Analyzing the organization (the same work in Jone's "Organizational Theory, Design, and Change") to analyze FMC Technologies concluding in a 20 page report.

### **Organizational Theory (1-6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 499 (IL)** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 501** Behavioral Science in Business (3) Application of behavioral science concepts and analytical methods to problems in business organizations. Analysis of administrative behavior and decision making.

### **Behavioral Science in Business (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 507** Positive Organizational Behavior and Wellbeing (3) Exploration of positive organizational behavior and wellbeing concepts for developing the "human sustainability" factor in organizations.

### **Positive Organizational Behavior and Wellbeing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None



Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 520** Team Facilitation (2) To gain an in-depth understanding of team dynamics and develop skills for facilitating teams to achieve effective performance.

**Team Facilitation (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 521** Complex Negotiations (2) Develop concepts and strategies for analyzing and conducting multiparty negotiations.

**Complex Negotiations (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 523** Organizational Change: Theory and Practice (3) Analysis of research, theory, and practice in dynamics of organizational change. Research literature reviewed for evaluation of concepts and methods.

**Organizational Change: Theory and Practice (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 528** Seminar in Organizational Behavior (3) Current theoretical and research issues applicable to the study of individual and group behavior within organizational settings.

**Seminar in Organizational Behavior (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 531** Strategy Implementation and Organizational Change (2) Assess gap between current organization and that needed to implement new strategy or execute change; identify process for closing gap.

**Strategy Implementation and Organizational Change (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 534** Leadership and Change in Organizations (2) Understanding yourself as a leader, particularly as a leader in organizations and especially a leader of organizations undergoing change.

**MGMT 534 Leadership and Change in Organizations (2)**

This course mixes concept with practical, workable knowledge. We will focus on how you think about leadership, how things get done, and how things might be improved in organizations. This is the course that will allow you to discover, consider, and alter your leadership tendencies and values. Self-management is the major emphasis. Another is learning to lead organizations and the people in them humanely. It is also a course that will allow you to see the differing viewpoints and perspectives of your peers concerning many leadership and organizational issues.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 535** The Upper Echelons Perspective: Theory and Research (3) To learn to evaluate and conduct research on top executives and their influence on organizational strategy, structure and performance.

#### **The Upper Echelons Perspective: Theory and Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 538** Seminar in Organization Theory (3) Current theoretical and research issues applicable to the study of design and management of complex organizations.

#### **Seminar in Organization Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 539** Seminar in Organizational Social Networks (3) Learn theory, concepts and methods for research on organizational social networks.

#### **MGMT 539 Seminar in Organizational Social Networks (3)**

This course familiarizes doctoral students with the theory, research and methodological issues connected with social network analysis in organizational contexts. The course encompasses topics from the micro level (e.g., cognition and networks) to the macro level (e.g., interorganizational networks) and introduces a range of network ideas concerned with centrality, structural holes, embeddedness, and social capital. Class periods will consist mainly of focused discussion of academic papers, but will also include discussion of data analysis exercises, and student presentations. Upon completion of the course, students should have a good grasp of social network concepts and methods and be able to use them to conduct research. The course requirements include participation in discussion, the completion of data analysis exercises, and the writing of a research paper. The course is designed for 15 students and is likely to be offered once every two years.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 541** Human Resource Management (3) An in-depth examination of the strategic planning and implementation of human resource management, including staffing, development, appraisal, and rewards.

#### **Human Resource Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 551** Growth and Innovation Strategy (2) Identify opportunities for growth and profitability through technological and organizational innovations and market independently or with strategic partners.

**Growth and Innovation Strategy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 558** Seminar in Organizational Decision Making (3) An in-depth examination of decision making, including bounded rationality, political behaviors, choice and post-decision processes.

**Seminar in Organizational Decision Making (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 561** Global Strategy and Organization (1-3) Course focuses on three major aspects of international business: competitive strategy, organization design, and management processes.

**MGMT 561 Global Strategy and Organization (2)**

The course focuses on three major aspects of international business: competitive strategy, organization design, and management processes. As multinational companies globalize, they rely on a variety of managerial and organizational arrangements to accomplish their strategic objectives. We will examine those arrangements according to several major corporate decisions: the decision to go abroad, doing business in a particular country or region, transforming a multinational firm into a global firm and so on.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 565** Power and Influence (2) Provides a pragmatic and ethical framework for analyzing the sources of power in organizations and its effective use.

**MGMT 565 Power and Influence (2)**

Power and politics are ever-present and necessary features of organizational life. Without them, much of what gets done in organizations could never be accomplished. However, power can also be abused, and personal or political goals can overshadow organizational ones. This course provides a framework for intelligently analyzing the sources of power in organizations, and the circumstances that lead to its attainment and effective use. It also offers a framework for evaluating political behaviors on both pragmatic and ethical grounds.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 571** Strategic Management (3) This capstone course provides analysis and application of strategy concepts and techniques in business organizations.

**Strategic Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 573** Corporate Innovation Strategies (3) Survey of managerial issues involved in formulating and implementing a corporate innovation or technology strategy.

**Corporate Innovation Strategies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 578** Seminar in Corporate Strategy (3) Current theoretical and research issues applicable to the study of corporate strategy formulation and implementation.

**Seminar in Corporate Strategy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 591** Organizational Research Design (3) Experience in designing research for organizational science, to maximize the validity of eventual conclusions; methodological choices, constraints, and compromises (tradedoffs).

**Organizational Research Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 592** Qualitative Research Methods (3) This course provides students with an introduction to and experience with qualitative research methods employed in organizational contexts.

**Qualitative Research Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 597** Special Topics (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 597A** Developing Global Leaders: European Management Perspectives (3) The increase in both diversity and globalization in business require managers to develop cross-cultural competence to work effectively in a European Management setting. This course develops students' global understanding for working, following, and leading in European organizations. It explores how human resource management processes and organizational dynamics in European countries such as France, Germany and Switzerland differ from practices in the United States. This course will help managers and organizational leaders make sense of French, German, Swiss, and other European cultures in order to prepare global leaders for work in highly diverse, intercultural environments. The goal is to better understand how culture impacts the whole management process when working in Europe. Several case studies--describing both successful and unsuccessful practices--will be presented.

### **Developing Global Leaders: European Management Perspectives (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 597B** Team Facilitation Labs (1) Lab to work with 1st Year Teams.

### **Team Facilitation Labs (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 599** (IL) FOREIGN STUDY--MANAGEMENT (1-12) Full-yime graduate-level foreign study at an overseas institution with whom linkages have been established.

### **FOREIGN STUDY--MANAGEMENT (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 601** PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION FULL-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 602** SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) COURSE INVOLVES SERVING AS A TEACHING ASSISTANT IN A SPECIFIED UNDERGRADUATE COURSE UNDER THE SUPERVISION OF A FACULTY MEMBER. REQUIRES PLANNING, DISCUSSION, AND APPLICATION OF ITS APPROACH.

**SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MGMT 611** PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION PART-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Management Information Systems (M I S)

**M I S 538** Decision Support Systems (3) Analysis of information requirements for planning, decision making, and performance measurement in organizations.

**Decision Support Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M I S 539** Management of MIS (3) Organizational issues in managing computer-based information systems.

**Management of MIS (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M I S 590** Management Information Systems Colloquium (1-3) This seminar will deal with current research areas dealing with the development and management of management information systems within organizations.

#### **Management Information Systems Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M I S 596** Individual Studies (1-9) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M I S 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M I S 599** (IL) Foreign Study--Management and Information Systems (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

#### **Foreign Study--Management and Information Systems (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Management Science and Information Systems (MS&IS)**

**MS&IS 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MS&IS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MS&IS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MS&IS 599** (IL) Foreign Study--Management Science and Information Systems (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Study--Management Science and Information Systems (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MS&IS 602** Supervised Experience in College Teaching 1-3 per semester/maximum of 6 No description.

**Supervised Experience in College Teaching 1-3 per semester/maximum of 6**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Management-CI (MNGMT)**

**MNGMT 505** Managing Human Resources (3) Issues in human resource management including recruitment and selection, employee development, performance management, employee and labor relations, and employee safety.

**MNGMT 505 Managing Human Resources (3)**

This course examines the primary functions and responsibilities of those who manage human resources in formal organizations. The emphasis of this course is on the practical application of the methods human resource specialists, generalists, and managers use to perform their duties. The course is designed to appeal not only to future (or current) human resource practitioners, but also to anyone who aspires to manage people in organizations. Topics covered include management practices, the legal and regulatory environment of human resources, employee recruiting, selection and placement, training and development, performance management, compensation and benefits, employee and labor relations, and employee health, safety, and security.

This course surveys the major functions and responsibilities of human resource managers. In doing so, a primary objective is to gain greater factual knowledge of human resource issues by studying organizational practices, analyzing cases, conducting research using the World Wide Web, and utilizing other sources of information. It is also hoped that each student will develop a philosophy concerning the relationships among the employee, employer, union, and government agencies involved in employment issues.

Students' knowledge is evaluated, in part, using written examinations. Each student is also typically the member of a small team that will research a specific challenge, trend, or issue that currently confronts human resource managers. Each team prepares a concise and focused presentation and written summary on its chosen topic. Other means of evaluating student knowledge may include case analyses, investigations of human resource practices within specific organizations, or other related projects.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 511** Organizational Behavior (2) Individual and group behavior in organizations; motivation, performance and rewards, job satisfaction, decision processes, conflict resolution; job and organizational design.

### **MNGMT 511 Organizational Behavior (2)**

This course provides students with an enhanced understanding of their own behavior, the behavior of others, and the capability to deal more effectively with people and groups in organizations. Primary emphasis is placed upon application of experiential learning theory in developing the ability to perform well as a member of a team, and also in facilitating team effectiveness. As adult learners, students are empowered to become active creators of their own learning, and working with the faculty member responsible for the course, to develop skill sets and competencies in analyzing ethical issues, negotiation and communication skills, and developing leadership responses to these issues.

This course provides the skill sets and competencies underpinning the collaborative learning model used throughout the MBA program. It is intended to be taken by students who have not taken a similar course either as part of their undergraduate programs, or as graduate work. Where required, this course must be among the first 6 credits taken in the MBA program.

Evaluation will be based upon class participation (10%), two examinations (70%), and a group presentation of a management case (20%). Each examination will cover about half of the course material. Both exams will consist of essay questions, and will be evaluated on the basis of demonstrated knowledge of course content as well as clarity and accuracy of presentation. Students will choose a team based on the topic they wish to study. Each team will be responsible for critically addressing and analyzing a particular management case, and making a formal in-class presentation. The case reports will be evaluated on the basis of each teams ability to: 1) address and integrate relevant material from each text chapter; 2) demonstrate critical thinking and evaluation of the case; and 3) provide a formal, professional presentation of the case material.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 514** Organizational Learning (2) Structural, strategic, technical, and ecological approaches, including institutional, resource dependence, and discontinuous improvement models; evaluating and institutionalizing learning.

### **MNGMT 514 Organizational Learning (2)**

The objective of this course is to provide an overview of current theory and practice in the field of organizational learning -a developing field of applied social science. Organizational learning aims to improve the attributes of, and alignment between elements of the organization, and between the organization and its environments to improve effectiveness, performance, and satisfaction of primary stakeholders. The course focuses on the theories, research findings, techniques, and approaches to learning. Particular attention is paid to discussion practitioner-centered cases, and large-scale, system-wide organizational transformation. An understanding is developed of the paradigm shift necessary to achieve organizational transformation, and the re-conceptualization of management philosophies, principles, practices, and behavior that lead to high performance.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 515** (P ADM 515) Labor Management Relations (3) Labor relations issues; collective bargaining agreement, negotiations, and administration; legal framework of collective bargaining; labor relations in larger social context.

### **Labor Management Relations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 520** Organizational Transformation (3) Treats methods, practices, and theory of organizational empowerment, quality management, process redesign, re-engineering, restructuring, and planned change.

### **MNGMT 520 Organizational Transformation (3)**

The objective of this course is to review the current theory and practice of organizational development (OD), and applied field of social science. ODs primary aim is helping to improve the "alignment" between individuals and the organization, and between the organization and its environment in order to achieve greater effectiveness, performance, and stakeholder satisfaction. The course provides an overview of theories, research findings, approaches, and concepts of OD. Particular attention is paid to discussing practitioner-centered cases in OD. Large-scale, system-wide organizational development - usually one that involves a paradigm shift is often referred to as Organizational Transformation or Re-engineering. The paradigm shift often involves a re-conceptualization of management philosophies, principles, practices, and behavior leading to a high performing, empowering organization.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 522** Operations and Supply Chain Management (3) Design, development, management of manufacturing systems in a supply chain context; tools, techniques, and applications at tactical and strategic levels.

### **MNGMT 522 Operations and Supply Chain Management (3)**

The purpose of Operations and Supply Chain Management is to provide students with tools and knowledge that can help them increase productivity and profitability in a manufacturing environment. Both strategic and tactical aspects of operations management will be emphasized. The course is taught in supply chain context meaning that decisions made in manufacturing must consider the overall impact of the suppliers and customers in the supply chain. Students will be asked to read and participate in the discussion of articles dealing with progressive operations and supply chain methods. The course also incorporates the case study method, in order to provide students an opportunity to apply their knowledge in class.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 523** Service Operations Management (3) Design, development, and management of service systems. Tools and techniques for non-manufacturing operations at tactical and strategic levels.

### **MNGMT 523 Service Operations Management (3)**

This course is designed to introduce students to the operational aspect of a service organization, the kinds of decisions that operations managers make, and the impact these decisions have on the tactical and strategic position of the firm. Students will be introduced to tools and concepts that have the ultimate objective of increasing the productivity of the firm and the customer satisfaction of its clientele.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 545** Employment Law for Business (3) The regulation of the employer-employee relationship, discrimination in employment, and the employment environment with respect to managing human resources.

### **MNGMT 545 Employment Law for Business (3)**

This course is intended for graduate students who want to learn more about the laws governing the employment practices introduced in a graduate survey course in human resource management. This course will clarify the legal context within

which businesses in general, and managers in particular, manage their employees.

Students will learn about the legal rights and responsibilities of both employers and employees. Objectives of the course include learning how to comply with workplace laws and regulations, learning how to implement these requirements legally and effectively in an organization, and, as managers of human resources, knowing how to run a safe and fair workplace. To accomplish these objectives, students will evaluate and analyze federal employment laws and regulations, state employment laws (where applicable), and U.S. Supreme Court rulings. The emphasis will be on providing an informed legal context for managerial behavior.

Student achievement of these learning objectives will be evaluated using several methods: students will summarize, interpret, and analyze employment law cases, write and develop a portfolio of critical essays of corporate employment practices, research and present (with team members) a project analyzing a current legal challenge to a specific company employment practice, and prepare a comprehensive written examination of material covered in the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 570** Leadership Development (3) Experientially based skill-building for development of managerial and leadership competencies.

### **Leadership Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 596** Individual studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or semester.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNGMT 897A** Special Topics: Fixed Income (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### Special Topics: Fixed Income (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Manufacturing Sys Eng (MFGSE)

**MFGSE 520** Analytical Techniques in Manufacturing and Design (3) Applied statistics, QC, SPC, design for experiments, six sigma, design tolerance and process optimization.

### MFGSE 520 Analytical Techniques in Manufacturing and Design

This course will provide the student with an introduction to the use of probabilistic and analytical techniques to optimize process performance and improve product quality. Similarly these methods can be used to predict reliability and ultimately determine a product life. Additionally these techniques are integrated into the design process to minimize product failure and rejects. Topics include:

- Statistical Techniques
- Design of Experiments
- Product Design Considerations Product Life

Student performance will be evaluated by written reports, quizzes and exams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MFGSE 550** Design for Manufacturability I (3) Introduction to DFM, a review of enabling technologies and the systematic use of quality tools during the DFM process.

### MFGSE 550 Design for Manufacturability I (3)

This course will provide the student with an introduction to the product design process and techniques used in the design process to optimize product design for both overall quality and minimum cost.

#### PRODUCT DESIGN PROCESS

- Product fit, competitive analysis, bench marking (2 periods)
- Concurrent engineering (2 periods)
- Process standards (2 periods)
- Value engineering, cost containment methods (2 periods)
- Project management (3 periods)
- Product liability, patents, trade secrets (1 period)
- Design standards (e.g., UL, ASME) (1 period)
- Process standards (e.g., ISO 9000, Q.S. 9000) (1 period)
- The topics include:
  - Design for Manufacturability
  - Design for Assembly
  - Enabling Technologies for DFM and DFA
  - Quality Tools

Student performance will be evaluated by written reports, quizzes and exams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MFGSE 580** Masters Project (1-3) Manufacturing capstone or technology study utilizing both manufacturing and management skills.

### **Masters Project (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MFGSE 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MFGSE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Marketing (MKTG)**

**MKTG 410** Personal Selling (3) Principles underlying the selling process and practical application of these principles to selling situations.

### **Personal Selling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 420** Direct Marketing (3) Applies principles of marketing management to the direct marketing of products by mail, telephone, print, and broadcast media.

### **Direct Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 422 Advertising and Sales Promotion Management (3)** Perspectives and models of the key decisions involved in managing advertising and sales promotion campaigns.

**Advertising and Sales Promotion Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 426 Business Marketing (3)** Developing marketing strategies and programs. The course emphasizes the special nature of the business and organizational markets.

**Business Marketing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 428 Advanced Sales Management (3)** Approaches to planning, organizing, staffing, training, directing, and controlling the sales force in support of marketing objectives.

**Advanced Sales Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 437 Advanced Retailing and Merchandise Management (3)** Analyzing planning and controlling the retail merchandising effort, including procurement, resource selection, vendor relations, product presentation, inventory control.

**Advanced Retailing and Merchandise Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 440 Services Marketing (3)** Marketing theory and methods applied to profit and nonprofit service industries such as health care, finance, transportation, tourism, arts and consulting.

**Services Marketing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 443 Sports Marketing (3)** This course will focus on how companies develop, execute and measure marketing strategies and tactics to use sports teams, families, leagues and other organizations to market their products and services domestically and internationally to consumers and business partners. The course will examine the marketing strategies employed by sports teams and leagues.

**MKTG 443 Sports Marketing (3)**

“Sports Marketing” is designed to explore how various types of businesses and other organizations market products and/or service related to sports as well as how sports are used as marketing platforms for non-sports products. Unique aspects of the sports business will be explored including how strategies and tactics related to marketing in this sector differs from other industries. The purpose of this course is to provide an overview of various aspects of sports marketing. This will include the use of sports as a marketing tool for other products, the marketing of sports products and emerging considerations that are relevant for both marketing through and the marketing of sports. Since sports involves consumers, businesses and other organizations, this courses will cover B2C as well as B2B marketing.

How product, distribution, pricing and promotional programs are developed particular to this industry will be one of the primary focuses. Relationship marketing, the role of technology, sponsorships, ambush marketing, partnership leveraging, endorsements, venue naming rights, licensing and emerging legal and ethical issues will also be important focuses.

A guest speaker series will provide additional professional perspectives on a variety of unique aspects of marketing particular to sports. Reading Sports Business Journal, the most highly regarded source of news by sports industry employees, will further expand this knowledge base as will current news events related to the industry. Students will be provided an opportunity to network with guest speakers and those interested in considering sports among their job search, will also be able to receive internship and career counseling from the instructional team. Students enrolled in this class will also be able to submit resumes and requests to be interviewed for internships with various sports organizations being arranged in cooperation with the Smeal Collage Corporate and Career Services Office. Students will apply what is being learned in the class to the development of a project related to sports marketing, with the added benefit of having a deliverable which can be used to further the search for jobs and/or internships in the sports business.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 445 (IL) Global Marketing (3)** Role of international marketing in the global environment; political, economic, geographic, historical, cultural conditions; developing and implementing international marketing strategies.

**MKTG (I B) 445 Global Marketing (3)  
(IL)**

MKTG/I B 445 focuses on the wide range of issues, which face enterprises as they develop and execute marketing strategies and tactics, designed to support business activities in markets outside their home country. This course deals directly with these issues as they apply to firms, which concentrate on a few markets closer to home, or on many markets throughout the world, including via the Internet. This course also deals with the important role played by governments in shaping the global marketing environment, including through trade policies, treaties and marketing supports. Students successfully completing this course also gain a greater understanding of the cultural, technological, economic, political and social environments which international businesses and global marketers face as they seek to expand their product and/or service offerings into other nations. Understanding this important part of the challenge facing international businesses and global marketers is achieved through the text, lectures, and student group projects and presentations including some focused on specific countries, including both major trading partners of the United States and select emerging new markets. This course is designed for students who have an interest in these topics and/or who plan to enter fields such as international business or global marketing and/or who expect to work for businesses, which are active internationally. Class discussions and projects are designed to help students explore these topics in greater depth. A series of small group assignments and presentations will further help students apply what is being learned via problem-based learning. This is an interactive class. Therefore, a portion of the grade each student achieves will be based on class attendance and participation. Students are also expected to pay attention to examples of the issues discussed in class that they encounter during the semester in prim broadcast, and online communications. Along with material from lectures and the text, issues discussed in class will be included in the exam.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 450W Marketing Strategy (3)** Market-oriented problems of the firm; identification and selection of market opportunities; formulation of competitive strategies; marketing policies and programs.

**Marketing Strategy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 475 Innovation and Product Management (3)** This course is an application-oriented interdisciplinary course on new product development concepts, and innovation management.

**MKTG 475 Innovation and Product Management (3)**

This course is designed to provide students the opportunity to examine and understand the new product development process. It takes the process from the strategy and ideation stage to the after-market product launch. The course blends the perspectives of marketing, management, and engineering into a single approach to product development. It provides students with an appreciation for the realities of industrial new product development practice. Therefore, case studies and other in-class assignments are designed in a way that students can apply the theoretical/abstract concepts to the real life phenomenon. The new product development projects are assigned to teams in real life, students have the opportunity to complete the case analyses and assignments in teams. Course aims to integrate micro level new product development issues (e.g., firm-level product strategy) to macro level issues (e.g., anti-trust regulations and legislations).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 476 Sales Management (3)** Application of modern management principles to field sales force planning, organization, and administration; selection, training, and compensation plans.

**Sales Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 478 Services Marketing Management (3)** Conceptual understanding of services and the analytical tools that are used in solving strategic services marketing problems.

**Services Marketing Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 485 Business-to-Business Marketing (3)** Application of marketing principles to commercial enterprises, industrial firms, government, and other non-profit institutions.

**Business-to-Business Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**MKTG 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 495** Internship (1-18) Supervised off campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 496A** Use of Yammer in Higher Education (3) Investigates how yammer affects teamwork, communication, and collaboration among two students teams.

**Use of Yammer in Higher Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 497A** Sports Marketing Models and Analytics (3) This course offers instruction on the current application of quantitative models in the growing field of research and analytics in sports marketing.

**Sports Marketing Models and Analytics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 497B Sports Business (3)** This course is designed to introduce you to the major activities of one of the nation's largest industries = sports. These will include matters related to management structures in professional, intercollegiate, and international sports. Additional aspects of sports business such as facility management, sociological aspects or concerns (e.g. gender and race), and sports consumer behavior will be explored. This course will provide an overview of the business aspect of sports and help develop skills to think critically about current issues and topics in the sports world.

### **Sports Business (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 497C Intermediate Social Media Marketing (3)** This course familiarizes students with the current technologically-centered tools and techniques available to marketers for building brand recognition, brand liking, and increasing the number of customers. These technology tools and platforms include but not limited to: Facebook, LinkedIn, Twitter, YouTube, Google+, Pinterest, Foursquare, Friendster, Technorati, Blogs, Vlogs, Podcasts, Hootsuite, Radian6, various search engines, and QR codes. These social media tools can be used to find, reach, connect, and automate marketing messages to efficiently and effectively build relationships, stronger brands and loyalty. These technologies may be utilized with or without a fully realized marketing automation structure, allowing ideas to be shared on a global platform.

### **Intermediate Social Media Marketing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 499 (IL) Foreign Studies (1-12)** Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 500 Marketing Management (3)** Development of a marketing management focus, including market analysis, competition analysis, and decisions in pricing, product, promotion, and distribution channels.

### **Marketing Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MKTG 512 Consumer and Market Behavior (3)** Application of buyer behavior concepts from the behavioral sciences, including utility, culture, life cycle, personality, attitudes, learning, decision making.

**Consumer and Market Behavior (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 513 Market Research (3)** User-oriented analysis of marketing research process, including problem definition, design, data collection, data analysis, interpretation, and presentation.

**Market Research (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 515 Business Marketing (3)** Study of marketing of goods and services to business, institutions, and government. Focus on organizational buying, market planning and analysis, and development of marketing mix.

**Business Marketing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1984

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 516 Product Development and Management (3)** Marketing and product strategies for new and old products are covered in this course.

**Product Development and Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1987

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 518 Global Marketing (3)** Role of international marketing in the global business environment; development of marketing plans and implementation strategies under differing socio-economic conditions.

**Global Marketing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 521 Scientific Marketing Analysis and Implementation (2)** An introduction to the tools used, rationale for, and the practice and implementation of a variety of current marketing techniques.

**MKTG (MS&IS) 521 Marketing Engineering (3)**

This course deals with concepts, methods, and applications of decision modeling to address such marketing issues as segmentation, targeting and positioning, new product design and development, advertising, sales force and promotion planning, and sales forecasting. The course is designed for MBAs as well as for students in engineering and related disciplines who have some background in or understanding of marketing principles, and exposure to spreadsheet

programs such as EXCEL.

Unlike conventional capstone marketing courses that focus on conceptual material, this course will attempt to provide skills to translate conceptual understanding into specific operational plans--a skill in increasing demand in organizations today. Using market simulations and related exercises tied to PC-based computer software, students will develop marketing plans in various decision contexts.

Specifically, the course objectives are to:

- Provide students with an understanding of the role that analytical techniques and computer models can play in enhancing marketing decision making in modern enterprises.
- Improve students' skill in viewing marketing processes and relationships systematically and analytically.
- Expose students to numerous examples demonstrating the value of the analytic approach to marketing decision making.
- Provide students with the software tools that will enable them to apply the models and methods taught in the course to real marketing problems.

The course will be of particularly valuable to students planning careers in marketing and management consulting. The course is designed for students with some background in quantitative methods as well as some exposure to basic marketing concepts.

Class sessions will be devoted to probing, extending and applying the material in the readings and the cases. We will use the "Tell-Show-Do" sequence to give you hands-one experience in using the course materials for making marketing decisions. It is your responsibility to be prepared for each session as detailed in the course outline. Each one of you will benefit from belonging to a "study group" that meets and prepares for each session before coming to class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 532 Brand Management (2)** To examine and understand the processes of building, designing, measuring, and maintaining brand equity.

#### **Brand Management (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 533 Business Marketing (2)** Study of marketing of goods and services to business, institutions, and government.

#### **Business Marketing (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 534 Integrated Market Communications (2)** Provides the frameworks for thinking, tools, language, and skills for strategic management of integrated market communications.

#### **Integrated Market Communications (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 541 Consumer Behavior (2)** Introduce theories and concepts from psychology, sociology, economics, and other disciplines that are useful in understanding and marketing to consumers.

#### **Consumer Behavior (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 542** New Product Development and Management (2) Identify business opportunity, understand potential customer needs, and develop a new product from concept to virtual prototype.

### **New Product Development and Management (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 543** (EBIZ 543) e-Marketing (2) Using the Internet and related technologies to enhance and transform marketing functions and processes.

### **e-Marketing (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 551** Theoretical Perspectives on Buyer Behavior (3) Review of marketing and social sciences research related to understanding consumer and market behavior.

### **Theoretical Perspectives on Buyer Behavior (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 554** Research Methods in Marketing (3) Philosophical, methodological, and measurement issues involved in designing, conducting, analyzing, and interpreting research in marketing.

### **Research Methods in Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 555** Marketing Models (3) Topics in the model building approach to marketing decision making, focusing on current research issues.

### **Marketing Models (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 556** Marketing Management (3) To explore the conceptual and applied dimensions of marketing management.

**MKTG 556 Marketing Management (3)**

This course is a seminar course, so class involvement will be a major component. In addition, students will be expected to prepare two papers. The first will be a journal submission review; the second will be the written version of each student's research proposal. Academics need to understand journal reviewing, and they need to develop research ideas and write about them. Students will also be expected to prepare and perform two oral presentations. The first will be the presentation discussed in the session description below and will be a part of their class participation. The second will be an oral form of the student's research presentation. Students need to be able to communicate their ideas, and it is hoped that having an oral presentation of their proposals before the written presentation will also help them improve their proposal. Finally, there will be an examination at the end of the course.

Each class session, with the exception of the first and last class periods, will be devoted to an important topic in the marketing management domain.

For each class period, other than the two exceptions, students will read around 7 papers. The papers will be a mix of classical, seminal works and recent, cutting-edge works in the assigned area. The bulk of the class period will be devoted to discussion of the articles assigned. Discussion will be devoted to a) why the article is important, b) good points of the article, c) bad points of the article, and d) research ideas that the article might suggest or engender. In addition, one student per week will be responsible to find, prepare, and present another published paper that deals with the weeks' issues; this presentation will be part of the student's participation grade. The last few minutes of each class will be devoted to a discussion by the instructors of where research in the assigned area is going and some interesting open research questions in the area.

The two exceptions among the class periods will be the first and last class. In the first class, we will have an introduction to research in marketing management and this particular Ph.D. seminar, while the last class will be devoted to allowing the remaining students to present their research proposals.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:  
 Concurrent: MKTG 555

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 571 Marketing Strategy (2)** Examines business-level marketing issues and solutions to problems in competitive business environments.

**Marketing Strategy (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 597 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 597A** Special Topics in Consumer Behavior (3) The purpose of this graduate seminar is to investigate special topics in consumer behavior. The class will be organized in a way that allows you to 1) gain an in-depth understanding of important areas of consumer behavior research identified by faculty; 2) gain exposure to various faculty in marketing and their research values and styles; and 3) develop and advance your own research interests. The course will focus on special topics that are prominent or receiving increasing attention in the literature (e.g., aesthetics, hedonics, financial decision-making, non-conscious processes, identity, culture, consumption/experience and satisfaction). In addition, students will have the opportunity to identify topics of interest and lead seminars with faculty guidance. (In addition to tailoring the course content to student interests, the latter is also intended to provide students with hands-on experience at leading a PhD.-level discussion.)

### **Special Topics in Consumer Behavior (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 597B** Sustainable Marketing (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Sustainable Marketing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 599** (IL) Foreign Study--Marketing (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

### **Foreign Study--Marketing (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description available.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1982

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MKTG 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Marketing-Bd (MRKTG)

**MRKTG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKTG 597** special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Marketing-CI (MRKT)

**MRKT 513** Marketing Management: Structures and Processes (2) This course examines concepts, techniques, and developments of strategic marketing plans and programs within domestic and international market environments.

**MRKT 513 Marketing Management: Structures and Processes (2)**

As an important functional area of business, Marketing Management: Structures and Processes course equips MBA students with the concepts and techniques that are necessary for the development and application of marketing programs, plans, and strategies. As such, the major focus of the course will be on analysis of the market opportunities, development of strategic marketing plans both at domestic and global level, organization of the activities of the participants, implementation of the marketing plans, and control of the marketing activities. Furthermore, important issues of social responsibility and marketing ethics will be explored. This course will deal with marketing strategies of



brick-and-mortar and on-line companies.

The course replaces our existing 3 credit MRKT 520 - Marketing Management course. Students will be evaluated by using group case assignments, Internet marketing exercises, mini research assignments, marketing plan exercise and a final exam. The course does not require special facilities. It will be offered twice a year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 514 Marketing Management: Relationships and Institutions (2)** Examination of relationships formation with customers and distribution channels; traditional and on-line marketing issues.

### **MRKT 514 Marketing Management: Relationships and Institutions (2)**

MRKT 514 provides MBA students with concepts and techniques necessary for the development of customer satisfaction and value. The major focus of the course is on the analysis of relationships and total quality marketing. The role of actors in the distribution and supply chain is explored conceptually as well as analytically. In addition, important issues of marketing for not-for-profit organizations, Data based marketing are explored. Finally, the course will conclude with applications of marketing concepts and techniques of on-line marketing and electronic commerce.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 570 Marketing Strategy and Planning (3)** Analysis of management's marketing problems, including marketing analyses, pricing, channels of distribution, promotion, competition, product strategies, and marketing research.

### **MRKT 570 Marketing Strategy and Planning (3)**

This course is intended to provide graduate students with the conceptual background and the analytical tools that are used in solving strategic marketing problems. The text and assigned readings furnish the conceptual background for effective analysis of marketing problems; the cases utilize practical application tools for making strategic marketing decisions. To operationalize this objective, class discussion will be geared toward evaluating marketing information to comprehensive and integrated marketing strategies. These discussions will nurture students' understanding of the operation of marketing programs; will emphasize theory; and, will foster the integration of the various marketing management elements into a comprehensive marketing strategy.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 571 Consumer Behavior (3)** Factors influencing buyer behavior; contributions of the behavioral sciences to the study of selected phenomena.

### **MRKT 571 Consumer Behavior (3)**

This course is intended to introduce graduate students to the basic theoretical ideas and techniques of investigations into consumer behavior phenomenon. Such a study will, it is hoped, provide an appreciation of the problems of consumer behavior and the techniques available for their solution. Specific objectives are:

- (a) The prepared graduate students who will enter a wide range of careers with a substantial knowledge of consumer behavior theory, research, and state-of-the art conclusions, that will permit them to use more sophisticated analytical techniques in anticipating and meeting consumer needs and demand.
- (b) To offer strategic how-to, and "insider" information for using theoretical concepts and techniques and give graduate students specific opportunities, within the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 572** Marketing Research (3) Management information needs, evaluation of research proposals and findings, methods of data collection and analysis, integration of research and decisions.

### **MRKT 572 Marketing Research (3)**

This is a graduate level Marketing Research course and deals with collection, processing, analysis and interpretation of information, which are main steps in completing a successful market research project. The course provides students with an understanding of marketing research and its is designed in the belief that one must understand market research jobs and use it effectively in managerial decision-making. It is practical oriented and aligned with scientific, scholarly and logical truth. The course will cover the research process including problem identification, secondary and primary data collection questionnaire design, sampling, coding process, research methodology, data analysis and interpretations, and communication with management through research reports and presentations.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 585** Business-to-Business Marketing (3) Marketing of products and services to other businesses and organizations including strategy, planning, research, communications, pricing, distribution, and global issues.

### **MRKT 585 Business-to-Business Marketing (3)**

This course builds upon marketing management concepts and focuses on the special elements and requirements of business-to-business marketing. Emphasis is given to managerial decision-making in the areas of business marketing environment, business buying functions, business marketing strategy, business marketing systems, business marketing planning, business marketing research, business marketing segmentation and demand analysis, product strategy in business marketing, business marketing communications, promotion, pricing, and distribution and globalization strategy in business marketing. The course employs real marketing situations treated analytically and emphasizing business marketing situations. In order to present the materials in a real life environment, case problems from business-to-business marketing will be used. Heavy student preparations and participation are expected. The course will also cover business marketing strategies on the Internet.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 586** Internet Marketing (3) Concepts, techniques, and applications of Internet marketing; buyer behavior; Web site design; marketing plans; legal, ethical, and international environments.

### **MRKT 586 Internet Marketing (3)**

With the introduction of the Internet and the World Wide Web, the marketing field has moved to a new stage in meeting the demands of current and prospective customers. In this respect, many companies have added a new medium of delivery and promotional channel to their existing brick and mortar operations. This course will deal with marketing strategies of click-only and click-and-mortar firms. The course is a valuable addition to our marketing course offerings in our MBA program. It is a marketing course, and will not deal with technical aspects of the Internet. Students will be evaluated by using group assignments such as development of Web Marketing plans, case studies, mini research assignments, and a final exam. The course does not require special facilities except desktop computer and MS software, which are available in many of our classrooms. It may be offered once a year.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 587** Global Marketing (3) Exploration of strategic marketing planning concepts and techniques from a global perspective within diverse overseas market environments.

**MRKT 587 Global Marketing (3)**

This course is a systematic treatment and application of marketing management knowledge on a global scale. The objective of the course is to develop knowledge and understanding of the global marketing environment and of concepts, tools, and theory that will prepare students to take responsibility for successful global market penetration. The perspective of the course is managerial: i.e., the ability to identify market opportunities, develop plans/programs, resolve problems, and implement strategies. This course will provide graduate students with an understanding of marketing planning and strategy from a global perspective. The world should be viewed as a marketplace with a resulting need for familiarity with various environmental similarities and/or differences. These may necessitate adaptation and/or standardization of marketing programs, strategies and plans from region/nation to region/nation. A major focus of this course will be a strategic marketing management techniques, issues, strategies and problems within a global marketing framework. As well, an understanding and appreciation of world cultures, socioeconomic, and legal/political conditions which have a profound effect on a US firm's target market selection and marketing strategy development, will be established.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 596 Individual Studies (1-9)** Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MRKT 597 Special topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Materials (MATL)**

**MATL 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 597** Special Topics (1-9) Supervised student activities on research projects identified on an individual or small-group basis.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 602** SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) NO DESCRIPTION.

**SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATL 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Materials Science and Engineering (MATSE)**

**MATSE 400** Crystal Chemistry (3) Principles of crystal chemistry applied to structures, structural defects and properties of organic, inorganic, intermetallic, and metallic crystals.

### **Crystal Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 401** Thermodynamics of Materials (3) Review of equilibrium thermodynamics and applications to metallurgical and material systems.

### **Thermodynamics of Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 402** Materials Process Kinetics (3) A treatment of process kinetics including chemical reaction kinetics and momentum, energy and mass transport.

### **Materials Process Kinetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 403 (BIOE 443)** Biomedical Materials (3) Describe properties of materials and composites and their in vivo interactions.

### **MATSE 403 (BIOE 443) Biomedical Materials (3)**

Metals, polymers, and ceramics, and their composites, which are capable of emulating the functions of hard and soft tissues, are the subjects of this course. The subject matter shall be confined to implanted materials; external appliances, such as casts, braces, etc are not considered. The topical content of this course will be grouped into four areas. A general introduction to selected aspects of physiology will be presented. This will provide the background necessary to appreciate the factors which govern the selection of biomedical materials. Specific emphases will be placed on polymerization of biopolymers (polypeptides and polysaccharides) and the general relationships between conformation and biological function, the biochemistry of blood and blood surface interactions, the formation of teeth and bone and the relationships between microstructure, composition and function, the immune responses to implanted materials, the resorption of bone (osteoporosis) and the development of caries. The perspective placed on these topics will be that of materials science. The selection of ceramics for hard tissue prosthesis will be discussed. Orthopaedic and dental applications for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses and pyrolytic carbons. Various classes of inorganic cements, gypsum, zinc phosphates, zinc

carboxylates, silicates, and glassionomer cements will also be considered as ceramics. Hydroxyapatite, Hap-based composites and Hap-metal interactions will be discussed in particular Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described. Dental and orthopedic applications of metals will be described. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and vitallium, used in prosthetic applications, will be described and their properties and limitations discussed The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particular debris in the vicinity of an implant will be discussed in particular Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications it is desirable that a polymeric material biodegrade while in others property retention is desirable.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 404 (IL) (BIOE 444) Surfaces and the Biological Response to Materials (3)** Focus is on the special properties of surfaces as an important causative and mediating agent in the biological response to materials.

### **MATSE 404 (BIOE 444) Surfaces and the Biological Response to Materials (3)**

This course factors the classical picture of the biological response to materials into spatial and temporal components, identifying the special properties of surfaces as an important causative and mediating agent. Biophysical mechanisms are emphasized that lead to formulation of structure property relationships and the biological response to materials. Contact activation of the blood plasma coagulation cascade, bioadhesion, and protein adsorption are used as example biological responses to material surfaces to illustrate concepts and principles. Leading theories attempting to correlate both kind and intensity of biological responses to surface and interfacial energetics will be compared and contrasted through a process that will quantify important surface thermodynamic properties of materials. The hydrophobic effect and related phenomena, especially as this pertains to water solvent effects in biology, receives special emphasis. Course materials are drawn from a selection of relevant library reserve texts.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 409 (NUC E 409) Nuclear Materials (3)** Nuclear reactor materials: relationship between changes in material properties and microstructural evolution of nuclear cladding and fuel under irradiation.

### **MATSE (NUC E) 409 Nuclear Materials (3)**

MATSE/NUC E 409 provides a background on the types of materials used in nuclear reactors and their response to neutron irradiation. Most of the materials problems encountered in the operation of nuclear power reactors for energy production are discussed here. The objective of the course is to give nuclear engineering students a background in materials so they understand the limitations put on reactor operations and reactor design by materials performance. In the first part of the course, we review basic concepts of physical metallurgy, to develop a mechanistic and microstructurally based view of material properties. In the second part of the course, we present the methods to calculate displacement damage to the material produced by exposure to neutron irradiation. The microstructural evolution that results from the reactor exposure (including radiation damage and defect cluster evolution, and changes) is described. The aim is to create a linkage between these changes at the atomistic level and the changes in macroscopic behavior of the material. Special attention is given to property changes that affect fuel performance and operational safety. Both mathematical methods and experimental techniques are emphasized so that theoretical modeling is instructed by experimental data. Students use the TRIM and SPECTER codes to quantitatively evaluate neutron damage, as well as learn simple analytical models that describe microstructural evolution and property changes under irradiation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 410 Phase Relations in Materials Systems (3)** Phase rule; construction and interpretations of equilibrium diagrams;

importance of nonequilibrium in materials.

### **MATSE 410 Phase Relations in Materials Systems (3)**

This course integrates three core components of materials science and engineering: thermodynamics, kinetics, and interface crystallography in understanding processing and development of inorganic materials. It is the key course bridging the fundamentals to practical materials processing. Phase equilibria, phase diagrams, phase transformations and heat treatments are addressed in great details through nucleation, transformation kinetics, crystal interface and diffusion. The complexity of materials is discussed in hierarchy from pure elements, binaries, ternaries to multicomponents.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

Concurrent: MATSE 201 MATSE 400 MATSE 430

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 411 Processing of Ceramics (3)** Principles of ceramic processing, including powder preparation and characterization, forming operations, and the basic phenomena underlying these operations.

### **MATSE 411 Processing of Ceramics (3)**

This course covers the scientific and engineering principles of manufacturing of ceramic products. The course covers powder synthesis and characterization; surface and colloid chemistry; fabrication; and densification by sintering. There is an emphasis on the physical chemistry of particulate systems as relates to the various stages processing. The course is offered every fall semester and is required for BS graduates of the Ceramic Science and Engineering option in Materials Science and Engineering.

The course objectives are for the student to (1) become knowledgeable of all steps involved in ceramic manufacture from powder synthesis through final densification by sintering, (2) understand the rationale and compromises for selecting a given processing route, (3) understand and be able to apply the parametric relations for manufacture of a ceramic with a specified microstructure, and (4) understand the physical chemistry fundamentals responsible for the unique properties of fine powders.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 412 Thermal Properties of Materials (3)** Generation of high temperatures, measurement of temperature, heat transfer and furnace design, thermal stability of ceramic materials, applied thermodynamics.

### **MATSE 412 Thermal Properties of Materials (3)**

The fundamentals of achieving, measuring, and controlling high temperature for materials processing are addressed. The crystal physics underlying heat capacity, internal energy, phonon and photon conduction, and thermal expansion is used to rationalize the behavior of a wide variety of ceramic and metallic materials in severe thermal environments. Micro- and macroscopic thermal transport, thermal shock and fatigue behavior, and thermochemical durability are addressed insofar as their impact on the design of, and with, high performance materials in thermostructural applications.

Case studies on materials selection and design using the fundamentals of inorganic crystal chemistry, physics, thermodynamics, kinetics, elastic, and mechanical properties are widely employed. Students interested in disciplines such as metallurgy, ceramic science, electronic and photonic materials, mechanical engineering, aerospace engineering, industrial engineering, engineering science, and chemical engineering will benefit significantly from this course.

The course is offered annually, in the spring semester, in the Department of Materials Science and Engineering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2005

Prerequisite:

Concurrent: MATSE 401

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 413 Solid-State Materials (3)** Structures of metallic, ionic, and covalent solids, amorphous materials, and surfaces; electronic structure; electronic properties of solids and their manipulation.

### **Solid-State Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 415** Introduction to Glass Science (3) Composition, melting, fabrication, properties, and uses of glass; combinations of glass with metals and other materials.

### **MATSE 415 Introduction to Glass Science (3)**

This course aims to explain the unique characteristics of the glassy state, and to describe their role in the processing, application, and engineering performance of amorphous materials and glass products. The course teaches fundamental concepts of amorphous structure, and then utilizes them to establish structure-property relations in various glass systems. The viscosity, thermal expansion, chemical durability, strength behavior, and optical properties of silicate-based glasses are emphasized, although the important properties of phosphate, halide, and chalcogenide glasses are not overlooked. Also included are phenomenological descriptions of glass formation, liquid-liquid immiscibility, viscous flow, structural relaxation, stress relaxation, and crystallization in glass. Various methods for the synthesis of glass are reviewed (melting, CVD, and sol/gel), along with important manufacturing processes for commercial glass products. Throughout the course, the applications of glass and glass components in electronics, photonics, biomedicine, transportation, and energy are described to rationalize the use of glass (i.e., the materials selection), the specific glass composition, and the associated processing method.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 417 (E SC 417)** Electrical and Magnetic Properties (3) Electrical conductivity, dielectric properties, piezoelectric and ferroelectric phenomena; magnetic properties of ceramics.

### **MATSE (E SC) 417 Electrical and Magnetic Properties (3)**

E SC 417 is designed to provide students with a fundamental understanding of the different responses a material can have to applied electrical or magnetic fields. Important properties are introduced and correlated with knowledge of material chemistry, crystal structure, and microstructure to provide an understanding of the mechanisms responsible for controlling the observed properties, as well as the ways in which properties can be engineered. Electronic and magnetic properties encompass dielectric, ferroelectric, conductor, superconductor, and ferromagnetic materials. Material properties and structures are related to sensors, energy storage and conversion devices, biomedical devices and electronic components in telecommunications.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 419** Computational Materials Science and Engineering (3) Introduction to computational material science and engineering. Overview of the computational methods for materials, from atomistic to the continuum scale.

### **MATSE 419 Computational Materials Science and Engineering (3)**

Modeling is a critically important tool in the field of materials. This course is designed to inform students about all areas of materials modeling, and to explore the use of modeling in different research areas. This is a hands-on undergraduate level course, mandatory for all MATSE students, covering current methods for modeling soft and hard matter, at the atomistic, meso and continuum scale levels. It consists of an overview of individual techniques of modeling from atomistic molecular dynamics and Monte Carlo, coarse-grained molecular dynamics, and multiscale modeling, to the continuum (e.g. SAFT, CALPHAD). It also includes a computer laboratory component with hands-on exercises. At the conclusion of the course, students will understand the physical basis and basic procedures of each technique. Students will be able to understand the general literature in modeling and its connection with experimental work, as well as to communicate with experts in the field. From the laboratory practices, they will learn how the individual modeling techniques contribute to knowledge in each area, and to interconnect them with experimental information.



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 421 Corrosion Engineering (3)** Industrial forms of corrosion and preventive methods, and their description in terms of basic thermodynamic and kinetic considerations.

### **MATSE 421 Corrosion Engineering (3)**

This variable 2 or 3-credit course is an introduction to the corrosion field and more broadly to the principles of electrochemistry and to the electrode reactions that occur during the undesirable corrosive degradation of metal, and also in various important commercial processes such as electroplating, electroless plating, battery and fuel cell operation, aqueous extraction metallurgy and corrosion prevention techniques. The objectives of this course are to introduce the student to the (1) principles of electrode reactions, (2) nature of commercial corrosion resistant alloys and their compositions, (3) various forms of corrosion and preventative measures, and (4) design of electrochemical laboratory and field procedures for detecting corrosion processes and determining their rates. Thermodynamic and rate data are used to make engineering decisions relative to the occurrence of corrosion, to the effectiveness of the various preventative measures, and to electrochemical design. Corrosion processes and electrode reactions more generally are primarily concerned with the surface properties of materials, but the bulk properties, such as microstructure, grain size, hardness, and composition, are discussed in terms of their impact on materials degradation. In-class closed-book exams and problem sets, and homework that allow student collaboration, are used for evaluation. Computer access to the course is available and includes all lecture material, old exams with answers, home works, and syllabus on the Web. This course is offered every year with typical class size of less than 20 students. The 2-credit version is required in the Metals Science and Engineering curriculum. The 3-credit version includes additional lecture material and some laboratory demonstrations; evaluation included a lab report.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 422 Thermochemical Processing (3)** Physico-chemical aspects of high temperature extraction and processing of metals and alloys. Design and evaluation of processes and process options.

### **MATSE 422 Thermochemical Processing (3)**

An important goal of materials engineering is to efficiently produce metals and alloys of specific composition. Familiar examples include the tonnage production of metals and alloys, the production of ultra high purity electronic materials such as silicon and germanium, and the deposition of thin films for various applications. In this course the students get an understanding of the physical and chemical principles underlying these operations and how these principles are applied in industrial practice. The students get ample opportunities to apply thermodynamics, kinetics, and transport phenomena to understand why the processes currently in use work. Furthermore, they learn how to marshal information for the design of projected new processes and process options.

Broadly stated, the topics include solid-state reactions, production of liquid metals, and processing, all carried out at high temperatures. The topics are covered in a set of lecture notes available from the instructor. The lectures are accompanied by about fifteen problems sets in the form of home work and class work so that the students experience first-hand how the principles of thermodynamics and rate processes are applied in solving important problems in thermochemical processing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 424 Materials Selection and Design (1)** Introduction to the selection and design of materials for structural applications.

### **Materials Selection and Design (1)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 425 Processing of Metals (3)** Modern methods of shaping metals in liquid and solid states: casting, joining, powder and deformation processing. Design of new technology.

### **MATSE 425 Processing of Metals (3)**

This course focuses on how metals and alloys may be processed into different shapes and how those processing procedures affect the metallurgical microstructure and properties. Consideration of shape, the alloy composition, and property goals are all factors in selecting an optimum processing "window". Such carefully selected processing conditions not only produce the desired component shape in a cost-efficient manner but also ensure acceptable properties and safe in-service performance. This course surveys the following metal processing procedures: (a) solidification processing, (b) heat treatment processing, (c) welding, (d) deformation processing, and (e) powder metallurgy.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 426 (MN PR 426) Aqueous Processing (3)** A study of the chemical and engineering principles pertinent to metal processing in aqueous systems: hydrometallurgical extraction, plating, materials preparation.

### **MATSE (MN PR) 426 Aqueous Processing (3)**

This 3-credit course deals with the chemical and engineering principles underlying the aqueous processing of metals: metal extraction from primary and secondary sources, electroplating, and metal finishing, powder synthesis, energy storage and conversion, and treatment of recycling of metal-containing toxic wastes.

1. Physico-Chemical Principles - Thermodynamic, chemical kinetic and transport factors which control hydrochemical processes (leaching; precipitation; adsorption; solvent extraction; ion exchange; electrowinning, electrorefining and electroplating; membrane processes; energy storage and conversion); graphical representation of homogeneous and solid/solution equilibria; chemical reagents.
2. Engineering Principles - Reactor design and staged operations; ideal batch, continuous stirred-tank and plug-flow reactors; fluidized bed reactors; electrochemical reactors; multistage separation processes (solid-liquid, liquid-liquid, and gas-liquid systems).
3. Process Synthesis - Design of metal separation (extraction, refining, waste treatment) materials synthesis, metal finishing, and energy storage/conversion processes and system-integration of unit operations, industrial practice. Emphasis on closing circuits to minimize or eliminate waste effluents.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 430 Materials Characterization (3)** Elements of crystallography and the characterization of crystalline and non-crystalline materials using x-ray diffraction, electron microscopic, and other instrumental techniques.

### **Materials Characterization (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 435 Optical Properties of Materials (3)** Electromagnetic spectrum, interaction of light with materials, color, thin film optical coatings, electro-, integrated and nonlinear optics.

### **Optical Properties of Materials (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 436 Mechanical Properties of Materials (3)** Fundamental relationships between structure and mechanical behavior of materials.

**MATSE 436 Mechanical Properties of Materials (3)**

The topics covered in this course are essential to students in the Materials Science and Engineering options, and these are also required for materials engineering courses nationally accredited by the professional societies. The course is taught at the 400 level because it requires the fundamental courses in mathematics and physics to be completed. The course also requires completion of an introductory course in materials science. This new course typically fits into the junior or senior year, when students in the major are understanding how the properties of materials can be changed by controlling the structure of materials. The course has also been designed such that students in other engineering majors can take this course as a technical elective. Some of the information in this course is used in laboratory courses for the major. The course is not required as a prerequisite for other courses.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 440 (E MCH 440) Nondestructive Evaluation of Flaws (3)** Methods and limitations of nondestructive evaluation of mechanical flaws; optical, acoustical, electromagnetic, x-ray, radiography, thermography, and dye techniques.

**Nondestructive Evaluation of Flaws (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 441 Polymeric Materials I (3)** Manufacture of industrially significant polymers together with discussion of their major chemical, physical, and mechanical properties.

**MATSE 441 Polymeric Materials I (3)**

This 3-credit course focuses on about 40 commercially most important polymers together with the discussion of synthesis routes, industrial production processes, processing methods, physical and chemical properties, and applications.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 443 Introduction to the Materials Science of Polymers (3)** Introduction to the nature and structure of high polymers. Characteristics of polymers and polymer systems.

**MATSE 443 Introduction to the Materials Science of Polymers (3)**

This course is an introduction to the field of polymer science and engineering, providing an overview of the synthesis and structure of these materials; the crystalline and glassy states; solution properties and phase behavior; and mechanical and rheological properties.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 444 Solid State Properties of Polymeric Materials (3)** Structure/property relationships in the bulk solid state of polymers. Characterization of bulk properties and structure.

**MATSE 444 Solid State Properties of Polymeric Materials (3)**

Prerequisite is PLMSE 406. Understanding relationships between structure and properties in the bulk solid state of polymers is important in designing and utilizing polymers in many applications. In trying to understand 'structure' we also need to define what is meant by and important in 'structure' and review tools used to measure desired structural features. Two-thirds of the course addresses accepted general features of the polymeric solid state, with particular emphasis on characterization of semicrystalline polymers since semicrystalline polymers represent approximately 75% of industrially important polymers. In this portion of the course, we will be particularly concerned with defining and measuring percentage crystallinity and with defining and measuring orientation in polymers. Both of these parameters play important roles in establishing physical characteristics of polymers, in particular in mechanical properties. Mechanical properties continues to be an important feature for polymers since polymers possess the widest available range of mechanical properties of any material. The remainder of the course covers new and/or continuing topics selected from composition-branching distribution; barrier properties of thin films and recycle-degradation of polymers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 445 Thermodynamics, Microstructure, and Characterization of Polymers (3)** The properties of individual polymer chains. Theoretical and experimental techniques pertaining to the characterization of polymeric microstructure.

**Thermodynamics, Microstructure, and Characterization of Polymers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 446 Mechanical and Electrical Properties of Polymers and Composites (3)** The mechanical (viscoelastic) and electric properties of polymers and polymer-based composites.

**MATSE 446 Mechanical and Electrical Properties of Polymers and Composites (3)**

This course is an introduction to the mechanical and electrical properties of polymers and polymer-based composites: focusing on the importance of molecular structure, rubber elasticity, mechanisms of yielding, viscoelasticity and manifestation thereof, static and ac dielectric properties, and conduction.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 447 Rheology and Processing of Polymers (3)** This course deals with the fluid mechanics, rheology, and processing of polymeric materials.

**Rheology and Processing of Polymers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 448 (CH E 442) Polymer Processing Technology (3)** Basic principles of polymer melt processing are reviewed and subsequently applied to the most important industrial processing operations.

**MATSE 448 (CH E 442) Polymer Processing Technology (3)**

MATSE 448 involves both lectures and laboratory experiments illustrating the interrelations between structure, processing conditions, and physical properties of industrial polymer products. Students apply engineering fundamentals and principles of polymer melt rheology to analyze industrial processing operations. Unlike typical polymer processing courses

offered at most U.S. universities, MATSE 448 covers detailed analyses of individual processing operations, rather than dwelling on underlying polymer science fundamentals that are covered elsewhere in our curriculum. Students learn to optimize processing variables, given a particular set of materials and conditions, establishing how processing conditions impact the physical properties of finished polymer products. We explore the physics governing processing operations including extrusion, mixing, calendaring, blow molding, thermoforming fiber spinning compression molding, injection molding, and nanolithography.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 450** (E SC 450) Synthesis and Processing of Electronic and Photonic Materials (3) The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

### **Synthesis and Processing of Electronic and Photonic Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 455** Properties and Characterization of Electronic and Photonic Materials (3) Materials characterization in general; electrical properties of crystals, contacts, films; optical properties of single phase materials, waveguide, and multilayer stacks.

### **Properties and Characterization of Electronic and Photonic Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 460** Introductory Laboratory in Materials (1) An introduction to comparative physical properties and characteristics of various materials including mechanical, electrical thermal, and structure/ morphology.

### **MATSE 460 Introductory Laboratory in Materials (1)**

This is a lab course whose goal is to provide an integrated approach to materials science and engineering. Any individual lab will consist of a number of elements, initially students will be provided with a presentation summary of the proposed lab. This could be film, video, web delivery, hard copy or live presentation. Presentation time will be limited but should be reviewed before students attempt the hands-on lab. All labs will examine a variety of different materials including metal, ceramics and polymers. Labs will be integrative in the sense that they will include use of spreadsheets, data plotting, and presentation of results as written reports and/or as a "PowerPoint" presentation. The labs selected have been chosen specifically because they cut across all current basic materials disciplines. These labs are intended to provide students with a broad appreciation of the range and contrast of material structures and properties, in order that students more fully appreciate the breadth of material science and engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 462** General Properties Laboratory in Materials (1) An introduction to comparative physical properties of various materials including mechanical, thermal electrical properties and the measurement of said properties.

### **MATSE 462 General Properties Laboratory in Materials (1)**

This is a lab course whose goal is to provide an integrated approach to physical property measurements in materials science and engineering. Any individual lab will consist of a number of elements, initially students will be provided with a presentation summary of the proposed lab. This could be film, video, web delivery, hard copy or live presentation. Presentation time will be limited but should be reviewed before students attempt the hands-on lab. All labs will examine a

variety of different materials including metal, ceramics, polymers and composites. Labs will be integrative in the sense that they will include use of spreadsheets, data plotting, and presentation of results as written reports and/or as a "PowerPoint" presentation. The labs selected have been chosen specifically because they cut across all current basic materials disciplines. These labs are intended to provide students with a broad appreciation of the range and contrast of material properties and the measurement of such properties, in order that students more fully appreciate the breadth of material science and engineering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 463** Characterization and Processing of Electronic and Photonic Materials Laboratory (1) Provides experience with key processing methods for EPM materials and advanced characterization methods for EPM materials and simple device structures.

#### **Characterization and Processing of Electronic and Photonic Materials Laboratory (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:  
 Concurrent: MATSE 450 MATSE 455

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 468** Ceramics Laboratory III (1) Ceramic processing and powder characteristics.

#### **MATSE 468 Ceramics Laboratory III (1)**

This course will demonstrate to students the experimental techniques by which the key powder characteristics and powder processes are determined, how to analyze the data from the measurements, and to reveal the interaction between properties, processing and structure. The course concentrates on the importance of powder characterization, forming techniques, sintering and microstructure characterization in the processing of ceramics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 471** Metallurgy Laboratory I (1) A laboratory integrating experimental aspects of material contained in MATSE 402, 413, and 410, e.g. phase diagram determination, solidification micro- structures, etc.

#### **MATSE 471 Metallurgy Laboratory I (1)**

This course is largely an introduction to basic laboratory characterization techniques (optical microscopy, scanning electron microscopy, image analysis, hardness testing, thermal analysis). However, it also applies those characterization techniques in the context of Design of Experiments. This laboratory class also contains significant drills in technical writing.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 472** Metallurgy Laboratory II (1) Application of principles of mechanical metallurgy, pyroprocessing, corrosion and metal processing.

#### **MATSE 472 Metallurgy Laboratory II (1)**

This course provides a range on laboratory experiences ranging from metals processing to alloy properties. A primary course objective is to demonstrate important relationships between the processing, microstructure, and properties of metals. The individual laboratory practices include the following: powder metallurgy, metal casting, mechanical property testing and analysis, welding and weldment characterization, non-destructive testing, failure analysis and fractography,

computational processing design, corrosion, and aqueous processing. The course requires hands-on involvement by the students in the design and planning of experiments as well as data acquisition and analysis of results. Students work in groups, and written reports are the primary basis for grading.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 473 Polymeric Materials Laboratory--Synthesis (1)** Principles and practices of polymerization, including condensation, free radical (bulk, solution, suspension, emulsion), ionic, and Zeigler-Natta procedures.

#### **MATSE 473 Polymeric Materials Laboratory--Synthesis (1)**

This laboratory course provides students exposure to a variety of synthetic techniques basic to Polymer Science. From the polymerization of styrene to the preparation of urethane foams, students will see the role varied synthetic methods and chemistries play in determining the final form and properties of a given polymer. Students also learn the polymer structure characterization by examining the produced polymers with proper tools and instruments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 474 Polymeric Materials Laboratory--Characterization (1)** Principles and practices involved in determination of properties, structure and morphology, employing thermal, mechanical, spectroscopic, viscometric and computer techniques.

#### **MATSE 474 Polymeric Materials Laboratory--Characterization (1)**

Prerequisite for the course is MATSE 443. This course introduces the student to a series of simple physical and physical-chemistry tests on polymers that are the basis for a wide range of more complex tests routinely carried out in industry. In addition to the tests listed below students are also instructed in preparation of lab reports and in some of the typical problems associated with presenting data. A final report utilizes data collected by a number of different student teams throughout the course of the lab. Finally, students are demonstrated a number of state-of-the-art characterization tools used specifically to determine properties of interest in the polymer area. Grading is based on written lab reports (10% for each of 8 separate reports and 20%) for a final comprehensive report using data from other groups as well as the student's own group.

#### Course content

Injection Molding - students work with a simple injection molder to find optimum molding conditions to prepare sample bars for mechanical testing.

Static Mechanical Testing - an Instron is used to determine modulus, yield, and elongation to break for samples prepared above and for other materials.

Izod Impact Test - injection molded samples are used to measure notched impact tests on what are typically tough materials.

Dilute Solution Viscometer - standard solution viscosity tests are used to measure intrinsic viscosity of polymer solutions and (viscosity average) molecular weight.

Melt Viscometer - melt index and 'die swell' are easily measured with a simple ram and die 'melt indexer' as a measure of processibility.

Optical Microscopy - some semi-crystallizable polymers produce large enough spherulities that rate of crystallization can be followed optically.

Elasticity - a simple experiment measuring the retractive force of an elastic band as a function of temperature shows the entropic origin of elasticity.

#### Copolymerization Computer

A computer program (VI) allows students to try a wide variety of 'what if' experiments to measure the effects of a range of copolymerization parameters.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 475 (E SC 475) Particulate Materials Processing (3)** Fundamentals of processing particulate materials including production, characterization, handling, compaction, and sintering of metal, carbide, intermetallic, and composite powders.

### **Particulate Materials Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 483 (E SC 483) Simulation and Design of Nanostructures (3)** Introduction to computer simulation techniques and their applications at the physical/life sciences interface.

### **MATSE (E SC) 483 Simulation and Design of Nanostructures (3)**

Students will learn the simulation techniques and the design rules of nanostructures. Basic concepts of computer modeling will be introduced using quantum and classical approaches. Fundamental physical phenomena encountered in the molecular fields of computational physics, chemistry, and biology will be studied. Applications are drawn from a broad range of fields including soft and condensed matter to build an understanding of nanostructures.

The course will assume knowledge and skill developed in the prerequisite courses of PHYS 214 and MATH 230. Students are expected to combine knowledge from other courses with information presented here to develop sophisticated interpretations and understanding of physical and chemical principles of nanostructures and their design rules.

Evaluation methods to be used in this course will be two in-class examinations and one final period examination. The course contains a computer code generation and implementation component. Students will use commercial or educational computer codes (e.g. Matlab, Mathematica, AMBER, CHARMM, VASP, etc.) which are available at our high performance computing clusters (<http://gears.aset.psu.edu/hpc/>) Students will use the computing clusters to perform simulations which are accessible from any classroom or laboratory at Penn State.

The principal objectives of the course is to learn the fundamental physics of nanostructures and to design them with computer simulations. This approach starts from classical molecular dynamics that apply on the large scale biological and synthetic assemblies and encompasses quantum mechanics for the molecular and atomic sizes. This course will give a broad scientific picture of simulation techniques in the area of nano-science and technology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 484W (IL) International Internship in Materials: Research Definition and Methodology (3)** A course focused on international research, specific design and methodology, facilitated through the International Internship in Materials and Program.

### **MATSE 484W International Internship in Materials: Research Definition and Methodology (3) (IL)**

The objective of this course is to enrich our students' preparation for careers in materials science and engineering in a global environment. The course will emphasize the development of international communication skills as well as an appreciation of cultural and technical issues associated with conducting research in overseas laboratories. Students will select a research topic in collaboration with a Materials Science and Engineering faculty mentor and a mentor from an overseas laboratory or University. Students will perform and document a literature review encompassing the technical, economic, manufacturability, sustainability, environmental, safety/health, social and political issues of relevance to the topic, with emphasis on the cultural, social, and scientific differences and similarities in performing the research in an international venue. Students will articulate and document a research hypothesis, experimental approach and methodology necessary to comprehensively evaluate the topic, and commence laboratory research under the supervision of the mentor at the host institution.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 485W (IL) International Internship in Materials: Experimentation and Documentation (3)** A course focused on international research, specifically experimentation and documentation, facilitated through the International Internship in Materials Program.

**MATSE 485W International Internship in Materials: Experimentation and Documentation (3) (IL)**

The objective of this course is to enrich students' preparation for careers in materials science and engineering in a global environment. The course is intended as a follow-up to MATSE 484W: International Internship in Materials: Research Definition and Methodology, in which the student will complete the research and documentation on the topic developed in that course. It may be used as a direct substitution for MATSE 494W: Research and Design Senior Project in the degree requirements for Materials Science and Engineering. The course will continue the student's development of international communication skills and appreciation of cultural and technical issues associated with conducting research in overseas laboratories. Students will complete their research experimentation, data analysis and interpretation under the supervision of a Materials Science and Engineering faculty mentor and a mentor from their host overseas laboratory or University. Students will compile a written thesis encompassing their technical findings, with specific emphasis on the economic, manufacturability, sustainability, environmental, safety/health, social and political issues of relevance to the topic. It is expected that the students will carefully and comprehensively articulate and consider the cultural, social, and scientific differences and similarities they experienced in performing the research in an international venue.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 492W Materials Engineering Methodology and Design (3)** Designed to familiarize students with the literature and technology developments in the use of, and design with, materials in industrial applications.

**MATSE 492W Materials Engineering Methodology and Design (3)**

The objective of this course is to teach students the skills to solve realistic problems related to the use of materials in industrial practice. This will be accomplished by considering alternatives for materials design or selection and proposing the most effective scientific or engineering solutions. The methodology will take into account other forces acting on the design process, such as economic, environmental, sustainability, manufacturability, ethical, health and safety, social and political concerns. Students will develop these design skills by working in teams on projects defined by industry, and will learn to communicate their solutions in verbal and written form. Students will also learn the key features needed in developing a team approach to solving problems.

Each team will visit the company at the beginning of the semester to become familiar with its problem. Tours of processing and other facilities associated with the problem will be conducted. Data and appropriate information will be gathered during the visit and, after returning to campus, via telecom and through reviews of the available literature on an as needed basis. During the first half of the semester, students will focus on understanding the nature of the problem, the current state of the art, and nomenclature and the materials engineering concepts appropriate to solving the problem. Each team will meet weekly to organize the investigation, share resources, and discuss results; a faculty mentor will help guide the team's deliberations.

Weekly in-class activities consist of team-building exercises, and unscheduled individual oral presentations in which students present the progress of their work. This progress is also presented in written form in several short papers. The instructor presents "mini-lectures" on materials engineering concepts, nomenclature, equipment, etc., as needed. During a second industry visit at mid-semester, the teams make formal oral presentations to the industrial representatives on their progress. An extensive written report is also required. Interspersed through this process, class discussions will be held on 1) the use of the library system to find technical information, 2) the role of intellectual property in industry, and 3) factors that influence the design process.

During the second half of the semester, the emphasis is on the development of proposed solutions to the problems. During a final industry visit at the end of the semester, each team will make a formal oral presentation of their proposed solution to the problem. Each student also presents a final written proposal to the instructor.

Evaluation is based on written reports, performance in presentations, and instructors's assessment of the student's participation in design team activities. This course will be offered once per year, in the spring semester. At the conclusion of the course, each student will select a design or independent research topic for their capstone senior-year design project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 493W** Materials Science and Engineering Multidisciplinary Capstone Design Project (3) This course focuses on multidisciplinary industry-sponsored and community service-based design projects offered in conjunction with the College of Engineering's Learning Factory.

**MATSE 493W Materials Science and Engineering Multidisciplinary Capstone Design Project (3)**

This course will provide students with the opportunity to learn the design process in the context of an industry-sponsored or community service-based design project that demands they produce a working solution. The design projects in this course will be structured for students from two or more different engineering majors, as defined by the project sponsors in collaboration with the instructor and departmental project coordinators. The project sponsor will provide the technical expertise for the project, a clear definition of all project deliverables that are expected, and the financial support to cover needed materials and supplies and travel costs. Project sponsors will be invited to attend the Project Kickoff at the start of the semester to present their ideas and answer questions from the students as well as the Design Showcase at the end of the semester where teams display their results to the project sponsors and the public. The Center for Engineering Design and Entrepreneurship (CEDE) in Hammond Building and the Bernard M. Gordon Learning Factory will provide the facilities where the design teams can work together to develop the design concept and prototype solutions. Faculty members in the School of Engineering Design, Technology, and Professional Programs (SEDAPP) will administer the course, including reading, evaluating, and grading the final project report, provide lectures on topics including on project management, design, product manufacturing, intellectual property, engineering ethics, societal/global/contemporary/professional issues, and related technical topics, and organize invited technical lectures related to industry projects. In accordance with standard Learning Factory procedures, specific multidisciplinary projects will be selected for this course to provide challenging senior-year design experiences for all students, and the Director of the Learning Factory will coordinate the selection of these projects with the course instructor prior to the start of each semester of the course offering. Multidisciplinary teams will be formed based on specific project needs (i.e., expertise from two or more disciplines based on the project scope).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 494M** Research and Design Senior Project (1-3) Continuation of a research problem in materials culminating in a bound thesis describing the work.

**Research and Design Senior Project (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 494W** Research and Design Senior Project (1-3) Continuation of a research problem in materials culminating in a bound thesis describing the work.

**MATSE 494W Research and Design Senior Project (2)**

This course continues the senior thesis research topic addressed by the student in MATSE 493W. This is a capstone research/design project which integrates: a) background literature search with articulation of a research hypothesis, b) design and implementation of an experimental plan to test the hypothesis, and c) conclusions regarding the validity of the hypothesis based on the experimental data obtained in the course of the research.

The main characteristic of this course is the performance of the research plan articulated in MATSE 493W, followed by interpretation of the data in the context of the original hypothesis(es). Laboratory research is generally performed in collaboration with faculty and graduate research assistants, using equipment and facilities in a wide range of laboratories throughout campus. Occasionally, the nature of the research may require the student to collaborate with researchers outside of Penn State, perhaps even spending some time in residence at other facilities.

The course culminates in the preparation of a bound thesis detailing the relevance and findings of the research. Assessment of the student's progress is via grading of all components of the thesis (literature review/background, statement of the problem, design of the experimental plan, results and discussion, conclusions, recommendations for future work, and references/appendices), as well as the diligence of the student in performing the experimental research in a professional and timely fashion. The course is offered each semester to allow for differing schedules for students following the conventional MATSE curriculum versus those who have elected to participate in the Cooperative Education program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 497B** Materials Sustainability and Life Cycle Assessment (3) Materials sustainability as measured by life cycle assessment and practiced by designers, engineers and scientists.

#### **Materials Sustainability and Life Cycle Assessment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 497C** Microstructure Design of Structural Materials (3) The focus of this course is on understanding the microstructure development and design of structural materials including steel, titanium, aluminum, nickel-based alloys, zirconia, and silicon nitrides. The course will begin with understanding the basic physical metallurgy concepts of the ferrous and nonferrous metals and applying these principles to understanding their processing/structure/property relationships. Specifically, the alloying principles, phase transformation behavior, and transformation kinetics for each metal system will be considered in detail. Heat treatment practices (annealing, normalizing, tempering, aging, and precipitation hardening) and their effects on the microstructure and mechanical properties of each of these metals will also be studied. The course will also examine the microstructure development of the ceramic materials zirconia and silicon nitride, and how manipulation of these microstructures controls mechanical properties.

#### **Microstructure Design of Structural Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 501** Thermodynamics of Materials (3) Application of thermodynamics to materials equilibria and processes, including solution theory, electrochemical processes, capillarity, and the effect of stresses.

#### **MATSE 501 Thermodynamics of Materials (3)**

The goal of this course is to teach the fundamental principles of thermodynamics of materials from a practical viewpoint - thermodynamics as a "toolbox" to help understand chemical behavior of materials. It attempts to integrate chemistry,

phase equilibria, and thermodynamics of a materials system as different means of describing the same chemical behavior. It develops quantitative relationships among them. Thermodynamic terms/values are defined in terms of measurable quantities such as temperature, pressure (partial pressures), and concentrations to diminish the abstract nature of thermodynamics. The course emphasizes problem solving, and more specifically, developing explanations and understanding of chemical and thermal behavior observed in the laboratory/industry. A integral part of the course is to teach the use of state-of-the-art equilibrium thermodynamics computer software as an aid in performing calculations, particularly those involving chemically complex systems with many species.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 503 Kinetics of Materials Processes (3)** Introduction to application of transition state theory and mass transfer to the kinetics of materials and mineral processes.

### **MATSE 503 Kinetics of Materials Processes (3)**

MATSE 503 is fundamentals of atomistic theories and phenomenological descriptions of kinetic processes in solids. It provides the foundation for the advanced understanding of materials processing, phase transformations, and microstructural evolution. Topics include atomistic mechanisms of diffusion, solutions to the phenomenological diffusion equation, diffusion along extended defects, gas-solid reactions, phase transformations, computer simulation of diffusional processes, and microstructure evolution.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 505 Irreversible and Statistical Thermodynamics of Materials (3)** Introduction to statistical and irreversible thermodynamics as applied to chemical and materials systems.

### **MATSE 505 Statistical and Irreversible Thermodynamics (3)**

This course will introduce students to statistical and irreversible thermodynamics as models of describing equilibrium and rate process starting from the atomic/molecular level. The course will begin with a review of relevant concepts from classical thermodynamics, including the four laws, entropy, Gibbs and Helmholtz functions, and chemical and electrochemical equilibrium. The formulation of classical thermodynamics does not require the existence of atoms, as it is largely concerned with average, bulk properties and, indeed, much of classical thermodynamics was developed before the existence of atoms, and molecules was accepted unequivocally in the scientific disciplines. However, knowledge of the properties of atoms and molecules allows one to predict the thermodynamic properties of bulk materials through the discipline of statistical thermodynamics (statistical mechanics) in *ab initio* manner. Indeed, many tabulated thermodynamic properties, particularly for unstable systems, have been calculated rather than measured. Finally, we live in an irreversible world (i.e., one that evolves, such that the entropy of the system and surroundings continuously increases), and statistical thermodynamics cannot provide a satisfactory description of this change. Spontaneous change is best described in terms of the discipline of Irreversible Thermodynamics, which addresses the rate of generation of total entropy of the system plus surroundings. The framework of Irreversible Thermodynamics will be established in terms of coupled fluxes and Onsager's Reciprocity Principle and these concepts will be employed to explain thermal diffusion and electro-osmosis, among other phenomena.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 506 Interfacial Electrochemical Processes (3)** Survey of thermodynamic and kinetic fundamentals of electrochemical processes at interfaces.

### **MATSE 506 Interfacial Electrochemical Processes (3)**

This course will introduce students to the thermodynamic and kinetic fundamentals of interfacial electrochemical processes, with emphasis on the atomic/molecular level. The course will begin with a review of relevant concepts from electrochemical thermodynamics and charge transfer theory and will progress to the application of these fundamental concepts to describe reaction mechanisms, mass transfer, and other important phenomena, such as passivity and passivity breakdown. These processes will be described analytically, by solving the appropriate equations subject to the

relevant natural laws (e.g., conservation of mass and charge and Faraday's Law). The course will also emphasize the flexibility of analyzing electrochemical phenomena in different spaces, including temporal space and Laplace and Fourier frequency spaces, and will show how it is possible to transform between these various spaces to provide the most advantageous medium for mechanistic analysis. The mechanisms of actual charge transfer reactions will be analyzed, including the hydrogen electrode reaction and the oxygen electrode reaction to illustrate important concepts in mechanistic analysis, including the existence of adsorbed intermediates and pseudo-capacitance, the inhomogeneity of surface adsorption sites, surface structure, and quantum mechanical aspects of charge transfer ("partial" charge transfer). No prerequisites are specified, because the course begins with the very basics of electrochemistry. Furthermore, all of the students who would take this course have a background in materials science and engineering, chemistry, physics, mechanical engineering, chemical engineering, or engineering science and mechanics. Specification of prerequisites would only discourage enrollment. This course (with a 597 designation) has been taught several times in the past and no problems with the lack of prerequisites have been experienced.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 507 (BIOE 517) Biomaterials Surface Science (3)** Special properties of surfaces as an important causative and mediating agent in the biological response to materials.

### **MATSE 507 (BIOE 517) Biomaterials Surface Science (3)**

This course will factor the classical picture of the biological response to materials into spatial and temporal components, identifying the special properties of surfaces as an important causative and mediating agent. Emphasis will be on biophysical mechanisms, the biological response to materials. Contact activation of blood plasma coagulation cascade, bioadhesion, and protein adsorption will be repeatedly used as example biological responses to material surfaces to illustrate concepts and principles. Leading theories attempting to correlate both kinds of intensity of biological responses to surface and interfacial energetics will be compared and contrasted through a process that will quantify important surface thermodynamic properties of materials. The hydrophobic effect and related phenomena, especially as this pertains to water solvent effects in biology, will receive special emphasis. A general background in chemistry and/or biology is required, but prerequisites are purposefully limited, reflecting the interdisciplinary aspects of the subject and to draw students from different specializations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 508 (BIOE 508) Biomedical Materials (3)** Properties and methods of producing metallic, ceramic, and polymeric materials used for biomedical applications.

### **Biomedical Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 510 (CH E 510) Surface Characterization of Materials (3)** Physical and chemical principles of characterization techniques widely used in materials science, chemistry and engineering.

### **Surface Characterization of Materials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 511A Powder X-Ray Diffraction (1)** Compound identification, lattice parameter measurement, and other applications of the powder diffraction method.

### **Powder X-Ray Diffraction (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 511B** (GEOSC 511B) Transmission Electron Microscopy (1) Principles and practice of transmission electron microscope operation. Students undertake individual projects.

### **Transmission Electron Microscopy (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 511E** Scanning Electron Microscopy (1) Principles and practice of scanning electron microscope operation. Students undertake individual projects.

### **Scanning Electron Microscopy (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 511G** Analytical Electron Microscopy (1) Modern analytical electron microscope techniques: scanning transmission electron microscopy; electron energy loss spectroscopy; energy dispersive analysis of x-rays.

### **Analytical Electron Microscopy (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 512** (GEOSC 512) Principles of Crystal Chemistry (3) Relation of structure to ionic size and nature; influence of pressure and temperature on structure; chemical-structural defects, crystalline solutions, phase-transitions.

### **MATSE (GEOSC) 512 Principles of Crystal Chemistry (3)**

Crystal chemistry is concerned with the systematics of crystal structures as determined by ionic sizes and characteristics of chemical bonds and with changes in crystal structure with variations in temperature and pressure. The course begins with a short review of crystallography. It then proceeds to elements and ions as the building blocks of crystals. Models for the chemical bonds which bind elements and ions into crystals include classical electrostatic theory, crystal field theory, molecular orbital theory, and band theory. The principles underlying each model are explained. The next step in the buildup of crystals is to explain the principles of ionic packing, crystal defects, and the concepts of polymorphism and phase transitions.

With the underlying principles and theory in place, the second half of the course deals with a systematic presentation of the various families of crystal structures, their properties, and some indication of the practical utilization of the various structural families. The discussion proceeds from binary packing structures to packing structures of ternary and quaternary composition, to metal structures, to silicate structures, to organic crystals, to defect structures and non-crystalline solids.

The course is divided into seven parts, and grading is achieved by a 30-minute quiz following completion of each part. There is no suitable textbook, but a comprehensive set of printed notes is provided as are recommended readings of selected review articles and current literature. Students are also required to prepare a semester paper on a topic of their choice.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 514** Characterization of Materials (3) Classical and new (microprobe, scanning microscope, magnetic resonance, and Mossbauer) techniques for the characterization of composition, structure, defects, and surfaces.

### **MATSE 514 Characterization of Materials (3)**

This course is designed for graduate and selected undergraduate students. The broad spectrum of the various materials characterization techniques will be briefly surveyed. Students will not be taught how to run specific instruments or be expected to be an expert on the analytical techniques. However, students will be given assignments that require a search of the literature and having discussions with the relevant experts to develop a detailed understanding of specific characterization techniques. Students will also be required to apply statistical methods in their assigned projects.

The objectives of the course include the presentation of a survey of material characterization techniques, lectures on experimental design and use of statistical techniques, as well as problem-solving techniques. The goal is to provide students with a foundation in the use of characterization techniques to solve and diagnose material problems that can be identified and potentially resolved with materials characterization.

The first part of the lectures provides a survey on many of the material characterization techniques. The second part of the course covers statistical analysis of experimental data including small population statistics, error analysis, curve fitting routines, and a brief survey of statistical experimental design. The third part of the course covers problem-solving techniques using materials characterization. Several characterization problems are given to the class that require the formation of project teams composed of 4 to 5 class members to resolve. Each project team prepares oral and written reports for the problem selected.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 518** Wetting Properties of Materials: Theory and Practice (3) Fundamentals of water wetting phenomenon are developed with special emphasis on thermodynamics of absorption and adhesion.

### **MATSE 518 Wetting Properties of Materials: Theory and Practice (3)**

This course will be of interest to students of applied surface science, especially those requiring an understanding of intermolecular forces in wetting phenomenon. A history-of-science approach is used to develop modern theory of contact angle and wetting; starting with the capillary theory of Laplace, through Gibbs and Guggenheim constructions of the interface, and ending with surface engineering of material wetting properties. General concepts are emphasized at the expense of mathematical detail and strengths/limitations of modern wetting theory are emphasized from a practical perspective, supplemented with hands-on laboratory experience. Adsorption and surfactancy are given special consideration along with the role that water structure and reactivity plays in controlling these phenomena. This course interfaces with curriculum in all branches of engineering and materials science, especially Bioengineering, Civil Engineering, and Materials Science and Engineering where consideration of the interaction of materials with aqueous solutions is of importance. Course materials are drawn from the primary literature, requiring students to consume reading from diverse sources and discuss scientific details in an interactive-classroom setting. Student evaluation will be based on class participation, homework assignments, and a term paper closely related to individual research interest. Access to web-based lecture notes is required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 523** (NUC E 523) Environmental Degradation of Materials in Nuclear Power Plants (3) Degradation of materials performance when exposed to the combination of high temperature, neutron irradiation, and aggressive electrochemistry found in nuclear reactors.

### **Environmental Degradation of Materials in Nuclear Power Plants (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MATSE 530 X-Ray Crystallography and Diffraction (3)** Reciprocal lattices and the Ewald sphere construction; crystal structure determination by powder and single crystal techniques; space groups.

**MATSE 530 X-Ray Crystallography and Diffraction (3)**

MATSE 530 is a general introduction to the crystallography and x-ray diffraction for a variety of different studies of the structure of solids. Students will gain an understanding of basic crystallography, the geometry of diffraction measurements and instrumentation, and the interpretation of diffraction data. Diffraction studies using synchrotron radiation and neutrons are also discussed.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 531 Transmission Electron Microscopy (3)** Diffraction pattern analysis and simple contrast theory applied to the structures of materials; analytical techniques in the microscope.

**MATSE 531 Transmission Electron Microscopy (3)**

This course will present the fundamentals of elastic and inelastic electron beam interactions with solid-state materials. Students will learn theoretical and practical aspects of electron diffraction and imaging, energy-dispersive x-ray spectroscopy, and electron energy loss spectroscopy. They will learn how to apply this knowledge to conduct experiments in and interpret data from the transmission electron microscope.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 535 Geometrical Crystallography (3)** Derivation of lattices, types, point groups, and space groups; and group theory applied to crystallography and spectroscopy.

**MATSE 535 Geometrical Crystallography (3)**

Visual, mathematical, and group theory approaches are used to examine in detail the geometry of periodic, quasiperiodic, and incommensurate structures. From computer-assisted class discussions and weekly homework assignments, the student becomes familiar with the symmetry operations involved in translation, rotation, and color changes. Point groups, space groups, and color groups are derived through a combination of visual and mathematical considerations. The structure of group theory is then explored and applied to the derivation of space groups.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 540 Crystal Anisotropy (3)** Symmetry aspects of crystals and physical properties. Matrix and tensor methods.

**MATSE 540 Crystal Anisotropy (3)**

In this course symmetry and tensors are used to describe the physical properties of materials as a function of direction, i.e., how a material will respond to different types of stimuli as a function of direction. A variety of thermal, mechanical, electric, magnetic, and optical properties are covered, including pyroelectricity, pyromagnetism, thermal expansion, dielectric constant, magnetic susceptibility, piezoelectricity, piezomagnetism, elastic stiffness and compliance, electrostriction, magnetostriction, index of refraction, and non-linear optical effects. At first the response of single crystals are considered, but this is later extended to polycrystalline samples with various types of texture.

As the course makes extensive use of symmetry, several weeks are dedicated to the development of the 32 crystallographic point groups using group theory. Symmetry operations are described using coordinate transformation matrices and stereographic projections. Both tensor quantities and tensor properties are described as a function of increasing tensor rank (up to fourth rank) for a multitude of polar tensors followed by axial tensors. For magnetic materials, the 90 magnetic point groups are introduced. For polycrystalline materials, the 7 Curie groups are utilized. A variety of practical examples illustrating the use of tensors to describe the properties of materials are covered in class and in in-depth homework sets involving both matrix and tensor form. The computer program Mathematica is used extensively in class and in the homework sets to visualize the physical properties of materials in three dimensions as well as to rapidly apply symmetry and tensor methods to high-rank tensor properties of low symmetry materials.



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 542** Polymeric Materials: The Solid State (3) Introduction to the fundamental concepts necessary to understand solid state structure and properties of polymer materials.

### **MATSE 542 Polymeric Materials: The Solid State (3)**

This course will cover concepts important to understanding polymer solids and their physical properties. We will begin with the concept of (partial) crystallinity, and the solid state microstructure of semi-crystalline polymers and copolymers. The fundamentals of crystallization kinetics of polymers will be covered, as will the concept of 'annealing'. Wide-angle x-ray diffraction and small-angle x-ray scattering methods will be discussed in the context of characterization of crystalline polymer structure. A discussion of nanoscale associations in both crystalline and non-crystalline ion-containing polymers will complete the first portion of the course. Several classes on the liquid crystalline state will follow, together with discussion of lyotropic and thermotropic liquid crystalline polymers. The fundamentals of binary and ternary polymer mixtures will come next. Concepts important to both miscible blends (e.g. concentration fluctuations) and immiscible blends (e.g. rubber toughening) will be covered. The origin of the morphology (phase diagrams) and properties of di-, tri- and multiblock copolymers will be discussed, as will their role as interfacial agents in multiphase systems. The latter portion of the course will be concerned with electrical and mechanical properties. The former will focus on dielectric relaxation, and conductivity (both electronic and ionic). The latter will focus on the relationship between solid state structure and mechanical (including viscoelastic) properties.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 543** (CHEM 543) Polymer Chemistry (3) This graduate course discusses recent advances in polymer chemistry that leads to new polymeric materials with interesting structures and properties.

### **MATSE (CHEM) 543 Polymer Chemistry (3)**

This course provides advance level of polymer chemistry and materials taught in MATSE 441 - Polymeric Materials. Students are able to know the versatility that is inherent in polymer chemistry and the new research results and activities, especially controlling polymerization, polymer structures, designing polymers with desirable properties, etc. Students shall also understand the major economic and environmental concerns and solutions in producing commercial-scale polymers.

This polymer chemistry course provides important links between chemistry and polymeric materials. The course will focus on recent advances in polymer chemistry that affords new polymer materials with controlled polymer structures, compositions, and properties, as well as economic and "green" processes.

This course is designed for graduate students having basic knowledge in organic, inorganic, and organometallic principles. For Chemistry major, this course offers students with the knowledge to apply chemical principles and methods to design and prepare the desirable polymers (no prerequisite for Chemistry graduate students). For Material Science and other majors, this course provides advance level of polymer chemistry and materials taught in MATSE 441 (a prerequisite course).

In addition, each student will be required to review (presentation and term-paper) a contemporary subject relative to polymer chemistry, which will help student self-education, and presentation and writing skills. Students will be evaluated by quizzes and examinations, a term-paper and presentation, and class participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 544** Computational Materials Science of Soft Materials (3) Pursue applications of computational modeling methods to soft materials; explore use of these methods to different research areas.

### **Computational Materials Science of Soft Materials (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 547** Thermophysical Properties of Ceramics (3) Heat capacity, heat of fusion, thermal conductivity, and thermal expansion in relation to macroscopic measurements and basic atomic concepts applied to ceramic materials.

### **Thermophysical Properties of Ceramics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 548** Dielectric and Other Electroceramics (3) Preparation and properties of ceramic semiconductors, dielectrics, and magnetic materials.

### **MATSE 548 Dielectric & Other Electroceramics (3)**

This course reviews the fundamental underpinnings of electroceramic materials as used in passive, active, and sensor components, and systems. The recent literature and industrial trends are critically discussed within the course to aid students in identifying key material science problems to be solved in this area.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 552** Sintering of Ceramics (3) Design and interpretation of ceramic microstructures through an understanding of the physics and chemistry of sintering and grain growth.

### **MATSE 552 Sintering of Ceramics (3)**

This course is about the processing of ceramic-based materials by sintering processes. Sintering is the thermal processing of a porous material which results in a decrease in surface free energy, strengthening and usually densification. The first half of the course covers the thermodynamics, mechanisms, kinetics, and models for densification. The theory of grain growth and coarsening processes are also discussed. The relations between densification and grain growth are discussed as they influence microstructure evolution. Tools for characterizing sintering and grain growth processes are reviewed. Practical applications of sintering for the manufacture of ceramic-based components ranging from low temperature co-fired ceramics to transparent ceramics are discussed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 555 (PHYS 555)** Polymer Physics I (3) Introduction to the fundamental concepts needed to understand the physics applicable to polymer melts, solutions and gels.

### **MATSE (PHYS) 555 Polymer Physics I (3)**

This course develops fundamental understanding of the conformations of polymers in solution and melt states. We start with ideal chains that have random walk statistics. Next excluded volume is introduced to understand the self-avoiding walk conformation and collapsed conformation of real chains. The behavior ideal and real chains are studied in extension, compression and adsorption. While positive excluded volume leads to swelling, negative excluded volume leads to collapse and phase separation. The phase behavior of polymer mixtures and solutions is described in detail. Semidilute solutions are understood in terms of two length scales where each chain changes its conformational statistics. Scattering is used to determine the conformation of chains, their molar mass and their interactions with surroundings. Percolation theory is introduced to model the statistics of random branching and gelation. The rubber elasticity of fully developed networks is understood in terms of the stretching laws for network chains. Entanglement effects, swelling and viscoelasticity are discussed in detail. Once the conformations of polymers are understood, dynamics of polymer liquids are considered. In dilute solutions hydrodynamic interactions dominate and the viscoelasticity predicted by the Zimm model is derived. In unentangled melts of short chains, hydrodynamic interactions are screened and the Rouse model is used to understand viscoelasticity. Unentangled polymers in semidilute solutions have Zimm dynamics on small length scales and Rouse dynamics on longer length scales. Dynamic scattering techniques are discussed for measuring polymer dynamics. Entanglement effects are described using the tube model, where surrounding chains confine the motion of a

given polymer to a tube-like region. The effects of concentration, chain length and polydispersity of linear chain polymer liquids are discussed in detail. The effects of branching on polymer dynamics are introduced at the level of simple structures such as star polymers and comb polymers.

The course assumes some prior knowledge of polymers, usually obtained through an introductory undergraduate course. The students should attain a working understanding of the basic concepts of polymer physics in this course, allowing them to tackle more difficult problems in their research. Such skills are reinforced through homework and take-home examinations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 560 (MN PR 507) Hydrometallurgical Processing (3)** Fundamental physico-chemical factors underlying the aqueous extraction and recovery of metals and nonmetals from ores, minerals, and scrap metal.

**MATSE 560 (MN PR 507) Hydrometallurgical Processing (3)**

This 3-credit course is concerned with the fundamental physico-chemical processes associated with the processing, utilization, and recycling of materials in aqueous systems. The topics covered cut across a wide range of practical applications. The course is therefore suitable for a broad spectrum of scientists and engineers concerned with processes and processing in aqueous systems, e.g., in materials science and engineering, mineral processing, geoscience, soil science, environmental engineering, chemistry, chemical engineering, petroleum and natural gas engineering, mining engineering, nuclear engineering, and electronic and electrical engineering. A required term paper provides a formal mechanism for ensuring that students have the opportunity to apply ideas discussed in the course to their specific areas of interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 561 Metal Electrode Reactions (2-3)** Evaluation of electrode reaction mechanisms and kinetics at metal/electrolyte interfaces relevant to corrosion and industrial electrolyte processes.

**MATSE 561 Metal Electrode Reactions (2-3)**

This variable 2- or 3-credit course lays out the fundamental principles of electrode reactions that occur during corrosive degradation of metals and in various important commercial electrolytic processes, such as electroplating, electroless plating, battery and fuel cell operation, aqueous extractive metallurgy, and corrosion prevention techniques. An introductory background in electrochemistry is assumed, such as would be obtained from an introductory electrochemistry or corrosion course, e.g., MATSE 421. The objectives of this course are to introduce the student to some advanced aspects of the (1) thermodynamic and kinetic bases of electrode reactions, (2) nature of commercial electroplating, etching, polishing and degradation of corrosion resistant alloys, and (3) principles of current distribution on planar surfaces and their extension to recesses and protrusions at surfaces such as are encountered in localized corrosion and electropolishing of rough metal surfaces, respectively. Goal 3 emphasizes the important roles of polarization and IR voltage in determining the distributions of the electrode potential and metal dissolution and plating rates inside crevices, pits, cracks, etc.

Exams and written and oral reports are used in evaluation of performance.

This course would be of interest to engineering and science graduate students wanting to be technologically informed about the nature of commercial electrolytic processes and/or desiring to enter into basic or applied research of these processes.

This is a Spring Semester offering in the Department of Materials Science and Engineering.

The 3-credit version includes an independent student investigation of an electrochemistry-related topic, preparation of a written proposal for obtaining funding for investigative research into some aspect of the topic, and an oral summary of the proposal.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 562 Solid to Solid Phase Transformations (3)** Mechanisms and rate-determining factors in solid-phase reactions in

metals; diffusion processes, nucleation theory, precipitations from solid solution, eutectoid decomposition and order-disorder phenomena.

### **MATSE 562 Solid to Solid Phase Transformations (3)**

This is the fundamental science of microstructural control in the solid state for inorganic materials. The course begins with a review of the crystallography of solid materials, from the simple concept of a lattice through the description of the stereographic projection to the point group notation.

Solid to solid nucleation theory is examined in detail as it forms the basis of microstructural development and control. Both "civilian" and "military" transformations are considered.

The theory of interface structure, the influence of orientation relationships, and the development of equilibrium precipitate morphologies are discussed in detail. It is argued that both thermodynamic and kinetic considerations may, however, dictate precipitate shapes. The kinetics of precipitate growth and coarsening are derived from first principles and employed to analysis overall transformation kinetics. Changes in precipitate shape during these kinetically driven processes are also examined.

The phenomena of nucleation, growth, and coarsening are all modified, and/or even controlled, by defects such as dislocations and grain boundaries. The course reviews dislocation theory and, e.g., the 0-lattice description of high angle grain boundaries and interphase interfaces.

A series of prototypical phase transformations are described in detail. These include: homogeneous and heterogeneous precipitation reactions; spinodal decomposition; order-disorder transformations, discontinuous precipitation, the eutectoid reaction, bainite and martensite.

Finally, experimental methods for the quantitative characterization of microstructure are presented.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 563 (E MCH 534) Micromechanisms of Fracture (3)** Mechanisms of fracture and their relationship to loading conditions, environment, flow behavior, processing history, and microstructure.

### **MATSE 563 (E MCH 534) Micromechanisms of Fracture (3)**

The in-service performance of structural materials relies on a combination of the mechanics of loading and of the material's ability to avoid fracture. Thus, modern mechanical design requires knowledge of fracture processes and fracture-based design criteria. This course addresses the mechanisms that control the fracture of structural materials. For the purposes of this course, structural materials are separated into two groups: "monolithic" materials (primarily polymers, metals, and alloys) and composite materials. An understanding of fracture mechanisms can serve as a basis for predicting failure conditions, performing failure analyses, or simply for recognizing when existing failure predictions may be wrong (i.e., "how to avoid bad surprises").

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 564 (E MCH 535) Deformation Mechanisms in Materials (3)** Deformation of crystalline/amorphous solids and relationship to structure; elastic, viscoelastic and plastic response over a range of temperatures and strain rates.

### **MATSE 564 (E MCH 535) Deformation Mechanisms in Materials (3)**

The course will study the relationship between the deformation mechanisms in materials and their structure. The types of deformation behavior considered in the course are linear elasticity (isotropic or anisotropic), viscoelasticity and plastic deformation. For the elastic behavior, the emphasis will be on the way elastic behavior is controlled by atomic structure and microstructure. The constitutive laws that describe this behavior and the assumptions on which they are based will be introduced. The next phase of the course considers the range of deformation behavior from purely viscous (linear or non-linear) to viscoelastic. Initially, the emphasis will be on the effects of temperature and strain history and the way this behavior is described by mechanical analogs. The effect of structure on creep and stress relaxation will be described. The use of linear viscoelasticity in describing the sintering process will also be included. In ductile crystalline materials, deformation is associated with the movement of dislocations. The types of dislocations, their stress fields and energies will be described. These aspects will then be combined with structural features by including considerations of slip geometry and obstacles to dislocation motion. This approach will allow strengthening methods to be identified and quantified. Finally, creep mechanisms in crystalline materials at high temperature will be discussed and quantified.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 565 Metals in Electronics (3)** Processing and performance of metals in electronics, covering electrical resistivity, metal film deposition, metal/semiconductor contacts, interconnects, and electronic packaging.

**MATSE 565 Metals in Electronics (3)**

This course addresses the processing, use, and performance of metals in electronics. The course is intended to provide students with a background in semiconducting or other electronic materials with specific knowledge about the application of metals in electronics as well as to allow students with a metallurgical background to learn about how their expertise fits into the electronics industry. Topics covered include electrical resistivity in thin metal and alloy films, deposition of thin metal films, metal/semiconductor contacts, interconnects in microelectronics, electromigration, diffusion barriers, electronic packaging, and metal/metal contacts. Grades are based on homework problems, a term paper, and class presentations. The course is offered in alternate fall semesters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 570 (EME 570) Catalytic Materials (3)** Preparation and characterization of solid catalytic materials and the relationships between their surface, defect, and electronic properties and catalytic activity.

**MATSE (EME) 570 Catalytic Materials (3)**

This course covers the preparation and characterization of solid catalytic materials, and the relationships between the surface and electronic properties and pore structure of the materials and their catalytic activity and selectivity. The course includes the following materials: zeolites and molecular sieves; metals and alloys; metal oxides; metal sulfides; and other catalytic materials. Also included are the major applications of catalytic materials in chemical and petroleum industries and in other manufacturing industries for environmental protection. This course can be grouped into three parts: (1) introduction to catalysis and analytical techniques; (2) synthesis and characterization of catalytic materials; and (3) catalysis at surfaces of solid materials. The course is suitable for a broad spectrum of students in energy and mineral engineering, materials science and engineering, fuel science, chemical engineering, chemistry, solid-state science, and environmental engineering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 575 Functional Polymeric Materials (3)** In-depth discussions of structure/property relationships in functional polymers and modern concepts of polymerization methods.

**MATSE 575 Polymeric Materials I (3)**

This 3-credit course focuses on the advances in polymer chemistry and new polymer materials that show unique physical properties (including mechanical, solution, optical, and electric). The discussion updates the progresses in the past 10 years along three polymerization mechanisms--step, chain, and ring opening with their kinetic and thermodynamic features, as well as new chemical reactions on the preformed polymers. The scope and limitations of each reaction and the process conditions which can be used to carry them out in small-and large-scale productions are discussed in detail. Each student is also required to involve self-study in an assigned subject and present the findings in the class and/or term paper.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 580 Computational Thermodynamics (3)** The integration of fundamental principles and advanced computational approaches in the thermodynamics of materials, including hands-on computation, theory and application.

**Computational Thermodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 581** Computational Materials Science II: Continuum, Mesocale Simulations (3) This course will focus on computational techniques and fundamentals of phase transformation simulations on the continuum, mesocale level.

### **MATSE 581 Computational Materials Science II: Continuum, Mesocale Simulations (3)**

This course will focus on computational techniques and fundamentals of phase transformation simulations on the continuum, mesocale level. The objective of the course is to introduce the evolution of simulation techniques and integrate fundamental principles in thermodynamics and kinetics with advanced computational approaches.

The teaching will be problem-oriented using literature publications. There will be many hands-on computer exercises to gain experience in presenting problems to computer and interpreting the computer results. This course is particularly useful for students who would like to explore the power of computational approaches and would like to understand the thermodynamic and kinetic principles behind computational phase transformations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 582** Materials Science and Engineering Professional Development (1) This course covers ethical conduct of research, pathways of professional development and strategies and tools for research.

### **Materials Science and Engineering Professional Development (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 597A** Polymers in Energy Research (3) This course focuses on current research involving how polymers are used in energy applications such as batteries and solar cells.

### **Polymers in Energy Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 597A** Polymers in Energy Research (3) This course focuses on current research involving how polymers are used in energy applications such as batteries and solar cells.

### **Polymers in Energy Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 597C** (EGEE 597C) Nanoscale Energy and Environmental Engineering (3) The course will cover the synthesis, characterization and applications of nanomaterials to energy generation, storage, conversion, conservation, control and environmental engineering. Selected topics in nanomaterial toxicity and production/process/product economics will be included.

### **Nanoscale Energy and Environmental Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 602** Supervised experience in college teaching (1-3 per semester/maximum of 6) Supervised assistance with the teaching program in metallurgy.

**MATSE 602 Supervised Experience/College Teaching (1-3)**

This course provides the opportunity for graduate students to learn college teaching by assisting a faculty member with an undergraduate or graduate course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATSE 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Mathematics (MATH)**

**MATH 401** Introduction to Analysis I (3) Review of calculus, properties of real numbers, infinite series, uniform convergence, power series. Students who have passed Math. 403 may not schedule this course.

**Introduction to Analysis I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 403** Classical Analysis I (3) Topology of  $R^n$ , compactness, continuity of functions, uniform convergence, Arzela-Ascoli theorem in the plane, Stone-Wierstrass theorem.

**Classical Analysis I (3)**

General Education: None  
 Diversity: None



Bachelor of Arts: Quantification  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 403H Honors Classical Analysis I (3)** Development of a thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces.

### **MATH 403H Honors Classical Analysis I (3)**

The central aim of this course is to develop thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces rather than multidimensional Euclidean spaces. This level of abstraction is essential since it is in the background of functional analysis, a fundamental tool for modern mathematics and physics. Another motivation for studying analysis in this wider context is that many general results about functions of one or several real variables are more easily grasped at this more abstract level, and, besides, the same methods and techniques are applicable to a wider class of problems, e.g. to the study of function spaces. This approach also brings to high relief some of the fundamental connections between analysis on one hand and (higher) algebra and geometry on the other.

This course is a sequel to Math 312H; it is highly recommended to all mathematics, physics and natural sciences majors who are graduate school bound, and is a great opportunity for all Schreyer Scholars.

The following topics will be covered: Metric spaces (topology, convergence, Cauchy sequences and completeness); Maps between metric spaces (continuous maps and homeomorphisms, stronger continuity properties: uniform continuity, Hoelder and Lipschitz continuity, contraction mapping principle, points of discontinuity and the Baire Category Theorem); Compact metric spaces (continuity and compactness, connectedness, total boundedness, coverings and Lebesgue number, perfect metric spaces, characterization of Cantor sets, fractals); Function spaces (spaces of continuous maps, uniform continuity and equicontinuity, Arzela-Ascoli Theorem, uniform approximation by polynomials. Stone-Weierstrass Theorem).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 404 Classical Analysis II (3)** Differentiation of functions from  $R_n$  to  $R_m$ , implicit function theorem, Riemann integration, Fubini's theorem, Fourier analysis.

### **Classical Analysis II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1985  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 405 Advanced Calculus for Engineers and Scientists I (3)** Vector calculus, linear algebra, ordinary and partial differential equations. Students who have passed MATH 411 or 412 may not take this course for credit.

### **Advanced Calculus for Engineers and Scientists I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 406 Advanced Calculus for Engineers and Scientists II (3)** Complex analytic functions, sequences and series, residues, Fourier and Laplace transforms. Students who have passed MATH 421 may not take this course for credit.

### **Advanced Calculus for Engineers and Scientists II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MATH 408** Advanced Calculus (3) Differential and integral calculus of functions of several variables, line and surface integrals, infinite series, series of functions, power series.

**Advanced Calculus (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 411** Ordinary Differential Equations (3) Linear ordinary differential equations; existence and uniqueness questions; series solutions; special functions; eigenvalue problems; Laplace transforms; additional topics and applications.

**Ordinary Differential Equations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 412** Fourier Series and Partial Differential Equations (3) Orthogonal systems and Fourier series; derivation and classification of partial differential equations; eigenvalue function method and its applications; additional topics.

**MATH 412 Fourier Series and Partial Differential Equations (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The purpose of MATH 412 is to introduce students to the origins, theory, and applications of partial differential equations. Several basic physical phenomena are considered - including flows, vibrations, and diffusions - and used to derive the relevant equations. The fundamentals of the mathematical theory of partial differential equations are motivated and developed for the students through the systematic exploration of these classic physical systems and their corresponding equations: the Laplace, wave, and heat equations.

In addition to treating the physical origins of the equations, this course focuses on solving evolution equations as initial value problems on unbounded domains (the Cauchy problem), and also on solving partial differential equations on bounded domains (boundary value problems). There is not one but many techniques for solving these equations, and the course presents some aspect of the expansion in orthogonal functions (including Fourier series), eigenvalue theory, functional analysis, and the use of separation of variables, Fourier transforms, and Laplace transforms to solve PDEs by converting them to ordinary differential equations.

This course currently serves a cross-section of students at the university with interests or the need for this advanced subject mathematics, including students majoring in the engineering program, meteorology, physics, and mathematics. This typically includes the most advanced physics, engineering, and meteorology students, as well as mathematics majors with interests in applied mathematics.

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 414** (STAT 414) Introduction to Probability Theory (3) Probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Students may take only one course from MATH(STAT) 414 and 418 for credit.

**Introduction to Probability Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 415** (STAT 415) Introduction to Mathematical Statistics (3) A theoretical treatment of statistical inference, including

sufficiency, estimation, testing, regression, analysis of variance, and chi-square tests.

### **Introduction to Mathematical Statistics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 416 (STAT 416) Stochastic Modeling (3)** Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.

### **Stochastic Modeling (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 417 Qualitative Theory of Differential Equations (3)** Linear differential equations, stability of stationary solutions, ordinary bifurcation, exchange of stability, Hopf bifurcation, stability of periodic solutions, applications.

### **MATH 417 Qualitative Theory of Differential Equations (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The main objective of the course is the qualitative theory of ordinary differential equations such as existence and uniqueness of solutions, dependence on initial data and parameters, and basic stability of solutions for both linear and nonlinear equations. It is designed to introduce students to modern concepts including the bifurcation theory, intermittent (transitional) and chaotic behavior of solutions and dynamical system approach to differential equations. Along the way, a number of applications are discussed and students get familiar with some basic examples illustrating main principles of the theory, such as Lorenz attractor, predator-prey models, etc.

The course is completed by students majoring in engineering programs, the sciences, and mathematics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 418 (STAT 418) Introduction to Probability and Stochastic Processes for Engineering (3)** Introduction to probability axioms, combinatorics, random variables, limit laws, and stochastic processes. Students may take only one course from MATH(STAT) 414 and 418 for credit.

### **MATH (STAT) 418 Introduction to Probability and Stochastic Processing for Engineering (3)**

This course gives an introduction to probability and random processes. The topics are not covered as deeply as in a semester-long course in probability only or in a semester-long course in stochastic processes only. It is intended as a service course primarily for engineering students, though no engineering background is required or assumed. The topics covered include probability axioms, conditional probability, and combinatorics; discrete random variables; random variables with continuous distributions; jointly distributed random variables and random vectors; sums of random variables and moment generating functions; and stochastic processes, including Poisson, Brownian motion, and Gaussian processes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 419 (PHYS 419) Theoretical Mechanics (3)** Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions.

**Theoretical Mechanics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 421** Complex Analysis (3) Infinite sequences and series; algebra and geometry of complex numbers; analytic functions; integration; power series; residue calculus; conformal mapping, applications.

**Complex Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Summer 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 422** Wavelets and Fourier Analysis: Theory and Applications (3) Fundamental mathematical issues of the theory of wavelets for senior undergraduate and graduate students in mathematics, engineering, physics, and computer science.

**MATH 422 Wavelets and Fourier Analysis: Theory and Application (3)**

Numerous problems arising in science and engineering find a common mathematical language in the theory of wavelets. Wavelet analysis can be viewed as an alternative as well as a generalization of classical Fourier analysis. In the latter case, the goal is to measure the local frequency content of a signal, while in the case of wavelets one is comparing several magnifications of this sequence with distinct resolutions. The goal of wavelets in mathematics engineering and science may be illustrated with the following archetypical problem. Suppose that we are given a real valued function of one variable representing some real-life phenomenon. For instance the function may represent a voice signal that we wish to transmit over the telephone lines or store in a compact disk. The whole function is given by the totality of its values and this makes it a continuum set of points. Both Fourier and wavelet analyses deal with discretizing the information and possibly extracting from it an appropriate finite sample. The difference between both types of approaches can be illustrated by the method of construction of the corresponding building blocks. In Fourier analysis, this process involves multiplications of a fixed "window function" by sines and cosines. In the case of wavelets, the window function is no longer multiplied by trigonometric functions, but instead it is translated and dilated by arbitrary translations and dilations.

The subject of wavelets appeared in the mid 1980's influenced by ideas from both pure mathematics (harmonic analysis, functional analysis, approximation theory, fractal sets) and applied mathematics (signal and image processing, mathematical physics, numerical analysis).

The purpose of the course is to show how wavelets can be constructed, illustrate why they provide us with a particularly powerful tool in mathematical analysis, and indicate how they can be used in applications.

The course is open to a wide range of undergraduate as well as graduate students with majors in mathematics, science, engineering and computer science. The course is accessible to students with some basic knowledge of the Fourier transform and its applications.

Main topics include:

- 1) the wavelet transform;
- 2) orthogonal wavelet decomposition;
- 3) applications to data compression, numerical analysis, image processing.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 425** Introduction to Operations Research (3) Nature of operations research, problem formulation, model construction, deriving solution from models, allocation problems, general linear allocation problem, inventory problems.

**Introduction to Operations Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MATH 426** Introduction to Modern Geometry (3) Plane and space curves; space surfaces; curvature; intrinsic geometry of surfaces; Gauss-Bonnet theorem; covariant differentiation; tensor analysis.

### **Introduction to Modern Geometry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 427** Foundations of Geometry (3) Euclidean and various non-Euclidean geometries and their development from postulate systems. Students who have passed MATH 427 may not schedule MATH 471.

### **Foundations of Geometry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 428** Geometry for Teachers (1) Research in mathematics education using ideas from Euclidean and non-Euclidean geometry. Students who have passed MATH 471 may not schedule MTHBD 478.

### **MATH 428 Geometry for Teachers (1)**

MTHBD 478 is designed to introduce students to mathematics education and research in education. The student will present topics in written and verbal classroom reports. Students will be evaluated on research papers and classroom presentations of those papers, classroom technology demonstration of geometry topics, and classroom demonstration of teaching geometry.

This course supplements MTHBD 477 by providing the education component that is required by the state of Pennsylvania for obtaining certification in teaching mathematics. This course is offered only at Penn State Erie, The Behrend College.

MTHBD 478 is a suggested core course for some of the students in the Behrend Mathematics major. It may serve the Mathematics minor as an elective at the 400-level. It is not applicable to the General Education course offerings.

This course will be offered every other year and enrollment is generally between 10 to 15 students.

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 429** Introduction to Topology (3) Metric spaces, topological spaces, separation axioms, product spaces, identification spaces, compactness, connectedness, fundamental group.

### **Introduction to Topology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 430** Linear Algebra and Discrete Models I (3) Vector spaces, linear transformations, matrices determinants, characteristic values and vectors, systems of linear equations, applications to discrete models.

### **Linear Algebra and Discrete Models I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 431** Linear Algebra and Discrete Models II (3) Vector spaces and linear transformations, matrices, determinants, characteristics values and vectors, systems of linear equations, applications to discrete models.

### **Linear Algebra and Discrete Models II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 435** Basic Abstract Algebra (3) Elementary theory of groups, rings, and fields. Students who have passed MATH 435 may not schedule MATH 470.

### **Basic Abstract Algebra (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 436** Linear Algebra (3) Vector spaces and linear transformations, canonical forms of matrices, elementary divisors, invariant factors; applications. Students who have passed MATH 436 may not schedule MATH 441.

### **Linear Algebra (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 437** Algebraic Geometry (3) Study of curves in the plane defined by polynomial equations  $p(x,y) = 0$ . Projective equivalence, singular points, classification of cubics.

### **MATH 437 Algebraic Geometry (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The geometric study of algebraic equations is one of the oldest and deepest parts of mathematics, and it lies at the heart of modern developments in geometry, algebra, number theory and physics. Students completing MATH 437 will understand many new algebraic and geometric ideas by studying examples of curves defined by equations of degrees 2 and 3 in the plane.

First come conics (given by equations of degree 2 in two variables). Rigid motions, similarities, and affine transformations give different classifications of them. New ideas then show how to get a conic through any five points and prove Pascal's theorem about six points on a conic. Special cases suggest extension of the usual plane to the projective plane, with "points at infinity," homogeneous coordinates, and projective transformations.

The main part of the course turns to equations of degree 3 and their singularities, flex points, tangents, and degeneracies. Several new ideas, both algebraic and analytic, are brought in to prove the existence of complex flex points on singular cubics and then real flex points on nonsingular real cubics. There is then a classification on complex projective cubics by a single parameter and finally a full classification of all real projective cubics.

As time permits, relations to further topics are sketched: addition of points on a nonsingular cubic, Mordell's theorem, doubly periodic functions, and Fermat's last theorem.

The course is typically taken by mathematics majors.

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 441** Matrix Algebra (3) Determinants, matrices, linear equations, characteristic roots, quadratic forms, vector spaces. Students who have passed Math 436 may not schedule this course.

### **Matrix Algebra (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Fall 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 444** Mathematical Statistics and Applications I (3) Distributions of random variables, special distributions, limiting distributions, sampling, statistical inference, point and interval estimation, orthogonal polynomials, and least squares.

### **Mathematical Statistics and Applications I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 445** Mathematical Statistics and Applications II (3) Further topics in point estimation, statistical hypotheses, other statistical tests, nonparametric methods.

### **Mathematical Statistics and Applications II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 446** Introduction to Applied Statistics I (3) Descriptive statistics, probability theory, discrete and continuous probability distributions, statistical inferences for means and proportions.

### **Introduction to Applied Statistics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 447** Introduction to Applied Statistics II (3) Regression, correlation, analysis of variance, contingency tables, nonparametric methods, time series, index numbers.

### **Introduction to Applied Statistics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Quantification  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 449** Applied Ordinary Differential Equations (3) Differential and difference equations and their application to biology, chemistry, and physics; techniques in dynamical systems theory.

### **MATH 449 Mathematical Modeling (3)**

Many phenomena that arise in the natural sciences, such as the motion of pendulum or signal conduction in neurons or oscillations in certain chemical reactions, can be modeled using nonlinear differential equations. This course will develop the mathematical techniques needed to investigate such differential equations. These techniques include the study of equilibria, stability, phase plane analysis, bifurcation analysis and chaos. The course will assume prior knowledge of

ordinary differential equations at the MATH 250/251 level; this is the only prerequisite for the course. We will focus on understanding and interpreting the behavior of the solutions to the differential equation models rather than on deriving the model equations themselves. Evaluation will be based on midterm exams, a final exam, graded homework, and graded longer projects which may involve computer work. The course should be of interest to any science or engineering major and some models will be chosen to reflect the fields of interest of the class. The goal is for the students to be able to apply the techniques learned in the course to mathematical models that they will encounter in other classes or situations. The class will be offered every other year with an expected enrollment of 10-15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 450 Mathematical Modeling (3)** Constructing mathematical models of physical phenomena; topics include pendulum motion, polymer fluids, chemical reactions, waves, flight, and chaos.

### **MATH 450 Mathematical Modeling (3)**

The purpose of the course is to introduce mathematical modeling, i.e., the construction of mathematical structures which capture relevant physical phenomena. The course will systematically explore mathematical ideas and tools used to study the natural world. Particular emphasis will be placed on the process of creating a mathematical model starting from a physical scenario. Typically this process will begin with an experiment either demonstrated in the W. G. Pritchard Lab or performed by the students in class.

Once a particular model has been developed, students will use mathematical analysis and experimentation to determine the properties and relevance of the model, and to make predictions. Often the model can be satisfactory; however, many times one also finds new features of the system that are not adequately accounted for in the model, and the process begins again. It is this cycle the course will focus on. For a given phenomenon (e.g., flow of viscous fluid, pendulum motion) several models may be compared and contrasted, and possible simplifications will be discussed.

A significant aspect of the course is its laboratory component, in which the students will perform experiments or observe demonstrations. However, the main emphasis will be placed on creating and rigorously analyzing the mathematical aspects of the models. Instead of presenting a finely tuned model for a given phenomenon, this course will try to convey some of the heuristic, intuitive, and mathematical ideas employed in modeling.

Examples of physical systems to be considered include: simple and compound pendulum motion, chemical oscillations, water waves, and elastic behavior of polymer solutions.

The course is open to a wide range of undergraduate as well as graduate students with majors in mathematics, biology, chemistry, engineering, and physics. The course should be accessible to students with some basic knowledge of mathematical analysis and differential equations. Main topics include: modeling with ordinary differential equations; bifurcation theory and stability; traveling waves in epidemics, chemical reactions, free fluid surfaces, and polymer solutions; fluctuations in nature, stochastic differential equations and chaos.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 451 (CMPSC 451) Numerical Computations (3)** Algorithms for interpolation, approximation, integration, nonlinear equations, linear systems, fast FOURIER transform, and differential equations emphasizing computational properties and implementation. Students may take only one course for credit from MATH 451 and 455.

### **Numerical Computations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 455 (CMPSC 455) Introduction to Numerical Analysis I (3)** Floating point computation, numerical rootfinding, interpolation, numerical quadrature, direct methods for linear systems. Students may take only one course for credit from MATH 451 and MATH 455.

### **Introduction to Numerical Analysis I (3)**

General Education: None



Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 456** (CMPSC 456) Introduction to Numerical Analysis II (3) Polynomial and piecewise polynomial approximation, matrix least squares problems, numerical solution of eigenvalue problems, numerical solution of ordinary differential equations.

### **Introduction to Numerical Analysis II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 457** Introduction to Mathematical Logic (3) Propositional logic, first-order predicate logic, axioms and rules of inference, structures, models, definability, completeness, compactness.

### **Introduction to Mathematical Logic (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 461** (PHYS 461) Theoretical Mechanics (3) Continuation of Math.(Phys.) 419. Theoretical treatment of dynamics of a rigid body, theory of elasticity, aggregates of particles, wave motion, mechanics of fluids.

### **Theoretical Mechanics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 465** Number Theory (3) Elements, divisibility of numbers, congruences, residues, and forms.

### **MATH 465 Number Theory (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course serves as an upper-level introduction to the fundamentals of elementary number theory. A major emphasis in the course is placed on the role that the prime numbers play in the study of properties of the integers along with the related topics of divisibility and factorization of integers. Additional topics covered in the course include congruences (and the theorems of Euler and Fermat which are classics in this area), properties of arithmetic functions including those which are multiplicative, and other topics such as Pythagorean triples and representations of numbers as sums of squares.

This course is completed by a wide variety of students across the university, especially those majoring in mathematics. (In many of the options in the MTHBS degree, MATH 465 can be used to satisfy one of the major requirements.) The course is also taken quite frequently by non-mathematics majors who wish to use the course to satisfy an upper-level requirement for the mathematics minor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 467** (CMPSC 467) Factorization and Primality Testing (3) Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

**Factorization and Primality Testing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 468** Mathematical Coding Theory (3) Shannon's theorem, block codes, linear codes, Hamming codes, Hadamard codes, Golay codes, Reed-Muller codes, bounds on codes, cyclic codes.

**Mathematical Coding Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 470** Algebra for Teachers (3) An introduction to algebraic structures and to the axiomatic approach, including the elements of linear algebra. Designed for teachers and prospective teachers. Students who have passed Math 435 may not schedule this course.

**Algebra for Teachers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1988  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 471** Geometry for Teachers (4) Problem solving oriented introduction to Euclidean and non-Euclidean geometries; construction problems and geometrical transformations via "Geometer's Sketchpad" software. Intended primarily for those seeking teacher certification in secondary mathematics. Students who have passed MATH 427 may not schedule this course.

**Geometry for Teachers (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 475W** (US;IL) History of Mathematics (3) A global survey of the history of mathematics as viewed as a human response to cultural, political, economic, and societal pressures.

**MATH 475W Introduction to the History of Mathematics (3) (DF)**

The primary goal of this course is to explore where mathematics comes from, how it was labored on, how ideas were perceived, and how theories developed. Development in algebra, geometry, arithmetic and calculus will be discussed.

A second goal is to help students understand the importance of written communication in mathematics and to provide opportunities for students to improve the quality of their writing. The primary means for accomplishing this goal will be four papers, 4-8 pages in length. These will be written for an audience of mathematically-knowledgeable readers. In addition, each quiz will contain at least one essay question.

Students will be evaluated on quizzes, homework, papers, and a final exam. Quizzes will total 250 points, the papers 200 points, and the final exam 150 points.

This course is a required course in the Mathematical Science (MA SC) BS curriculum. This course is also available as an elective for students in the Computer Science (COMP) program.

No special facilities are required for this course. This course will be offered once per year, with an expected enrollment of 25-40 students.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Quantification  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 479** (PHYS 479) Special and General Relativity (3) Mathematical description, physical concepts, and experimental tests of special and general relativity.

### **MATH (PHYS) 479 Special and General Relativity (3)**

This course is intended as an elective course (within the undergraduate Physics program) for Physics majors to be taken in their senior year. Intended to be cross-listed with MATH, it can also be used in support of a Mathematics minor and, in some options, within the Math program as a program elective as well. The course significantly expands upon the introduction to Special Relativity (SR) seen in PHYS 237, including discussions of experimental tests of SR and applications to relativistic mechanics. It then introduces students to the mathematical machinery required to understand General Relativity (GR), starting with the description of curved spacetimes and geodesics. It discusses solutions to the Einstein equations and surveys the classic tests which established the validity of General Relativity. It concludes with applications of GR in such areas as black hole physics, the generation and detection of gravitational waves, other topics (such as cosmology, relativistic astrophysics, etc.).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 482** Mathematical Methods of Operations Research (3) Survey of linear and nonlinear programming; mathematics of optimization; queues; simulation.

### **Mathematical Methods of Operations Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 484** Linear Programs and Related Problems (3) Introduction to theory and applications of linear programming; the simplex algorithm and newer methods of solution; duality theory.

### **Linear Programs and Related Problems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 485** Graph Theory (3) Introduction to the theory and applications of graphs and directed graphs. Emphasis on the fundamental theorems and their proofs.

### **Graph Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 486** Mathematical Theory of Games (3) Basic theorems, concepts, and methods in the mathematical study of games of strategy; determination of optimal play when possible.

### **MATH 486 Mathematical Theory of Games (3)**

This course covers several major classes of models and methods for analyzing multi-party strategic interactions, i.e. games. Specific topics include extensive and strategic form games, continuous games, cooperative games, strictly competitive games, repeated games and adaptive learning, and evolutionary models. The effects on outcomes of information, communication, and other modeling assumptions are discussed. Real-world examples drawn from economics, biology, anthropology, management and everyday life are discussed in detail. When appropriate, computer algebra systems are incorporated in the course. The course typically meets during either two 75-minute periods each week or three 50-minute periods each week. Evaluation methods may vary by instructor, but will typically include a combination of examinations, quizzes, homework, and projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 496A** Mathematical Models in Biology (1-6) Covers mathematical modeling in Biology; there are two major components: analytical modeling techniques and computational modeling techniques.

#### **Mathematical Models in Biology (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Summer 2013 Ending: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 496B** Elementary Combinatorics (1-6) Fundamental techniques of enumeration and construction of combinatorial structures, permutations, recurrences, inclusion-exclusion, permanents, 0, 1-, matrices, Latin squares, combinatorial designs.

#### **Elementary Combinatorics (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 497A** Number Theory in the Spirit of Ramanujan (4) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Number Theory in the Spirit of Ramanujan (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 497B** Elements of Functional Analysis (4) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Elements of Functional Analysis (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 497C** The Winding Number in Topology and Geometry (and the rest of Mathematics) (4) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **The Winding Number in Topology and Geometry (and the rest of Mathematics) (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 497D** MASS Interdisciplinary Seminar (3) Formal courses given infrequently to explore, in depth, a comparatively

narrow subject which may be topical or of special interest.

### **MASS Interdisciplinary Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 497E** MASS Colloquium (1) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **MASS Colloquium (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Quantification  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Quantification  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 501** Real Analysis (3) Lebesgue measure theory. Measurable sets and measurable functions. Lebesgue integration, convergence theorems.  $L_p$  spaces. Decomposition and differentiation of measures. Convolutions. The Fourier transform.

### **MATH 501 Real Analysis I (3)**

This course develops Lebesgue measure and integration theory. This is a centerpiece of modern analysis, providing a key tool in many areas of pure and applied mathematics. The course covers the following topics: Lebesgue measure theory, measurable sets and measurable functions, Lebesgue integration, convergence theorems,  $L_p$  spaces, decomposition and differentiation of measures, convolutions, the Fourier transform.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 502** Complex Analysis (3) Complex numbers. Holomorphic functions. Cauchy's theorem. Meromorphic functions. Laurent expansions, residue calculus. Conformal maps, topology of the plane.

### **MATH 502 Complex Analysis (3)**

This course is devoted to the analysis of differentiable functions of a complex variable. This is a central topic in pure mathematics, as well as a vital computational tool. The course covers the following topics: complex numbers, holomorphic

functions, Cauchy's theorem, meromorphic functions, Laurent expansions, residue calculus, conformal maps, topology of the plane.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 503** Functional Analysis (3) Banach spaces and Hilbert spaces. Dual spaces. Linear operators. Distributors, weak derivatives. Sobolev spaces. Applications to linear differential equations.

### **MATH 503 Functional Analysis (3)**

This course develops the theory needed to treat linear integral and differential equations, within the framework of infinite-dimensional linear algebra. Applications to some classical equations are presented. The course covers the following topics: Banach and Hilbert spaces, dual spaces, linear operators, distributions, weak derivatives, Sobolev spaces, applications to linear differential equations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 504** Analysis in Euclidean Space (3) The Fourier transform in  $L^1$  and  $L^2$  and applications, interpolation of operators, Riesz and Marcinkiewicz theorems, singular integral operators.

### **Analysis in Euclidean Space (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 505** Mathematical Fluid Mechanics (3) Kinematics, balance laws, constitutive equations; ideal fluids, viscous flows, boundary layers, lubrication; gas dynamics.

### **Mathematical Fluid Mechanics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 506** Ergodic Theory (3) Measure-preserving transformations and flows, ergodic theorems, ergodicity, mixing, weak mixing, spectral invariants, measurable partitions, entropy, Ornstein isomorphism theory.

### **Ergodic Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 507** Dynamical Systems I (3) Fundamental concepts; extensive survey of examples; equivalence and classification of dynamical systems, principal classes of asymptotic invariants, circle maps.

### **Dynamical Systems I (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 508** Dynamical Systems II (3) Hyperbolic theory; stable manifolds, hyperbolic sets, attractors, Anosov systems, shadowing, structural stability, entropy, pressure, Lyapunov characteristic exponents and non-uniform hyperbolicity.

### **Dynamical Systems II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 511** Ordinary Differential Equations I (3) Existence and uniqueness, linear systems, series methods, Poincare-Bendixson theory, stability.

### **Ordinary Differential Equations I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 512** Ordinary Differential Equations II (3) Floquet theory, regular and singular boundary value problems, Green's functions, eigenfunction expansions.

### **Ordinary Differential Equations II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 513** Partial Differential Equations I (3) First order equations, the Cauchy problem, Cauchy-Kowalevski theorem, Laplace equation, wave equation, heat equation.

### **Partial Differential Equations I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 514** Partial Differential Equations II (3) Sobolev spaces and Elliptic boundary value problems, Schauder estimates. Quasilinear symmetric hyperbolic systems, conservation laws.

### **Partial Differential Equations II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 515** Classical Mechanics and Variational Methods (3) Introduction to the calculus of variations, variational formulation of Lagrangian mechanics, symmetry in mechanical systems, Legendre transformation, Hamiltonian mechanics, completely integrable systems.



**Classical Mechanics and Variational Methods (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 516** Stochastic Processes (3) Markov chains; generating functions; limit theorems; continuous time and renewal processes; martingales, submartingales, and supermartingales; diffusion processes; applications.

**Stochastic Processes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 517** (STAT 517) Probability Theory (3) Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

**Probability Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 518** (STAT 518) Probability Theory (3) Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

**Probability Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 519** (STAT 519) Topics in Stochastic Processes (3) Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.

**Topics in Stochastic Processes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 521** Complex Analysis: Theory and Applications I (3) Conformal mappings, Schwarz-Cristoffel transformations, Dirichlet and Neumann problems, electrostatics and fluid flow, transform methods, asymptotic methods, Runge approximation theorems.

**Complex Analysis: Theory and Applications I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 523 Numerical Analysis I (3)** Approximation and interpolation, numerical quadrature, direct methods of numerical linear algebra, numerical solutions of nonlinear systems and optimization.

**MATH 523 Numerical Analysis I (3)**

1. Approximation and interpolation. Weierstrass theorem, Bernstein polynomials, Jackson theorems, Lagrange interpolation, least squares approximation, orthogonal polynomials, piecewise Lagrange and Hermite interpolation, spline interpolation, the Fast Fourier Transform.
2. Numerical quadrature. Newton-Cotes rules, Peano Kernel Theorem, Euler-Maclaurin expansion, Romberg integration, Gaussian quadrature, adaptive quadrature.
3. Direct methods of numerical linear algebra. Gaussian elimination with pivoting, backward error analysis, conditioning of linear systems.
4. Numerical solution of nonlinear systems and optimization. One-point iterations, Newton's and quasi-Newton's method, Broyden's method, unconstrained optimization, line-search methods.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 524 Numerical Linear Algebra (3)** Matrix decompositions. Direct method of numerical linear algebra. Eigenvalue computations. Iterative methods.

**MATH 524 Numerical Linear Algebra (3)**

This course provides a graduate level foundation in numerical linear algebra. It covers the mathematical theory behind numerical algorithms for the solution of linear systems of equations and eigenvalue problems. Specific topics include: matrix decompositions, direct methods of numerical linear algebra, eigenvalue computations, iterative methods.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 527 Metric and Topological Spaces (3)** Metric spaces, continuous maps, compactness, connectedness, and completeness. Topological spaces, products, quotients, homotopy, fundamental group, simple applications.

**MATH 527 Metric and Topological Spaces (3)**

This course covers the classical theory of metric and topological spaces. It provides the background for several other courses in analysis, as well as a foundation in methods of algebraic topology. This course starts by covering foundational material, so it is accessible to all first-year graduate students. The following topics are covered: metric spaces, continuous maps, compactness, connectedness, completeness, topological spaces, products, quotients, homotopy, fundamental group, and provide simple applications.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 528 Differentiable Manifolds (3)** Smooth manifolds, smooth maps, Sard's theorem. The tangent bundle, vector fields, differential forms, integration on manifolds. Foliations. De Rham cohomology; simple applications. Lie groups, smooth actions, quotient spaces, examples.

**MATH 528 Differentiable Manifolds (3)**

This course covers the foundations of differential geometry, developing the theory of differentiation and integration on manifolds. It provides tools for the study of nonlinear problems, combining techniques in analysis and geometry. Concepts and tools from differential geometry have found wide use in different areas of mathematics, including nonlinear differential equations, control and optimization problems, and numerical analysis. The goal is to cover the most important

techniques of differential geometry in a concise way. The course will appeal not only to students who plan to do research in geometry, but also to those interested in analysis, or applied and computational mathematics, as well. It covers the following topics: smooth manifolds, smooth maps, Sard's theorem, the tangent bundle, vector fields, differential forms, integration on manifolds, foliations, de Rham cohomology, Lie groups, smooth actions, quotient spaces, examples.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 529** Algebraic Topology (3) Manifolds, Poincare duality, vector bundles, Thom isomorphism, characteristic classes, classifying spaces for vector bundles, discussion of bordism, as time allows.

### **Algebraic Topology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 530** Differential Geometry (3) Distributions and Frobenius theorem, curvature of curves and surfaces, Riemannian geometry, connections, curvature, Gauss-Bonnet theorem, geodesic and completeness.

### **Differential Geometry (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 531** Differential Topology (3) DeRham's theorem, geometry of smooth mappings, critical values, Sard's theorem, Morse functions, degree of mappings, smooth fiber bundles.

### **Differential Topology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 533** Lie Theory I (3) Lie groups, lie algebras, exponential mappings, subgroups, subalgebras, simply connected groups, adjoint representation, semisimple groups, infinitesimal theory, Cartan's criterion.

### **Lie Theory I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 534** Lie Theory II (3) Representations of compact lie groups and semisimple lie algebras, characters, orthogonality, Peter-Weyl theorem, Cartan-Weyl highest weight theory.

### **Lie Theory II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 535** Linear Algebra (3) Vector spaces. Linear transformations. Bilinear forms. Canonical forms for linear transformations. Multilinear algebra.

**MATH 535 Linear Algebra (3)**

This course reviews undergraduate linear algebra and proceeds to more advanced topics. Its purpose is to provide a solid understanding of linear algebra, which is needed throughout graduate mathematics. It covers the following topics: vector spaces, linear transformations, bilinear forms, canonical forms for linear transformations, multilinear algebra.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 536** Abstract Algebra (3) Groups. Sylow's theorems. Rings. Ideals, unique factorization domains. Finitely generated modules. Fields. Algebraic and transcendental field extensions, Galois theory.

**MATH 536 Abstract Algebra (3)**

This course covers fundamental concepts, needed toward the study of advanced areas in abstract algebra. The course covers the following topics: groups, Sylow's theorems, rings, ideals, unique factorization domains, finitely generated modules, fields, algebraic and transcendental field extensions, Galois theory.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 537** Field Theory (3) Finite and infinite algebraic extensions; cyclotomic fields; transcendental extensions; bases of transcendence, Luroth's theorem, ordered fields, valuations; formally real fields.

**Field Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 538** Commutative Algebra (3) Topics selected from Noetherian rings and modules, primary decompositions, Dedekind domains and ideal theory, other special types of commutative rings or fields.

**Commutative Algebra (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 542** Group Theory I (3) Topics selected by instructor from abelian, solvable, and nilpotent groups; finite presentations; free products; group extensions; group representations.

**Group Theory I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 547** Algebraic Geometry I (3) Affine and projective algebraic varieties; Zariski topology; Hilbert Nullstellensatz; regular functions and maps; birationality; smooth varieties normalization; dimension.

### **Algebraic Geometry I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 548** Algebraic Geometry II (3) Topics may include algebraic curves, Riemann-Roch theorem, linear systems and divisors, intersectino theory, schemes, sheaf cohomology, algebraic groups.

### **Algebraic Geometry II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 550** (CSE 550) Numerical Linear Algebra (3) Solution of linear systems, sparse matrix techniques, linear least squares, singular value decomposition, numerical computation of eigenvalues and eigenvectors.

### **Numerical Linear Algebra (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 551** (CSE 551) Numerical Solution of Ordinary Differential Equations (3) Methods for initial value and boundary value problems; convergence and stability analysis, automatic error control, stiff systems, boundary value problems.

### **Numerical Solution of Ordinary Differential Equations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 552** (CSE 552) Numerical Solution of Partial Differential Equations (3) Finite difference methods for elliptic, parabolic, and hyperbolic differential equations; solutions techniques for discretized systems; finite element methods for elliptic problems.

### **Numerical Solution of Partial Differential Equations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 553** (CSE 553) Introduction to Approximation Theory (3) Interpolation; remainder theory; approximation of functions; error analysis; orthogonal polynomials; approximation of linear functionals; functional analysis applied to numerical analysis.

### **Introduction to Approximation Theory (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 554** Approximation Theory (3) Approximation in normed spaces; existence, uniqueness, characterization, computation of best approximations; error bounds; degree of approximation; approximation of linear functionals.

### **Approximation Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 555** (CSE 555) Numerical Optimization Techniques (3) unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar's algorithm, global optimization, parallelism in optimization.

### **Numerical Optimization Techniques (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 556** (CSE 556) Finite Element Methods (3) Sobolev spaces, variational formulations of boundary value problems; piecewise polynomial approximation theory, convergence and stability, special methods and applications.

### **Finite Element Methods (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 557** Mathematical Logic (3) The predicate calculus; completeness and compactness; Godel's first and second incompleteness theorems; introduction to model theory; introduction to proof theory.

### **Mathematical Logic (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 558** Foundations of Mathematics I (3) Decidability of the real numbers; computability; undecidability of the natural numbers; models of set theory; axiom of choice; continuum hypothesis.

### **Foundations of Mathematics I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 559** Recursion Theory I (3) Recursive functions; degrees of unsolvability; hyperarithmetical theory; applications to Borel combinatorics. Computational complexity. Combinatory logic and the Lambda calculus.

**Recursion Theory I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 561** Set Theory I (3) Models of set theory. Inner models, forcing, large cardinals, determinacy. Descriptive set theory. Applications to analysis.

**Set Theory I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 565** Foundations of Mathematics II (3) Subsystems of second order arithmetic; set existence axioms; reverse mathematics; foundations of analysis and algebra.

**Foundations of Mathematics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 567** Number Theory I (3) Congruences, quadratic residues, arithmetic functions, partitions, classical multiplicative ideal theory, valuations and p-adic numbers; primes in arithmetic progression, distribution of primes.

**Number Theory I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 568** Number Theory II (3) Congruences, quadratic residues, arithmetic functions, partitions, classical multiplicative ideal theory, valuations and p-adic numbers; primes in arithmetic progression, distribution of primes.

**Number Theory II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 569** Algebraic Number Theory I (3) Dedekind rings; cyclotomic and Kummer extensions; valuations; ramification, decomposition, inertial groups; Galois extensions; locally compact groups of number theory.

**Algebraic Number Theory I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 570** Algebraic Number Theory II (3) Topics chosen from class field theory; integral quadratic forms; algebraic and arithmetic groups; algebraic function of one variable.

**Algebraic Number Theory II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 571** Analytic Number Theory I (3) Improvements of the prime number theorem, L-functions and class numbers, asymptotic and arithmetic properties of coefficients of modular forms.

**Analytic Number Theory I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 572** Analytic Number Theory II (3) Distribution of primes, analytic number theory in algebraic number fields, transcendental numbers, advanced theory of partitions.

**Analytic Number Theory II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 574** Topics in Logic and Foundations (3-6 per semester) Topics in mathematical logic and the foundations of mathematics.

**Topics in Logic and Foundations (3-6 per semester)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 577** (M E 577) Stochastic Systems for Science and Engineering (3) The course develops the theory of stochastic processes and linear and nonlinear stochastic differential equations for applications to science and engineering.

**Stochastic Systems for Science and Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 578** (M E 578) Theory & Applications of Wavelets (3) Theory and physical interpretation of continuous and discrete wavelet transforms for applications in different disciplines.

**Theory & Applications of Wavelets (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 580** Introduction to Applied Mathematics I (3) A graduate course of fundamental techniques including tensor, ordinary and partial differential equations, and linear transforms.

### **Introduction to Applied Mathematics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 581** Introduction to Applied Mathematics II (3) A graduate course of fundamental techniques including Ordinary, Partial, and Stochastic Differential Equations, Wavelet Analysis, and Perturbation Theory.

### **MATH 581 Introduction to Applied Mathematics II (3)**

Calculus of variations: Euler-Lagrange equations; constrain problems; Hamilton's principle; stability and second variations; applications. Partial differential equations: Green's functions and fundamental solutions; eigenfunction expansions and Galerkin's method; Sobolev space and weak solutions. Asymptotic expansions: Laplace method; method of steepest descents; method of stationery phase. Regular perturbation theory: oscillations and periodic solutions; perturbation of eigenvalues; Lyapunov-Schmidt method. Singular perturbation theory: initial value problems; boundary value problems. Wavelet analysis. Stochastic differential equations, Black-Scholes model.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 582** Introduction to C\* Algebra Theory (3) Basic properties of C\* algebras, representation theory, group C\* algebras and crossed products, tensor products, nuclearity and exactness.

### **Introduction to C\* Algebra Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 583** Introduction to K-Theory (3) K-theory groups for compact spaces and C\*-algebras. Long exact sequences, Bott periodicity, index theory and the Pimsner-Voiculescu theorem.

### **Introduction to K-Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 584** Introduction to von Neumann Algebras (3) Comparison of projections, traces, tensor products, ITPFI factors and crossed products, the Jones index, modular theory, free probability.

### **MATH 584 Introduction to von Neumann Algebras (3)**

A concise introduction to von Neumann algebra theory, beginning with the basic definitions and proceeding through modular theory. The currently important subjects of index theory and free probability theory will be introduced.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 585** Topics in Mathematical Modeling (3) Introduction to mathematical modeling, covering the basic modeling and common mathematical techniques for problems from physical, biological and social sciences.

**MATH 585 Topics in Mathematical Modeling (3)**

The course provides an introduction to the basic mathematical modeling process that includes a statement of the problem, formulation of a model, different types of a model, parameter identifications, mathematical analysis and numerical solution, model reduction and simplifications, uncertainty quantification, model validation and interpretation of findings. It also covers related mathematical techniques such as methods for dimensional analysis, analytical and numerical approximations, bifurcation analysis and perturbation theory, parameter identification and estimation techniques.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 588** (CSE 588) Complexity in Computer Algebra (3) Complexity of integer multiplication, polynomial multiplication, fast Fourier transform, division, calculating the greatest common divisor of polynomials.

**Complexity in Computer Algebra (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 597A Nonlinear PDEs (3)** The course will cover topics in the theory of nonlinear PDEs, mainly from Part III of Evan's book. In particular: - Variational methods. The Euler- Lagrange equation, Coercivity, lower semicontinuity, weak solutions. Regularity of solutions. Critical points, the mountain pass theorem, and existence of solutions to semilinear elliptic PDEs. - Fixed point methods. Schauder's fixed point. - Monotonicity methods. Upper and lower solutions. - Hamilton-Jacobi equations. Viscosity solutions. Relations with optimal control theory and the principle of dynamic programming. - Introduction to hyperbolic systems of conservation laws. Weak solutions. Rankine-Hugoniot equations. Entropy admissibility conditions. The Riemann problem.

### **Nonlinear PDEs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 597B q-series and Partitions (3)** In the course, the topics to be covered include partition function  $p(n)$ , congruences for  $p(n)$  and  $\tau(n)$ , the Rogers-Ramanujan identities, partition rank and crank, Eisenstein series, theta functions, and basic hypergeometric functions.

### **q-series and Partitions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 597C Numerical Methods for Stochastic Differential Equations (3)** The course is about numerical methods for the solution of differential equations involving random input and stochastic sources. Main topics include: Basic concepts of random variables and stochastic processes, differential equations involving random terms, simulation of Brownian motion, numerical methods for Ito stochastic differential equations, basic strong and weak convergence analysis, spectral representations of random fields, methods for stochastic PDEs, methods for estimating rare events, methods for quantifying uncertainties.

### **Numerical Methods for Stochastic Differential Equations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 598 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 599 (IL) Foreign Studies (1-12 per semester, maximum of 24)** Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

### **Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MATH 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of mathematics undergraduate recitation classes with senior faculty instruction supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MATH 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Mathematics Education (MTHED)

**MTHED 411** Teaching Secondary Mathematics I (3) Conditions for learning mathematics; problem solving; subject matter types; curriculum; learning goals; nature and history of mathematics at secondary level

**MTHED 411 Teaching Secondary Mathematics I (3)**

This is the first of two secondary mathematics methods courses. In this course, participants look at mathematics teaching and learning from a teacher's perspective as well as from a student's perspective. Course participants engage in mathematical problem solving and in the study of the history and nature of mathematics as the foundation for understanding current curriculum and standards. Lesson planning follows from the consideration of different types of

mathematical content, including skills and concepts. Looking specifically at the learning of mathematics and questioning to promote higher-level thinking prepares students for field experiences in subsequent semesters.

The goals for the course are:

- To improve understanding of some of the mathematical concepts which are important in secondary school mathematics.
- To improve understanding of the nature of mathematics: what is important, how it is practiced, how mathematical validity is determined.
- To improve understanding of the historical development of selected topics from secondary school mathematics.
- To develop a vision of good school mathematics.
- To see mathematics, mathematics learning, and mathematics teaching as problematic and to develop an inquiry approach to and an ability to reflect on these domains.
- To increase understanding of secondary school students' mathematical thinking and understanding.
- To increase ability to specify subject matter involved in a specific mathematics topic and make distinctions among them.
- To improve understanding of various teaching strategies and their strengths and weaknesses.
- To increase ability to choose among lessons and curriculum materials based on the intended mathematical subject matter and the current understandings of the students.
- To increase insight into creating a thriving, supportive mathematics classroom culture.

Students are evaluated through written assignments, examinations, classroom performance, presentations, and lesson plans.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:  
 Concurrent: MTHED 427

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 412W Teaching Secondary Mathematics II (3)** Assessing learning and instruction; methods of evaluation and grading; long-term planning; accommodating needs of diverse learners; connecting theory and practice.

### **MTHED 412W Teaching Secondary Mathematics II (3)**

MTHED 412 is an inherently cumulative experience. This course builds upon ideas developed in MTHED 411 and MTHED 427. In particular, students continue to consider types of subject matter, problem solving, lesson planning, technology use, questioning, history and nature of mathematics, and curriculum and standards. MTHED 412 then links understanding of mathematics education with other education courses and with field experiences as well as with understanding of K-16 mathematics. Students focus on lesson and unit development and implementation, assessment and evaluation, classroom management and organization within school communities, and continued professional growth as reflective practitioners. Students are encouraged to draw whenever possible on education psychology, adolescent psychology, educational theory and policy, mathematics, and other bodies of knowledge. In other words, course participants live as teachers with a wealth of knowledge and responsibility to draw on that knowledge in the service of their students.

Student goals are to:

- Develop an expanded view of the process of teaching mathematics;
- Develop a deeper understanding of what it means to learn mathematics and the processes by which mathematics is learned;
- Be able to reflect on the instruction and one's learning in MTHED 412 and to relate it to students' learning of secondary mathematics;
- Be able to plan and teach appropriate mathematics lessons and reflect on one's teaching;
- Be familiar with and be able to draw on a variety of teaching resources;
- Investigate current issues influencing evaluation in the secondary mathematics curriculum;
- Choose goals and content for middle school and high school mathematics courses;
- Develop strategies for assessing and evaluating what students have learned
- Create and implement assessment instruments for middle school and high school mathematics courses;
- Develop insights into student understanding, especially in relationship to exceptional students as well as to mathematically talented and challenged students;
- Identify the needs of diverse learners and to develop strategies to address these needs;
- Create classroom environments that are conducive to learning; and
- Incorporate appropriate technology in the teaching and learning of mathematics.

Students are evaluated through written assignments, examinations, classroom performance, unit lesson and evaluation plans. Throughout the course writing is a process to help students learn course content as well as to help students learn ways of writing needed in the work of the secondary mathematics teacher.

The course is offered each Fall and Spring semester with typical enrollment of 20-25 students in each of 1 or 2 sections. Through co-requisite course, CI 495C, students spend approximately five full weeks in secondary school classrooms.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:  
 Concurrent: C I 412W C I 495C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 420** Teaching Mathematics in the Elementary Schools (3) Strategies for teaching mathematics at the elementary school level; analysis of the philosophy and content of contemporary programs of instruction.

### **MTHED 420 Teaching Mathematics in the Elementary Schools (3)**

MTHED 420 is designed to help teacher candidates: 1) to come to see mathematics, mathematics learning, and mathematics teaching as complex and to develop an inquiry approach to these domains; 2) to improve their understanding of the mathematical concepts and procedures they will teach, and to improve their understanding of children's mathematical learning and thinking about these concepts and procedures; 3) to increase their ability to choose among tasks, lessons, and curriculum materials from a variety of print and electronic sources based on intended mathematical understandings; 4) to develop a productive mathematics culture in the classroom; and 5) to explore key educational issues, such as equity, assessment, and technology, with respect to mathematics teaching and learning.

In the course, teacher candidates explore important mathematical ideas and their development. They will become familiar with important pedagogical principles and questions. To help candidates develop an inquiry approach toward teaching mathematics, course assignments engage them in reflecting on readings and class discussions, their previous experiences as a learner of mathematics, and their ongoing experiences observing and teaching in classroom settings.

MTHED 420 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: C I 495A or C I 495B ; SCIED 458 SS ED 430W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 420** Teaching Mathematics in the Elementary Schools (3) Strategies for teaching mathematics at the elementary school level; analysis of the philosophy and content of contemporary programs of instruction.

### **MTHED 420 Teaching Mathematics in the Elementary Schools (3)**

MTHED 420 is designed to help teacher candidates: 1) to come to see mathematics, mathematics learning, and mathematics teaching as complex and to develop an inquiry approach to these domains; 2) to improve their understanding of the mathematical concepts and procedures they will teach, and to improve their understanding of children's mathematical learning and thinking about these concepts and procedures; 3) to increase their ability to choose among tasks, lessons, and curriculum materials from a variety of print and electronic sources based on intended mathematical understandings; 4) to develop a productive mathematics culture in the classroom; and 5) to explore key educational issues, such as equity, assessment, and technology, with respect to mathematics teaching and learning.

In the course, teacher candidates explore important mathematical ideas and their development. They will become familiar with important pedagogical principles and questions. To help candidates develop an inquiry approach toward teaching mathematics, course assignments engage them in reflecting on readings and class discussions, their previous experiences as a learner of mathematics, and their ongoing experiences observing and teaching in classroom settings.

MTHED 420 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: C I 495A or C I 495B ; SCIED 458 SS ED 430W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 424** Contemporary School Mathematics Programs (3) In-depth analysis of school mathematics programs and the factors and forces influencing them; contemporary curriculum developments.

### **Contemporary School Mathematics Programs (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MTHED 427 Teaching Mathematics in Technology-Intensive Environments (3)** Interaction among pedagogy, content, and technology in mathematics teaching and learning in technology-intensive environments; secondary, early college curricula; laboratory experience.

**MTHED 427 Teaching Mathematics in Technology-Intensive Environments (3)**

Students should expect to learn something about each of several common types of mathematics software, new things about secondary school mathematics, and a lot about how to make decisions about how to use technology as an effective mathematics teacher. Students will also use communication software (e.g., word processors, e-mail, PowerPoint) not as objects of our discussion but in simple ways to generate and share products, assignments, and ideas.

The course has a significant lab component. Students will be assessed based on written assignments, lesson plans, oral presentations, class participation, and examinations. The course is offered each fall and spring semester with an approximate enrollment of 20 students per semester. Students must enroll concurrently in MTHED 411.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:  
Concurrent: MTHED 411

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 430 Students' Mathematical Thinking (3 per semester, maximum of 6)** Develop abilities in planning, conducting, and interpreting mathematics interviews to gain an understanding of students' thinking processes and current knowledge.

**Students' Mathematical Thinking (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 431 Data Analysis in Secondary School Mathematics (3)** Intense development of foundations of data analysis for secondary mathematics as a process using statistical concepts for predictions and inferences.

**MTHED 431 Data Analysis in Secondary School Mathematics (3)**

As prospective secondary mathematics teachers, students will develop broad and deep understanding of measures of and representations for center, measures of spread, distribution, and correlation. They will become fluent in using dynamic statistics programs, various physical models, and representations to convey the essence of these statistical concepts to secondary school students. They will compare various statistical methods and measures and make and defend claims both in terms of the discipline and in terms of how these ideas unfold for learners in school mathematics. They will connect these statistical concepts to the broader study of secondary school mathematics.

In particular, students will see data analysis as a process. It involves the systematic application of statistical techniques, as well as logical techniques, to summarize, interpret, and compare data. Although the emphasis of the course will be on statistical concepts, one of the main themes of the course will involve understandings the mathematical structure of these statistical concepts. For example, students should be able to answer, from a mathematical perspective, why some data analysis techniques are more useful than other techniques.

Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teachers' understanding of statistics as a vital part of secondary mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, dynamic statistics environments, and graphing calculators), as appropriate.

Students in this course would be expected to complete weekly assignments and exams and to participate in classroom investigations of statistical concepts. Course grades depend on students' performance on all of these measures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 432 Mathematical Modeling in Secondary School Mathematics (3)** Students work from teaching and curricular

perspective to explore and apply school and undergraduate mathematics to model real-world phenomena.

### **MTHED 432 Mathematical Modeling in Secondary School Mathematics (3)**

Given the attention to mathematical modeling and applications in secondary school mathematics, prospective teachers need to be able to recognize situations that allow secondary school students to use relevant mathematics to apply mathematics and to model real-world phenomena as a means to learn about various mathematical topics. This course provides experiences in generating, interpreting, and evaluating geometric, discrete, stochastic, and function models. The course also helps prospective teachers develop an understanding of how mathematical modeling arises in school mathematics and how students learn mathematics through modeling.

Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, geometry construction environments, and graphing calculators), as appropriate.

Students in this course would be expected to complete a major modeling project and paper in addition to weekly assignments, exams, quizzes, and written reflections of classroom participation. Course grades depend on students' performance on all of these measures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 433** Function Concept in Secondary School Mathematics (3) This course develops the concept of function as an essential topic that underlies and connects school and collegiate mathematics.

### **MTHED 433 Function Concept in Secondary School Mathematics (3)**

Prospective teachers as students need to understand the concept of function deeply as an essential topic of school and collegiate mathematics. In this course, they develop greater facility in using multiple representations and encounter function ideas as they unfold in multiple areas of mathematics, thus extending their understanding of collegiate mathematics and its connection to school mathematics. The students become conversant in current state and national expectations about functions as a mathematical entity. They plan appropriate instruction to develop secondary school student's understanding of function.

Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teacher's conceptual understanding of function so that they may draw more strongly on this understanding to engage secondary students in mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, geometry construction environments, and graphing calculators), as appropriate.

Students in this course would be expected to complete a major project and paper in addition to weekly assignments, exams, quizzes, and written reflections of classroom participation. Course grades depend on students' performance on all of these measures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.



**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 501** Foundations of Mathematics Education I: Learning (3) This course focuses on understanding and application of theories of mathematical thinking and learning in research and practice.

**MTHED 501 Foundations of Mathematics Education I: Learning (3)**

An understanding of what it means to learn mathematics, knowledge of extant theories of learning mathematics, and knowledge of the nature of students' mathematical thinking at various grade levels are central to the work of mathematics educators. Research, curriculum development, classroom interactions with mathematics students, development of assessments, and many other activities in which mathematics educators engage all draw heavily on understanding and knowledge of mathematical thinking and learning.

Students in this course will develop a deeper understanding of classical and contemporary theories of mathematical learning and thinking and comparisons among these theories. Assignments in the course support students' growth in applying these theories to frame research, to enhance instruction, to consider curriculum, to support teacher development, and to effect policy. A major project in the course builds students' skills in investigating mathematical thinking and learning.

This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. [The other required courses are MTHED 502 Foundations of Mathematics Education II: Teaching; MTHED 503 Foundations of Mathematics Education III: Curriculum; and MTHED 504 Foundations of Mathematics Education IV: Teacher Development and Policy.]

Students in this course would be expected to participate in class discussion, complete weekly assignments, conduct two major projects, and respond to a final examination. Course grades depend on students' performance on all of these measures.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 502** Foundations of Mathematics Education II: Teaching (3) Teaching is the object of study encountered through connections among classical and contemporary theories of teaching and research on teaching.

**MTHED 502 Foundations of Mathematics Education II: Teaching (3)**

Teaching mathematics and developing knowledge, skills, and dispositions of mathematics teachers are central tasks in the work of mathematics educators. Thus acquiring deeper theoretical knowledge and practical skills in teaching are fundamental objectives for doctoral students in mathematics education. The focus of this course is on teaching - and not the teacher - as an object of study.

In this course, students explore and connect classic and contemporary research and theories of teaching, come to know the nature of mathematics teaching in tradition and vision, relate theories of teaching to theories of learning, develop ability and disposition to study and improve mathematics teaching and hone ability to evaluate and conduct research on teaching.

This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. [The other required courses are MTHED 501 Foundations of Mathematics Education I: Learning; MTHED 503 Foundations of Mathematics Education III: Curriculum; and MTHED 504 Mathematics Education IV: Teacher Development and Policy. This course would typically follow MTHED 501.]

Students in this course would be expected to participate in weekly discussions, articulate their emerging philosophies of teaching, and analyze teaching episodes. Course grades depend on students' performance on all of these measures.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 503** Foundations of Mathematics Education III: Curriculum (3) Study of mathematics curriculum blends historical trends and current issues with research literature and techniques to study effects of innovations.

### **MTHED 503 Foundations of Mathematics Education III: Curriculum (3)**

Mathematics educators who are active in leadership of school systems, teacher education, research and development projects, and formulation of education policy are frequently called on for analytic or creative work related to the school and collegiate curriculum. They are asked for advice on the content, organization, presentation, and evaluation of mathematics curricula and to conduct research directly related to curricula and the effects of their implementation.

Students in this course will develop a connected current and historical view of the nature of K-16 mathematics curriculum materials, movements, and guidelines. They will develop skills and dispositions to critique, conceptualize, design, conduct and report research on curriculum development and implementation efforts.

This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. [The other required courses are MTHED 501 Foundations of Mathematics Education I: Learning; MTHED 502 Foundations of Mathematics Education II: Teaching; and MTHED 504 Foundations of Mathematics Education IV: Teacher Development and Policy.]

In addition to participation in class discussions, students in this course would be expected to conduct a historical analysis of the treatment of a mathematical theme or topic in K-16 curricula, analyze and synthesize research related to an important issue, analyze instruments used in curriculum research, and propose a research study in some aspect of the mathematics curriculum. Course grades depend on students' performance on all of these measures.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 504** Foundations of Mathematics IV: Teacher Development and Policy (3) Nature and study of teacher education and professional development programs and projects coupled with policy and impact in mathematics education.

### **MTHED 504 Foundations of Mathematics IV: Teacher Development and Policy (3)**

One of the principal day-to-day responsibilities of mathematics educators is teaching of content and pedagogy courses for prospective teachers. This work often leads to opportunities for leadership through professional development courses and projects with in-service teachers and to consulting work with local, state, and national school, governmental, and professional organizations concerned about educational policy. Effective work in these arenas requires knowledge and practical skills about professional development and institutional change as well as awareness of policies and the role of policy in influencing practice.

Students study research and practice in teacher education and professional development of mathematics teachers. They come to know the research and the issues that confront those who prepare teachers and support teachers' continued professional development. Students become familiar with governmental and professional organizations and the critical issues that impact the direction of mathematics education. They also learn how to study local, state, and national policies and publications.

This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. [The other required courses are MTHED 501 Foundations of Mathematics Education I: Learning; MTHED 502 Foundations of Mathematics Education II: Teaching; and MTHED 503 Foundations of Mathematics Education III: Curriculum.]

In addition to participation in class discussions, students in this course would be expected to articulate a policy regarding a critical issue in mathematics education, evaluate a teacher education or professional development program, propose a professional development or teacher education project, and complete a final examination. Course grades depend on students' performance on all of these measures.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 520** Analysis of Research in Mathematics Education (3) Survey of the status of knowledge about mathematics learning and instruction, K-12; analysis of research procedures; instruments for evaluating research.

**Analysis of Research in Mathematics Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 523** Projects in Mathematics Education Research, Curriculum Development, and Evaluation (1-3 per semester, maximum of 24) Conceptualizing, designing, conducting, and reporting mathematics education research, curriculum development and/or evaluation projects.

**Projects in Mathematics Education Research, Curriculum Development, and Evaluation (1-3 per semester, maximum of 24)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1997

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 525** Research Participation in School Mathematics Curriculum Construction (3) Development of theoretical bases for the construction of instructional materials in mathematics; research participation in preparing and testing curriculum materials.

**Research Participation in School Mathematics Curriculum Construction (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 527** Research on the Use of Technology in Mathematics Education (3) Reviewing, critiquing, designing, and conducting research on mathematics learning and teaching in technology intensive environments.

**Research on the Use of Technology in Mathematics Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1997

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 530** Mathematical Thinking at the Secondary and Early College Levels (3) Exploring and applying theories of advanced mathematical thinking; reviewing, conducting research on mathematical thinking at secondary and early college levels.

**Mathematical Thinking at the Secondary and Early College Levels (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1997

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or

outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 595** Advanced Clinical Internship in Mathematics Learning (3) Supervised internship in advanced procedures for the implementation of diagnostic/prescriptive approaches as a strategy for improving mathematics learning.

### **Advanced Clinical Internship in Mathematics Learning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 597A** Research Design in Mathematics Education (3) This course will engage students in developing an understanding of research techniques and methodologies commonly used in mathematics education research.

### **Research Design in Mathematics Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MTHED 597A** Research Design in Mathematics Education (3) This course will engage students in developing an understanding of research techniques and methodologies commonly used in mathematics education research.

### **Research Design in Mathematics Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

## Md Clkship Island-Hy (MCLKS)

**MCLKS 701** Advanced Clinical Diagnostics (1) Advanced instruction for third-year medical students in laboratory medicine, neurology, ophthalmology, radiology and motivational interviewing.

### Advanced Clinical Diagnostics (1)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MCLKS 702** Clinical Therapeutics (1) Skill development: discussion of end of life issues; pain management; clinical pharmacology including use of antibiotics, nutrition, cost of medical care and reducing medical errors.

### Clinical Therapeutics (1)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MCLKS 704** Improving Healthcare (1) Skill development: discussion of end of life issues; pain management; medical literature evaluation' effective utilization and improvement of medical systems.

### Improving Healthcare (1)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MCLKS 705** Transition to Internship (1) Provide review of clinical skills prior to internship training, and introduce new skills in team building, education and time management.

### Transition to Internship (1)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Mechanical Engineering (M E)

**M E 400** Thermodynamics of Propulsion and Power Systems (3) Analysis and modeling of propulsion and power systems, including combustion, compressible flow through nozzles, chemical equilibrium, and moist air systems.

### M E 400 Thermodynamics of Propulsion and Power Systems (3)

This course is specifically designed to take advantage of the senior level standing of the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass, momentum, and energy conservation to relatively complex systems. These systems include spark-ignition and diesel engines, gas-turbine engines for power production, and turbojet engines. The integration of the topics of combustion, compressible flow, and psychrometrics allow these systems to be analyzed in their totality. Emphasis is on creating engineering models of these systems. The course aims to integrate previous knowledge and develop skill in "thinking like an engineer."

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 401 Refrigeration and Air Conditioning (3)** Theoretical principles, design, performance, and selection of various refrigeration and air-conditioning systems; building heat and cooling loads; solar heating.

### Refrigeration and Air Conditioning (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 402 Power Plants (3)** A study of fossil-fuel steam generation and utility plants, including cogeneration, gas turbine, and combined cycles.

### M E 402 Power Plants (3)

This course serves as an introduction to fossil-fuel plants for both steam generation and electricity production. Following an overview of an entire plant and an introduction to combustion processes, each subsystem of a fossil-fuel plant will be considered. The subsystems include fuel preparation and handling, boiler types and the fundamentals of steam generation, water systems (condensate-feedwater, makeup, cooling, and waste), and turbomachinery. Consideration will be given to environmental aspects of steam and power generation as well as operations, maintenance, and controls issues. Students will spend time at the West Campus Steam Plant (WCSP) to observe the various systems discussed in class. Data taken from the WCSP will be used in problem solving and in an assessment of the plant.

#### Course Objectives:

To acquaint students with both steam generation and electricity production and to present some of the engineering calculations encountered in practice.

Objectives that students will meet at the end of the course:

1. list the subsystems of a plant, indicating the function of each subsystem
2. sketch typical subsystems of a power plant (example: sketch the coal and ash handling system)
3. perform basic analyses associated with each subsystem
4. sketch the flow of water-steam, fuel, and air through a plant
5. analyze a heat balance, perform an availability analysis, and interpret the results of those analyses
6. select the type of plant appropriate for a given application
7. perform an energy audit on the auxiliary systems
8. perform a water audit on the plant
9. use DoE Best Practices (or equivalent program) to assess a steam plant

Students will be required to draw on material from core undergraduate courses in thermodynamics (M E 030 and M E 031), fluid mechanics (M E 033), and heat transfer (M E 412). Students must be able to:  
 sketch the configuration and draw a T-s diagram for a Rankine cycle and a Brayton cycle  
 indicate the general trends for the ideal cycles (example: for a Brayton cycle, how does the efficiency depend on the pressure ratio, inlet temperature, etc.)  
 define the basic modifications to the simple Rankine cycle and simple Brayton cycle  
 discuss the significance of the modifications  
 state the definition of the adiabatic efficiency for turbines and pumps  
 perform an energy balance given a particular cycle  
 use the Darcy-Weisbach equation to determine the friction losses in pipes and ducts  
 perform simple analysis of a heat exchanger

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 403 Polymer Electrolyte Fuel Cell Engines (3)** Introduction to Fundamentals of Polymer Electrolyte Fuel Cells (PEFCs). Includes fundamentals of electrochemistry, thermodynamics, fluid mechanics, heat transfer materials, and manufacturing issues of PEFCs. A brief survey of other fuel cell types is also included.

### M E 403 Polymer Electrolyte Fuel Cell Engines (3)

This course is intended for the engineering student interested in obtaining a fundamental background required for

polymer electrolyte fuel cell (PEFC) modeling and diagnosis. Those students with interest in the basic design, operation, and characteristics of PEFC systems should also benefit.

This course serves as an introduction to the fundamental principles of electrochemistry, thermodynamics, heat and mass transfer, materials and manufacturing issues related to PEFC engines. The various types of PEFC components and technologies are dissected in detail, including direct inject alternative fuel systems. A survey of cutting-edge issues in fuel cell technology including the future direction of PEFC technology will be presented as time permits. The student will also participate in an experimental lab study to aide in the understanding of these systems, a computer-based simulation project, and a group-based fuel cell system design project. Issues of specific interest to mechanical engineers, including water management and heat and mass transfer in thin film porous media, will be dealt with in depth. A brief survey of other fuel cell types is also presented.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

Concurrent: M E 410 or equivalent

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 404 Gas Turbines (3)** Thermodynamic cycles relating to gas turbines; analysis and performance of compressors, combustion chambers, single- and multi-stage turbines; recent developments.

### **M E 404 Gas Turbines (3)**

This course enables students with the proper background to gain specialized knowledge as a step towards becoming practitioners in the field of gas turbines. The information imparted covers from basic cycles to properties of materials required to put together these impressive machines. Competent course performance requires knowledge of basic thermodynamics, fluids and heat transfer. The homework is carefully graduated in order to highlight key aspects already covered in the lectures, with new thinking an unavoidable part. As an optional part of the course, students can run and acquire data in an actual gas turbine. Additionally, those with a strong background in fluids can design blades and study the flow around them with CDF.

Course Objectives: Upon completion of this course, students should be able to:

1. Analyze cogeneration plants.
2. Analyze turbofans, jets and turbojets.
3. Specify a typical gas turbine installation, including auxiliaries.
4. Carry out conceptual design of gas turbine engines for different applications.
5. Specify construction materials to withstand typical operating conditions.
6. Demonstrate professionalism in interactions with colleagues, faculty, and staff.

Program Objectives: This course covers the following program objectives:

1. demonstrate ability to solve differential equations
2. demonstrate familiarity with linear algebra
3. perform analysis of thermal/fluids components
4. perform analysis of thermal/fluids systems
5. work effectively on multidisciplinary teams
6. demonstrate ability to communicate effectively with the written word
7. demonstrate ability to communicate effectively in oral communications
8. demonstrate professionalism in interactions with colleagues, faculty, and staff

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 405 Indoor Air Quality Engineering (3)** Prediction of the motion of contaminants (both gaseous particulate) in gas streams; analysis of ventilation systems and air pollution control systems; comparison of experimental sampling techniques.

### **M E 405 Air Pollution Control Systems (3)**

This course serves as an introduction to environmental health engineering, which presents the quantitative relationships describing generation, movement, and control of pollutants inside the workplace. Although some aspects of the course can be applied to outdoor air pollution, the course concentrates on applications related to indoor air quality. In particular, students are taught how to measure and predict concentrations of air pollutants, both gaseous and particulate, in rooms. In addition, they are taught how to design both local and general ventilation systems to maintain acceptable indoor air quality. In addition, the design of air pollution control systems that remove both gaseous and particulate contaminants from the air is discussed.

The relationships are described by mass and energy balances that relate pollutant generation and movement to process

parameters. The course is designed for seniors and graduate students in Mechanical, Chemical, Environmental and Civil Engineering, and Meteorology.

To work effectively in environmental health engineering, students must be proficient in applying the thermal sciences. The course uses principles of mathematics and thermal sciences included in accredited programs of engineering. Most students will have mastered some of these principles, but few will have mastered them all. The course reviews all the necessary thermal science principles before using them, but some students will need to review this material in more detail than others.

This course is offered once per year.

**Course Objectives:**

- a. Demonstrate the ability to analyze and compare risks associated with various activities and with exposure to hazardous chemicals.
- b. Demonstrate a working knowledge of the physiology and function of the respiratory system, including diseases of the lung.
- c. Demonstrate the ability to estimate pollutant emission rates using emission factors and fundamental mass balance techniques.
- d. Analyze practical problems of general and local ventilation requirements.
- e. Design local ventilation systems using standard guidelines from ACGIH and ASHRAE.
- f. Predict the motion of particles in air, and analyze pollution control devices which remove particles from the air.
- g. Demonstrate professionalism in interactions with colleagues, faculty, and staff.

**Program Objectives:**

- a. demonstrate knowledge of chemistry
- b. demonstrate ability to solve differential equations
- C. demonstrate familiarity with statistics
- d. perform analysis of thermal/fluids components and thermal/fluids systems
- e. demonstrate an appreciation of the economic, global, social, and ethical context of their work
- f. demonstrate professionalism in interactions with colleagues, faculty, and staff
- g. make effective use of spreadsheets as an analysis and design tool
- h. use software such as Matlab and MathCAD to solve engineering problems including ODE'S, systems of linear equations, and numerical integration

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 406 (NUC E 406) Introduction to Statistical Thermodynamics (3)** Statistical description of systems composed of large numbers of particles in the context of classical and quantum mechanics; basic concepts of probability theory and thermodynamics as they relate to statistical mechanics.

**M E (NUC E) 406 Introduction to Statistical Thermodynamics (3)**

This course is an introduction to probabilistic and statistical concepts in the physical sciences, which we refer to as "statistical thermodynamics." In areas such as design and processing of electronic devices, materials engineering, chemical engineering, and combustion engineering, the science of statistical mechanics is a particularly necessary, powerful, and important tool for the engineer. The underlying foundation of statistical mechanics is developed by (1) reviewing the basic ideas from probability theory, (2) deriving the binomial, Poisson, and Gaussian probability distributions, and (3) using these models to analyze several examples taken from science and engineering. To make a connection between macroscopic quantities and the corresponding probabilistic representation, classical thermodynamics is reviewed using the internal energy, entropy, and free energy functions in the context of the first and second laws. Statistical mechanics for classical and quantum-mechanical systems is presented via the micro-canonical, canonical, and grand canonical ensembles using the associated partition functions. During the syntheses of ideas, applications from various branches of science are presented. Some examples of applications are the Einstein crystal, the Debye crystal, the ideal gas, and black body radiation.

This course covers the following program objectives:

1. Demonstrate knowledge of basic chemistry and physics.
2. Demonstrate a knowledge of atomic and nuclear physics.
3. Demonstrate a knowledge of thermodynamics, heat transfer, and fluid flow.
4. Understand and apply the basic concepts of particle transport.
5. Understand and apply thermodynamics and heat transfer principles to the analysis of nuclear power components and systems.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**M E 408 Energy Systems (3)** Theory, analysis, design, selection, and application of energy conversion systems.

**M E 408 Polymer Electrolyte Fuel Cells Engines (3)**

This course is intended for the engineering student interested in obtaining a fundamental background required for polymer electrolyte fuel cell (PEFC) modeling and diagnosis. Those students with interest in the basic design, operation, and characteristics of PEFC systems should also benefit.

This course serves as an introduction to the fundamental principles of electrochemistry, thermodynamics, heat and mass transfer, materials and manufacturing issues related to PEFC engines. The various types of PEFC components and technologies are dissected in detail, including direct inject alternative fuel systems. A survey of cutting-edge issues in fuel cell technology including the future direction of PEFC technology will be presented as time permits. The student will also participate in an experimental lab study to aide in the understanding of these systems, a computer-based simulation project, and a group-based fuel cell system design project. Issues of specific interest to mechanical engineers, including water management and heat and mass transfer in thin film porous media, will be dealt with in depth. A brief survey of other fuel cell types is also presented.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 410 Heat Transfer (3)** Thermal energy transfer mechanisms: conduction (steady, transient), convection (internal, external), radiation; lumped parameter method; heat exchangers; introduction to numerical methods.

**M E 410 Heat Transfer (3)**

M E 410, Heat Transfer, is a required course for mechanical and nuclear engineering students. The course presents the three modes of heat transfer: conduction, convection, and radiation. One-dimensional steady and transient conduction is studied for planar, cylindrical, and spherical geometries. The lumped capacitance analysis is used for transient conduction when appropriate. Analytical and numerical methods are presented for two-dimensional conduction problems, including the analysis of extended surfaces. Convection heat transfer is studied in both internal and external geometries and under laminar and turbulent flow regimes. External flows include cooling on flat plates due to laminar and turbulent boundary layer flows, and cooling of cylinders due to cross flow. The convection heat transfer analysis in internal flows considers laminar and turbulent pipe flows. Free convection is also considered where heat transfer is due to flow induced by fluid buoyancy. Boiling and condensation considers the effect of two-phase flows on surface heat transfer. Radiation heat transfer is studied by considering both the general characteristics of radiation as well as the properties of radiating surfaces and radiation heat transfer between surfaces. Methods for solving multi-mode heat transfer are presented throughout the course. Heat exchangers and heat transfer from extended surfaces are two applications studied in the course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 411 Heat-Exchanger Design (3)** Thermal design and application of different heat-exchanger types, including surface selection and design optimization.

**Heat-Exchanger Design (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 420 Compressible Flow I (3)** Introductory compressible flow (gas dynamics), mathematical background, and physical concepts of isentropic flow, shock waves, expansion waves, and applications.

**Compressible Flow I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 421 Viscous Flow Analysis and Computation (3)** Apply analytical and computational methods to solve the differential equations describing fluid flow. Incompressible external flows past objects and internal flows in pipes and ducts are some problems considered.

**M E 421 Viscous Flow Analysis and Computation (3)**

M E 421 is an intermediate course in fluids mechanics that bridges between the required undergraduate fluid mechanics course and the graduate fluid mechanics courses. Steady and unsteady flows are considered past objects and in pipes, ducts, and annuli. Analytical and numerical methods are used to solve the boundary layer and Navier-Stokes equations that describe fluid motion. Analytical methods include solutions for steady and unsteady internal flows with heat transfer. Similarity equations for boundary layer flows are derived and then solved numerically using the Runge-Kutta method. Finite difference methods for viscous flows are introduced and applied. Turbulence modeling is presented and applied in a boundary layer code. The stages of transition from laminar to turbulent flow and methods for the prediction of transition are introduced.

Topics in M E 421 include:

1. Analytical solutions for one-dimensional viscous flows in Cartesian and cylindrical coordinates with heat transfer.
2. Unsteady viscous flow solutions using Separation of Variables.
3. Boundary layer similarity solutions using the Runge-Kutta method.
4. Panel method for incompressible inviscid flows.
5. Finite-differenced equations for viscous flows and the accuracy and stability of the schemes.
6. Using a commercial CFD code for a simple geometry.
7. Algebraic turbulence models and the approximations of each.
8. Higher-order turbulence models and the approximations used.
9. Stages of transition from laminar to turbulent flow.
10. Methods to predict boundary layer stability and transition.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 422 Principles of Turbomachinery (3)** Application of Newton's laws of motion and basic laws of thermodynamics to analysis of fluid flow in turbomachinery.

**Principles of Turbomachinery (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 427 Incompressible Aerodynamics (3)** Analysis of lift and drag using potential flow theory, effects of viscosity on potential flow calculations, wind tunnel testing.

**M E 427 Incompressible Aerodynamics (3)**

The primary objective of this course is to teach students how to determine aerodynamic lift and drag using a variety of techniques, including potential flow theory, viscous flow analysis, and wind tunnel testing. Students also learn the limitations of each technique and how they can be used together to obtain better results. Fundamental concepts in aerodynamics are also discussed, including lift, drag, aerodynamic moment, induced drag, viscous drag, pressure drag, separation, stall, circulation, downwash, camber, thickness ratio, and lift distribution. Students should be able to use knowledge gained in this course to solve aerodynamic design problems.

Students will be evaluated through the use of written exams during the semester, a comprehensive written final, and weekly homework assignments. This course is a technical elective in the Mechanical Engineering program and allows students who have completed ME BD 240, Elementary Fluid Mechanics, to improve their understanding of fluids by covering the subject in more detail and applying it specifically to aerodynamics problems. It will usually be offered annually in the spring semester.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 428 Applied Computational Fluid Dynamics (3)** Introduction to theory and application of computational techniques for solving fluid flow and heat transfer.

**M E 428 Applied Computational Fluid Dynamics (3)**

The purpose of this course is to teach students how to use a commercial CFD code to solve real-world engineering fluid flow problems. The definition of appropriate problem domain, set of governing equations, boundary conditions, and fluid properties is discussed. Sufficient theory of CFD is covered so that students are able to select appropriate elements or interpolation techniques and options, mesh size, pressure-correction technique and solution technique. Students are also taught how to interpret the results of a CFD simulation, including determination that the solution is physically realistic, conforms to the governing equations, is converged and grid independent, and determination of important engineering quantities such as net force, pressure drop and flow rate. Students are evaluated through the use of written exams during the semester, a comprehensive written final, weekly homework assignments, and a semester project. This course is a technical elective in the Mechanical Engineering program and allows students who are interested in fluid mechanics and heat transfer to further their study. It is offered periodically.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 430 (EGEE 430) Introduction to Combustion (3)** Concepts related to laminar and turbulent premixed and nonpremixed combustion with applications to propulsion and stationary systems.

**M E (EGEE) 430 Introduction to Combustion (3)**

This course provides an introductory treatment of combustion science. The objectives of the course are to develop in the students an understanding of combustion kinetics, combustion thermochemistry, flame dynamics, flame stability, and pollutant formation. Coverage includes laminar and turbulent flames, premixed and diffusion flames, and detonations. Emphasis is placed on the role that Kinetics, heat transfer, mass transfer, and fluid dynamics have on flame structure and flame stability. The course includes some laboratory demonstrations of flat flame and diffusion flame burners, and incorporates numerical calculations of thermodynamic and kinetic combustion phenomena. The course begins with a review of transport phenomena, physical gas dynamics, and thermochemistry. Then, the concept of the laminar flame speed is introduced in the context of a one-dimensional flame and a propagating chemical wave. Issues of premixed flame structure and stability are presented along with a discussion of flammability limits. Next, laminar diffusion flames are presented via the Burke-Schumann analysis. From laminar flames, the emphasis shifts to turbulent premixed and diffusion flames, and the concepts of flame stretch and strain. Detonations are considered, with emphasis on thermodynamic analysis of the detonation and the structure of the detonation wave. Details of chemical kinetics for the hydrogen-oxygen and hydrocarbon-air reaction systems are presented, with linkage back to earlier topics such as flame stabilization and flammability limits. After kinetic phenomena, the course then considers pollutant formation focusing on soot and NO<sub>x</sub>. The fundamental aspects of combustion are applied to analysis of the combustion process and pollutant formation in internal combustion engines and catalytic combustors. The course wraps up with discussion of atmospheric chemistry, the fate of pollutants, and the formation of secondary pollutants.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 431 Internal Combustion Engines (3)** Thermodynamic aspects of internal combustion engine design and performance; two- and four-stroke cycle, supercharged and non-supercharged, diesel and spark-ignition types.

**M E 431 Thermodynamics of Propulsion and Power Systems (3)**

This course is specifically designed to take advantage of the senior level standing of the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass, momentum, and energy conservation to relatively complex systems. These systems include spark-ignition and diesel engines, gas-turbine engines for power production, and turbojet engines. The integration of the topics of combustion, compressible flow, and psychrometrics allow these systems to be analyzed in their totality. Emphasis is on creating engineering models of these systems. The course aims to integrate previous knowledge and develop skill in "thinking like an engineer."

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 432 Rocket Propulsion (3)** Design and performance of rocket propulsion components and systems; thermodynamics, solid and liquid fuels, heat transfer, materials, controls, and instrumentation.

### **Rocket Propulsion (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 433 Fundamentals of Air Pollution (3)** Natural and man-made sources of pollution; atmospheric dispersion; biological and health effects; control systems; legislation and regulations.

### **M E 433 Analysis and Design in Vibration Engineering (3)**

In this course, students will learn basic techniques for modeling and analyzing linear multidegree-of-freedom (MDOF) mechanical systems, and will learn how to use these techniques for mechanical design. Students will learn to obtain equations of motion using energy methods (Lagrange's equations), with emphasis on the efficient formulation and reduction to the linear case. The basic theory of MDOF systems will be presented, including: eigenvalue problems; natural frequencies and normal modes; superposition and modal analysis; and frequency response. Numerical methods for solving static, dynamic and eigenvalue problems will be presented. Introductions to the theory of linear continuous systems and experimental methods of vibrations will be presented. A substantial portion of the course will be spent discussing design applications of the basic theory, such as: finite element numerical analysis and experimental modal analysis of beams and plates; vehicle suspension design; and vibration isolation and absorption.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 440W Mechanical Systems Design Project (3)** Design and analysis of mechanical components and systems. Application of fundamental design and analysis methods to open ended engineering problems.

### **M E 440W Mechanical Systems Design Project (3)**

Students develop and practice skills and techniques for managing and executing engineering design projects. These skills are applied to an industry-sponsored project. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students will travel to industrial sites to gain an understanding of existing processes and problems and to assess the customer's needs. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 441W Thermal Systems Design Project (3)** Design of thermal systems through component design and/or selection, system simulation and optimization. Assessment of system economics and energy efficiency.

### **M E 441W Thermal Systems Design Project (3)**

Students develop and practice skills and techniques for managing and executing engineering design projects related more to thermal design but not excluding mechanical design. These skills are applied to projects mostly sponsored by the industry. Project teams perform all facets of product and process design either on paper via use of computer models and/or as a physical product. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the

specification of manufacturing processes, prototyping of manufacturing processes and parts, design computations, drawings and performance via use of CFD and analysis and documentation of results. Students will travel to industrial sites when possible to gain an understanding of existing processes and problems and to assess the customer's needs. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages and reports.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 442W Advanced Vehicle Design I (2)** Part one of a two course sequence; applications of design and analysis methods to open-ended advanced transportation vehicles. Two semester course; satisfies Senior Design or ME Technical Elective requirements (when combined with M E 443W).

### **M E 442W Advanced Vehicle Design I (2)**

Students develop and practice skills and techniques for managing and executing engineering design projects. This is done in the context of an international University-level engineering design competition that is sponsored by government agencies and/or by industry. The competitions are structured to span a full calendar year, with the competition itself taking place in late Spring. For that reason, the course is spread over two semesters. In the Fall semester, there is approximately equal emphasis on classroom lectures and hands-on laboratory activities; in the Spring semester, the emphasis is on hands-on laboratory activities. The focus is advanced powertrain technology for personal transportation vehicles. Broader aspects of energy efficiency, security, and sustainability also will be discussed. The specific technologies that are targeted will evolve with time to remain ahead of what is available in current production vehicles. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students also will participate in broader aspects of the design competition. This may include securing sponsorship and funding, participating in outreach and public relations events, developing a business plan, developing a web site, and traveling to competition workshops and to the annual competition. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:  
 Concurrent: M E 410

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 443W Advanced Vehicle Design II (1)** Part two of a two course sequence; applications of design and analysis methods to open-ended advanced transportation vehicles. Two semester course; satisfies Senior Design or ME Technical Elective requirements (when combined with M E 442W).

### **M E 443W Advanced Vehicle Design II (1)**

Students develop and practice skills and techniques for managing and executing engineering design projects. This is done in the context of an international University-level engineering design competition that is sponsored by government agencies and/or by industry. The competitions are structured to span a full calendar year, with the competition itself taking place in late Spring. For that reason, the course is spread over two semesters. In the Fall semester, there is approximately equal emphasis on classroom lectures and hands-on laboratory activities; in the Spring semester, the emphasis is on hands-on laboratory activities. The focus is advanced powertrain technology for personal transportation vehicles. Broader aspects of energy efficiency, security, and sustainability also will be discussed. The specific technologies that are targeted will evolve with time to remain ahead of what is available in current production vehicles. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students also will participate in broader aspects of the design competition. This may include securing sponsorship and funding, participating in outreach and public relations events, developing a business plan, developing a web site, and traveling to competition workshops and to the annual competition. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 444** Engineering Optimization (3) Problem formulation, algorithms and computer solution of various engineering optimization problems.

### **M E 444 Engineering Optimization (3)**

Students will learn to formulate and solve a variety of engineering optimization problems. Basic concepts, problem formulation, scaling, use of different optimizers, effect of tuning parameters and starting points and solution interpretation will be taught. Example problems will be taken from mechanical, aerospace, nuclear, civil, chemical, electrical and other engineering disciplines. This course will complement other engineering design courses, such as capstone design. Students will learn how optimization can reduce product turnaround time, and to make decisions involving weight, stiffness, strength, performance, energy utilization, and other attributes. Pedagogy will focus on hands-on experience through computational problem-solving and graphical understanding. Technology classrooms and computer labs for instruction will be used. A by-product of this course is increased math and computer skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 445** Microcomputer Interfacing for Mechanical Engineers (4) Interfacing of electro-mechanical systems to microcomputers for data acquisition, data analysis and digital control.

### **Microcomputer Interfacing for Mechanical Engineers (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 446** (NUC E 446) Reliability and Risk Concepts in Design (3) Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications.

### **M E (NUC E) 446 Reliability and Risk Concepts in Design (3)**

The course covers materials reliability in design including mechanical, electrical and system aspects. Five main topics will be studied. The course starts by introducing engineering risk and reliability, highlighting its interdisciplinary nature and its significance in system design. The concept of reliability as a probability is introduced and the basic laws of probability are reviewed. The discussion centers on the mathematics needed to understand and analyze complex systems including components in series and parallel. The topics include the independence, mutual exclusivity, truth tables and Venn diagrams. These concepts are then applied to simple systems consisting of one, two and three components in various configurations. The equivalency of the various methods is discussed. The effect of maintenance on a system's reliability is presented along with discussions of various maintenance strategies. Then, the failure modes and effects analysis is introduced and examples discussed. The concept of fault trees and event trees and their application to reliability analysis are presented. Risk analysis is then introduced as a case study in the application of reliability analysis. A nuclear power plant system is analyzed to quantify the risk to the public from its operation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 448** Engineering Design Concepts (3) Engineering design and modelling, engineering economic analysis techniques, technical communication skills, project planning and design.

### **M E 448 Engineering Design Concepts (3)**

This course is the first of a two-part sequence of courses that make up the capstone design experience in the ME BD major (the second course is M E 449, Mechanical Design Projects). In this course students study the engineering design process, begin working on their senior design project, and learn about professional topics related to industry. Topics in the engineering design process include customer needs identification, development of engineering specifications, concept generation, concept selection, costing, and project planning. Professional topics include communication, team work,

ethics, safety, sustainability, globalization, and engineering economics. Students are evaluated on the design process and professional topics through assignments and quizzes. A major component of the course is to begin work on a capstone design project. Students work in teams of 3 to 4 on an industrially-sponsored project or other project approved by the faculty. The student teams work with the sponsor to develop specifications and a project plan, perform background research necessary to fully understand the project, begin to solve the problem, and make two presentations during the semester. The first presentation is a formal project proposal; the second presentation at the end of the semester is a progress report. Students are evaluated on both their technical and presentation skills, as well as their ability to function as a team. This course is required in the Behrend Mechanical Engineering (ME BD) program, and integrates material from a number of previous courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 449 Mechanical Design Projects (3)** Group or individual design projects in the areas of mechanical engineering.

### **Mechanical Design Projects (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 450 Modeling of Dynamic Systems (3)** Modeling and analysis of dynamic interactions in engineering systems. Classical and state variable methods; digital simulation; stability and dynamic response.

### **Modeling of Dynamic Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 452 Vehicle Road Dynamics (3)** Investigations of three-dimensional dynamics and design into the study of vehicle dynamics including tire forces, suspension, and stability.

### **Vehicle Road Dynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 455 Automatic Control Systems (3)** Dynamic analysis of systems involving automatic control of position, speed, power, flow, pressure, temperature, and other physical quantities.

### **Automatic Control Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 456 (I E 456) Industrial Robot Applications (3)** Introduction to robotics, with emphasis on robot selection, programming, and economic justification for manufacturing applications.

### **M E (I E) 456 Industrial Robot Applications (3)**

This course is a technical elective, and is normally taken by students in their Senior years. In this course, students learn

about present and future status of robot applications, and are required to apply fundamental knowledge of physics and mathematics to develop software to analyze and control robots.

The course deals with mechanics and control of robot manipulators and wheeled mobile robots. First, students are taught to analyze 3-D kinematics, statics and dynamics of robot manipulators. Then, control algorithms for robot manipulators are presented. Sensors, actuators and softwares used in industrial robots are discussed. In the end, kinematics and control of wheeled mobile robots are presented. During this course, application of computer, particularly Matlab, is emphasized as much as possible.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 460** Advanced Machine Design Problems (3) Special machine design problems in unusual types of springs; gear problems and involutometry; cam design and application; multiple diameter shaft deflections and ball bearings.

**M E (NUC E) 460 Reliability and Risk Concepts in Design (3)**

The course covers materials reliability in design including mechanical, electrical and system aspects. Five main topics will be studied. The course starts by introducing engineering risk and reliability, highlighting its interdisciplinary nature and its significance in system design. The concept of reliability as a probability is introduced and the basic laws of probability are reviewed. The discussion centers on the mathematics needed to understand and analyze complex systems including components in series and parallel. The topics include the independence, mutual exclusivity, truth tables and Venn diagrams. These concepts are then applied to simple systems consisting of one, two and three components in various configurations. The equivalency of the various methods is discussed. The effect of maintenance on a system's reliability is presented along with discussions of various maintenance strategies. Then, the failure modes and effects analysis is introduced and examples discussed. The concept of fault trees and event trees and their application to reliability analysis are presented. Risk analysis is then introduced as a case study in the application of reliability analysis. A nuclear power plant system is analyzed to quantify the risk to the public from its operation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 461** (E MCH 461) Finite Elements in Engineering (3) Computer modeling and fundamental analysis of solid, fluid, and heat flow problems using existing computer codes.

**M E (E MCH) 461 Finite Elements in Engineering (3)**

This is an introductory course in the Finite Element Method. Through this course, students gain knowledge in finite element theory and problem modeling. The mathematical formulation of the method is presented and then applied to problems in elasticity and heat transfer. Projects are assigned to demonstrate the finite element method in simplified problems using hand- calculations and computer programs such as Matlab. The use of commercial FEA programs is introduced and problems of increased complexity are assigned to demonstrate their use in a computer lab. Finally, problems of realistic complexity are assigned such that students can practice solving, documenting and presenting their use of commercial FEA programs.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 462** Lubrication in Machine Design (3) Lubricants and lubrication with applications to design aspects of machines and mechanisms including bearings, gears, cams, and automotive engines.

**M E 462 Lubrication in Machine Design (3)**

The course covers interdisciplinary materials on lubrication in machine design including mechanical, mechanics and chemistry aspects. Six main topics will be studied. The course starts by introducing engineering tribology, highlighting its interdisciplinary nature and its significance in machine design. Surfaces of machine components in contact are studied, including surface physiochemistry, surface topography, topographical measurements and characterization and classification of regimes of lubrication. Lubricants used in machine design are discussed in length, including types of



industrial lubricants, properties of lubricating oils: compositions, viscosity and additives, synthetic lubricants and engine oils. The course will develop the theory of fluid-film lubrication, including the mechanisms of pressure generation, configuration of tribo-contacts and the Reynolds equation. Hydrodynamic lubrication is studied. The topics include the machine components with hydrodynamic lubrication, thrust bearings, journal bearings and design considerations of these devices. The last topic to be covered is the theory and application of Elastohydrodynamic lubrication (EHL). First, the machine components with concentrated contacts are introduced. Then, the Hertz theory of contact is studied and the governing equations for EHL are derived. Thermal EHL and traction are studied, and design calculations for rolling bearings, cams and gears are developed in relation to the geometrical and kinematic features of these components.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 465** Introduction to Manufacturing Laboratory (1) A laboratory-based introduction to manufacturing processes including material removal, forming, casting and joining for metals and non-metals.

### **M E 465 Introduction to Manufacturing Laboratory (1)**

This laboratory course provides an integrated approach to Manufacturing Science and Engineering. The laboratory examines common techniques for fabricating parts; providing an introduction to several basic processes for creating both metallic and polymeric parts. As a part of this course, students will be exposed to compressive, tensile, sheet, bending, casting and powder metal processes. Using basic material science principles, students will examine concepts such as material flow, springback, and cold working. The course requires hands-on involvement by the students in the planning of experiments as well as data manipulation and analysis of results. The laboratory exercises are intended to provide students with a broad appreciation of the breadth of Manufacturing Science and Engineering. Students work in groups. Written reports and in-class exercises are the primary basis for grading.

This course is a technical elective.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 467** Applied Finite Element Analysis (3) Review of matrix algebra; discretization; finite element formulation; application of finite element computer codes.

### **Applied Finite Element Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 468** Engineering for Manufacturing (3) Manufacturability, the selection of the most effective materials and processes, and quality assurance.

### **M E 468 Engineering for Manufacturing (3)**

This course will present an overview of the various manufacturing techniques that are currently used within industry. The advantages and disadvantages of each manufacturing technique will be discussed along with common defects that occur with each process. The start-up, operating, maintenance, and labor costs of each process will be presented along with general manufacturing economical concerns. Statistics and Quality assurance topics will also be covered, along with manufacturability and design for manufacturing concepts.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 469** Metallic Manufacturing Processes (3) Principles of metal working and introduction to current theories; analysis of deformation, joining, and metal removal processes.

**M E 469 Metallic Manufacturing Processes (3)**

In this integrated lecture/laboratory course students will learn a) metal deformations techniques such as: forging, rolling, extrusion and drawing, b) metal removal techniques for single, multi and infinite point cutting, and c) metal fastening techniques, including bolts, rivets and welds. As a part of the learning process, students will directly compare existing standards and theories to actual laboratory results. Students will learn how to assess the accuracy of both theoretical derivations and experimental procedures by first deriving theoretical equations in the classroom and then directly examining the ability of the equations to predict the given behavior by actually performing the manufacturing operation in the laboratory. Based on in-depth discussions regarding assumptions, approximations, and experimental error, students will assess the ability of the current state-of-the-art techniques to accurately predict the forces generated/required during various manufacturing metal working operations. In addition, students will derive their own theories by removing/improving some assumptions within the existing theories. For processes where multiple theories exist, students will compare and contrast the predictive abilities of the various techniques to those found through controlled laboratory experiments. Similar comparisons will also be made for processes where both engineering standards and theoretical techniques exist.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 470** (E MCH 470) Analysis and Design in Vibration Engineering (3) Application of Lagrange's equations to mechanical system modeling, multiple- degree-of-freedom systems, experimental and computer methods; some emphasis on design applications.

**M E 470 Analysis and Design in Vibration Engineering (3)**

In this course, students will learn basic techniques for modeling and analyzing linear multidegree-of-freedom (MDOF) mechanical systems, and will learn how to use these techniques for mechanical design. Students will learn to obtain equations of motion using energy methods (Lagrange's equations), with emphasis on the efficient formulation and reduction to the linear case. The basic theory of MDOF systems will be presented, including: eigenvalue problems; natural frequencies and normal modes; superposition and modal analysis; and frequency response. Numerical methods for solving static, dynamic and eigenvalue problems will be presented. Introductions to the theory of linear continuous systems and experimental methods of vibrations will be presented. A substantial portion of the course will be spent discussing design applications of the basic theory, such as: finite element numerical analysis and experimental modal analysis of beams and plates; vehicle suspension design; and vibration isolation and absorption

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 471** Noise Control in Machinery (3) Nature of noise sources in machine elements and systems. Propagation and reduction of noise. Effects of noise on man.

**M E 471 Noise Control in Machinery (3)**

Course Objectives: This course prepares students to perform effectively as noise control engineers in industries with noise and vibration applications, e.g., during the early stages in product design or environmental noise control in industrial settings. Much of the material presented builds on second and third year courses covering such topics as dynamics, vibration, fluid mechanics and electrical components. Hands-on laboratory experiments (both programmed and open-ended) coordinated with focused lectures provide students with a working knowledge of the disciplines associated with noise and vibration and their practical applications for identifying, analyzing, and solving real world problems. The first part of the course centers on learning modules that cover the fundamentals of acoustics and noise control. Each module consists of two lectures followed with a laboratory experiment that demonstrates the relevant principles. These take place in small group settings (8 students maximum). Students are required to write individual reports based on the results of each of the laboratory experiments. The modules are followed with a laboratory project competition wherein each small group is given a noisy, small machine with the challenge to reduce its noise and vibration signatures. The course concludes with formal Power Point presentations of the results from each small group to an assessment team consisting of the industrial sponsors and selected professors and graduate students. This course is offered annually during the fall semester with an enrollment limited to 32 students (8/laboratory group).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 480 Mechanism Design and Analysis (3)** Design and analysis of mechanical linkages including kinematic synthesis and dynamic analysis. Linkages for a variety of applications are considered.

**M E 480 Mechanism Design and Analysis (3)**

The student who takes this course will develop a basic understanding of the analysis and synthesis of planar linkage mechanisms. Students will develop the ability to model real linkage mechanisms using kinematic diagrams, including identification of links and joints. They will also learn to use Gruebler's equation to calculate the mobility or number of degrees of freedom of linkages based on the kinematic diagram. Students will also become familiar with real mechanism applications in the context of mechanism synthesis, where they will learn to determine the required dimensions of a mechanism for a specific application. Students will apply these dimensional synthesis methods in a design project which includes building a simple linkage prototype. They will learn kinematic analysis methods, i.e., analysis of position, velocity, and acceleration of planar linkages. These methods consist of graphical, algebraic, and complex number approaches. Students will also learn to use commercial software packages, e.g. Working Model, to predict position, velocity, and acceleration of planar linkages, and will compare their predictions to those using analytical approaches. Finally, students will learn to do dynamic force analysis of planar linkages to predict joint forces and motor torques. They will use commercial software packages to predict joint forces and motor torques of planar linkages, and will compare their predictions to those using analytical approaches.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 481 Introduction to Computer-Aided Analysis of Machine Dynamics (3)** Techniques and formulations for computer based kinematic and dynamic analyses of machines.

**M E 481 Introduction to Computer-Aided Analysis of Machine Dynamics (3)**

This course addresses computer methods for kinematic and dynamic analyses of two-dimensional (2D) multi-body machines at the advanced undergraduate and introductory graduate level. The course introduces the formalism of kinematic mobility and topology to help students recognize constrained kinematic chains embedded in larger engineering systems. Classic kinematic and Newtonian dynamic methods are reformulated using modern matrix methods. The latter half of the course focuses on underlying algorithms and theory behind commercially available mechanism analysis software packages that employ differential-algebraic equation (DAE) solvers. Students program their own numerical integration methods for time domain simulation of forward dynamics of a simple system to reinforce the theory. The overall goals are for students to be able to identify forward versus inverse dynamic problems; and to be able to plan, implement and debug an appropriate computer-based design tool to analyze kinematics and dynamics of 2D constrained mechanisms.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 491 Bioengineering Applications of Mechanical Engineering (3)** Application of mechanical engineering knowledge in the context of life sciences.

**M E 491 Bioengineering Applications of Mechanical Engineering (3)**

The primary objective of this course is to teach students how to apply mechanical engineering knowledge in the context of life sciences. Fundamental mechanical engineering knowledge such as solid mechanics, fluid mechanics and system dynamics will be reviewed first. Then, different topics in bioengineering, such as motion biomechanics, physiological fluid mechanics, modeling of physiological systems, and rehabilitation engineering will be discussed. Throughout the semester, students also work in groups to solve several simplified real-life bioengineering projects. Students will be evaluated through these projects plus a final project presentation, an application presentation and several homework assignments. This course is a technical elective in the ME BD program and allows students who have completed their junior year to learn the application of mechanical engineering knowledge in the life science context.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 494H** Senior Thesis (1-9) Students must have approval of a thesis adviser before scheduling this course.

#### **M E 494H Senior Thesis (1-9)**

All Schreyer Scholars are required to complete an undergraduate honors thesis. This work represents the culmination of a student's honors experience. Through the thesis, the student demonstrates a command of relevant scholastic work and a personal contribution to that scholarship.

The thesis project can take many forms - from laboratory experiments all the way to artistic creations. The thesis document captures the relevant background, methods and techniques, as well as describing the details of the completion of the individual project. Two Penn State faculty members judge the merits of this Scholar's honors thesis, the student's self-selected thesis supervisor and the department-selected honors adviser in the student's area of honors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 496** Independent Studies (1-18) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 497A** Bioinspired Interfacial Engineering (3) The course will discuss how natural creatures utilize micro/nanoengineered material interfaces to interact with fluids/solids to achieve engineering functions.

### **Bioinspired Interfacial Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 497K** (NUC E 497K) Thermal-Hydraulics of Two-Phase Flow in Energy Systems (3) This course provides students with fundamental knowledge necessary for thermal-hydraulic analysis of single-phase and two-phase flow systems. The power reactor will be employed as a generic example of the thermal-hydraulic energy systems. In single-phase flow analysis, the one-dimensional thermal- hydraulic system analysis method, which is often employed by the industry's system analysis code, will be introduced for normal and off-normal plant operating conditions.

### **Thermal-Hydraulics of Two-Phase Flow in Energy Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 504** Advanced Engineering Thermodynamics (3) Pure and applied thermodynamics including its application to advanced engineering problems; collateral reading and discussion of the classical works on the subject.

### **Advanced Engineering Thermodynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 505** Design of Air Pollution Control Systems (3) Advanced principles of design drawn from professional literature, including mechanical collectors, electrostatic precipitators, filters, scrubbers, and industrial ventilation systems.

### **Design of Air Pollution Control Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 512** Heat Transfer--Conduction (3) One- and two-dimensional conduction heat transfer for steady state and transient systems with varying boundary conditions.

**Heat Transfer--Conduction (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 513** Heat Transfer--Convection (3) Laminar and turbulent flow heat transfer in natural and forced convection systems.

**Heat Transfer--Convection (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 514** Heat Transfer--Radiation (3) Thermal radiation fundamentals; specular and diffuse systems; differential and integral methods; numerical techniques; industrial applications.

**Heat Transfer--Radiation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 515** Two-Phase Heat Transfer (3) Heat transfer processes involving evaporation, boiling, and condensation.

**Two-Phase Heat Transfer (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 517** Techniques for Heat Transfer Enhancement (3) Study of advanced concepts in convective and two-phase heat transfer, with emphasis on techniques of heat transfer enhancement.

**Techniques for Heat Transfer Enhancement (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 520** Compressible Flow II (3) Two-dimensional subsonic flow; similarity rules; theory of characteristics; supersonic and hypersonic flows; nonsteady flow; oblique shock waves.

**Compressible Flow II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 521** Foundations of Fluid Mechanics I (3) First semester of core sequence in fluid mechanics; Navier-Stokes equations, potential flow, low Re flow, laminar boundary layers.

**Foundations of Fluid Mechanics I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 522** Foundations of Fluid Mechanics II (3) Second semester of core sequence in fluid mechanics; continuation of boundary layers, stability, transition, turbulence, turbulent boundary layers, turbulence models.

**Foundations of Fluid Mechanics II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 523** Numerical Solutions Applied to Heat Transfer and Fluid Mechanics Problems (3) Application of finite difference methods to the study of potential and viscous flows and conduction and convection heat transfer.

**Numerical Solutions Applied to Heat Transfer and Fluid Mechanics Problems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 524** (AERSP 524) Turbulence and Applications to CFD: DNS and LES (3) First of two courses: Scalings, decompositions, turbulence equations; scale representations, Direct and Large-Eddy Simulation; modeling; pseudo-spectral methods; 3 computer projects.

**Turbulence and Applications to CFD: DNS and LES (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 525** (AERSP 525) Turbulence and Applications to CFD: RANS (3) Second of two courses: Scalings, decomposition, turbulence equations; Reynolds Averaged Navier Stokes (RANS) modeling; phenomenological models; 3 computer projects.

**Turbulence and Applications to CFD: RANS (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 526** (AERSP 526) Computational Methods for Shear Layers (3) Study of numerical solution methods for steady and unsteady laminar or turbulent boundary-layer equations in two and three dimensions.

**Computational Methods for Shear Layers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 527** (AERSP 527) Computational Methods in Transonic Flow (3) Numerical solution of partial differential equations of mixed type, with emphasis on transonic flows and separating boundary layers.

**Computational Methods in Transonic Flow (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 530** Fundamentals of Combustion (3) Theoretical formulations and methods of solution of engineering problems and physical/chemical processes in various propulsion systems.

**M E 530 Fundamentals of Combustion (3)**

This course is devoted to the fundamentals of chemically reactive flow systems with application to modern jet, rocket, air-breathing engines, and other power generation systems. Experimental and theoretical foundations of steady-state reactions of homogeneous gas mixtures; application of mass and heat diffusion concepts to premixed and non-premixed gaseous flames, liquid-fuel droplet combustion; detonation waves, deflagration-to-detonation transition processes; ignition of gaseous mixtures. Methods for evaluation of thermal and transport properties of gases and liquids will also be discussed. While there are no prerequisites for M E 531, this course serves as a prerequisite for M E 532 (Turbulent and Two-Phase Combustion).

The course will:

- 1) help students acquire a better understanding of the fluid flow, heat transfer, and chemical reaction processes in combustion systems by presenting a systematic description of various analyses developed for describing the fundamental processes involved in chemically reacting flow systems;
- 2) demonstrate the usefulness of basic principles by performing analyses and obtaining solutions for various combustion problems encountered in engineering so that individuals can utilize them to solve "real-world" problems.
- 3) provide graduate students with the opportunity to demonstrate their abilities to absorb new materials and to present project results to the class.

It is anticipated that, upon completion of this course, students will be able to formulate models for simulating ignition and combustion problems in laminar flow conditions, solve certain types of models, and design laboratory experiments for some diagnostic measurements.

Students will be evaluated on the basis of class participation (5%), homework (20%), quizzes (5%), projects (25%), a mid-semester examination (20%) and a final examination (25%).

M E 531 will be offered each spring with an anticipated enrollment of 12 students; M E 532 will be offered each fall with an anticipated enrollment of 12.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 531** Species Measurements in Combustion Systems (1-3) Study of modern instrumentation techniques for determination of species concentrations in combustion systems.

**Species Measurements in Combustion Systems (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 532** Turbulent and Two-Phase Combustion (3) Fundamentals of chemically reacting turbulent flows in homogeneous systems including turbulent flames, spray combustion, ignition, reacting boundary layers.

**M E 532 Turbulent and Two-Phase Combustion (3)**

M E 532 is the second course of two-course sequence. Continuing where M E 531 (Fundamentals of Combustion) left off, this course is devoted to the fundamentals of chemically reacting turbulent flows in both homogeneous and heterogeneous systems with special emphasis on turbulent flames in gases; heterogeneous combustion; chemical reactions in boundary-layer flows; spray combustion of liquid fuel droplets; two-phase combustion of solid particles; and,



ignition of gaseous mixtures and condensed phases.

Upon completion of this course, students should be able to:

- 1) formulate a theoretical model to simulate a combustion problem, based upon knowledge of existing research.
- 2) identify the major mechanisms involved in a given combustion problem.
- 3) design a laboratory-scale test apparatus and test matrix to observe combustion phenomena and to take measurements.
- 4) interpret experimental results in terms of the trend of operating parameters.
- 5) validate the model using the experimental data and observations.
- 6) evaluate the merit of a model or experimental design presented in a technical article.
- 7) analyze realistic combustion problems using the basic principles of combustion and state-of-the-art technology.

Students will be evaluated on the basis of homework (20%), projects (25%), a mid-semester examination (25%), a final examination (25%), and class participation (5%).

M E 531 will be offered each spring with an anticipated enrollment of 12 students; M E 532 will be offered each fall with an anticipated enrollment of 12.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 533 Solid Propellant Combustion (3)** Introduction to phenomena of solid propellant combustion, analytical techniques for modeling propellant ignition and combustion behavior, experimental methods.

### **Solid Propellant Combustion (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 535 (AERSP 535) Physics of Gases (3)** An introduction to kinetic theory, statistical mechanics, quantum mechanics, atomic and molecular structure, chemical thermodynamics, and chemical kinetics of gases.

### **Physics of Gases (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 537 Laser Diagnostics for Combustion (3)** A study of laser-based techniques for measuring gas temperature and concentration in chemically reacting flows.

### **Laser Diagnostics for Combustion (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1990

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 546 (I E 546) Designing Product Families (3)** Product families, product platforms, mass customization, product variety, modularity, commonality, robust design, product architectures.

### **M E (I E) 546 Designing Products Families (3)**

Designing Product Families is a graduate-level course generally offered in the spring. It is designed for students interested in product realization, engineering design, and manufacturing to gain an understanding of mass customization and methods for designing families of products based on modular and scalable product platforms. The transition from craft production to mass production to mass customization will be covered in this course along with methods and tools for designing robust, modular, and scalable product platforms. Platform leveraging strategies and commonality metrics will be investigated through product dissection activities, which will also be integrated with lectures on evaluating manufacturing and assembly. Several industry case studies will also be discussed in the course to examine the

implications of producing a variety of products and strategies for effective mass customization and product postponement.

Students interested in taking this course should be familiar with product design and manufacturing.

Students are evaluated through individual and group homework assignments, in-class participation and activities, and a group project report and presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 547** (EDSGN 547, I E 547) Designing for Human Variability (3) Statistics, optimization and robust design methodologies to design products and environments that are robust to variability in users.

### **Designing for Human Variability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 550** (E E 550) Foundations of Engineering Systems Analysis (3) Analytical methods are developed using the vector space approach for solving control and estimation problems; examples from different engineering applications.

### **M E (E E) 550 Foundations of Engineering Systems Analysis (3)**

This 3-credit course is offered at the first-year graduate level and provides a systems-theoretic background for more advanced graduate courses in the disciplines of engineering and science. The course uses the vector space approach to develop the analytical foundations for solutions of science and engineering problems in diverse application areas such as optimal control, estimation, and signal processing. First, the theoretical foundation of vector spaces, function spaces, and Hilbert spaces are developed. Linear transformations are then introduced, followed by the Reisz-Frechet theorem and Hahn-Banach theorem, with applications to optimization problems. Spectral analysis is then covered. Finally, diverse applications of these various techniques are presented throughout this course to illustrate the wide range of engineering problems that can be solved using the vector space approach.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 554** Digital Process Control (3) Analysis and design of control systems with digital controllers, including PID, finite settling time, state feedback, and minimum variance algorithms.

### **Digital Process Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 555** Automatic Control Systems (3) Advanced problems and techniques in the design of automatic control systems with emphasis on stability, controller design, and optimum performance.

### **Automatic Control Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 556** (I E 556) Robotic Concepts (3) Analysis of robotic systems; end effectors, vision systems, sensors, stability and control, off-line programming, simulation of robotic systems.

**Robotic Concepts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 558** (E E 584) Robust Control Theory (3) Fundamentals of Robust Control Theory with emphasis on stability and performance analysis and design.

**Robust Control Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 559** (E E 587) Nonlinear Control and Stability (3) Design of nonlinear automatic control systems; phase-plane methods; describing functions; optimum switched systems; Liapunov stability; special topics in stability.

**Nonlinear Control and Stability (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 560** (E MCH 500) Solid Mechanics (3) Introduction to continuum mechanics, variational methods, and finite element formulations; application to bars, beams, cylinders, disks, and plates.

**M E (E MCH 500) 560 Solid Mechanics (3)**

This course introduces students to the fundamental principles and basic methods used in solid mechanics. Using indicial notation and integral formulations provides a foundation for more advanced study in continuum mechanics (E MCH 540) and finite element analysis (E MCH 560) specifically and in mechanics in general. The materials behavior is restricted to linear elastic and the emphasis is on stress analysis. Students are expected to have an understanding of elementary mechanics of materials (such as E MCH 013).

The course objectives are to:

- 1) provide students with a firm foundation in solid mechanics.
- 2) introduce continuum mechanics concepts, variational methods, and the formulation used in finite element analysis.
- 3) enable students to formulate and solve the boundary value problems commonly encountered in the analysis of structures.

The study of solid mechanics starts with the definition of stress and strain and how the two are related by material law. Field equations that relate strain to displacement, ensure a single valued displacement field, and the balance momentum are formulated. These are partial differential equations that can only be solved subject to known boundary and initial conditions. The field equations and boundary conditions comprise a boundary value problem that is usually difficult to solve exactly. Variational methods are used to bound or approximate the solution. The finite element method employs variational methods to formulate generic elements and is a computational tool for solving boundary value problems for complex geometries.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 561** Structural Optimization Using Variational and Numerical Methods (3) Shape and size optimization of elastic

structures, continuous and discrete solution methods and numerical algorithms, design of compliant mechanisms.

### **M E 561 Structural Optimization Using Variational and Numerical Methods (3)**

Optimal Structural Design is a graduate-level course generally offered in spring semester. The course is designed for graduate students in mechanical engineering or related fields who have already taken a course in finite element analysis. The course covers techniques in structural optimization from classical variational-based methods to modern numerical and finite element-based methods. Topics include shape and size optimization of elastic structures, continuous and discrete methods for least weight maximum stiffness design, solution using optimality criteria methods, structural topology optimization, gradient-based solution methods and numerical algorithms, and design project(s) using these methods. Methods are applied to examples such as beam and truss structures, compliant mechanisms, and piezoelectric actuators.

Computer programming skills using software such as Matlab are required. Students are evaluated based on homework assignments, review and presentation of articles from the literature, class participation, and a group design project.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 563 (E MCH 563) Nonlinear Finite Elements (3)** Advanced theory of semidiscrete formulations for continua and structures; emphasizes dynamic and nonlinear problems.

### **Nonlinear Finite Elements (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 564 Elastic and Dynamic Stability of Structures (3)** An introduction to the concept and analysis methods of structural stability; structures under static/dynamic loading and high speed conditions.

### **Elastic and Dynamic Stability of Structures (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 565 Optimal Design of Mechanical and Structural Systems (3)** Application of numerical optimization techniques to design mechanical and structural systems; design sensitivity analysis.

### **Optimal Design of Mechanical and Structural Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 571 (AERSP 571, E MCH 571) Foundations of Structural Dynamics and Vibration (3)** Modeling approaches and analysis methods of structural dynamics and vibration.

### **Foundations of Structural Dynamics and Vibration (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 572** Experimental Modal Analysis (3) The development of structural dynamic models from experimental data, analytical and experimental vibration, analysis methods, laboratory techniques.

### **Experimental Modal Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 573** (ACS 573) Designing Quiet Structures (3) Course integrates structural dynamics, acoustics and optimization into unified method for designing quiet structures virtually for early product development.

### **M E (ACS) 573 Designing Quiet Structures (3)**

During the past decade, several Mechanical & Nuclear Engineering faculty have been developing a broadly applicable methodology for the acoustic design of structures. The method integrates the disciplines of structural dynamics, acoustics and optimization into a unified approach that allows designers the possibility of including sound as a parameter in the early stages of product development. This course is designed as an introduction to this unique design method.

The format of the teaching style is a series of modular lectures each supplemented with an experiment (either numerical or physical) that students perform in teams. Because of the multidisciplinary nature of the course, the composition of the teams is balanced to ensure that at least one team member has a solid background in one of the three disciplines to be covered.

All of the experiments center on the problem of controlling the sound power spectrum of a structure via material tailoring, e.g., adding trim elements such as mass, stiffness, damping or dynamic absorbers. In particular, each team is asked to modify the acoustic signature of a selected structure to minimize its sound power radiation within a given frequency band. Optimization search routines identify the optimal location and size of the trim elements to give the best fit to the prescribed objective function.

Dedicated computer programs are available to students enrolled in this course.

Students are evaluated through individual and group homework assignments, in-class participation and activities, and a group project report and presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 577** (MATH 577) Stochastic Systems for Science and Engineering (3) The course develops the theory of stochastic processes and linear and nonlinear stochastic differential equations for applications to science and engineering.

### **Stochastic Systems for Science and Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 578** (MATH 578) Theory and Applications of Wavelets (3) Theory and physical interpretation of continuous and discrete wavelet transforms for applications in different engineering disciplines.

### **Theory and Applications of Wavelets (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 580** Advanced Dynamics of Machines (3) Linear and torsional vibrations in and balancing of rotating and reciprocating machinery; exact analysis of stresses produced by these and other dynamic forces in machine parts.

**Advanced Dynamics of Machines (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 581** Simulation of Mechanical Systems (3) Introduces computational fundamentals, including digital logic; programming language, basic numerical analysis and data processing, as applied to mechanical simulation techniques.

**Simulation of Mechanical Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 582** Mechanism Synthesis (3) Geometrical and algebraic methods for synthesizing planar and spatial mechanisms, dynamics of spatial mechanism.

**Mechanism Synthesis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 590** Colloquium (1) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597A** Atomistic-scale Simulation Methods for Engineers (3) Theory and software related to various atomistic-scale simulations methods and demonstrate engineering applications.

**Atomistic-scale Simulation Methods for Engineers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597A** Atomistic-scale Simulation Methods for Engineers (3) Theory and software related to various atomistic-scale simulations methods and demonstrate engineering applications.

**Atomistic-scale Simulation Methods for Engineers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597B** Optimal Control of Energy Systems (3) Optimal control theory and application to energy generation, storage, transmission, and management systems.

**Optimal Control of Energy Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597C** Battery Systems Engineering (3) Dynamic modeling, analysis, design, estimation, and control of battery systems.

**Battery Systems Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597D** Materials for Energy Conversion and Storage (3) This course examines materials related to energy conversion and storage techniques, including fuel cells and batteries. The course will consist of lecture, lab activities, and projects.

**Materials for Energy Conversion and Storage (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597E** Mechatronics (3) This class will facilitate hands-on investigation and learning of mechatronic systems via a problem-based approach. The course material will consist of lectures, lab activities, and major projects focused on the myriad areas of mechatronics.

**Mechatronics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597F** Vehicle Hardware in the Loops Method (3) This course is required for the Graduate Automotive Technology Education (GATE) Program in High Power, In-Vehicle Energy Storage.

**Vehicle Hardware in the Loops Method (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 597K** In-vehicle High-Power Energy Storage (3) One of two required core courses in the Penn State Graduate Automotive Technology Education (GATE) curriculum leading to a GATE certificate.

**In-vehicle High-Power Energy Storage (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 602** Suprvised Experience in College Teaching (1-3 per semester/maximum of 6) For graduate students helping to teach the beginning thermodynamics course, M.E. 22. Must have taken M.E. 504.

**Suprvised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 603** Foreign Academic Experience (1 per semester/maximum of 12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 610** Thesis Research Off Campus (1-15) No Description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Medical Ethics Profe (MEP)

**MEP 721** Medical Ethics and Professionalism (3) This course provides an introduction to bioethics and professionalism and provides a framework for understanding ethical issues in medicine.

**Medical Ethics and Professionalism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:  
Concurrent: CAR 722 REN 728 PLM 726 GI 729

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Medical Home Curricu (MHC)

**MHC 797** Medical Home Longitudinal Curriculum - Pilot (2) Medical Home Longitudinal Curriculum (3rd year pilot course).

**Medical Home Longitudinal Curriculum - Pilot (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MHC 797A** Medical Home Longitudinal Advanced Elective (5) The Medical Home Longitudinal Advanced Elective will provide continuity experiences for students to learn and witness the natural progression of illnesses, develop treatment options over time in a team format, as well as develop empathetic healing relationship with patients.

**Medical Home Longitudinal Advanced Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Medical Triag&Resusc (MEDTR)

**MEDTR 743** Triage and Resuscitation (5) This course provides knowledge and skills necessary for recognition and initial management of the patient with a potentially life-threatening illness or injury.

### Triage and Resuscitation (5)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Medicine-Hy (MED)

**MED 700** Clinical Clerkship in Medicine (15) To provide supervised clinical experience in the management of patients with acute and chronic illness.

### Clinical Clerkship in Medicine (15)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 715** Clinical Elective in Infectious Disease (5-10) Principles of human-host defense mechanism, host-parasite interactions, manifestations of various infections, systematic approach to problem solving, rational use of antibiotics.

### Clinical Elective in Infectious Disease (5-10)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 721** Cardiology Elective for 3rd Year Students (5) Students learn non-invasive and invasive cardiology procedures, then work as clinical clerks on an in-patient cardiology service.

### Cardiology Elective for 3rd Year Students (5)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 722** Medicine Acting Internship (5) Active participation on an advanced level in the diagnosis and management of patients admitted to the General Internal Medicine Services. More responsibility for decision-making and patient management is afforded subinterns than clinical clerks.

### Medicine Acting Internship (5)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 723** Clinical Elective in Gastroenterology (5-15) A program in clinical gastroenterology to expose student to basic GI physiology, pathophysiology, and management of gastrointestinal and liver problems.

**Clinical Elective in Gastroenterology (5-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 724** Clinical Elective in Hematology (5-15) Provides students with the basic understanding of the fundamental problems of hematology.

**Clinical Elective in Hematology (5-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 725** Clinical Elective in Medical Oncology (5-15) Introduces students to cancer chemotherapy and immunotherapy with emphasis on workings of lymphoma and solid tumor patients.

**Clinical Elective in Medical Oncology (5-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 727** Elective in Pulmonary Medicine (5-15) A clinical program in pulmonary medicine with emphasis in pulmonary physiology, pathophysiology, and patient diagnosis and management.

**Elective in Pulmonary Medicine (5-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 728** Clinical Program in Nephrology (5-10) Problems in clinical nephrology with emphasis placed on a pathophysiologic approach. Introduction to renal biopsy, peritoneal dialysis, and hemodialysis.

**Clinical Program in Nephrology (5-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 733** Cardiology Acting Internship (5) Advanced training in cardiovascular pathophysiology and diseases for fourth-year students functioning as acting interns.

**Cardiology Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 734** Clinical Elective in Endocrinology (5-15) Expose students to a large number of clinical endocrine problems, familiarize them with diagnostic laboratory procedures used in evaluating patients.

**Clinical Elective in Endocrinology (5-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 736** Clinical Management of Obesity (5) This course provides exposure to the multifaceted area of obesity management, including diabetes, bariatric surgery, medical management and pediatrics

**MED (SURG) 736 Clinical Management of Obesity (5)**

This course is designed to introduce 4th year students to a clinical approach to the co-morbidities associated with obesity and development of a treatment plan that incorporates a variety of treatment options (medical, surgical, pharmaceutical). Students will learn to counsel/motivate patients to make informed decisions consistent with adopting and maintaining a healthy lifestyle, including establishing appropriate dietary and exercise goals, and the behavioral skills to reach these goals.

Students will perform one patient encounter per clinic, where the student will be expected to perform a history and physical and design a plan specific for that patient. One of these sessions will be interchanged so the student will be able to observe one surgical procedure at Hershey Medical Center. Evaluation of patients will be augmented by Weight Management Program staff and will include interaction with clinical dietitians and the Department of Psychiatry staff to learn nutrition, physical activity, and behavioral skills. Students will be given an opportunity to perform body composition analysis. Students will be expected to demonstrate evidence of independent reading, and will complete a short review paper on an obesity related topic.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 738** Clinical Elective in Cardiology--Consultation Service (5) Students evaluate and follow in-patients on general non-cardiology services with cardiac problems referred to the Cardiology Consult Service.

**Clinical Elective in Cardiology--Consultation Service (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 742A** Allergy and Immunology Clinical Elective for 3rd Year Students (2.5) Allergy and Immunology Clinical Elective for 3rd year students.

**Allergy and Immunology Clinical Elective for 3rd Year Students (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 745** Geriatric Elective (5) Students will perform assessments and develop care plans for hospitalized elders who are transitioning to home or long-term care setting.

**Geriatric Elective (5)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 747 (PED 747) Pediatric Allergy, Asthma and Immunology Elective (5)** This course provides exposure to basic concepts for diagnosis and management of children and adults with allergic and immunologic diseases and respiratory and cutaneous abnormalities.

#### **MED 747 Clinical Elective in Allergy, Asthma and Immunology (5)**

The fourth year student rotating on the allergy service will experience an active and up to date Allergy and Immunology clinical service. Diseases you will be managing include allergic skin disorders, asthma, sleep, rhinitis, sinusitis, primary immunodeficiencies, recurrent infections, drug, food and insect allergy, and anaphylaxis. Developing an excellent history to include occupational, environmental and travel history will be facilitated. The student will be able to participate as an active member of the clinic and will have responsible for the patient. We anticipate that you will act as an intern and will manage the patient completely from start to finish. Clinic hours are daily 8 AM to 5 PM except Weds AM which is our academic time. In addition, to clinic there is an opportunity to participate in inpatient consults; however, the majority of time (90%) will be spend in the clinic seeing patients. Techniques include skin biopsy, skin test, patch testing, spirometry, and patient education and there will be ample opportunity to practice these techniques. Most of the education is done bedside during the patient's visit. Lastly, we expect that the student will present a short power point presentation, develop a manuscript or participate in research if time permits.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 748 Adult Rheumatology Elective (5)** This course provides exposure to concepts utilized in the diagnosis and management of rheumatic diseases in adults.

#### **MED 748 Adult Rheumatology Elective (5)**

This course is designed to introduce fourth year medical students to the basics of evaluation and management of adults with musculoskeletal disease with an emphasis on diagnosis and treatment of inflammatory and non inflammatory arthritis. This primarily outpatient experience will build on the concepts presented during the second year didactic course in MSK medicine that dealt with rheumatology topics as well as the Island I MSK portion which utilized physical diagnosis skills related to musculoskeletal joint evaluation. Students on this elective will serve as an integral part of the team and will be the first contact with returning and new patients in the outpatient clinic setting having had a chance to interact one on one with patients in order to practice history taking and exam skills. Students will then present the information to the attending physician where management and treatment options will be discussed. Pertinent physical exam and radiographic findings will be noted and technique for joint aspiration and injection will be demonstrated in the appropriate patients. Students will be expected to demonstrate evidence of independent reading on rheumatology topics and preparation of case based presentations for weekly conferences. Opportunities for interested students to participate in pediatric rheumatology clinics are also available during this time.

The overall goal of this elective is to allow students to attain the basic skills and knowledge necessary for the initial evaluation and diagnostic work up of common presenting musculoskeletal complaints in the primary care outpatient and in-patient settings. Emphasis will be placed on pathophysiology, differential diagnosis, physical exam findings and management options as well as the essential portions of the history and physical exam. Students will be encouraged to practice their musculoskeletal exam skills under supervision in order to become proficient by the end of the four week elective.

Evaluation methods will include a pre-test and post-test as well as subjective evaluation of students' fund of knowledge and patient care skills by the attending rheumatology faculty. This course will be offered throughout the entire academic year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 749 Medical Intensive Care Acting Internship (4th year) (5)** Senior students assume Acting Intern responsibilities for Medical ICU level patients. This intense training is recommended for highly motivated students interested in a "hands-on" experience in the critical care unit.

#### **Medical Intensive Care Acting Internship (4th year) (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 757** Hematology-Oncology Subinternship (5) Students will function as acting interns in the inpatient hematology/oncology unit under the direction of senior housestaff fellows and faculty.

### **Hematology-Oncology Subinternship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 796** Medicine Individual Studies (5) Clinical or laboratory research on a selected topic by special arrangement with member of faculty who will act as preceptor.

### **Medicine Individual Studies (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 796A** Medicine Individual Studies for 3rd Year (2.5) Medicine individual studies for 3rd year.

### **Medicine Individual Studies for 3rd Year (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MED 797** Medicine Special Topics (5) Advanced clinical training in internal medicine or subspecialty --neurology, cardiology, clinical pharmacology, hematology, gastroenterology, endocrinology, pulmonary medicine, renal disease.

### **Medicine Special Topics (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Medieval Studies (MEDVL)**

**MEDVL 411** (IL) (HIST 411) Medieval Britain (3) Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

### **Medieval Britain (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MEDVL 411U** (IL) (HIST 411U) Medieval Britain (3) Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

**Medieval Britain (3)**

General Education: None

Diversity: IL

Bachelor of Arts: Humanities

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 413** (IL) (HIST 413) Medieval Celtic Studies (3) Celtic civilization from antiquity to the end of the middle ages.

**Medieval Celtic Studies (3)**

General Education: None

Diversity: IL

Bachelor of Arts: Humanities

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 499** (IL) Foreign Studies (12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 595** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 596** Individual Studies (1-9) Creative projects, including nonthesis research that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 599** (IL) Foreign Studies (1-12 per semester; maximum of 24) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12 per semester; maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Students experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

#### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MEDVL 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Meteorology (METEO)**

**METEO 410** Advanced Topics in Weather Forecasting (3) Exploring highly specialized topics and techniques in weather forecasting that span from mesoscale to planetary spatial scales and short-term to long-range time scales.

#### **METEO 410 Advanced Topics in Weather Forecasting (3)**

T.H. Huxley's passage from Biogenesis and Abiogenesis -- "The great tragedy of Science - the slaying of a beautiful hypothesis by an ugly fact" (1870) -- will serve as the springboard for learning in METEO 410. In the spirit of a "beautiful hypothesis," forecasters' diagnoses of the present state of the atmosphere and their prognoses for how the atmosphere will evolve with time may be scientifically sound. Yet, local weather can turn out dramatically different than the intent of the forecast (the ugly fact). To compound this "great tragedy of Science," weather forecasters routinely spend most of their preparation time on local details, particularly when the weather tends to get more interesting.

Nonetheless, there are "master forecasters" who regularly avoid great tragedies in weather forecasting. Master forecasters will prudently weigh the length of the forecast time as well as interactions between weather features on the hemispheric, synoptic, meso and local scales while, at the same time, they will adroitly use an array of forecasting tools to arrive at a high-quality local forecast. With the prudent and seasoned approach of the master forecaster in mind, METEO 410 will provide students with a master apprenticeship in weather forecasting. As master apprentices, students will learn highly specialized tools and techniques that will help them to hone and expand their overall forecasting skills.

For example, students will learn a new technique for forecasting rare and extreme weather that is based on assessing departures of specific meteorological fields from climatological norms. In the process, students will study rare historic events, such as the great ice storm across northern New England and eastern Canada in 1998. Along the way, students will learn some basic statistics, including climatological means and standard deviations.

As master apprentices, students will also learn about medium-range forecasting (three to seven days into the future) and medium-range computer models. Students will learn how to implement modern prediction techniques, such as ensemble forecasts from computer models. Master forecasters increasingly take advantage of this avant-garde technique in short to medium-range forecasting.

Unique learning modules, which run the gamut from forecasting wildfires to learning about the influence of the North Atlantic Oscillation on long-range forecasts (seven days or more), will provide students with the tools to understand the bases for all the forecasts they see on television, hear on the radio, read in publications such as *Weatherwise*, or access on

the World Wide Web. For example, students will learn about the forecasting products issued by the Climate Prediction Center, which include seasonal outlooks that focus on the seasonal impacts of La Nina and El Nino.

To facilitate the learning objectives, METEO 410 will include the use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, text, and interactive quizzes that provide timely feedback.

It should be noted here that METEO 410 will be one of four courses required for students to earn a Certificate of Achievement in Weather Forecasting, a unique online program offered through Penn State's World Campus. The three other courses that will comprise this online program are METEO 101: Understanding Weather Forecasting, METEO 241: Fundamentals of Tropical Forecasting and METEO 361: Fundamentals of Mesoscale Weather Forecasting.

To demonstrate their mastery of the learning objectives, students will complete automated online quizzes, actively engage in online discussion groups focusing on real-time weather, and publish, to a personal "e-portfolio", four comprehensive projects that will explore timely case studies related to weather forecasting. The e-portfolio will take the form of a Web site that students initially create during the second course of the program (METEO 241 or METEO 361). Students will augment their e-portfolio as part of the requirements for METEO 241, METEO 361 and METEO 410. They will also use the space to reflect on their learning.

At the end of the program, students will make a final e-portfolio entry that highlights their program accomplishments. In this way, the e-portfolio will serve both as a showcase of a student's work for the purpose of course assessment and as a chronicle of a student's achievements during the program. By using their Penn State personal Web space to host their e-portfolios, students will be able to share their work not only with program faculty and students, but also with external audiences, including potential employers. Upon successful completion of the program, graduates will receive a copy of their final e-portfolio on CD-ROM.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 411** Synoptic Meteorology Laboratory (4) Techniques of analyzing synoptic scale weather situations; introduction to weather forecasting.

#### **Synoptic Meteorology Laboratory (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 413** Map Analysis (3) Analysis of actual surface weather observations, with emphasis on the Norwegian cyclone model, missing or bad data, and mesoscale phenomena.

#### **METEO 413 Map Analysis (3)**

METEO 413, Map Analysis, is designed as a professional elective for Meteorology majors and as such it is primarily taken by fourth-year students. Third-year students who have completed METEO 411 may also register for Map Analysis. The course encourages students to tie together concepts learned in prior meteorology courses through analysis of numerous weather maps from across the northern hemisphere both at the surface and above. This is accomplished by improving the student's understanding of the cyclone model and applying that knowledge to "real-life" analyses where data quality may be compromised and topographic and other mesoscale factors may be important. Grades are based upon the best 13 of 14 lab assignments, 2 or more quizzes, and in-class assignments. Class participation is rewarded on an extra-credit basis. METEO 413 is offered each spring; enrollment is limited to 15 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 414** Mesoscale Meteorology (4) A survey of conceptual models and analysis techniques for mesoscale atmospheric features.

#### **Mesoscale Meteorology (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 415** Forecasting Practicum (3) Modern techniques in weather analysis and forecasting.

**Forecasting Practicum (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 416** Advanced Forecasting (3) Competitive, simulated, operational, real-time forecasting is covered.

**Advanced Forecasting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 418W** Topics in Mesoscale Meteorology (3) Topics in mesoscale meteorology will be investigated in an independent study environment through computer-based modules, papers, and semester project.

**Topics in Mesoscale Meteorology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 419** Air Quality Forecasting (3) Issues relating to the prediction and dispersion of air pollutants as discussed.

**METEO 419 Air Quality Forecasting (3)**

Prediction of air quality is discussed from the perspective of operational weather forecasting. The chemical properties of pollutants for which public forecasts are currently made, fine-scale particulate matter and ozone, are summarized to provide the physical background for making forecasts. The impacts of weather on pollutant concentrations are discussed. Current techniques for forecasting air quality are presented and used by the students to create their own air quality forecasts. Students present air quality weather briefings and post-analysis of significant historical air quality events. To take this course, students must have the background provided in a basic course in chemistry and a basic course in meteorology that covers weather systems governing the transport of air pollution.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 421** Atmospheric Dynamics (4) Balanced and unbalanced flows, vorticity, circulation and potential vorticity, an introduction to wave dynamics and stability analysis, and a quantitative discussion of the general circulation.

**Meteo 421 Atmospheric Dynamics (4)**

This course builds on the foundation laid in METEO 300, Fundamentals of Atmospheric Science, by presenting applications of the equations of motion to the description of a variety of atmospheric motions. The dynamics of balanced flows (e.g., geostrophic winds) are reviewed and contrasted with unbalanced flows (e.g., inertial oscillations, isallobaric and convective isallobaric winds) that often help to maintain geostrophy (for examples, frontogenesis). The intrinsically rotational aspects of large-scale atmospheric motions are presented through a discussion of vorticity dynamics (including both relative and planetary vorticity) and the related circulation theorems of Kelvin and Bjerknes that culminate in

potential vorticity thinking. An introduction to wave dynamics presents the perturbation method and the concepts of phase and group velocity with applications to gravity and Rossby waves, and to geostrophic adjustment. These techniques are then applied to the stability of convective, barotropic, and baroclinic motions. Finally, the general circulation (including zonally averaged circulation, longitudinally dependent features, the angular momentum budget, and the Lorenz energy cycle) is discussed quantitatively to provide a description of planetary-scale motions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:  
 Concurrent: METEO 431 MATH 251 PHYS 212

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 422 Advanced Atmospheric Dynamics (3)** Survey of advanced dynamical topics including instabilities, numerical modeling, and others of current interest.

### **METEO 422 Advanced Atmospheric Dynamics (3)**

This course in atmospheric dynamics covers advanced topics, including instabilities that lead to the development of various atmospheric phenomena at the synoptic and smaller scales, numerical modeling principles and applications, topographic gravity and Rossby waves, understanding of the general circulation that can be used for extended-range forecasting, and frontal structure and frontogenesis. Some additional topics will vary at the discretion of the instructor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 431 Atmospheric Thermodynamics (3)** Classical thermodynamics applied to both the dry and the moist atmosphere.

### **Atmospheric Thermodynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 434 Radar Meteorology (3)** Fundamental operating principles of radars, with application to observation of meteorological phenomena.

### **METEO 434 Radar Meteorology (3)**

Students will learn the basic operation principles of weather radar as it affects the taking and interpreting of measurements of weather phenomena. To achieve this ability, students must master concepts of radar design and operation, electromagnetic propagation through and scattering by atmospheric constituents, and the characteristics of atmospheric scatterers. With these tools in hand, the class will focus on interpreting weather phenomena. One-third of each lecture will be dedicated to the discussion and interpretation of student-provided radar images. Students will actively participate in the class through bringing radar observations to class for discussion. They will be required to access data from the World Wide Web, organize it for a computer-based presentation, do an in-class presentation and lead the subsequent discussion. Students should have a basic background in electromagnetic theory, such as can be acquired in a physical meteorology course (METEO 437), as well as have either completed or be co-registered for a mesoscale meteorology class (METEO 414). Students will be evaluated based on class participation, homework and two exams.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:  
 Concurrent: METEO 414

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 436 Radiation and Climate (3)** Elements of earth-sun geometry, radiative transfer, photochemistry, remote sensing

of the atmosphere, physical climatology, climate forcing.

### **METEO 436 Radiation and Climate (3)**

This course covers radiation and how it interacts with the atmosphere and earth's surface to drive motions in the atmosphere. The fundamentals of radiative transfer at the molecular level, including absorption, scattering, transmission, and emission of radiation by matter, are discussed and applied to help describe the earth's energy budget. Crucial to understanding these processes in the atmosphere are the interactions of radiation with water in the vapor, liquid, and solid states. Applications of radiative transfer to the understanding of seasons and of climate and climate change are presented as well.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:  
Concurrent: METEO 431

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 437 Atmospheric Chemistry and Cloud Physics (3)** Properties of aerosols and clouds, cloud nucleation and precipitation processes, atmospheric electricity, cloud and precipitation chemistry, biogeochemical cycles.

### **METEO 437 Atmospheric Chemistry and Cloud Physics (3)**

This course develops an understanding of how the physical and chemical properties of the atmosphere influence cloud and precipitation formation, as well as how clouds in turn affect the properties of the atmosphere. The roles that chemistry and clouds play in modulating weather, climate, and atmospheric electricity are also treated.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 440W Principles of Atmospheric Measurements (3)** Theory and practices used in measurement and analysis of meteorological variables.

### **METEO 440W Principles of Atmospheric Measurements (3)**

The standard theories and practices used in measurement and analysis of atmospheric variables are surveyed in the lecture portion of the course. The laboratory portion of the course provides students hands-on experience with using standard and self-produced instruments to make reliable measurements and with analyzing meteorological observations to determine their significance. In the laboratory reports, students learn the fundamentals of appropriate scientific writing to summarize the objectives of the lab exercise, to provide an analysis of the observations, and to critique the results. The initial drafts of these reports are evaluated critically by the instructors and teaching assistants and then are revised by the students based on these evaluations. Discussion of scientific writing and of proper report protocols are presented in the course as well.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 446 Laboratory in Atmospheric Physics II (1)** Experimental practices in cloud and aerosol physics, atmospheric electricity, atmospheric chemistry, radar meteorology.

### **Laboratory in Atmospheric Physics II (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 451 Introduction to Physical Oceanography (3)** Air-sea interaction, wind-driven and thermohaline circulations,

upwelling, El Nino, waves, and tides.

### **METEO 451 Elements of Physical Oceanography (3)**

The primary objective of this course is to describe the circulation of the ocean and present a theoretical basis for understanding it. The focus is on the large-scale, basin-wide features of the ocean circulation, such as: 1) the subtropical ocean gyres that contain the wind-driven western boundary currents like the Gulf Stream, 2) the equatorial oceans that respond rapidly to external forcing to produce phenomena like El Nino, and 3) the thermohaline circulation that acts as a slow regulator of the earth's climate. A main goal is to demonstrate to meteorology students that the ocean is not a static, passive lower boundary to the atmosphere but a dynamic, evolving entity that is intimately coupled to the atmosphere through the exchange of heat, momentum, and water. Thus the oceans affect weather and climate. Students are evaluated on their comprehension of the relevant physical processes (as determined by written examinations) and by term papers and laboratory reports or a combination of the two. This course will be offered annually with an enrollment of about 12 students.

Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 452 Tropical Meteorology (3)** Atmospheric processes in the tropics; mass, heat, energy, momentum, and water vapor budgets, cumulus convection, hurricanes and other disturbances.

### **Tropical Meteorology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 454 Introduction to Micrometeorology (3)** Physical processes and their measurement in the lowest layers of the atmosphere; application to hydrology, plant systems, and air pollution.

### **METEO 454 Introduction to Micrometeorology (3)**

Students will learn the basic fluid mechanics and thermodynamics of the atmospheric boundary layer (ABL), the lowest few hundred meters to few kilometers of the atmosphere. Specific topics covered include:

1. Introduction to micrometeorology
2. The surface energy budget
3. Radiation balance near the surface
4. Soil heat transfer
5. Air temperature and humidity in the boundary layer
6. Wind distribution in the boundary layer
7. Introduction to viscous flows
8. Introduction to turbulence in the boundary layer
9. Semi-empirical theories of turbulence

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 455 Atmospheric Dispersion (3)** The basic principles of atmospheric flow, introduction to the modeling of turbulent diffusion, and the use of EPA dispersion models.

### **METEO 455 Atmospheric Dispersion (3)**

Students will learn both the theory and current practice of numerical modeling of the turbulent dispersion of effluents from sources in the atmospheric boundary layer. Lab sessions involve hands-on experience with the numerical models used in the applied dispersion community. Classroom sessions cover the boundary-layer meteorology and dispersion theory on which these models are based. In laboratory sessions, students become acquainted with the present practice of short-range atmospheric dispersion modeling through:  
exploring the air-quality resources available on the World Wide Web

examining the design of the air-quality models used today in permitting and hazardous-release applications  
 discussing the input data needed by the models, the nature and reliability of their predictions and the advantages of improved models including AERMOD  
 running the models SCREEN3 and ISC (the U.S. EPA's Industrial Source Complex model).

Lectures on boundary-layer meteorology include:

the atmospheric boundary layer, turbulence, and the surface energy budget  
 buoyancy, stability and their influence on the atmospheric boundary layer  
 mass conservation in fluid motion, turbulent and molecular fluxes and their roles in atmospheric dispersion  
 the contrast between instantaneous and average properties of turbulent flow, the convergence of averages and implications for dispersion models

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 460 Weather Risk and Financial Markets (3)** This course will introduce the role that weather plays as a source of financial and operational risk for businesses, market and other institutions.

### **METEO 460 Weather Risk and Financial Markets (3)**

The course introduces students to the role that weather plays as a source of financial and operational risk for business, markets, and other institutions. It also introduces the tools and concepts for weather risk management-the insurance products, financial instruments, and decision tools that organizations use to manage, reduce, and transfer their weather-related risks. Major topics include: (i) The concept of risk and the role of weather as a driver of economic risk; (ii) Probabilistic approaches to weather forecasting; (iii) Techniques for valuation of weather derivatives; (iv) Links between weather and markets for energy and agricultural commodities; and (v) Management of catastrophic hurricane risks. Weekly assignments culminate in a major student project on weather risk management.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 465 Middle Atmosphere Meteorology (3)** A topical survey of physical, chemical, and dynamical processes at work in the stratosphere and mesosphere (middle atmosphere).

### **Middle Atmosphere Meteorology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1988

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 466 Planetary Atmospheres (3)** A survey of planetary atmospheres and the chemical and physical processes by which they form and evolve.

### **Planetary Atmospheres (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 469 From Meteorology to Mitigation: Understanding Global Warming (3)** Introduction to global warming and climate change: the basic, science, projected impacts, and approaches to mitigation.

### **METEO 469 From Meteorology to Mitigation: Understanding Global Warming (3)**



Human-caused climate change represents one of the great environmental challenges of our time. As it is inextricably linked with issues of energy policy, a familiarity with the fundamentals of climate change is therefore critical for those looking to careers in the energy field. To appreciate the societal, environmental, and economic implications of policies governing greenhouse gas emissions, one must further understand the basic underlying science. METEO 469 serves to lay down the fundamental scientific principles behind climate change and global warming. A firm grounding in the science is then used as a launching point for exploring issues involving climate change impacts and mitigation. METEO 469 will introduce students to the basic information necessary for understanding Earth's climate, including the relevant atmospheric processes, and aspects of other key components of the climate system such as the cryosphere, hydrosphere, and biosphere. Students will learn how to do basic computations and to use theoretical models of the climate system of varying complexity to address questions regarding future climate change. Students, further, will explore the impacts of various alternative greenhouse gas emissions scenarios and investigate policies that would allow for appropriate stabilization of future greenhouse gas concentrations. The structure of the course roughly parallels the treatment of the subject matter by the reports of the Intergovernmental Panel on Climate Change (IPCC), focusing first on the basic science, then the future projections and their potential impacts, and finally issues involving adaptation, vulnerability, and mitigation. METEO 469 will combine digital video, audio, simulation models, virtual field trips to on-line data resources, text, and interactive quizzes that provide instantaneous feedback.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 470 Climate Dynamics (3)** The fundamental principles that govern Earth's climate and their relevance to past and future climate change.

### **METEO 470 Climate Dynamics (3)**

Climate Dynamics delves into the fundamental processes that control the earth's climate of the past, present, and future. Fundamentals are developed from concepts of basic dynamic meteorology, radioactive transfer, and thermodynamics. Basic atmospheric radioactive transfer, the surface energy and hydrologic budgets, and the atmospheric and oceanic circulation are covered. A survey of the earth's climate through geologic history is also covered, including extinction events and the impacts on climate. The concepts developed in this course are applied to the topic of anthropogenic climate change and how various aspects of the system could be influenced by global warming.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 471W Observing Meteorological Phenomena (3)** Teaching the observational and interpretative skills needed to read the sky.

### **Observing Meteorological Phenomena (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 473 Application of Computers to Meteorology (3)** Application of statistical and numerical methods to practical problems in meteorology.

### **Application of Computers to Meteorology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 474 Computer Methods of Meteorological Analysis and Forecasting (3)** Distribution of scalars and vectors; sampling; regression and correlation in two and three dimensions; time series, statistical forecasting; forecast verification.

### **METEO 474 Computer Methods of Meteorological Analysis and Forecasting (3)**

**Meteorology 474: Computer Methods of Meteorological Analysis and Forecasting** explores the computationally intensive statistical methods used in the development of automated weather analysis and forecasting systems. The focus of the course is on learning to develop and use artificially intelligent automated systems to perform data quality control, quantitative analysis of large meteorological data sets, and weather forecasting. Coverage will include the relevant statistical, mathematical, and computational methods including matrix operations, data quality control, regression analysis, neural network construction, decision tree growth, and forecast system verification. Students will leave the course with an understanding of how to efficiently develop accurate and robust statistical weather analysis and prediction systems. Thus, the course serves as a professional elective for those students wishing to pursue careers in statistical weather forecasting, meteorological data analysis, and associated fields. Meteorology 474 uses a project oriented lecture/lab format to provide students with hands-on experience in developing and testing weather analysis and forecast systems. Students will both code their own forecast system development programs and use off-the-shelf software designed for rapid development and testing of forecast systems. To tackle these assignments, students will team up in pairs using the computer laboratory facilities of the Meteorology Department and meteorological data sets of current interest. A key element of the resulting project reports will be an investigation into the origin of the observed forecast system errors. One section of Meteorology 474 will be offered each year with a capacity of approximately 20 students. The class size is tailored to in-class training with the software tools and open discussion with the instructor and classmates. Grading will be based on the team assignments and on a mid-term and final examination.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 477 (E E 477) Fundamentals of Remote Sensing Systems (3)** The review of fundamental physical properties leads into discussions of various techniques, including imaging, spectroscopy, radiometry, and active sensing.

#### **Fundamentals of Remote Sensing Systems (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 480M Undergraduate Research (3)** A research thesis will be prepared. A written and oral presentation required.

#### **Undergraduate Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 480M Undergraduate Research (3)** A research thesis will be prepared. A written and oral presentation required.

#### **Undergraduate Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 480W Undergraduate Research (3)** A research thesis will be prepared. A written and oral presentation required.

#### **Undergraduate Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1991  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 481** Weather Communications I (3) Multi-instructor weather communications survey including forecasting, science teaching and writing, television and radio broadcasting, climate studies, forensics, industrial applications.

**Weather Communications I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 482** Weather Communications II (3) Multi-instructor workshop designed to mimic real-life applications of weather communications in industry, broadcasting, the courtroom, and the classroom.

**Weather Communications II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 483** Weather Communications III (3) Individualized course designed for in-depth study of weather communications in industry, broadcasting, the courtroom and/or the classroom.

**Weather Communications III (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 486** Pennsylvania Climate Studies (1-2 per semester/maximum of 3) An overview of the Pennsylvania State Climate Office and an introduction to various aspects of its operations.

**METEO 486 Pennsylvania Climate Studies (1-2)**

Those interested in climate topics will become thoroughly acquainted with the important process of acquiring and assessing the quality of climate observations. Students will be introduced to the various observational networks and data formats. They will learn to manipulate large climate data fields using both flat and relational database management systems. Each student will contribute to the state climate web page and will conduct a research project during the second half of the semester. This course will be offered in fall and spring semesters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 495A** Meteorology Communications Internship (3 per semester/maximum of 6) Internship focusing on communication of weather forecasts or other meteorological information.

**METEO 495A Meteorology Communications Internship (3 per semester/maximum of 6)**

A student participates for at least 100 hours in an internship with an agency or company that focuses on communication of weather forecasts or other meteorological information. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed the required course on synoptic meteorology. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 495B Meteorology Private Sector Internship (3 per semester/maximum of 6)** Internship focusing on meteorological problems and applications pursued by private sector companies.

**METEO 495B Meteorology Private Sector Internship (3 per semester/maximum of 6)**

A student participates for at least 100 hours in an internship with a private sector company that focuses on problems or applications that use meteorological information. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed the required course on synoptic meteorology. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 495C Meteorological Operations Internship (3 per semester/maximum of 6)** Internship focusing on time-sensitive meteorological applications such as weather or climate forecasts that are produced.

**METEO 495C Meteorological Operations Internship (3 per semester/maximum of 6)**

A student participates for at least 100 hours in an internship in an operational setting that focuses on the creation of time-sensitive meteorological products such as weather or climate forecasts. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed the required course on synoptic meteorology. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 495D Meteorological International Internship (3 per semester/maximum of 6)** Meteorological internship in an international setting.

**METEO 495D Meteorological International Internship (3 per semester/maximum of 6)**

A student participates for at least 100 hours in an internship in an international setting that focuses on applying meteorological knowledge. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to 400-level meteorology coursework, students must have completed at least six credits of Meteorology courses. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 495E** Meteorological Off-Campus Research Internship (3 per semester/maximum of 6) Off-campus meteorological internship focusing on a research project.

**METEO 495E Meteorological Off-Campus Research Internship (3 per semester/maximum of 6)**

A student participates for at least 100 hours in an internship whose focus is a research project requiring applications of meteorological knowledge. This internship is normally completed after the junior year. To provide sufficient background for performing atmospheric research successfully, students must have completed at least nine credits of 400-level Meteorology courses. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 501** Atmospheric Phenomena (3) Overview of the complex interactions within the atmosphere, ranging from molecular to global scale.

**Atmospheric Phenomena (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 511** The Weather From Global to Micro Scales (3) Conceptual models and underlying physics for weather phenomena on scales from the global general circulation to turbulence.

**METEO 511 The Weather From Global to Micro Scales (3)**

Earth's weather occurs on a variety of scales from the global general circulation down to microscale turbulence. This spectrum includes synoptic scale storms whose structure and dynamics vary with latitude and topography as well as a broad range of mesoscale phenomena whose structure depends strongly on the vertical structure of the atmosphere. At these intermediate scales, each phenomenon draws energy from conditions created by phenomena of both larger and smaller scale phenomena. Thus, the full spectrum of weather phenomena is linked energetically. This course explores these linkages and the dynamics of the weather phenomena that result. Quantitative results from this theoretical analysis are then used to explain the structure and behavior of the phenomena themselves. Using both theoretical and observational methods students will gain an understanding of the full spectrum of weather phenomena including the physics and dynamics responsible for their structure, development, and evolution.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 512** Topics in Synoptic Meteorology (3) Application of atmospheric dynamics to the diagnosis and prediction of synoptic-scale weather.

**METEO 512 Synoptic Applications of Dynamic Meteorology (3)**

The primary objective of the course is to investigate midlatitude synoptic-scale weather systems from a quasigeostrophic perspective. Topics include Sutcliffe's development theorem, quasigeostrophic height tendency and omega equations, midlatitude extratropical cyclones, fronts and frontogenesis, semigeostrophic theory, and the potential vorticity perspective of synoptic-scale analysis. The course builds upon the dynamical understanding acquired in atmospheric dynamics and synoptics courses, and is well-suited for students seeking careers in a broad range of areas, including but not limited to air quality, weather forecasting and communications, microscale meteorology, mesoscale meteorology, and synoptic meteorology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 516** Mesoscale Forecasting (3) Competitive, simulated, operational, real-time forecasting is covered.

**Mesoscale Forecasting (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 520** Geophysical Fluid Dynamics (3) Fundamentals of fluid dynamics with an emphasis on basic concepts that are important for atmospheric and oceanic flows.

**METEO 520 Geophysical Fluid Dynamics (3)**

This is a course in the fundamentals of fluid dynamics with an emphasis on basic concepts that are important for geophysical flows, such as those in the atmosphere and ocean. Topics include kinematics, conservation laws, vorticity dynamics, dynamic similarity, laminar flows, and an introduction to waves and instability. Students should leave this course with a solid foundation in fluid dynamics, possessing a conceptual and mathematically rigorous understanding of

the fundamental conservation laws for fluids and some basic applications of them. Together, METEO 520 and METEO 521 (Dynamic Meteorology) make up the core dynamics curriculum for graduate students of meteorology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 521 Dynamic Meteorology (3)** An overview of the major large-scale atmospheric motions of weather and climate.

**Dynamic Meteorology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 523 Modeling the Climate System (3)** An introduction to the mathematical description and modeling of atmospheric and oceanic motions.

**Modeling the Climate System (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 526 Numerical Weather Prediction (3)** Finite difference and spectral methods, barotropic and baroclinic models, filtered and primitive equation models, synoptic-scale and mesoscale models.

**Numerical Weather Prediction (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 527 Atmospheric Wave Motion (3)** From classical and physical hydrodynamics to the numerical prediction of wave motion in a baroclinic atmosphere.

**Atmospheric Wave Motion (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 529 Mesoscale Dynamics (3)** A survey of concepts of mesoscale systems including frontogenesis, symmetric instability, mountain waves, wave CISK, and frontal waves.

**Mesoscale Dynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1988  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 531** Atmospheric Thermal Physics (3) Advanced treatment of thermodynamic principles as they relate to atmospheric cloud physics, radiation and dynamics.

**METEO 531 Atmospheric Thermal Physics (3)**

Thermal physics concepts are important to understanding many facets of atmospheric cloud physics, radiation and dynamics. This course presents a rigorous treatment of these concepts as they appear in the atmospheric sciences.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 532** Chemistry of the Atmosphere (3) Review of chemical principles in gaseous and multiphase environments; characteristics of key atmospheric components and chemical systems in the lower and middle atmosphere.

**Chemistry of the Atmosphere (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 533** Cloud Physics (3) Overview of cloud systems; theories of phase changes in clouds and micro- physical mechanisms of precipitation formation; cloud electrification.

**Cloud Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 535** Radiative Transfer (3) Fundamentals of electromagnetic radiation and its interaction with matter; radiation and climate, atmospheric remote sensing, and observable atmospheric optical phenomena.

**Radiative Transfer (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 538** Atmospheric Convection (3) Properties of shallow and deep atmospheric convection and interactions between convection, the boundary layer, and larger-scale weather systems.

**Atmospheric Convection (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 554** Atmospheric Turbulence (3) An introduction to the physics, structure, modeling, representation, and measurement of atmospheric turbulence.

**Atmospheric Turbulence (3)**

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 563** Bioclimatology (3) Climatic phenomena in their relation to life.

**Bioclimatology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 565** Physics of the Upper Atmosphere (3) Graduate version of material that is covered in METEO 465.

**Physics of the Upper Atmosphere (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 574** Atmospheric Dynamics Seminar (1-3 per semester/maximum of 15) A weekly seminar course that focuses on current and past research problems in dynamic meteorology and oceanography.

**Atmospheric Dynamics Seminar (1-3 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 575** Climate Dynamics Seminar (1-3 per semester/maximum of 15) Review of evolving climate dynamics and earth system science, including ongoing departmental research.

**Climate Dynamics Seminar (1-3 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 580** Communication of Meteorological Research (1) Methods for effective written and oral presentation of meteorological research are reviewed.

**Communication of Meteorological Research (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 581** Topics in Atmospheric Chemistry (1-3 per semester/maximum of 15) Discussion of recent research papers in, and concepts pertinent to, acidic deposition, photochemical air pollution, and global chemical budgets.

**Topics in Atmospheric Chemistry (1-3 per semester/maximum of 15)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 582** Ice and Snow Physics (1-3 per semester/maximum of 15) Structure of ice and its electrical, optical, mechanical, and surface properties; snow formation in the atmosphere.

**Ice and Snow Physics (1-3 per semester/maximum of 15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 588** Oceans and Climate Seminar (2) A focussed discussion on some aspect of the ocean's role in the climate system. Theme to vary from semester to semester.

**Oceans and Climate Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 591** Development and Ethics in the Atmospheric Sciences (1) Provide a forum for discussion of scholarship and research integrity as well as critical components of professional development.

**METEO 591 Development and Ethics in the Atmospheric Sciences (1)**

This course provides a forum with graduate faculty for discussions on responsible conduct of research topics relevant to the atmospheric sciences, including, but not limited to: acquisition, management, sharing, and ownership of data; publication practices and responsible authorship; conflict of interest and commitment; research misconduct; peer review; mentor/trainee responsibilities; collaborative science. Important components to successful professional development of students are also considered.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 592** Research Proposal Preparation in the Atmospheric Sciences (1) This course familiarizes graduate students with research rigor, proposals, and processes.

**METEO 592 Research Proposal Preparation in the Atmospheric Sciences (1)**

This course familiarizes graduate students with research rigor, proposals, and processes. The focus of these topics is upon research proposal preparation, research literature surveys, preparing a research proposal, and verbally defending the written research proposal in an oral presentation type setting.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 596A** Numerical Methods for Geophysical Fluid Dynamics (3) Course covers fundamentals of numerical methods applied to partial differential equations with emphasis on the equations governing geophysical fluid flows.

**Numerical Methods for Geophysical Fluid Dynamics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 597A** Dynamic Oceanography (3) A study of the dynamic processes in the earth's oceans and how they are modeled.

**Dynamic Oceanography (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 602** Supervised Experiences in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experiences in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 801** Understanding Weather Forecasting for Educators (3) Fundamental principles of synoptic and physical meteorology, remote sensing and data analysis in the setting of mid-latitude weather forecasting.

**METEO 801 Understanding Weather Forecasting for Educators (3)**

Never before has the quantity of available weather information so far exceeded the quality of the public's understanding of atmospheric science. METEO 801 aims to help correct this imbalance by helping secondary teachers to develop the knowledge and skills they need to become critical consumers of weather information and to, in turn, help their own students to do the same. Students who successfully complete METEO 801 will be able to apply knowledge of fundamental concepts of atmospheric science to discriminate between reliable and unreliable weather forecasts, to explain what makes one forecast better than another, and to teach these same concepts and applications to secondary school students.

To ensure that students develop the knowledge and skills required to critically assess public weather forecasts, METEO 801 will provide an apprentice-training environment that will encourage students to learn forecast mid-latitude weather themselves. They will discover that weather forecasting involves sophisticated data analysis techniques, a thorough understanding of atmospheric science, and strong verbal and graphic communication skills.

METEO 801 will combine digital video, audio, simulation models, virtual field trips to on-line weather data resources, text, and interactive quizzes that provide instantaneous feedback. The course will provide unprecedented access to one of the world's most distinguished meteorology programs. METEO 801 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms.

The overarching goal of the course is to help secondary science teachers become informed, critical consumers of the weather information they rely upon every day and to be able to effectively convey their knowledge to their students as part of an Earth science curriculum.

Students will be required to complete weekly assignments. There are 12 lessons in METEO 801. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of how the atmosphere works. At the end of each Lesson, students will take an open-book "Promotion Quiz" that allows them to improve their status as an apprentice forecaster.

In addition to Promotion Quizzes and weekly assignments on the course discussion board, students will be assigned four projects throughout the semester. Projects are also open book but require you to apply the principles students have learned to past case studies of storms and specific weather patterns.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 802** Fundamentals of Tropical Forecasting for Educators (3) Applying atmospheric principles to the tropics, with an emphasis on the development, structure, prediction, and destructive impact of hurricanes.

### **METEO 802 Fundamentals of Tropical Forecasting for Educators (3)**

Worldwide, approximately 80 tropical cyclones develop each year. This global annual average of tropical cyclones is small in comparison to the thousands of low-pressure systems that routinely parade across the middle latitudes each year. Yet tropical storms and hurricanes garner far greater attention from meteorologists and the media. The obvious reason for this lopsided focus is that tropical cyclones can inflict great devastation to life and property.

To ensure that students develop the knowledge and skills required to critically assess weather forecasts issues by the National Hurricane Center, METEO 802 provides, like METEO 801, an apprentice-training environment. Under the tutelage of professional weather forecasters, students, in their role as apprentices, work toward the goal of creating their own tropical-weather forecasts.

In the process, students in METEO 802 learn about the pitfalls of forecasting the tracks and intensities of tropical storms and hurricanes as they actively work with output from sophisticated numerical models available on the Internet. Moreover, successful students apply their knowledge of the fundamental concepts of atmospheric science in order to competently evaluate forecasts issues by the National Hurricane Center in Miami and the Joint Typhoon Warning Center in Honolulu.

Students also gain a broad perspective of the general weather and oceanic patterns in the tropics. For example, students learn about El Nino and La Nina. In the process, they discover the El Nino and La Nina are not to blame for every unusual weather even that occurs anywhere in the world.

To facilitate the learning objectives, METEO 802 includes the use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, text, and interactive quizzes that provide timely feedback. The course will provide unprecedented access to one of the world's most distinguished meteorology programs. METEO 802 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms.

One of the primary objectives of METEO 802 is to give secondary science teachers a working knowledge of hurricanes and tropical storms so that they can become critical weather consumers and to be able to effectively convey their knowledge to their students as part of an Earth science curriculum.

Students will be required to complete weekly assignments. There are 12 lessons in METEO 802. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of how the atmosphere works.

To demonstrate their mastery of the learning objectives, students complete automated online quizzes actively engage in online discussion groups focusing on real-time weather, and publish, to a person "e-portfolio," three comprehensive projects that explore timely case studies related to weather forecasting. The e-portfolio takes the form of a Web site. In addition to posting their work to their e-portfolio, students also use the space to reflect on their learning. By using their Penn State personal Web space to host their e-portfolios, students are able to share their work not only with program faculty and students, but also with external audiences, including potential employers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 803** Fundamentals of Mesoscale Weather Forecasting for Educators (3) Applying atmospheric principles to small-scale weather systems, with an emphasis on the conceptual modeling and short-range prediction of severe thunderstorms.

### **METEO 803 Fundamentals of Mesoscale Weather Forecasting for Educators (3)**

When outbreaks of severe weather occur, dire warnings for tornadoes, large hail or damaging straight-line winds urgently scroll across the bottoms of television screens. Simultaneously, television weathercaster's warn viewers to "take cover immediately." Yet, because of the limited spatial and time scales of severe thunderstorms, the areas affected by tornadoes, large hail and damaging straight-line winds often turns out to be relatively small (sometimes as small as a tenth of one percent of the original "watch area"). There is no doubt that people should be prepared to take definitive action to protect their lives and the lives of their families when outbreaks of severe weather occur. But the overall impression that entire counties or cities will be destroyed by severe weather can be, and frequently is, misleading.

To ensure that students develop the knowledge and skills required to critically assess public weather forecasts, METEO

803 provides an apprentice training environment that guides students, under the tutelage of professional weather forecasters, to actively learn how to create their own mesoscale-weather forecasts. In the process, METEO 803 reinforces the notion that weather forecasting involves sophisticated techniques of data analysis and a thorough understanding of atmospheric science. METEO 803 also stresses that the clear communication of the forecast requires strong verbal and graphic communication skills.

Using conceptual models and real-time radar and satellite imagery in concert with output from numerical models designed specifically for mesoscale forecasting, students predict severe weather on time scales of a few hours to one day. For example, students are required to choose a tornado "watch-box" issued by the Storm Prediction Center (SPC) in Norman, Oklahoma, and then to evaluate the forecast (and forecast verification) in the setting of a litany of scientifically sophisticated tools on SPC's Web site. In effect, students will mirror the process that professional forecasters follow to create such high-profile forecasts. For more general outlooks that identify regions where there is a potential for severe weather (time scales of one to two days), students will use output from the numerical models that were introduced in METEO 801 to identify the areas likely to be at risk for severe weather.

To facilitate the learning objectives, METEO 803 includes the use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, text, and interactive quizzes that provide timely feedback. The course will provide unprecedented access to one of the world's most distinguished meteorology programs. METEO 803 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms.

One of the primary goals of METEO 803 is to give secondary science teachers a scientifically grounded perspective of the spatial and time scales of typical outbreaks of severe weather and other events associated with mesoscale weather systems. In the process, students become better weather consumers and to be able to effectively convey their knowledge to their students as part of an Earth science curriculum. To gain such insights, students learn conceptual models of the life cycles of severe thunderstorms and then apply them in real-time outbreaks of severe weather. In the final analysis, students are able to more accurately weigh the information being disseminated by the media and the Storm Prediction Center in Norman, Oklahoma.

Students will be required to complete weekly assignments. There are 8 lessons in METEO 803. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of how the atmosphere works.

To demonstrate their mastery of the learning objectives, students complete automated online quizzes, actively engage in online discussion groups focusing on real-time weather, and publish, to a personal "e-portfolio," three comprehensive projects that explore timely case studies related to mesoscale weather forecasting. The e-portfolio takes the form of a Web site. In addition to posting their work to their e-portfolio, students also use the space to reflect on their learning. By using their Penn State personal Web space to host their e-portfolios, students are able to share their work not only with program faculty and students, but also with external audiences, including potential employers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 804** Special Topics in Weather Forecasting for Educators (3) Exploring specialized weather forecasting topics and techniques spanning from mesoscale to planetary spatial scales and short-term to long-range time scales.

### **METEO 804 Special Topics in Weather Forecasting for Educators (3)**

T.J. Huxley's passage from Biogenesis and Abiogenesis -- "The great tragedy of Science - the slaying of a beautiful hypothesis by an ugly fact" (1870) -- will serve as the springboard for learning in METEO 804. In the spirit of a "beautiful hypothesis," forecasters' diagnoses of the present state of the atmosphere and their prognoses for how the atmosphere will evolve with time may be scientifically sound. Yet, local weather can turn out dramatically different than the intent of the forecast (the ugly fact). To compound this "great tragedy of Science," weather forecasters routinely spend most of their preparation time on local details, particularly when the weather tends to get more interesting.

Nonetheless, there are "master forecasters" who regularly avoid great tragedies in weather forecasting. Master forecasters will prudently weigh the length of the forecast time, as well as interactions between weather features on the hemispheric, synoptic, meso and local scales, while, at the same time, they will adroitly use an array of forecasting tools to arrive at a high-quality local forecast. With the prudent and seasoned approach of the master forecaster in mind, METEO 804 will provide students with a master apprenticeship in weather forecasting. As master apprentices, students will learn highly specialized tools and techniques that will help them to hone and expand their overall forecasting skills. METEO 804 marks a dramatic shift in paradigm from the more traditional approach used in METEO 801, 802, and 803. Indeed, this course is, for all practical purposes, the "real deal" with regard to applying one's forecasting skills.

A major component of METEO 804 requires students to participate in the national forecasting content run by the University of Oklahoma, which will enable them to apply their meteorological knowledge to real-life situations. Over the course of the 10 week contest, students will compose and submit short-range, deterministic forecasts for selected cities across the United States (two cities per week). As a result, the instructors will only offer a modicum of new material at the beginning of the course, with Lessons 1 and 2 serving to bolster students' forecasting skills before the national forecasting contest begins a few weeks into the course. This will require students to spend most of their course time communicating on the discussion boards with fellow classmates, formulating strategies, and identifying keys to each forecast. Once the forecasting contest begins, the only new material presented to students will be situational, i.e., if there's a twist to the forecast, the instructors will write-up a brief vignette that will serve to help students better

understand that situation.

To facilitate the learning objectives, METEO 804 includes that use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, and text - all on an "as-needed" basis, in line with the needs that arise through the national forecasting contest. The course will provide unprecedented access to one of the world's most distinguished meteorology programs. METEO 804 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms.

The overarching goal of METEO 804 is for students to "learn by doing". In other words, a large component of the course serves as a practicum that provides students the opportunity to forecast for five specific cities across the United States. These forecasting exercises will take place in the setting of a competition between students and professors from universities across the nation. Invariably, students will make errors in their forecasts (the very nature of weather forecasting). By keeping a log that documents their rationale for the details of their forecasts, students, after conducting "post mortems" (post analysis and verification), will examine and critique their forecasting approach. In the process, they will discover "lessons learned" that they will then document in their e-portfolios. In this way, students will sharpen their forecasting skills and solidify the underpinning scientific concepts. This strategy of "learning by doing" will make students more competent weather forecasters and more discriminating consumers of weather information, which they will then be able to translate to classroom activities in the courses they teach.

Students will be required to complete daily and weekly assignments. The primary activity for METEO 804 is participation in the national forecasting contest (WxChallenge) that runs for ten weeks during the semester. The contest requires students to test their forecasting skills at five selected cities (two weeks per city). For each week during the contest, students are required to electronically submit forecasts on four days (Monday through Thursday). Each day requires them to predict the high and low temperatures, total liquid precipitation, and the maximum sustained wind speed at the current contest city for the upcoming forecast period.

Four e-portfolio assignments are also required in METEO 804.

\* The first e-portfolio assignment will require students to document their "lesson learned" during a practice week at the first city in the national contest.

\* The second e-portfolio assignment requires students to write-up their "lessons learned" (analyses, scientific insights, observations and reflections on their forecasts) for the first two contest cities (four weeks of the national forecasting contest).

\* Similarly, the third e-portfolio assignment requires students to write-up their "lessons learned" (analyses, scientific insights, observations and reflections on their forecasts) for the last three contest cities (six weeks of the national forecasting contest).

\* The fourth e-portfolio assignment will require students to create a capstone project that utilizes the skills and knowledge they developed in METEO 804. This capstone project takes the form of a learning module that they, in turn, will be able to use to teach course concepts to their own secondary school students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**METEO 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Microbiology-Hy (MICRO)**

**MICRO 550** Medical Microbiology (2) Principles of medical microbiology: host-parasite relationships; structure and function of viruses, bacteria, and fungi as agents causing human disease.

### **Medical Microbiology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MICRO 551** Medical Microbiology (3) Principles of medical microbiology: host-parasite relationships; structure and function of viruses, bacteria, and fungi as agents causing human disease.

### **Medical Microbiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 553** Science of Virology (4) Replication of viruses and effects on host cells, including oncogenic properties of viruses and cellular growth and survival pathways disrupted.

### **MICRO (CMBIO) 553 Science of Virology (3)**

The objective of the Science of Virology course is to describe at the molecular level the replication strategies of representative DNA and RNA viruses and the effects of virus infection on cell growth control and survival. Emphasis is placed on developing an understanding of the experimental systems used to elucidate individual steps in virus life cycles and their interactions with host cells. Host cell-virus interactions leading to production of progeny virus and interactions involved in establishing and maintaining long term interactions, such as latency and oncogenesis, are discussed in detail. Reading from primary literature sources is an integral component of the course. Evaluation is by written examination. The examination format centers on problem solving and synthesis. The course is offered yearly and open to all students who have fulfilled the prerequisite.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 554** Principles of Immunology (2) Study of immune response. Nature of antigens, structure, function of antibodies, hypersensitivity, transplantation and tumor immunology, autoimmunity, and immunosuppression.

### **Principles of Immunology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 560** Concepts in Immunology (4) Selected lectures/readings in advanced immunological concepts; emphasis on lymphocyte function and applications to anti-viral/tumor immunity.

### **MICRO (CMBIO) 560 Concepts in Immunology (4)**

Concepts in Immunology is an advanced course in immunology that is designed to instruct students in immunological topics that are typically not covered in depth in lower-level classes in microbiology and/or immunology. These topics usually represent emerging areas in immunology and/or the specific interests of the teaching faculty and/or students registered for the course. This course is team taught and is offered primarily to graduate students. Most students enrolled in this course are either graduate students in Graduate Programs in Microbiology and Immunology or students in other graduate programs but who are conducting thesis research in laboratories of faculty who are in the Department of Microbiology and Immunology. One major objective of this course is to reinforce the students' knowledge in the fundamentals of immunology and to provide a substantially deeper base of knowledge in selected fundamental areas. Another major objective is to broaden the students' scope of immunological concepts through the teaching of interdisciplinary topics in immunology. In the past, such topics have included neuroimmunology, immunological aspects of aging, immunology of atherosclerosis, regulation of the maternal immune response during pregnancy, and pathogenesis of rheumatoid arthritis. Achieving these objectives is accomplished through a combination of didactic lectures and readings/discussion of both primary and review literature. Student performance is evaluated on the basis of their performance on mid-term and final examinations. Final grades are also based on a written paper and oral presentation of the student's choice. This course is typically offered in the Spring semester of each year and class enrollment usually ranges between four and ten students.

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 572 Literature Reports (1 per semester)** Weekly analysis of current literature in microbiology.

**Literature Reports (1 per semester)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 581 Immunology A: Basic Concepts in Innate and Adaptive Immunity (1)** Discuss innate immune mechanisms and the basic concepts and molecular/ cellular components of adaptive immune system.

**MICRO 581 Immunology A: Basic Concepts in Innate and Adaptive Immunity (1)**

This course will cover basic concepts, molecular/cellular components, and recognition mechanisms of innate immune system. It will also include an introduction of the molecular/cellular components of the adaptive immune system. Lectures are based on research literature, although an Immunology textbook will be recommended to the students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 582 Immunology B: Adaptive Immunity (1)** Discuss adaptive immune mechanisms.

**MICRO 582 Immunology B: Adaptive Immunity (1)**

This course focuses on the mechanisms in the development, activation, and effector functions of the adaptive immune system. It covers the development and activation of lymphocytes, humoral and cellular immunity, cytokines, as well as immunological techniques.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 583 Viral Vectors (1)** Use and design of viral vectors in research and use in gene therapy; exploration of viral vector strengths and limitations.

**MICRO 583 Viral Vectors (1)**

This course is designed to provide the student with the "big picture" regarding the properties, design, and use of viral vectors within the research laboratory. A basic understanding on the construction of viral vectors, the various methods used for transfection, choice of promoters, as well as considerations regarding Kozak's rules, distance requirements between the 5'-end and the ATG, internal initiation sites, splicing signals, nuclear export signals, polyadenylation etc. In addition, emphasis will also be placed on the future role viral vectors will play in gene therapy and vaccination. One of the strengths of this course is that it will address a subject in translational medicine that is rapidly evolving and the students will be exposed to the dynamic aspects regarding the development of viral vectors for their eventual use in treatment of disease.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 597** Special Topics (1-9) Formal courses on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching students laboratory techniques and tests that are used to identify microorganisms and to aid in the diagnosis of disease.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MICRO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Mineral Engr Mgmt (M E M)**

**M E M 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E M 599** (IL) Foreign Studies (1-12 per semester, maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Studies (1-12 per semester, maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E M 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M E M 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Mineral Processing (MN PR)

**MN PR 401** Mineral Process Engineering (3) Unit operations for processing particulate materials: comminution, screening, classification, slurry pumping, thickening, filtration, etc.; application to mineral processing plant design.

### Mineral Process Engineering (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 413** Mineral Processing Laboratory (1) A laboratory study of the chemical and physical principles involved in practical mineral processing operations.

### Mineral Processing Laboratory (1)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 424** Coal Preparation (3) Unit operations, flowsheets, and testing methods used in preparation of coal.

### Coal Preparation (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 425** Interfacial Phenomena and Flotation (3) Surface and interfacial phenomena related to flotation agglomeration, flocculation, and dispersion of particles. Application to mineral separation and related processes.

### Interfacial Phenomena and Flotation (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 426 (MATSE 426)** Aqueous Processing (3) A study of the chemical and engineering principles pertinent to metal processing in aqueous systems: hydrometallurgical extraction, plating, materials preparation.

### MN PR (MATSE) 426 Aqueous Processing (3)

This 3-credit course deals with the chemical and engineering principles underlying the aqueous processing of metals: metal extraction from primary and secondary sources, electroplating, and metal finishing, powder synthesis, energy storage and conversion, and treatment of recycling of metal-containing toxic wastes.

1. Physico-Chemical Principles - Thermodynamic, chemical kinetic and transport factors which control hydrochemical processes (leaching; precipitation; adsorption; solvent extraction; ion exchange; electrowinning, electrorefining and electroplating; membrane processes; energy storage and conversion); graphical representation of homogeneous and solid/solution equilibria; chemical reagents.
2. Engineering Principles - Reactor design and staged operations; ideal batch, continuous stirred-tank and plug-flow reactors; fluidized bed reactors; electrochemical reactors; multistage separation processes (solid-liquid, liquid-liquid, and gas-liquid systems).
3. Process Synthesis - Design of metal separation (extraction, refining, waste treatment) materials synthesis, metal

finishing, and energy storage/conversion processes and system-integration of unit operations, industrial practice. Emphasis on closing circuits to minimize or eliminate waste effluents.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 505** Physical Separations in Mineral Processing (3) Intensive study of theory and applications of gravity, magnetic, electrostatic, centrifugal, and other methods of mineral processing.

#### **Physical Separations in Mineral Processing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 507 (MATSE 560)** Hydrometallurgical Processing (3) Fundamental physico-chemical factors underlying the aqueous extraction and recovery of metals and nonmetals from ores, minerals, and scrap metal.

#### **MN PR 507 (MATSE 560) Hydrometallurgical Processing (3)**

This 3-credit course is concerned with the fundamental physico-chemical processes associated with the processing, utilization, and recycling of materials in aqueous systems. The topics covered cut across a wide range of practical applications. The course is therefore suitable for a broad spectrum of scientists and engineers concerned with processes and processing in aqueous systems, e.g., in materials science and engineering, mineral processing, geoscience, soil science, environmental engineering, chemistry, chemical engineering, petroleum and natural gas engineering, mining engineering, nuclear engineering, and electronic and electrical engineering. A required term paper provides a formal mechanism for ensuring that students have the opportunity to apply ideas discussed in the course to their specific areas of interest.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in development of instructional materials, organizing and conducting lectures and laboratories and evaluating students in

undergraduate level courses (1-499).

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MN PR 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Mining (MNG)

**MNG 401** Introduction to Mining Operations (1) An introduction to underground and surface mining methods; selection of extraction equipment; relevant auxiliary operations. Not intended for Mining Engineering majors.

**Introduction to Mining Operations (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 404** Mine Materials Handling Systems (2) Analysis and design of materials-handling systems in mining, such as belt conveyors, locomotives, and hoisting.

**Mine Materials Handling Systems (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 410** Underground Mining (3) Underground mine design; extraction techniques; description of auxiliary operations as they relate to the mining methods.

**MNG 410 Underground Mining (3)**

The purpose of this course is to describe the logic and discuss the steps taken in the planning and design of an underground mine. Since every underground mine incorporates a unique combination of technological, economic, legal, social, and environmental factors, the course will stress the auxiliary operations (ventilation, ground control, etc.) which must be accommodated, as well as the unit operations and equipment dealing with resource extraction.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 411** Mine Systems Engineering (2) Applied operations research and systems methods for decision making in mine operations; time and systems studies to improve productivity.

### **Mine Systems Engineering (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 412** Mineral Property Evaluation (3) Ore reserve estimation using statistics and geostatistics, mine cost estimation, engineering economy concepts applied to mineral deposits.

### **Mineral Property Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 422** Mine Ventilation and Air Conditioning (3) Quality, quantity, and temperature-humidity control of the mine atmosphere; general mine environmental control.

### **Mine Ventilation and Air Conditioning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 441** Surface Mining Systems and Design (3) Design of surface mining for noncoal and coal minerals; emphasis on quarry and strip mining planning parameters: unit operations, systems, haulroads, draglines, spoil stability, reclamation, legal requirements, and health and safety.

### **Surface Mining Systems and Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 451W** Mining Engineering Project (1-5) Independent and integrative design and report of specific mine evaluation, layout, equipment selection, environmental control, permitting, and financial analysis.

### **Mining Engineering Project (1-5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**MNG 460** Mine Maintenance Engineering (3) Mine maintenance system design; maintenance planning and management; safety and cost analysis of maintenance programs.

**Mine Maintenance Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 470** Mining and Geologic Structures (3) Study of geologic structures and their impacts on mining operations.

**MNG 470 Mining and Geologic Structures (3)**

The objective of this course is to introduce students to geologic structures that can impact mining operations and how to represent them for mine planning. A fundamental understanding of geologic processes that lead to various structures is covered.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 497** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 515** Mine Systems Simulation (3) Principles and practices of probabilistic and deterministic simulation in the analysis of operating systems related to mills and mines.

**Mine Systems Simulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 541** Surface Mine Equipment Selection Analysis (3) Design analysis and selection criteria for principal surface mine equipment, their interaction in operation, and auxiliary equipment requirements.

**Surface Mine Equipment Selection Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 554** Rock Mechanics Design (3) Engineering design process; design of mines, tunnels, slopes, and underground chambers; guided design concept; creativity and innovation; group design project.

**Rock Mechanics Design (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 590** (EME 590, F SC 590, P N G 590) Colloquium (1-3) Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

#### **MNG (EME/F SC/P N G) 590 Colloquium (1-3)**

The objective of the course is to expose students through a seminar format to a wide range of topics on energy and mineral engineering. The lectures would be presented by faculty, students and guest speakers. Students would be required to write a short summary of each presentation and provide a critique of the presentation. Seminar topics will cover aspects of energy production, processing, utilization, and conservation, and the associated environmental, health and safety, and policy, economics, and management issues. Students are expected to keep up with current developments on each topic and to actively participate in the discussions. Students will be evaluated based on their class participation, and written summary and critique of each presentation. This is a required course in the energy and mineral engineering graduate program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 599** (IL) Foreign Study (1-12 maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

#### **Foreign Study (1-12 maximum of 24)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None

Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MNG 611** Ph.D. Dissertation Part Time (0) No description.

**Ph.D. Dissertation Part Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Mngmt Info Sysms-Bd (MISBD)**

**MISBD 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MISBD 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Molecular Medicine (M M)**

**M M 596** Individual Studies (1-4 per semester/maximum of 36) M M Individual Studies.

### **Individual Studies (1-4 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M M 597** Special Topics (1-3 per semester/maximum of 36) Special topics within the Molecular Medicine Graduate program.

### **Special Topics (1-3 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M M 600** Thesis Research (1-9 per semester/maximum of 36) Laboratory work on thesis project.

### **Thesis Research (1-9 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Molecular Toxicology (M T)**

**M T 596** Individual Studies (1-3 per semester/maximum of 6) Laboratory Rotations for first year students.

### **Individual Studies (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M T 600** Thesis Research (1-9 per semester/maximum of 36) Laboratory work on thesis project.

### **Thesis Research (1-9 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**M T 601** Thesis Preparation (0) MT full time thesis preparation.

### **Thesis Preparation (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Mstr Law Courses (LLMLW)**

**LLMLW 900** Introduction to U.S. Legal Systems (2) To develop a good foundation for the LL.M. student's other course work, this course introduces the United States court system, the role of the Constitution in the United States legal system, and other foundation materials in United States law. The goal is to introduce students to distinctive aspects and/or fundamental principles in U.S. law. Enrollment in this course is limited to LL.M. candidates.

### **Introduction to U.S. Legal Systems (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

Concurrent: LLMLW 901

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 901** LLM Legal Analysis, Writing and Research (2) This course explores U.S. common law analytic methods and discourse. Students will analyze cases and statutes to solve client problems. Students will draft objective memoranda and other documents to communicate their legal analysis in writing. Students will also learn the basics of U.S. legal research.

### **LLM Legal Analysis, Writing and Research (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 902** Advanced LLM Legal Analysis Writing & Research (2) Building on the LL.M. Legal Analysis, Writing and Research course, students will develop common law communication and research skills in the persuasive writing/advocacy context. Students will also develop effective client letter writing skills in a U.S. legal setting. The final portion of the course will contract drafting.

### **Advanced LLM Legal Analysis Writing & Research (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 903** Introduction to Common Law Analysis and Language (2) This course introduces students to fundamental concepts of U.S. common law analysis and methods. The course will explore the role cases play within a common law system, including how they interact with other sources of law, as well as the methods common law lawyers use to analyze cases. Students will apply this knowledge to solve real legal problems while at the same time building language skills for clear legal communications.

### **Introduction to Common Law Analysis and Language (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 903** Introduction to Common Law Analysis and Language (2) This course introduces students to fundamental concepts of U.S. common law analysis and methods. The course will explore the role cases play within a common law system, including how they interact with other sources of law, as well as the methods common law lawyers use to analyze cases. Students will apply this knowledge to solve real legal problems while at the same time building language skills for clear legal communications.

### **Introduction to Common Law Analysis and Language (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 904** US Common Law Methods (2-4) The course is for LL.M. students who speak English as a second language. It serves as a companion to a substantive law course, e.g., Constitutional Law I. Students will build skills in analyzing cases, applying case holdings to hypothetical facts and understanding the material presented in the substantive law course. Also, students will learn and practice skills necessary for success in law school, e.g., preparation of effective case briefs, class notes, and course outlines.

### **US Common Law Methods (2-4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 905** LL.M. Scholarly Writing Workshop (1) This course provides LL.M. students with the framework for developing a thesis, conducting research and producing a significant scholarly paper. In an interactive workshop setting, students will discuss progress, and receive feedback from faculty and fellow students on: (1) identification and refinement of a thesis; (2) developing and implementing a research plan; (3) appropriate use of authority, including legal citation form; (4) developing and refining a critical perspective and scholarly argument. Exemplary papers selected by faculty may be published in the law school's digital repository.

### **LL.M. Scholarly Writing Workshop (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Concurrent: LL.M. students must be concurrently enrollend in a Penn State Law Seminar (SEM) course or an independent study (PERSP 996) of at least two credits with a law faculty supervisor.

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 906** U.S. Constitutional Law and Analysis (3) This course will examine the roles of the U.S. executive, legislative and judicial branches in determining the limits of individual and civil rights under the U.S. Constitution. It will also introduce LLM-level international students to analytical methods commonly used by U.S. lawyers with a focus on U.S. constitutional law. The goals of the course are to introduce students to U.S. constitutional law and to provide them with the analytical and English language skills necessary to succeed in a U.S. law school.

### **U.S. Constitutional Law and Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 906** U.S. Constitutional Law and Analysis (3) This course will examine the roles of the U.S. executive, legislative and judicial branches in determining the limits of individual and civil rights under the U.S. Constitution. It will also introduce LLM-level international students to analytical methods commonly used by U.S. lawyers with a focus on U.S. constitutional law. The goals of the course are to introduce students to U.S. constitutional law and to provide them with

the analytical and English language skills necessary to succeed in a U.S. law school.

### **U.S. Constitutional Law and Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 907** Introduction to U.S. Business Associations and Commercial Law (3) This course will examine common forms of business entities in the U.S. and the legal structure in which the entities operate. The course will introduce commercial law frequently encountered in business, including sales, negotiable instruments, and secured transactions. The course will require analysis of case law and statutory interpretation.

### **Introduction to U.S. Business Associations and Commercial Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

### **LLMLW 997** Special Topics (4) Special Topics

#### **Special Topics (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 997A** Foundations of U.S. Business Law (2) This course explores the sources and core concepts of U.S. business and commercial law including the common law of contractual obligation, sale of goods, secured finance, and payment systems under the Uniform Commercial Code, business entity law, and competition law. It also considers how lawyers facilitate business transactions and add value to their clients' business operations. Students will read and discuss cases and statutes, and will practice negotiating business disputes and drafting agreements.

### **Foundations of U.S. Business Law (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 997B** Foundations to US Common Law and Language (2) This course will introduce students to how U.S. lawyers analyze and communicate about client problems. Because legal language is rooted in the law and legal system of the U.S., the vehicle of our work will be common law legal analysis. From our classroom work and assignments, students will build skills in: (1) Active listening and speaking in class discussions, (2) Understanding U.S. legal materials, and (3) U.S. legal analysis and legal writing.

### **Foundations to US Common Law and Language (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**LLMLW 997C** Foundations of US Constitutional Law (2) This course explores the foundations of the American system of government under the Constitution. Students will read and discuss seminal opinions of the United States Supreme Court which interpret the powers and limitations of the three branches of government (executive, judicial, and legislative) and the rights of individuals that the Constitution protects in criminal and civil proceedings. Throughout the course, students will engage in common law legal analysis, and will practice their skills in a series of exercises on issues of constitutional

law designed to build analytical ability and English language writing and speaking skills.

### **Foundations of US Constitutional Law (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Muscul Medicine-Hy (MSC)**

**MSC 727** Musculoskeletal Medicine (3) Interdisciplinary - Medical Education

### **Musculoskeletal Medicine (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Music (MUSIC)**

**MUSIC 400J** Solo Recital (1) Required recital for Performer's Certificate.

### **Solo Recital (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 412** Jazz Pedagogy (2) The development of advanced skills in pedagogy for teaching jazz bands.

### **Jazz Pedagogy (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 414** String Pedagogy (1-2) The development of skills in pedagogy for teaching strings.

### **String Pedagogy (1-2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 415** Woodwind Pedagogy (1-2) The development of skills in pedagogy for teaching woodwinds.

### **Woodwind Pedagogy (1-2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts



Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 416 Brass Pedagogy (1-2)** The development of skills in pedagogy for teaching brass.

**Brass Pedagogy (1-2)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 417 Percussion Pedagogy (1-2)** The development of advanced skills in pedagogy for teaching percussion.

**Percussion Pedagogy (1-2)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 418 Voice Pedagogy (2)** Analysis of techniques of teaching voice and studies of related music literature and pedagogical writings.

**Voice Pedagogy (2)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 419 Piano Pedagogy I (2)** Analysis of beginning teaching methods and teaching strategies for children.

**Piano Pedagogy I (2)**

General Education: None

Diversity: None

Bachelor of Arts: Arts

Effective: Spring 1997

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 420 Song Writing and Recording (3)** Song composition, arranging and recording in a variety of style genres.

**MUSIC 420 Song Writing and Recording (3)**

This course will take the student through the process of composing and producing a recorded song. The class will consist of a combination of class meetings and individual instruction. Topics will include form, lyric writing, arranging, audio/MIDI recording and sequencing. Familiarity with basic audio sequencing software and music theory concepts is essential. The focus of the class is vernacular song as opposed to classical art song, but all the basic concepts discussed in the class apply to either genre. The course requires the composition of original songs and the creation of high-quality recordings of them and their conversion to MP3 format. The student are expected to enter the class with a basic knowledge of digital audio and MIDI (MUSIC/INART 258 or equivalent).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 421 Jazz Combo Class (1 per semester/maximum of 8)** Study and performance of small group jazz.

**Jazz Combo Class (1 per semester/maximum of 8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 421** Jazz Combo Class (1 per semester/maximum of 8) Study and performance of small group jazz.

**Jazz Combo Class (1 per semester/maximum of 8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 422** Jazz Harmony and Arranging (3) Analysis and composition of jazz tunes and chord progressions; instrumental and vocal arranging in the jazz idiom.

**Jazz Harmony and Arranging (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 424** Piano Pedagogy II (2) Analysis of techniques of teaching intermediate-early advanced level piano and studies of music literature and pedagogical writings.

**Piano Pedagogy II (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 425** Advanced Voice Pedagogy (2) Analysis of techniques of teaching voice, supervised teaching, studies of studio materials and related topics.

**Advanced Voice Pedagogy (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2004  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 429** Aural Review for Graduate Students (1) An intensive review of the aural skills required for a theoretical understanding of 18th- and 19th-century music.

**Aural Review for Graduate Students (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 431** ADVANCED TONAL ANALYSIS (2-3) Advanced techniques of musical analysis.

**ADVANCED TONAL ANALYSIS (2-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 432** Graduate Review of Twentieth-Century Analysis (2-3) The theory and analysis of style in music of the twentieth century.

**Graduate Review of Twentieth-Century Analysis (2-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 433** Advanced Analysis of Twentieth Century Music (2-3) In-depth studies of selected twentieth-century repertoires and/or analytical models.

**Advanced Analysis of Twentieth Century Music (2-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 435** Score Reading (1) Introduction in score reading at the keyboard.

**Score Reading (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 1991  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 441W** Emphasis in Elementary General and Choral Music (3) Selection and application of materials, methods, teaching and assessment strategies for elementary general and choral music settings.

**MUSIC 441W Capstone Experiences in Elementary General and Choral Music (3)**

This course is intended for Music Education majors in their senior year who have particular interest in working with elementary school children in a general music or choral setting. Students will apply all previous Music Education course work to this teaching setting. They will learn how to construct a course of study, including assessment strategies. Students will then apply that course of study by working with one elementary music class in the local schools. Teacher delivery issues, reflective practice, and assessment of student achievement will become a major component of this experience. A review of traditional approaches to elementary music teaching will also be presented and critically discussed. In addition, students will prepare two drafts of a philosophical statement justifying the inclusion of music in every child's curriculum as well as four drafts of a paper reviewing and summarizing articles on a topic of interest related to elementary music teaching.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 442W** Emphasis in Secondary General Music (3) Emphasis in teaching in secondary general music settings.

**MUSIC 442W Emphasis in Secondary General Music (3)**

MUSIC 442W is offered to students who have been accepted into the Teacher Certification program in Music Education. The focus of this course is to provide students with opportunity to explore secondary general music settings under the close supervision of a faculty member. Topics include: the design and implementation of curriculum in secondary general music, the leading and teaching of songs in these settings, and specific grade-level appropriate pedagogy. The instructional format includes: lecture, small group discussion, readings, musical and teaching examples, and off campus observation and teaching in middle and high school classrooms. Students complete several practical assignments including off campus observations, presentation of the summations of small group discussions, curriculum planning and models, and teaching within public schools in grades 5-12. This is a writing intensive course with focus on a detailed, multi-drafted topic paper relating to specific elements of teaching choral and general music at the secondary level.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 442W** Emphasis in Secondary General Music (3) Emphasis in teaching in secondary general music settings.

### **MUSIC 442W Emphasis in Secondary General Music (3)**

MUSIC 442W is offered to students who have been accepted into the Teacher Certification program in Music Education. The focus of this course is to provide students with opportunity to explore secondary general music settings under the close supervision of a faculty member. Topics include: the design and implementation of curriculum in secondary general music, the leading and teaching of songs in these settings, and specific grade-level appropriate pedagogy. The instructional format includes: lecture, small group discussion, readings, musical and teaching examples, and off campus observation and teaching in middle and high school classrooms. Students complete several practical assignments including off campus observations, presentation of the summations of small group discussions, curriculum planning and models, and teaching within public schools in grades 5-12. This is a writing intensive course with focus on a detailed, multi-drafted topic paper relating to specific elements of teaching choral and general music at the secondary level.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 444W** Emphasis in Elementary and Intermediate Band (3) Examination and application of teaching strategies and materials for students planning to teach band in the elementary and middle schools.

### **MUSIC 444W Capstone Experiences in Elementary and Intermediate Band (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The course is intended to prepare pre-service teachers to teach beginning through intermediate instrumental (band) music. Preparation will include observation of current public school teachers and teaching techniques and methods, preparation and implementation of appropriate lessons including assessments, in-depth analysis (case study) of a student currently in the public schools, development of a written philosophy of music education and band instruction, and consideration of practical matters associated with teaching in the public schools such as scheduling, recruitment and parent interaction.

The course serves as a capstone to the prior courses in the music education curriculum. Previous courses in instructional planning, instructional materials, instrument techniques, conducting piano and voice use will have developed necessary prior skills. Skills and concepts from these classes will be applied in this authentic context in the collegiate and public school classrooms.

The students will be assessed according to their effectiveness in observation, teaching preparation, teaching and research. Evaluation will be in the form of written and verbal feedback, and completion of rubrics by the instructor and the students themselves (self- and peer-evaluation). Enrollment will likely be approximately 5 students each time the course is offered.

The students will be spending considerable class time in local elementary and middle schools for field work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 445W** Emphasis in High School Band (3) Examination and application of teaching strategies and materials for students planning to teach high school bands.

**MUSIC 445W Capstone Experiences in High School Band (3)**

This course is intended to prepare pre-service teachers to teach high school band. Students will observe, analyze, and discuss the teaching techniques, methods, and materials used by public school teachers in high school band instructional settings. Students will prepare and implement rehearsal plans including assessments, in-depth investigation of appropriate repertoire for use in high school bands and concert programming. Students will develop score analysis skills necessary to plan and guide music making and learning in the band rehearsal. Students will develop materials and strategies that strengthen the connection of instrumental performance to the public school curriculum. Students will develop a written philosophy of music education and the role instrumental performance in band within the music education of high school students. Students will consider practical matters associated with teaching in the public schools such as: scheduling, interaction with parents/teachers/administrators, parental support organizations (music boosters), advocacy, community/school support, and long-range instrumental music program development plans.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 446W** Emphasis in Strings and Orchestra (3) Development of teaching techniques for instructing elementary and secondary string/orchestra student musicians for music education majors.

**MUSIC 446W Capstone Experiences in Strings and Orchestra (3)**

This course is intended to prepare pre-service teachers to teach elementary and secondary string instrumental (orchestra) music. Preparation will include observation of current public school teachers and teaching techniques and methods, preparation and implementation of appropriate lessons including assessments, in-depth analysis (case study) of a student currently in the public schools, development of a written philosophy of music education and string/orchestra instruction, and consideration of practical matters associated with teaching in the public schools such as scheduling, recruitment and parent interaction.

The course serves as a capstone to the prior courses in the music education curriculum. Previous courses in instructional planning, instructional materials, instrument techniques, conducting, piano and voice use will have developed necessary prior skills. Skills and concepts from these classes will be applied in this authentic context in the collegiate and public school classrooms.

The students will be assessed according to their effectiveness in observation, teaching preparation, teaching, and research. Evaluation will be in the form of written and verbal feedback, and completion of rubrics by the instructor and the students themselves (self- and peer-evaluation). Enrollment will likely be approximately 5 students each fall semester. Students will spend considerable class time in local public schools for fieldwork.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 450** Teaching Marching Band (2) Traditional and contemporary drill design principles, show development strategies, instructional techniques, and organizational procedures involved in teaching marching band.

**MUSIC 450 Teaching Marching Band (2)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

MUSIC 450 is a marching band technique course for music education majors, band directors, and experienced marching band members. This course develops knowledge and skills required to organize and teach marching band with an emphasis on traditional and contemporary drill design and charting. Students are taught an eclectic understanding of drill systems, contemporary drill design, and visual design theory with opportunities to apply drill design computer software (Pyware Java 3D) in developing effective movements for marching units. Course topics include philosophy and role of marching band in the music program, historical perspectives, marching band styles, administration and organization of the marching band and auxiliary units and teaching techniques.

General Education: None  
Diversity: None

Bachelor of Arts: Arts  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 451** Computer Programming for Musicians (3 per semester/maximum of 12) In-depth study of music programming techniques.

**MUSIC 451 Computer Programming for Musicians (3 per semester/maximum of 12)**

This is an in-depth study of a given music programming language or environment. The language/environment will vary from semester to semester, to include languages such as SuperCollider and Max/MSP. Students will be expected to work independently on a series of projects that require increasing levels of difficulty in programming methodology. The course may be repeated for credit.

Students will be acquainted with the basics of how the programming environment treats fundamental matters such as signal flow, defining functions, variables and arguments, and music synthesis techniques.

These principles will be expanded, with added layers of complexity to the types of problems presented. More complex instruments, processing, and filtering will be covered, along with real-time capabilities (ability of the program to respond to input from audio input or data from an external controller) and the creation of graphical user interfaces (GUIs).

Advanced topics will include algorithmic composition and the creation of plug-ins that may be used by other programs.

As this is an upper division class, students will be expected to be self-motivated and work independently. Assignments will present problems that may be approached in a number of ways - there is no single right answer; putting it another way, the correct answer is the one that works.

Students pursuing the minor in Music Technology (MUTEC) are required to complete two elective courses, one of them upper division. This course will serve those students wishing to apply the minor to areas of software development.

Along with MUSIC 455 Technology in Music, this course may also serve as the second part of an elective music technology cognate for students in the graduate and IUG programs in music theory.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 452** Computer Music Synthesis (3) Use of sound synthesis software for music creation.

**Computer Music Synthesis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 453** Recording Studio Training (1) Training in how to use a professional multi-track recording studio.

**MUSIC 453 Recording Studio Training (1)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This is a course in recording studio engineering, directed at students who wish to learn how to operate a professional level multi-track recording studio. Topics include microphone theory, signal flow, audio mixing and mastering, and maintenance issues.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 455** Technology in Music (1-3:1.5:1.5) Survey of how musical information is stored and processed in computer

systems.

### **MUSIC 455 Technology in Music (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course provides a survey of how musical information is stored and transmitted in digital devices. It will be divided into three sections.

Weeks 1 and 2 are an introduction to acoustical principles such as the nature of sound transmission and measurements of frequency, sound power level, phase, timbre, and localization. Computer basics will also be covered, with topics to include binary number representation and basic computer operation.

Weeks 3 through 8 cover the MIDI transmission protocol that enables musical information to be stored and transmitted efficiently. Topics include the nature of the MIDI data structure, the types of messages that may be passed, and the suitability of MIDI for expressive performance. MIDI software is discussed, including notation software, editor/librarian software, and sequencers. The bulk of the course's project component involves working with sequencing programs. Students are also exposed to using MIDI on the web, downloading files and importing them into various applications.

Weeks 9 through 15 cover digital audio so that students may understand how instruments capable of understanding MIDI messages are able to translate the instructions into audio signals. Topics include sampling theory, digital vs. analog recording, filters, signal processing, and editing sound files. Projects involving digital audio also use a sequencing program that is able to combine MIDI and audio data.

The students are expected to work independently to complete reading assignments according to the schedule outlined in the course syllabus. While due attention will be given to discussion of this material in class, the primary focus of class sessions will be hands-on application, to ensure that students master a set of skills on the computer.

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 458 Electronic Music Composition (3)** An introduction to the art of composition in the electronic audio medium.

### **MUSIC 458 Electronic Music Composition (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Music 458 will focus on the creative craft of musical composition in the medium of electronic audio. Topics covered will include but not be limited to: recording, MIDI and digital audio techniques, study of literature and the investigation of the creative process in musical composition. Students are expected to enter the class with strong fundamentals in both music theory and MIDI and digital audio. The student will be expected to complete several projects that demonstrate both their creativity and their technical competence in the medium.

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 460 Teaching Musical Cultures (2)** Exploration of the world's musical cultures and the implication of and procedures for teaching multicultural music. Limited to upper division music majors or permission of program.

### **Teaching Musical Cultures (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 461W Studies in Music History: Antiquity to 1600 (3 per semester/maximum of 6)** In-depth study of selected aspects of music and culture from antiquity to 1600, with emphasis on writing and research.

### **Studies in Music History: Antiquity to 1600 (3 per semester/maximum of 6)**

General Education: None  
Diversity: None

Bachelor of Arts: Arts  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 462W** Studies in Music History: 1550-1750 (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from 1550-1750, with emphasis on writing and research.

**Studies in Music History: 1550-1750 (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 463W** Studies in Music History: 1700-1900 (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from 1700-1900, with emphasis on writing and research.

**Studies in Music History: 1700-1900 (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 464W** Studies in Music History: 1850-Present (3 per semester/maximum of 6) In-depth study of selected aspects of music and culture from 1850 to the present, with emphasis on writing and research.

**Studies in Music History: 1850-Present (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 465** Advanced Conducting I (3) Advanced instruction in conducting; conducting techniques specific to instrumental or choral music; emphasis on score study and rehearsal technique.

**Advanced Conducting I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 466** Advanced Conducting II (2 per semester/maximum of 8) Standard scores of symphonies, tone poems, operas, oratorios, and shorter vocal and instrumental works studied from the viewpoint of the conductor.

**Advanced Conducting II (2 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 467** Opera Workshop (1-3 per semester/maximum of 6) History, analysis, and production of operas from sixteenth century to present.

**Opera Workshop (1-3 per semester/maximum of 6)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 468** Acting for Singers (2 per semester/maximum of 4) To help students develop authentic and specific characters/portrayals on stage through physical and emotional awareness.

### **MUSIC 468 Acting for Singers (2)**

This is a course teaching singers the fundamentals of acting. All types of stage work related to vocal music will be explored from performing in recitals and concerts to the opera and excerpted scenes. The objective of the course is to make singers more comfortable on stage and more realistic/believable in their performances/presentations. This course differs from acting courses offered in other areas because the singer has restrictions placed upon him due to the requirements of the music, especially in regard to timing and the sense of time, and the use of texts which are often in foreign languages. The course will be offered to music majors currently studying voice at an advanced level (V220J or higher) so that vocal technique will not be the main issue; this includes students enrolled in the BM, BMA, BA, and BME programs. Exceptions can be made by permission of the instructor. The course is an elective 2 credit course which students may repeat for a maximum of 4 credits. An accompanist will be present to accompany students in their song/aria presentations. Every class meeting will begin with warm-up exercises and then continue with further exercises focusing on helping students develop a sense of timing and enabling them to explore the "beats" (or central topic) of a scene. Emphasis will be placed on learning how to prepare for a scene, analyze it, and determining the goal(s) of the character. The students will be encouraged to learn how to be specific in their acting and to learn what will "read" to an audience while accurately reflecting the portrayed emotion. Some work will be solo work, but there will also be opportunities to work with partners. Improvisation will also be incorporated.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 471** Structural and Sixteenth-Century Counterpoint (2) Advanced species counterpoint and its application to the sixteenth-century style.

### **Structural and Sixteenth-Century Counterpoint (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 472** Eighteenth-Century Counterpoint (2) Imitative and nonimitative counterpoint in the style of Bach.

### **Eighteenth-Century Counterpoint (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 473J** Composition VII (3) Composition instruction for fourth-year composition majors.

### **Composition VII (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 474J** Composition VIII (3) Composition instruction for fourth-year composition majors.

**Composition VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 476W** B.A. Senior Project (3) A semester project appropriate to student's option in B.A. program (e.g., research paper, performance with program notes, or related paper).

**B.A. Senior Project (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 478** Vocal Literature (3) Introduction to the literature for solo voice in opera, oratorio, cantata, art song, and chamber music from the baroque to the present.

**Vocal Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 480** Opera Literature (3) Studies in the development of the opera from 1600 to the present, treating both libretto and music.

**Opera Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 481** Keyboard Literature (3) Studies in the development of keyboard music and instruments; a survey of all eras using listening, analysis, and performance.

**Keyboard Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 483** Seminar in Voice Pedagogy (2) Survey of literature relevant to the teaching of voice from historical sources through recent pedagogical scholarship.

**Seminar in Voice Pedagogy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MUSIC 485** Chamber Music Literature (3) Survey of chamber music for strings, winds, and brass instruments from the mid-16th century to the present day.

**Chamber Music Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 487** Orchestral Literature (3) Survey of orchestral literature.

**Orchestral Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 488** Studies in the Major Performance Area (1-2) Selected studies in music literature specific to the student's major performance area. Will include research, analysis and performance.

**MUSIC 488 Studies in the Major Performance Area (1-2)**

The objective of Music 488 is to create a thorough knowledge of the literature and resources in the students' major performance area. The course will be taught in a seminar format. Students will be grouped according by general performance area: i.e., keyboard, strings, woodwinds, brass, percussion, voice. The course will include lectures, research, class presentations and performance. The course will be offered for variable credit in order to meet varying conditions of scheduling and credit requirements. Specific evaluation methods will be determined by the instructor, to include class presentations, class participation, exams and/or written work.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 489** Studio and Recital Accompaniment (1 per semester/maximum of 4) Advanced keyboard accompaniment of student soloists in the studio and in public performance under faculty supervision.

**Studio and Recital Accompaniment (1 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 493** Sonata Duos (1 per semester/maximum of 4) Preparation for performance of advanced sonata literature for various individual instruments with keyboard.

**Sonata Duos (1 per semester/maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 494** Research Topics (1-3 per semester/maximum of 6) Supervised research leading to senior thesis or project.

**Research Topics (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 494H** Research Topics (1-3 per semester/maximum of 6) Supervised research leading to senior thesis or project.

**Research Topics (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 495A** Student Teaching: General Music (5-7) Observation and teaching under supervision.

**MUSIC 495A Student Teaching: General Music (6-8)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

As required by the Pennsylvania Department of Education, all music education students seeking certification must enroll in a culminating student teaching experience which closely approximates a full-time working experience in the public schools of Pennsylvania. The objective of this course is to offer a transition between student life and professional life directly prior to graduation. This total immersion in the field of GENERAL MUSIC allows the student to learn from and work with a mentor teacher in an off-campus setting. During the semester prior to the course, cooperating music teachers and school districts are contacted requesting their participation and music education students interview with the teachers. The students then move to the community in which they will be student teaching and adopt the practices of that mentor teacher within that specific school district.

Students are evaluated by both the mentor teacher and a Penn State supervisor who visits a minimum of four times per semester. This course is offered every semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2001  
 Prerequisite:  
 Concurrent: MUSIC 442

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 495B** Student Teaching: Choral Music (5-7) Observation and teaching under supervision.

**MUSIC 495B Student Teaching: Choral Music (5-7)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

As required by the Pennsylvania Department of Education, all music education students seeking certification must enroll in a culminating student teaching experience which closely approximates a full-time working experience in the public schools of Pennsylvania. The objective of this course is to offer a transition between student life and professional life directly prior to graduation. This total immersion in the field of CHORAL MUSIC allows the student to learn from and work with a mentor teacher in an off-campus setting. During the semester prior to the course, cooperating music teachers and school districts are contacted requesting their participation and music education students interview with the teachers. The students then move to the community in which they will be student teaching and adopt the practices of that mentor teacher within that specific school district.

Students are evaluated by both the mentor teacher and a Penn State supervisor who visits a minimum of four times per semester. This course is offered every semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2001  
 Prerequisite:  
 Concurrent: MUSIC 443

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 495C** Student Teaching: Instrumental Music (5-7) Observation and teaching under supervision.

**MUSIC 495C Student Teaching: Instrumental Music (5-7)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

As required by the Pennsylvania Department of Education, all music education students seeking certification must enroll in a culminating student teaching experience which closely approximates a full-time working experience in the public schools of Pennsylvania. The objective of this course is to offer a transition between student life and professional life directly prior to graduation. This total immersion in the field of INSTRUMENTAL MUSIC allows the student to learn from and work with a mentor teacher in an off-campus setting. During the semester prior to the course, cooperating music teachers and school districts are contacted requesting their participation and music education students interview with the teachers. The students then move to the community in which they will be student teaching and adopt the practices of that mentor teacher within that specific school district.

Students are evaluated by both the mentor teacher and a Penn State supervisor who visits a minimum of four times per semester. This course is offered every semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2001  
 Prerequisite:  
 Concurrent: MUSIC 444

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 496H** Independent Studies - Honors (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies - Honors (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497A** Survey Music History (3) For graduate students who need remedial work in music history.

**Survey Music History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497A** Survey Music History (3) For graduate students who need remedial work in music history.

**Survey Music History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497B** Clarinet Literature (1-2) Selected studies in music literature specific to the clarinet. Will include research, analysis, and performance.

**Clarinet Literature (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497B** Clarinet Literature (1-2) Selected studies in music literature specific to the clarinet. Will include research, analysis, and performance.

**Clarinet Literature (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497C** Business of Music (1) Survey of topics related to a career in music performance-including auditions, competition, finances, work abroad, etc. Guest lecturers included.

**Business of Music (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497C** Business of Music (1) Survey of topics related to a career in music performance-including auditions, competition, finances, work abroad, etc. Guest lecturers included.

**Business of Music (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497D** Horn Literature (1) Selected studies in music literature specific to the french horn. Will include research, analysis, and performance.

**Horn Literature (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497D** Horn Literature (1) Selected studies in music literature specific to the french horn. Will include research, analysis, and performance.

**Horn Literature (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497E** Double Bass Excerpts (1) This course is designed to study in depth a series of double bass excerpts from the standard orchestral and opera repertoire. We will look at how to prepare a mock audition behind a screen at the end of the semester.

**Double Bass Excerpts (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497F** Viola Literature (1) An introduction to excerpts from the viola parts of standard orchestral literature required for professional orchestral auditions.

**Viola Literature (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 497G** Viola Orchestral Excerpts (1) An introduction to excerpts from the viola parts of standard orchestral literature required for professional orchestral auditions.

**Viola Orchestral Excerpts (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 498A** Film Music (3) A central premise of this course is that music mediates and manipulates our perceptions of the visual image. Accordingly, we will develop both the eye and ear as we carefully consider the influential role music plays in cinematic narratives of Hollywood films. This course is not a history of film music, although our approach will in some respects be historic. Our purpose is to gain an understanding of the role of music in film, to observe various approaches to the use of music in film, and to examine how music interacts with the other elements of the sound track (sound effects and dialogue) that, in turn, accompanies and interacts with the movie's visual component to create a compelling and satisfying work of art.

### **Film Music (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 500** Introduction to Music Reference and Research Materials (2) A study of musicological reference and research materials in English and Western European languages, with exercises in their use.

### **Introduction to Music Reference and Research Materials (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 505** symphonic Wind Ensemble (1 per semester, maximum of 4) Rehearsal and performance of wind repertoire and concert band literature.

### **symphonic Wind Ensemble (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 507** Philharmonic Orchestra (1 per semester, maximum of 4) Orchestra rehearsal and performance.

### **Philharmonic Orchestra (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**MUSIC 508** Chamber Orchestra (1 per semester, maximum of 4) Chamber orchestra rehearsal and performance.

**Chamber Orchestra (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 519** Graduate Seminar in Intermediate Piano Pedagogy (2) Graduate seminar in intermediate teaching repertoire and strategies for piano from the Baroque to the 21st century.

**MUSIC 519 Graduate Seminar in Intermediate Piano Pedagogy (2)**

This course is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will have already passed the introductory undergraduate course in Intermediate Piano Pedagogy, MUSIC 424, or the current Graduate Seminar in Piano Pedagogy, MUSIC 589 (which will continue to be offered; it is required for piano pedagogy major students in the Master of Music degree), or an equivalent of one of these courses at another institution. The material will be covered in class discussions, reading and listening assignments, and in-class student presentations. Writing, performing, and speaking will be required. The course is designed to give developing professional pianists and piano teachers greater depth of knowledge of the pedagogical repertoire than is possible either in the introductory course or through their own concurrent teaching experiences. The seminar format encourages group discussion as well as independent work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 520** Chamber Music for Strings (1 per semester, maximum of 4) Preparation for performance of (advanced) chamber music literature involving primarily stringed instruments--quartets and quintets.

**Chamber Music for Strings (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 521** Chamber Music for Woodwinds (1 per semester, maximum of 4) Preparation for performance of (advanced) chamber music literature involving primarily woodwind instruments--quartets and quintets.

**Chamber Music for Woodwinds (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 522** Chamber Music for Brass (1 per semester, maximum of 4) Preparation for performance of (advanced) chamber music literature involving primarily brass instruments--quartets and quintets.

**Chamber Music for Brass (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 523** Sonata Duos (1 per semester, maximum of 4) Preparation for performance of (advanced) sonata literature for

various individual instruments with keyboard.

**Sonata Duos (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 524** Graduate Seminar in Advanced Piano Pedagogy (2) Graduate seminar in advanced repertoire, history of piano pedagogy, and strategies for piano from the Baroque to the 21st century.

**MUSIC 524 Graduate Seminar in Advanced Piano Pedagogy (2)**

MUSIC 524 is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will have already passed the introductory undergraduate course in Intermediate Piano Pedagogy, MUSIC 424, or the current Graduate Seminar in Piano Pedagogy, MUSIC 589 (which will continue to be offered; it is required for piano pedagogy major students in the Master of Music degree), or an equivalent of one of these courses at another institution. The material will be covered in class discussions, reading and listening assignments, and in-class student presentations. Writing, performing, and speaking will be required. The course is designed to give developing professional pianists and piano teachers greater depth of knowledge of the pedagogical repertoire than is possible either in the introductory course or through their own concurrent teaching experiences. The seminar format encourages group discussion as well as independent work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 531** Analytical Techniques (3) Twentieth-century theories of tonal music other than Schenker; emphasis on motivic, thematic, metric, and rhythmic analysis.

**Analytical Techniques (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 532** Schenkerian Analysis (3) An intensive introduction to the analytical method developed by the Twentieth-century Austrian theorist and musicologist, Heinrich Schenker.

**Schenkerian Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 533** The Pedagogy of Undergraduate Theory and History (2) A study of approaches to the teaching and learning of music theory (written and aural skills) and history.

**The Pedagogy of Undergraduate Theory and History (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 535J** Composition (1-4) Composition of vocal, instrumental, and electronic media and preparation of compositions for performance.

**Composition (1-4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 560J** Choral Conducting (2 per semester/maximum of 16) Study of choral conducting techniques, comprehensive score analysis, and supervised rehearsal and performance practicum.

**Choral Conducting (2 per semester/maximum of 16)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 561J** Orchestral Conducting (2 per semester, maximum of 16) Study of orchestral conducting technique, comprehensive score analysis, and supervised rehearsal and performance practicum.

**Orchestral Conducting (2 per semester, maximum of 16)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 562J** Band/Wind Ensemble Conducting (2 per semester/maximum of 16) Study of band and wind ensemble conducting, comprehensive score analysis, and supervised rehearsal and performance practicum.

**Band/Wind Ensemble Conducting (2 per semester/maximum of 16)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 565** Studio and Recital Accompaniment (1 per semester, maximum of 4) Keyboard accompaniment of student soloists in the studio and in public performance, under faculty supervision.

**Studio and Recital Accompaniment (1 per semester, maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 572** Seminar in Musicology (3 per semester/maximum of 9) Research in selected areas of music history.

**Seminar in Musicology (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 573** Integrative Seminar in Music Theory and History (3 per semester/maximum of 9) Special topics (composer,

style, genre) taught from both theoretical and historical perspectives.

**Integrative Seminar in Music Theory and History (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 574** Seminar in Music Theory (3) Study of analytical techniques, aesthetics, writings, in music theory, music cognition, musical sketches, and mathematical models taught from a theory perspective.

**Seminar in Music Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 575** Integrative Conducting Seminar (1 per semester/maximum of 2) A seminar for choral, orchestral, and band/wind ensemble graduate conducting majors, taught by conducting faculty in all three areas.

**Integrative Conducting Seminar (1 per semester/maximum of 2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 580** Studies in Orchestral Literature (2 per semester/maximum of 8) Selected studies in orchestral literature from the seventeenth century to the present.

**Studies in Orchestral Literature (2 per semester/maximum of 8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 582** Studies in Band/Wind Ensemble Literature (2 per semester/maximum of 8) Selected studies in band and wind ensemble literature from the Renaissance to the present.

**Studies in Band/Wind Ensemble Literature (2 per semester/maximum of 8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 583** Studies in Choral Literature (2 per semester, maximum of 8) Selected studies in choral literature of all types from the Renaissance to the present.

**Studies in Choral Literature (2 per semester, maximum of 8)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**MUSIC 585** Graduate Seminar in Keyboard Music 1710 to 1820 (2) Seminar in music for keyboards (organ, harpsichord, pianoforte) from the early works of J.S. Bach (c. 1710) to late Beethoven.

**MUSIC 585 Graduate Seminar in Keyboard Music 1710 to 1820 (2)**

This first of three seminar courses is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will have already passed the introductory survey in Keyboard Literature, MUSIC 481 or its equivalent at other institutions. The material, dealing with the periods beginning with late Baroque (J.S. Bach, Handel, Domenico Scarlatti) and ending with Beethoven, will be covered in class discussions, listening assignments, and student presentations in class. Both writing and speaking will be required. The course is designed to give developing professional pianists greater depth and breadth of knowledge of their repertoire than is possible either in the introductory survey or in their own practice. The seminar format encourages group discussion as well as independent work.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 586** Graduate Seminar in Piano Music 1820-1920 (2) Seminar in music for pianoforte from the early works of Schubert, circa 1820, to Rachmaninoff (Romantic and post-Romantic).

**MUSIC 586 Graduate Seminar in Piano Music 1820-1920 (2)**

This course is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will already have passed the introductory survey in Keyboard Literature, MUSIC 481, or its equivalent at other institutions. The material, in this case the Romantic music that is the core of pianists' repertoire, will be covered in class discussions, listening assignments, and student presentations in class. Both writing and speaking will be required. The course is designed to give developing professional pianists greater depth and breadth of knowledge of their repertoire than is possible either in the introductory survey or in their own practice. The seminar format encourages group discussion as well as independent work.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 587** Graduate Seminar in Piano Music 1890-Present (2) Seminar in modern music for pianoforte from the early works of Debussy (circa 1890) to the present day.

**MUSIC 587 Graduate Seminar in Piano Music 1890-Present (2)**

This course is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who have already passed the introductory survey in Keyboard Literature, MUSIC 481, or its equivalent at other institutions. The most extensive treatment will be given to Debussy and Ravel in the first weeks, and later to Schonberg and his followers, as well as Bartok, Stravinsky, Hindemith, Ives, Messiaen and other outstanding figures. Less-well known composers of superior accomplishment will also be addressed. The material will be covered in class discussions, listening assignments, and student presentations in class. Both writing and speaking will be required. The course is designed to give developing professional pianists greater depth and breadth of knowledge of their repertoire than is possible either in the introductory survey or in their own practice. The seminar format encourages group discussion as well as independent work.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 588** Seminar in Music Literature of the Major Performance Area (1-3) Selected studies in music literature specific to the student's major performance area. Will include research, analysis, and performance.

**Seminar in Music Literature of the Major Performance Area (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 589** Seminar in Piano Pedagogy (2) Selected variable topics in piano pedagogy; includes reserach, performance and discussion of appropriate literature, and class participation.

### **Seminar in Piano Pedagogy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 594** Master's Paper Research (1-6) Investigation of a specific problem in music or music education.

### **Master's Paper Research (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 595A** Internship in Piano Pedagogy (1) Piano performance and pedagogy majors observe experienced teachers and gain supervised teaching experience. Gradually assume responsibility for the lessons of one or two students.

### **Internship in Piano Pedagogy (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 595B** Internship in College Teaching (2) Identify goals for undergraduate courses in general music; develop and structure learning experiences in music for students in higher education.

### **Internship in College Teaching (2)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 597A** Philosophy of Music Education (3) Philosophy of music education will focus on both major and minor philosophical premises in music education including historical works, current philosophies, and new directions for the future of this field. This course contains a significant amount of reading and preparation for discussion.

#### **Philosophy of Music Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 597B** Philosophy of Music Education (3) Covers a majority of popular philosophical approaches including aesthetic and praxial. This course is intended to fulfill the required philosophy course work of the Ph.D. degree in music education.

#### **Philosophy of Music Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience for teaching assistants in music.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 801J** Doctoral Solo Recital (DMA) (2 per semester/maximum of 4) Culminating solo recital(s) of artist-level repertoire; may be repeated with different repertoire.

**Doctoral Solo Recital (DMA) (2 per semester/maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 802J** DMA Lecture-Recital Monograph (1) Preparation of a monograph to be text of the DMA lecture-recital; must be approved prior to performance.

**DMA Lecture-Recital Monograph (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 803J** Performance of the DMA Lecture-Recital (2) Performance of the D.M.A. lecture-recital (the lecture monograph to be pre-approved as MUSIC 802).

**Performance of the DMA Lecture-Recital (2)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 804J** Chamber Music Recital (DMA) (1 per semester/maximum of 2) Recital devoted to chamber music (including song groups or cycles for voice and piano). May be repeated.

**Chamber Music Recital (DMA) (1 per semester/maximum of 2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 805J** DMA Final Recital (3) Final, culminating solo recital of artist-level repertoire; independently prepared.

**DMA Final Recital (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 810** Choral Ensemble (1 per semester/maximum of 4) Rehearsal and performance of choral music.

**MUSIC 810 Choral Ensemble (1 per semester/maximum of 4)**

The goals of Music 810 are to develop the vocal performing skills, music reading abilities, and interpretive capabilities of the class members within a variety of choral ensemble types, including mixed-voice choirs of varying sizes, men's and women's choirs, and choral ensembles focusing on specific musical traditions. Repertoire is selected from Western music as well as world music traditions. The course is for students who have established vocal performance skills. An audition is required.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 811** Instrumental Ensemble (1 per semester/maximum of 6) Rehearsal and performance of instrumental music.

**MUSIC 811 Instrumental Ensemble (1 per semester/maximum of 6)**

The goals of Music 811 are to develop the instrumental performing skills, music reading abilities, and interpretive capabilities of the class members within a variety of instrumental ensemble types. Repertoire is selected from Western music as well as world music traditions. The course is for students who have established instrumental performance skills. An audition is required.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 891J** Graduate Degree Performance (1) A juried recital performance for students majoring in performance, composition, or conducting.

**Graduate Degree Performance (1)**

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MUSIC 896** Individual Studies (1-9 per semester/maximum of 18) Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Music - Brass (BRASS)

**BRASS 420J** Trumpet: Primary VII (2) Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

**Trumpet: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 421J** French Horn: Primary VII (2) Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

**French Horn: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 422J** Trombone: Primary VII (2) Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

**Trombone: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 423J** Euphonium: Primary VII (2) Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

**Euphonium: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 424J** Tuba: Primary VII (2) Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

**Tuba: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 430J** Trumpet: Performance VII (3) Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

**Trumpet: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 431J** French Horn: Performance VII (3) Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

**French Horn: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 432J** Trombone: Performance VII (3) Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

**Trombone: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 433J** Euphonium: Performance VII (3) Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

**Euphonium: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 434J** Tuba: Performance VII (3) Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

**Tuba: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**BRASS 470J** Trumpet: Primary VIII (2) Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

**Trumpet: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 471J** French Horn: Primary VIII (2) Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

**French Horn: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 472J** Trombone: Primary VIII (2) Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

**Trombone: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 473J** Euphonium: Primary VIII (2) Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors.

**Euphonium: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 474J** Tuba: Primary VIII (2) Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors.

**Tuba: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 480J** Trumpet: Performance VIII (3) Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

**Trumpet: Performance VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 481J** French Horn: Performance VIII (3) Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

**French Horn: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 482J** Trombone: Performance VIII (3) Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

**Trombone: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 483J** Euphonium: Performance VIII (3) Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

**Euphonium: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 484J** Tuba: Performance VIII (3) Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

**Tuba: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 500J** Trumpet: Secondary (1) Individual instruction in trumpet one-half hour per week.

**Trumpet: Secondary (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 501J** French Horn: Secondary (1) Individual instruction in French horn one-half hour per week.

**French Horn: Secondary (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 502J** Trombone: Secondary (1) Individual instruction in trombone one-half hour per week.

**Trombone: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 503J** Euphonium: Secondary (1) Individual instruction in euphonium/baritone one-half hour per week.

**Euphonium: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 504J** Tuba: Secondary (1) Individual instruction in tuba one-half hour per week.

**Tuba: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 510J** Trumpet: Secondary (2) Individual instruction in trumpet one hour per week.

**Trumpet: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 511J** French Horn: Secondary (2) Individual instruction in French horn one hour per week.

**French Horn: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 512J** Trombone: Secondary (2) Individual instruction in trombone one hour per week.

**Trombone: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 513J** Euphonium: Secondary (2) Individual instruction in euphonium/baritone one hour per week.

**Euphonium: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 514J** Tuba: Secondary (2) Individual instruction in tuba one hour per week.

**Tuba: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 530J** Trumpet: Performance (4 per semester/maximum of 16) Individual instruction in trumpet one hour per week. For graduate trumpet performance majors.

**Trumpet: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 531J** French Horn: Performance (4 per semester/maximum of 16) Individual instruction in French Horn one hour per week. For graduate French horn performance majors.

**French Horn: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 532J** Trombone: Performance (4 per semester/maximum of 16) Individual instruction in trombone one hour per week. For graduate trombone majors.

**Trombone: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 533J** Euphonium: Performance (4 per semester, maximum of 16) Individual instruction in euphonium one hour per week. For graduate euphonium majors.

**Euphonium: Performance (4 per semester, maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**BRASS 534J** Tuba: Performance (4 per semester/maximum of 16) Individual instruction in tuba two sessions per week. For graduate tuba performance majors.

**Tuba: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Music - Keyboard (KEYBD)

**KEYBD 420J** Piano: Primary VII (2) Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

**Piano: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 430J** Piano: Performance VII (3) Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

**Piano: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 470J** Piano: Primary VIII (2) Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

**Piano: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 480J** Piano: Performance VIII (3) Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

**Piano: Performance VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 500J** Piano: Secondary (1) Individual instruction in piano one-half hour per week. For students who qualify.

**Piano: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 501J** Organ: Secondary (1) Individual instruction in pipe organ one-half hour per week. For students who qualify.

**Organ: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 510J** Piano: Secondary (1) Individual instruction in piano one hour per week. For students who qualify.

**Piano: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 530J** Piano: Performance (4 per semester/maximum of 16) Individual instruction in piano one hour per week. For graduate piano performance majors.

**Piano: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**KEYBD 580J** Piano Performance Doctoral/Artist Level (4) One-hour weekly piano lessons with jury examination at end of each semester; repeatable course; four semesters required.

**KEYBD 580J Piano Performance Doctoral/Artist Level (4)**

KEYBD 580J consists of one-hour weekly lessons, like other private applied music lessons in the School of Music. The repertoire to be performed and the standards of preparation will be at the highest level, for pianist-students in the degree Doctor of Musical Arts, who will have already completed a Master of Music in Performance. This standard, which will be enforced via a jury examination at the end of the semester, will require large amounts of independent practice, and therefore will be valued at four credits per semester. Four semesters minimum (16 credits) will be required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Music - Percussion (PERCN)

**PERCN 420J** Percussion: Primary VII (2) Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

**Percussion: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERCN 430J** Percussion: Performance VII (3) Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

**Percussion: Performance VII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERCN 470J** Percussion: Primary VIII (2) Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

**Percussion: Primary VIII (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERCN 480J** Percussion: Performance VIII (3) Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

**Percussion: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERCN 500J** Percussion: Secondary (1) Individual instruction in percussion one-half hour per week.

**Percussion: Secondary (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERCN 510J** Percussion: Secondary (2) Individual instruction in percussion one hour per week.

**Percussion: Secondary (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERCN 530J** Percussion: Performance (4 per semester/maximum of 16) Individual instruction in percussion one hour per week. For graduate percussion performance majors.

**Percussion: Performance (4 per semester/maximum of 16)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1986

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Music - String (STRNG)

**STRNG 420J** Violin: Primary VII (2) Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

### Violin: Primary VII (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 421J** Viola: Primary VII (2) Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

### Viola: Primary VII (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 422J** Violoncello: Primary VII (2) Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

### Violoncello: Primary VII (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 423J** Double Bass: Primary VII (2) Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

### Double Bass: Primary VII (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 430J** Violin: Performance VII (3) Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

### Violin: Performance VII (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 431J** Viola: Performance VII (3) Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

**Viola: Performance VII (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 432J** Violoncello: Performance VII (3) Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

**Violoncello: Performance VII (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 433J** Double Bass: Performance VII (3) Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

**Double Bass: Performance VII (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 470J** Violin: Primary VIII (2) Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

**Violin: Primary VIII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 471J** Viola: Primary VIII (2) Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

**Viola: Primary VIII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 472J** Violoncello: Primary VIII (2) Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

**Violoncello: Primary VIII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 473J** Double Bass: Primary VIII (2) Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

**Double Bass: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 480J** Violin: Performance VIII (3) Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

**Violin: Performance VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 481J** Viola: Performance VIII (3) Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

**Viola: Performance VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 482J** Violoncello: Performance VIII (3) Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

**Violoncello: Performance VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 483J** Double Bass: Performance VIII (3) Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

**Double Bass: Performance VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 500J** Violin: Secondary (1) Individual instruction in violin one-half hour per week. For students who qualify.

**Violin: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**STRNG 501J** Viola: Secondary (1) Individual instruction in viola one-half hour per week. For students who qualify.

**Viola: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 502J** Violoncello: Secondary (1) Individual instruction in violoncello one-half hour per week. For students who qualify.

**Violoncello: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 503J** Double Bass: Secondary (1) Individual instruction in double bass one-half hour per week. For students who qualify.

**Double Bass: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 510J** Violin: Secondary (2) Individual instruction in violin one hour per week. For students who qualify.

**Violin: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 511J** Viola: Secondary (2) Individual instruction in viola one hour per week. For students who qualify.

**Viola: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 512J** Violoncello: Secondary (2) Individual instruction in violoncello one hour per week. For students who qualify.

**Violoncello: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 513J** Double Bass: Secondary (2) Individual instruction in double bass one hour per week. For students who qualify.

**Double Bass: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 530J** Violin: Performance (4 per semester/maximum of 16) Individual instruction in violin one hour per week. For graduate violin performance majors.

**Violin: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 531J** Viola: Performance (4 per semester/maximum of 16) Individual instruction in viola one hour per week. For graduate viola performance majors.

**Viola: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 532J** Violoncello: Performance (4 per semester/maximum of 16) Individual instruction in violoncello one hour per week. For graduate violoncello performance majors.

**Violoncello: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STRNG 533J** Double Bass: Performance (4 per semester/maximum of 16) Individual instruction in double bass one hour per week. For graduate double bass performance majors.

**Double Bass: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Music - Voice (VOICE)

**VOICE 412J** Musical Theatre Voice V (2) Individual instruction in voice. Intended for Theatre BFA in Music Theatre students.

**VOICE 412J Musical Theatre Voice V (2)**

VOICE 412J continues to develop a vocal approach and technique to musical theatre repertoire. It is required of fourth-year musical theatre students. All aspects of vocal production are explored. The voice sequence is a required element of the B.F.A. musical theatre training program. Grading will be based on attendance, preparation, and attitude.

These are all critical factors for entering the profession and for successfully completing this course. Deadlines and appointments must be kept. Students must do adequate outside preparation. VOICE 412J is a requirement for the B.F.A. in musical theatre. It is offered every fall semester with an enrollment of approximately 15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 420J** Voice: Primary VII (2) Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

**Voice: Primary VII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 430J** Voice: Performance VII (3) Individual instruction in voice one hour per week. For B.Mus. voice performance majors.

**Voice: Performance VII (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 462J** Musical Theatre Voice VI (2) Individual instruction in voice. Intended for Theatre BFA in Music Theatre students.

**VOICE 462J Musical Theatre Voice VI (2)**

VOICE 462J continues to develop a vocal approach and technique to musical theatre repertoire studied in Musical Theatre Voice V. It is required of fourth-year musical theatre students. All aspects of vocal production are explored. The voice sequence is a required element of the B.F.A musical theatre training program. Grading will be based on attendance, preparation, and attitude. These are all critical factors for entering the profession and for successfully completing this course. Deadlines and appointments must be kept. Students must do adequate outside preparation. This course is a requirement for the B.F.A. in musical theatre. It is offered every spring semester with an enrollment of approximately 15.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 470J** Voice: Primary VIII (2) Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

**Voice: Primary VIII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 480J** Voice: Performance VIII (3) Individual instruction in voice one hour per week. For B.Mus. voice performance majors.



**Voice: Performance VIII (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 500J** Voice: Secondary (1) Individual instruction in voice one-half hour per week.

**Voice: Secondary (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 510J** Voice: Secondary (2) Individual instruction in voice one hour per week.

**Voice: Secondary (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VOICE 530J** Voice: Performance (4 per semester/maximum of 16) Individual instruction in voice one and one-half hours per week. For graduate voice performance majors.

**Voice: Performance (4 per semester/maximum of 16)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Music - Woodwinds (WWNDS)**

**WWNDS 420J** Flute: Primary VII (2) Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

**Flute: Primary VII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 421J** Oboe: Primary VII (2) Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

**Oboe: Primary VII (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**WWNDS 422J** Clarinet: Primary VII (2) Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

**Clarinet: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 423J** Bassoon: Primary VII (2) Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

**Bassoon: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 424J** Saxophone: Primary VII (2) Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

**Saxophone: Primary VII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 430J** Flute: Performance VII (3) Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

**Flute: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 431J** Oboe: Performance VII (3) Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

**Oboe: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 432J** Clarinet: Performance VII (3) Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

**Clarinet: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**WWNDS 433J** Bassoon: Performance VII (3) Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

**Bassoon: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 434J** Saxophone: Performance VII (3) Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

**Saxophone: Performance VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 470J** Flute: Primary VIII (2) Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

**Flute: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 471J** Oboe: Primary VIII (2) Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

**Oboe: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 472J** Clarinet: Primary VIII (2) Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

**Clarinet: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 473J** Bassoon: Primary VIII (2) Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

**Bassoon: Primary VIII (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 474J** Saxophone: Primary VIII (2) Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

**Saxophone: Primary VIII (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 480J** Flute: Performance VIII (3) Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

**Flute: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 481J** Oboe: Performance VIII (3) Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

**Oboe: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 482J** Clarinet: Performance VIII (3) Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

**Clarinet: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 483J** Bassoon: Performance VIII (3) Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

**Bassoon: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 484J** Saxophone: Performance VIII (3) Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

**Saxophone: Performance VIII (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 500J** Flute: Secondary (1) Individual instruction in flute one-half hour per week.

**Flute: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 501J** Oboe: Secondary (1) Individual instruction in oboe one-half hour per week.

**Oboe: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 502J** Clarinet: Secondary (1) Individual instruction in clarinet one-half hour per week.

**Clarinet: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 503J** Bassoon: Secondary (1) Individual instruction in bassoon one-half hour per week.

**Bassoon: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 504J** Saxophone: Secondary (1) Individual instruction in saxophone one-half hour per week.

**Saxophone: Secondary (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 510J** Flute: Secondary (2) Individual instruction in flute one hour per week.

**Flute: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 511J** Oboe: Secondary (2) Individual instruction in oboe one hour per week.

**Oboe: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 512J** Clarinet: Secondary (2) Individual instruction in clarinet one hour per week.

**Clarinet: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 513J** Bassoon: Secondary (2) Individual instruction in bassoon one hour per week.

**Bassoon: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 514J** Saxophone: Secondary (2) Individual instruction in saxophone one hour per week.

**Saxophone: Secondary (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 530J** Flute: Performance (4 per semester/maximum of 16) Individual instruction in flute one and one-half hour per week. For graduate flute performance majors.

**Flute: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 531J** Oboe: Performance (4 per semester/maximum of 16) Individual instruction in oboe one hour per week. For graduate oboe performance majors.

**Oboe: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 532J** Clarinet: Performance (4 per semester/maximum of 16) Individual instruction in clarinet one hour per week.

For graduate clarinet performance majors.

**Clarinet: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 533J** Bassoon: Performance (4 per semester/maximum of 16) Individual instruction in bassoon one hour per week. For graduate bassoon performance majors.

**Bassoon: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WWNDS 534J** Saxophone: Performance (4 per semester/maximum of 16) Individual instruction in saxophone one hour per week. For graduate saxophone performance majors.

**Saxophone: Performance (4 per semester/maximum of 16)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Music Education (MU ED)

**MU ED 440** Music Learning and Development (2) Psychological principles related to music learning processes and applications of those to teaching music.

**Music Learning and Development (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 540** Reflective Practice and Inquiry I (2) This course will develop students' reflection in and on teaching through gaining understanding of systematic inquiry and reflection paradigms.

**Reflective Practice and Inquiry I (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 541** Developing Music Curricula (2) Introduction to the process for developing music curricula for grades K-12 that reflects current theories/research data as well as state/national guidelines.

**Developing Music Curricula (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 545** Psychological Foundations of Musical Behavior (3) Study of psychoacoustical effects of musical stimuli; emphasis on responses affecting learning musical ability, musical taste, and aesthetic reactions.

**Psychological Foundations of Musical Behavior (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 546** Assessment of Music Learning (2) Exploration of the unique processes, techniques, and challenges involved in the assessment of music learning.

**Assessment of Music Learning (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 547** Mentoring Novice Teachers (1 per semester/maximum of 2) Strategies for mentoring novice music teachers in peer teaching experiences and in K-12 school field experiences.

**Mentoring Novice Teachers (1 per semester/maximum of 2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 550** Reflective Practice and Inquiry II (2) This course will use systematic inquiry and reflection to assist students' in understanding the relevance of research methods in music education.

**Reflective Practice and Inquiry II (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 555** Doctoral Seminar in Music Education (1 per semester, maximum of 6) Forum for the discussion of problems in theory and design encountered in individual and group research projects.

**Doctoral Seminar in Music Education (1 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 557** Readings in the History of American Music Education (2) Intensive reading course on the history of American music education and the social, theological, and educational influences on the profession.

**Readings in the History of American Music Education (2)**

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 559** Contemporary Issues in Music Education (1-2) Consideration of the current political and pedagogical issues that influence curriculum development, teaching, and administration of K-12 music programs.

### **Contemporary Issues in Music Education (1-2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**MU ED 895** Practicum in Music Teaching (1 per semester/maximum of 4) Field experiences in music teaching for graduate students in music education.

### **Practicum in Music Teaching (1 per semester/maximum of 4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Neural & Behav Sci (NBS)**

**NBS 725** Neural and Behavioral Science (13) Organized around the neural and behavioral sciences; builds on Year I knowledge.

### **Neural and Behavioral Science (13)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Neuroscience-Hy (NEURO)**

**NEURO 511** (ANAT 511) Neurobiology II (3) Structure and physiology of central and peripheral nervous system, including specific sense organs.

### **Neurobiology II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 512** Comparative Neuroanatomy (4) This course elucidates the structural organization of the nervous system and describes the evolutionary principles that guide brain development.

### **NEURO 512 Comparative Neuroanatomy (4)**

This course provides instruction on the functional and structural organization of the vertebrate central nervous system. In addition to lectures, students attend laboratory sessions devoted to human brain dissections, histologic sections of

various vertebrate brains, and non-invasive magnetic resonance images.

Following instruction on the structural and physiological properties of neurons, students learn how structural and neurochemical variations endow neurons with specific computational properties so that connections between different neuronal subtypes enable local circuits to extract information and create specific input-output transformations that define the functional character of each neural system. The structural organization of the brain is then described both grossly and at the level of functional circuits.

Material at the gross level describes the 3-D spatial relationships among the nuclei and fiber tracts within each subdivision of the central nervous system so that students can describe the internal organization of the forebrain, midbrain, hindbrain, and spinal cord. As part of this, students learn to recognize specific structures in different planes of sections along the major axes of the brain.

Material at the functional level describes the sensory, motor, and limbic systems according to their circuit connections. Emphasis is placed on the specific connections that enable circuits to transform specific types of information. Students are expected to describe the successive series of nuclei and interconnected pathways that comprise each major neural system.

Students are also taught to view neuroanatomy as a scientific field of inquiry. Landmark discoveries and the methods by which prominent neuroanatomists made those discoveries provide a context for describing brain organization.

Breakthrough scientific experiments are discussed to illustrate how the structural-functional relationships of the brain have been elucidated. Attention is also devoted to instructing students in modern experimental methods that are used to determine how brain circuits are altered by experimental manipulations.

While the course emphasizes the mammalian nervous system, many aspects of brain organization in non-mammalian vertebrates are presented. In the last third of the course, students read a monograph focused on the principles that guided vertebrate brain evolution across different phylogenetic lineages. A series of lectures are devoted to neurocladistics and the evidence that has prompted competing theories of brain evolution so that students can critically evaluate differences in brain organization across different groups of vertebrates.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 515 (ANAT 515) Developmental Neurobiology (2)** Development of the nervous system in all its aspects.

### **Developmental Neurobiology (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 520 Cellular and Molecular Neuroscience (3)** An introduction to neurons, glia, and the molecular basis of brain function.

### **Cellular and Molecular Neuroscience (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 521 Systems Neuroscience (3)** An introduction to the major neural systems and their integrative functions.

### **Systems Neuroscience (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 522 Seminars in Neuroscience I (2)** Study at the cellular, molecular, and metabolic level of selected subjects in neuroscience.

### **Seminars in Neuroscience I (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 523** Seminars in Neuroscience II (2) Study at the cellular, molecular, and metabolic level of selected subjects in neuroscience.

**Seminars in Neuroscience II (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 530** Professional Development and Responsible Conduct in Science (1) An introduction to the professional skills necessary for careers in biomedical sciences.

**Professional Development and Responsible Conduct in Science (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered

infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 597A** Neuroscience Seminar (2) This course examines issues in neuroscience related to the research presented by invited speakers in the Neuroscience Seminar Series. This course is for first-year neuroscience students.

### **Neuroscience Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 597A** Neuroscience Seminar (2) This course examines issues in neuroscience related to the research presented by invited speakers in the Neuroscience Seminar Series. This course is for first-year neuroscience students.

### **Neuroscience Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 600** Thesis Research (1-15) No Description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 610** Thesis Research Off Campus (1-15) No Description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 611** Ph. D. Dissertation Part-Time (0) No Description.)

**Ph. D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 740** Neurology Clerkship (5) To teach the principles and skills underlying the recognition and management of the neurologic diseases that a general medical practitioner is most likely to encounter in practice.

**NEURO 740 Neurology Clerkship (5)**

The medical student will rotate on the Neurology service at one of the three sites (Penn State Hershey Medical Center, York Hospital, Lehigh Valley Hospital). The student will be assigned to the inpatient and consult services. He/she will be expected to evaluate new patients and follow them during their hospital stay. The student will be expected to perform a comprehensive neurological examination, formulate a differential diagnosis and management plan for each patient. The student will be supervised by a neurology attending. The student will be expected to attend outpatient clinic at least once a week and also attend scheduled conferences. The student will be required to perform a history/neurological examination in the presence of either a senior neurology resident or attending and be graded. A written examination will also be required at the end of the rotation. A packet of assigned reading material and lectures will be provided during the clerkship.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 796** Neurology Individual Studies (5) Neurology individual studies.

**Neurology Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 796A** Neurology Individual Studies for 3rd Year (2.5) Neurology individual studies 3rd year.

**Neurology Individual Studies for 3rd Year (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NEURO 797** Neurology Special Topics (5) Neurology Special Topics.

**Neurology Special Topics (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Neurosurgery (NSURG)**

**NSURG 750** Neurosurgery Acting Internship (5) Neurosurgery Acting Internship.

**Neurosurgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NSURG 750A** Neurosurgery Elective for 3rd Year Medical Students (2.5) Neurosurgery Elective for 3rd Year Medical Students.

**Neurosurgery Elective for 3rd Year Medical Students (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NSURG 796** Neurosurgery Individual Studies (5) Neurosurgery Individual Studies.

**Neurosurgery Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NSURG 796A** Neurosurgery Individual Studies 3rd Year (2.5) Neurosurgery Individual Studies for 3rd Year Medical Students.

**Neurosurgery Individual Studies 3rd Year (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NSURG 797** Neurosurgery Special Topics (5) Neurosurgery Special Topics.

**Neurosurgery Special Topics (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Nuclear Engineering (NUC E)**

**NUC E 401** Introduction to Nuclear Engineering (3) Fundamental concepts of nuclear engineering, including fission, reactor theory, shielding, and radioisotopes; intended for other than nuclear engineering students.

**Introduction to Nuclear Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 403** Advanced Reactor Design (3) Physical principles and computational methods for reactor analysis and design. Multigroup diffusion theory; determination of fast and thermal group constants; cell calculations for heterogeneous core lattices.

### **Advanced Reactor Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 405** (CHEM 406) Nuclear and Radiochemistry (3) Theory of radioactive decay processes, nuclear properties and structure, nuclear reactions, interactions of radiation with matter, biological effects of radiation.

### **Nuclear and Radiochemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 406** (M E 406) Introduction to Statistical Thermodynamics (3) Statistical description of systems composed of large numbers of particles in the context of classical and quantum mechanics; basic concepts of probability theory and thermodynamics as they relate to statistical mechanics.

### **NUC E (M E) 406 Introduction to Statistical Thermodynamics (3)**

This course is an introduction to probabilistic and statistical concepts in the physical sciences, which we refer to as "statistical thermodynamics." In areas such as design and processing of electronic devices, materials engineering, chemical engineering, and combustion engineering, the science of statistical mechanics is a particularly necessary, powerful, and important tool for the engineer. The underlying foundation of statistical mechanics is developed by (1) reviewing the basic ideas from probability theory, (2) deriving the binomial, Poisson, and Gaussian probability distributions, and (3) using these models to analyze several examples taken from science and engineering. To make a connection between macroscopic quantities and the corresponding probabilistic representation, classical thermodynamics is reviewed using the internal energy, entropy, and free energy functions in the context of the first and second laws. Statistical mechanics for classical and quantum-mechanical systems is presented via the micro-canonical, canonical, and grand canonical ensembles using the associated partition functions. During the syntheses of ideas, applications from various branches of science are presented. Some examples of applications are the Einstein crystal, the Debye crystal, the ideal gas, and black body radiation.

This course covers the following program objectives:

1. Demonstrate knowledge of basic chemistry and physics.
2. Demonstrate a knowledge of atomic and nuclear physics.
3. Demonstrate a knowledge of thermodynamics, heat transfer, and fluid flow.
4. Understand and apply the basic concepts of particle transport.
5. Understand and apply thermodynamics and heat transfer principles to the analysis of nuclear power components and systems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 408** Radiation Shielding (3) Radiation sources in reactor systems; attenuation of gamma rays and neutrons; point kernel methods; deep penetration theories; Monte Carlo methods.

### **Radiation Shielding (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 409 (MATSE 409) Nuclear Materials (3)** Nuclear reactor materials: relationship between changes in material properties and microstructural evolution of nuclear cladding and fuel under irradiation.

**NUC E (MATSE) 409 Nuclear Materials (3)**

NUC E/MATSE 409 provides a background on the types of materials used in nuclear reactors and their response to neutron irradiation. Most of the materials problems encountered in the operation of nuclear power reactors for energy production are discussed here. The objective of the course is to give nuclear engineering students a background in materials, so they understand the limitations put on reactor operations and reactor design by materials performance. In the first part of the course, we review basic concepts of physical metallurgy, to develop a mechanistic and microstructurally based view of material properties. In the second part of the course, we present the methods to calculate displacement damage to the material produced by exposure to neutron irradiation. The microstructural evolution that results from the reactor exposure (including radiation damage and defect cluster evolution, and changes) is described. The aim is to create a linkage between these changes at the atomistic level and the changes in macroscopic behavior of the material. Special attention is given to property changes that affect fuel performance and operational safety. Both mathematical methods and experimental techniques are emphasized so that theoretical modeling is instructed by experimental data. Students use the TRIM and SPECTER codes to quantitatively evaluate neutron damage, as well as learn simple analytical models that describe microstructural evolution and property changes under irradiation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 420 Radiological Safety (3)** Ionizing radiation, biological effects, radiation measurement, dose computational techniques, local and federal regulations, exposure control.

**Radiological Safety (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 428 Radioactive Waste Control (3)** Nature, sources, and control of radioactive wastes; theory and practice of disposal processes.

**Radioactive Waste Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 430 Design Principles of Reactor Systems (3)** Nuclear power cycles; heat removal problems; kinetic behavior of nuclear systems; material and structural design problems.

**Design Principles of Reactor Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 431W Nuclear Reactor Core Design Synthesis (4)** Technical and economic optimization of nuclear systems.

**Nuclear Reactor Core Design Synthesis (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Spring 1994

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 446** (M E 446) Reliability and Risk Concepts in Design (3) Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications.

### **NUC E (M E) 446 Reliability and Risk Concepts in Design (3)**

The course covers materials reliability in design including mechanical, electrical and system aspects. Five main topics will be studied. The course starts by introducing engineering risk and reliability, highlighting its interdisciplinary nature and its significance in system design. The concept of reliability as a probability is introduced and the basic laws of probability are reviewed. The discussion centers on the mathematics needed to understand and analyze complex systems including components in series and parallel. The topics include the independence, mutual exclusivity, truth tables and Venn diagrams. These concepts are then applied to simple systems consisting of one, two and three components in various configurations. The equivalency of the various methods is discussed. The effect of maintenance on a system's reliability is presented along with discussions of various maintenance strategies. Then, the failure modes and effects analysis is introduced and examples discussed. The concept of fault trees and event trees and their application to reliability analysis are presented. Risk analysis is then introduced as a case study in the application of reliability analysis. A nuclear power plant system is analyzed to quantify the risk to the public from its operation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 450** Radiation Detection and Measurement (3) Theory and laboratory applications of radiation detectors, including proton, neutron, charged particle detectors, NIM devices, and pulse-height analysis.

### **Radiation Detection and Measurement (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 451** Experiments in Reactor Physics (3) Acquisition and processing of nuclear and atomic data; application to nucleonic phenomena of importance in nuclear engineering.

### **Experiments in Reactor Physics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 470** Power Plant Simulation (3) Basic knowledge necessary for intelligent simulation and interpretation of simulations of transients in nuclear power plants.

### **Power Plant Simulation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 490** (AERSP 490, E E 471) Introduction to Plasmas (3) Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

### **Introduction to Plasmas (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 494H Senior Thesis (1-9)** Students must have approval of a thesis adviser before scheduling this course.

### **NUC E 494H Senior Thesis (1-9)**

All Schreyer Scholars are required to complete an undergraduate honors thesis. This work represents the culmination of a student's honors experience. Through the thesis, the student demonstrates a command of relevant scholastic work and a personal contribution to that scholarship.

The thesis project can take many forms - from laboratory experiments all the way to artistic creations. The thesis document captures the relevant background, methods and techniques, as well as describing the details of the completion of the individual project. Two Penn State faculty members judge the merits of this Scholar's honors thesis, the student's self-selected thesis supervisor and the department-selected honors adviser in the student's area of honors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 496 Independent studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 497A Fundamentals of Nuclear Engineering (3)** An intensive course providing introduction to Nuclear Engineering to undergraduate co-op students, non-NucE graduate, and returning students.

### **Fundamentals of Nuclear Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 497A Fundamentals of Nuclear Engineering (3)** An intensive course providing introduction to Nuclear Engineering to undergraduate co-op students, non-NucE graduate, and returning students.

### **Fundamentals of Nuclear Engineering (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 497A** Fundamentals of Nuclear Engineering (3) An intensive course providing introduction to Nuclear Engineering to undergraduate co-op students, non-NucE graduate, and returning students.

### **Fundamentals of Nuclear Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 497D** Radiation Detection Measurement Lab (1) Theory and laboratory applications of radiation detectors, including proton, neutron, charged particle detectors, NIM devices, and pulse-height analysis.

### **Radiation Detection Measurement Lab (1)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 497K (M E 497K)** Thermal-Hydraulics of Two-Phase Flow in Energy Systems (3) This course provides students with fundamental knowledge necessary for thermal-hydraulic analysis of single-phase and two-phase flow systems. The power reactor will be employed as a generic example of the thermal-hydraulic energy systems. In single-phase flow analysis, the one-dimensional thermal-hydraulic systems analysis method, which is often employed by the industry's system analysis code, will be introduced for normal and off-normal plant operating conditions.

### **Thermal-Hydraulics of Two-Phase Flow in Energy Systems (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 499 (IL)** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 501** Reactor Engineering (3) Thermal hydraulic fundamentals applied to power reactors, thermal analysis of fuel elements and two-phase heat transfer in heated channels.

### **Reactor Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 502** Reactor Core Thermal-Hydraulics (3) In-depth analysis of the reactor core thermal hydraulics; computational methods and practical applications.

**NUC E 502 Reactors Core Thermal-Hydraulics (3)**

This course provides students with a background in reactor core thermal hydraulics and enhances their understanding of the important phenomena in a nuclear reactor core, which can determine reactor safety performance. Students will obtain an overall view of reactor safety from the reactor thermal hydraulics perspective. This course examines the outcomes of research projects and international scientific activities in this area. Objectives are met by introducing course modules that utilize state-of-the-art computer codes to solve well established international thermal-hydraulics benchmark problems to demonstrate reactor performance during operational transients. One of the principal goals of the course is to provide students with a computationally intensive curriculum that is consistent with their capabilities and their expectations for a modern reactor thermal hydraulics course.

This course discusses detailed thermal-hydraulic analysis of reactor systems with an emphasis on the application of conservation equations for single- and two-phase flow in detailed modeling of reactor cores using three-dimensional subchannel analysis methods and examines the reactor's core thermal-hydraulic design for core limit analysis. The governing sets of equations that form the basis for the three-dimensional thermal-hydraulic methods commonly used in the nuclear industry will be derived and discussed in addition to specific models that are used for closure. Hot assembly analysis will be performed, as well as core wide analysis, to determine the hot assembly and resulting hot subchannels in the core. Students will use state-of-the-art three-dimensional computer codes to model fuel assemblies and the reactor core to determine the most limiting fuel pin and hottest subchannel.

Background on heat and mass transfer and fluid dynamics is the prerequisite to this course, which provides a basis for understanding reactor core thermal-hydraulic analysis.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 505** Reactor Instrumentation and Control (3) Reactor control principles; classical control methods; operational control problems; control simulation using modern mainframe and microcomputer software packages; reactor instrumentation.

**Reactor Instrumentation and Control (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 506** Nuclear Chemistry (3) Energetics, kinematics, and models of nuclear reactions; nuclear processes as chemical probes, mossbauer effect and perturbed angular correlation spectroscopy.

**Nuclear Chemistry (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 511** Nuclear Reactor Kinetics and Dynamics (3) Analytical kinetics and dynamics modeling for reactivity-induced transients; reactor accident kinetics methods for simple and complex geometries; experimental methods.

**NUC E 511 Nuclear Reactor Kinetics and Dynamics (3)**

This course provides students with a background in the area of nuclear reactor kinetics and dynamics and enhances their understanding of the important multi-physics phenomena in a reactor, which can determine reactor safety performance. Students will obtain an overall view of nuclear reactor safety from the nuclear reactor dynamics perspective. This course examines the outcomes of research projects and international scientific activities in the area of reactor dynamics. Objectives are met by introducing course modules that utilize state-of-the-art computer codes to solve well established international coupled thermal-hydraulics and neutronics benchmark problems to demonstrate reactor performance during operational transients. The course will be based on modules that demonstrate the Light Water Reactor (LWR) behavior utilizing state-of-the-art computer codes to solve well established Organization for Economic Cooperation and Development (OECD) coupled code benchmark problems. A supplementary module will also be developed which focuses on the High Temperature Reactor (HTR) in order to demonstrate the dynamic and safety issues unique to an advanced next generation reactor. The course will provide students with a computationally intensive modular curriculum that the instructor can utilize as appropriate to complement the nuclear reactor kinetics and dynamics concepts.

This course focuses on nuclear reactor kinetics and dynamics methods and techniques for multi-dimensional safety and transient analysis. It consists of five major topics: review of point nuclear reactor kinetics theory; reactivity feedback and nuclear reactor dynamics; methods for spatial kinetics; coupled and multi-dimensional thermal-hydraulics/neutron kinetics; and, experimental determination of reactor dynamics parameters. A computer project provides students with knowledge about state-of-the-art methods used to model reactor transients for safety evaluations.

Background on basic reactor physics and analysis is the prerequisite content to this course, which provides a basis for understanding nuclear reactor kinetics theory and nuclear reactor dynamics phenomena.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 512 Nuclear Fuel Management (3)** Nuclear fuel inventory determination and economic value through the fuel cycle. Emphasis on calculational techniques in reactor, optimization, and design.

### **Nuclear Fuel Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 521 Neutron Transport Theory (3)** Derivation of Boltzmann equation for neutron transport; techniques of approximate and exact solution for the monoenergetic and spectrum regenerating cases.

### **Neutron Transport Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 523 (MATSE 523) Environmental Degradation of Materials in Nuclear Power Plants (3)** Degradation of materials performance when exposed to the combination of high temperature, neutron irradiation, and aggressive electrochemistry found in nuclear reactors.

### **Environmental Degradation of Materials in Nuclear Power Plants (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 525 Monte Carlo Methods (3)** Fundamentals of the probability theory and statistics, analog and non-analog Monte Carlo methods and their applications, random processes, and numbers.

### **Monte Carlo Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 530 Parallel/Vector Algorithms for Scientific Applications (3)** Development/analysis of parallel/vector algorithms (finite-differencing of PDEs and Monte Carlo methods) for engineering/scientific applications for shared and distributed memory architectures.

**Parallel/Vector Algorithms for Scientific Applications (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 540** (AERSP 540) Theory of Plasma Waves (3) Solutions of the Boltzmann equation; waves in bounded and unbounded plasmas; radiation and scattering from plasmas.

**Theory of Plasma Waves (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 541** Plasma Theory (3) Advanced topics in kinetic theory, fluctuation theory, microinstability, and turbulence.

**Plasma Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 597F** Nuclear Fusion (3) Production of energy from controlled thermonuclear fusion. Nuclear fusion reactions,

plasma physics, magnetic and inertial confinement and fusion reactor technology.

### **Nuclear Fusion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 597F** Nuclear Fusion (3) Production of energy from controlled thermonuclear fusion. Nuclear fusion reactions, plasma physics, magnetic and inertial confinement and fusion reactor technology.

### **Nuclear Fusion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 597G** Nuclear Fuel Cycle Primer with Emphasis on Safety, Safeguards and Security (3) Nuclear fuel cycle, safety, security and safeguards and 3S approach; IAEA international safeguards; economic and political dimensions of the nuclear fuel cycle.

### **Nuclear Fuel Cycle Primer with Emphasis on Safety, Safeguards and Security (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Graduate assistants receive credit for teaching lower level courses while under the direct supervision of a graduate faculty member.

### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUC E 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Nursing (NURS)

**NURS 401** (IL) Concepts of Health (3) Exploration of current and ancient concepts of health and their respective modes of intervention.

**Concepts of Health (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 402** (US;IL) Holistic Health (3) Examination of emerging conceptualizations of health and therapy based on a holistic view of human beings.

**Holistic Health (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 403** School Health and Emergency Care of Children and Adolescents (3) Techniques for higher-level care for school health and emergency situations and application-based education.

**NURS 403 School Health and Emergency Care of Children and Adolescents (3)**

This course is a part of the school nurse series and will provide participants with advanced techniques for school health professionals that respond to health and emergency situations. The topics covered will include abdominal, genitourinary, head, musculoskeletal, and sports-related injuries. Students also will review shock, respiratory, neurologic, psychological and behavioral emergencies, and a wide array of issues facing students with special needs. Additionally, the participant will review disaster planning, preparation, and response activities. The course will review major medical and accidental situations facing the school nurse including the inter-agency coordination with emergency response systems and community entities. Students will learn what to include in a report for the communication center and emergency medical services. Skills stations for orthopedic injuries, trauma, and medical situations will allow students to practice skills and receive immediate feedback. Students will participate in application based education that utilizes case studies to pull the concepts together. Students will be asked to provide return demonstration for skills reviewed in this course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 404** Cardiac Dysrhythmias: Interpretation, Treatment, and Nursing Management (1) An introductory course with a focus on dysrhythmia recognition and interpretation of abnormal 12-lead electrocardiograms (EKG, ECG).

**NURS 404 Cardiac Dysrhythmias: Interpretation, Treatment, and Nursing Management**

NURS 404 (Cardiac Dysrhythmias: Interpretation, Treatment, and Nursing Management) is an introductory course in dysrhythmia recognition and interpretation of normal and abnormal rhythm strips and 12-lead electrocardiograms. The course involves integration of electrophysiology principles, anatomy, physiology, and arrhythmogenesis in interpretation of dysrhythmias. The diagnosis, medical treatment, and nursing management will be incorporated through case study analysis. Evaluation of course content will be done through exams, in class worksheets, and case study analysis. The class is open to nursing and non-nursing majors desiring introductory understanding of cardiac dysrhythmias. NURS 404 is a good course for nursing majors interested in critical care and non-nursing majors interested in emergency medical services associated with any major (e.g., Kinesiology). The class is offered fall and/or spring semester with enrollment limited (20 students) to allow interactive hands-on interpretation of dysrhythmias.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 405A** Nursing Care of the Adult Client with Complex Health Problems: Part A (4) In-depth study of care of patients with acute and complex health problems, utilizing evidence based practice.

**NURS 405A - Nursing Care of the Adult Client with Complex Health Problems: Part A (4)**

NURS 405A focuses on nursing care of adult clients with acute and complex health problems related to all major systems of the body. Upon completion of this course, the student will be able to synthesize knowledge from nursing and contributing discipline to maximize client care outcomes; recognize pathophysiological and pharmacological aspects related to the nursing care of the adult client; demonstrate the ability to communicate effectively including the use of technology with patients, families and the health care team; promote factors that create a culture of safety and caring for the adult client; demonstrate the ability to perform a comprehensive and systematic assessment and take appropriate nursing actions for the client with complex health problems; collaborate with colleagues from nursing and related disciplines using empirical and theoretical resources when defining nursing care priorities and determining nursing actions; utilize assessment data and technology to plan, implement, and evaluate interventions specific to the complex health problems of the adult client; participate in activities that advance the personal and professional developmental and cultural competency in the professional specialty of adult medical-surgical nursing; practice legal, ethical and professional accountability in the delivery of care to the adult medical-surgical client; apply evidence based practice to maximize client outcomes in health promotional and educational activities for the complex health needs of the adult client; demonstrate current and relevant knowledge of the social, health, behavioral and psychological sciences that can be applied to nursing practice for the adult client; demonstrate increasing self direction and confidence in providing nursing care for the adult client with complex health needs; demonstrate the role of professional nurse as a client advocate; demonstrate the ability to assess risk and actively promote the well being, safety, and security (patients and coworkers) in the work environment; demonstrate the ability with guidance to lead and coordinate a team, delegating care appropriately and safely; demonstrate the ability to respond appropriately to the emotional, psychological and spiritual needs of the adult client with complex care needs.

Teaching strategies include lecture, discussion, laboratory simulation and clinical experiences. Evaluation methods include examinations, scholarly papers, simulation laboratory experiences, preclinical preparatory written work, and mid-course and final clinical performance evaluations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 405B** Nursing Care of the Adult Client with Complex Health Problems: Part B (4) In-depth study of care of patients with acute and complex health problems, utilizing evidence based practice.

**NURS 405B - Nursing Care of the Adult Client with Complex Health Problems: Part B (4)**

NURS 405B focuses on nursing care of adult clients with acute and complex health problems related to all major systems of the body. The emphasis is on enhancing critical thinking skills necessary for making sound nursing judgments and the demonstration of self-direction in providing nursing care for clients with complex medical surgical problems. Upon completion of this course, the student will be able to: Synthesize knowledge from nursing and contributing discipline to maximize client care outcomes; Recognize pathophysiological and pharmacological aspects related to the nursing care of the adult client; Demonstrate the ability to communicate effectively including the use of technology with patients, families and the health care team; Promote factors that create a culture of safety and caring for the adult client; Demonstrate the

ability to perform a comprehensive and systematic assessment and take appropriate nursing actions for the client with complex health problems; Collaborate with colleagues from nursing and related disciplines using empirical and theoretical resources when defining nursing care priorities and determining nursing actions; Utilize assessment data and technology to plan, implement, and evaluate interventions specific to the complex health problems of the adult client; Participate in activities that advance the personal and professional specialty of adult medical-surgical nursing; Practice legal, ethical and professional accountability in the delivery of care to the adult medical-surgical client; Apply evidence based practice to maximize client outcomes in health promotional and educational activities for the complex health needs of the adult client; Demonstrate current and relevant knowledge of the social, health, behavioral and psychological sciences that can be applied to nursing practice for the adult client; Demonstrate increasing self direction and confidence in providing nursing care for the adult client with complex health needs; Demonstrate the role of professional nurse as a client advocate; Demonstrate the ability to assess risk and actively promote the well being, safety, and security (patients and coworkers) in the work environment; Demonstrate the ability with guidance to lead and coordinate a team, delegating care appropriately and safely; Demonstrate the ability to respond appropriately to the emotional, psychological and spiritual needs of the adult client with complex care needs. Teaching strategies include lecture, discussion, laboratory simulation and clinical experiences. The course is offered fall semester with approximately 120 students enrolled (60 at UP and 60 at HMC) with clinical sections limited to 10 students per section.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 407** Drugs of Abuse and Mental Health Issues (3) Examines the health care needs across the lifespan of clients who have an alcohol or other drug disorder.

#### **NURS 407 Drugs of Abuse and Mental Health Issues (3)**

NURS 407 is an elective course which examines the issue of substance abuse in today's society. It looks closely into the health care needs across the lifespan of clients who have an alcohol or other drug disorder in combination with a psychiatric disorder. Pharmacological, behavioral, biological, and sociocultural characteristics, along with factors and patterns of addiction, are discussed and then how these factors and characteristics relate to mental illnesses are further explored. The different classes of habit-forming drugs are covered and various treatment options are examined. The student is evaluated by written examination, research project, and/or community focus logs. This is an elective course placed in the spring semester and available to both nursing and non-nursing students in related fields. The course objectives follow.

Upon completion of this course, the student will be able to:

- a. Know the difference between pharmacological and behavioral definitions of addiction.
- b. Understand the biological basis of drug action and addiction.
- c. Understand the co-morbidity of major mental disorders and drug abuse issues.
- d. Understand the sociocultural factors of drug use and abuse.
- e. Describe and discuss the main characteristics of alcohol abuse, treatment, and recovery.
- f. Describe and discuss the main characteristics of stimulant abuse, treatment and recovery.
- g. Describe and discuss the main characteristics of marijuana and nicotine abuse and treatment.
- h. Describe and discuss the main characteristics of hallucinogen and inhalant abuse and treatment.
- i. Describe and discuss the use and abuse of prescription drugs.
- j. Understand the concept of Dual Diagnoses-the simultaneous existence of an alcohol and other drug disorder with a psychiatric disorder.
- k. Analyze how the use of drugs by an individual with a mental illness complicates treatment and recovery.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 408** Clinical Application of Pharmacological Concepts (1) Study of the application of pharmacological concepts to the clinical setting.

#### **NURS 408 Clinical Application of Pharmacological Concepts (1)**

NURS 408 is an elective course designed to provide the interested student an in-depth review of pharmacology. The application of pharmacological concepts in relation to the clinical setting is a primary focus of the course. The various drug classes are discussed with emphasis placed on care of the patient while administering different types of medications. Discussion of pharmacological principles and patient care requires knowledge and integration of anatomy, physiology, pathophysiology, and medical and nursing treatments for various disorders. NURS 408 provides an excellent review of medication classes as related to medical condition in preparation of the nursing student taking the NCLEX licensure examination upon graduation. The student is evaluated by written examination and/or case study interpretation. NURS 408 is placed in the spring semester and is open to all nursing students who have successfully completed administering medications in the 300 level nursing courses and are concurrently enrolled in the 400 level nursing courses. Enrollment is

not limited in numbers. Course objectives are as follows.

Upon completion of this course, the student will be able to:

- a. Categorize commonly used medications by major classifications of drugs.
- b. Predict classifications of medications given to specific clinical conditions.
- c. Develop patient teaching plans relevant to medication administration.
- d. Discuss research related to pharmacology which influences nursing practice.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 409** Introduction to Forensic Nursing (3) Provides an introduction to the forensic health sciences, forensic nursing, and the nursing role in the scientific investigation of violence.

### **NURS 409 Introduction to Forensic Nursing (3)**

NURS 409 is an elective course describing the role of the nurse in the forensic sciences. It is designed to provide the interested student an in-depth study of nursing forensics and provides an introduction to the forensic health sciences, clinical forensic nursing, and the nursing role in the scientific investigation of violence. NURS 409 describes the principles and philosophy of forensic nursing in acute care and community settings and the roles of the forensic science professional and advanced practice forensic nurse are explored. The students are evaluated through case study interpretation, papers, and written examination. The topics included in NURS 409 require the student to have a basic understanding of nursing skills and the professional role of the nurse, therefore, NURS 409 is placed in the spring semester and all Junior-Senior level nursing students are eligible to enroll for it. Course enrollment is not limited. The course also provides an excellent opportunity for the nursing student to collaborate with Sociology/ Criminal Justice in order to obtain a minor in forensics. The course objectives follow.

Upon completion of this course, the student will be able to:

- a. Describe the scope of the practice of the advanced practice forensic health professional.
- b. Identify and analyze current forensic science and nursing issues and trends.
- c. Identify the role of the advanced practice forensic health professional/ forensic nurse in the holistic care of victims of trauma, perpetrators of human violence, and families of both.
- d. Describe the role of the advanced practice forensic nurse in the development of protocols and standards for professional practice.
- e. Verbalize the connection between advanced practice theories with forensic nursing content while integrating forensic roles into various advanced practice arenas.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 410** Forensic Evidence Collection and Preservation (3) Examines forensic nurse's role recognizing injuries/patterns of injury. Evidence collection procedures are examined from collection to courtroom presentation.

### **Forensic Evidence Collection and Preservation (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 411** Seminar in Forensic Nursing (3) Seminar to discuss current topics, trends and research related to forensic nursing.

### **Seminar in Forensic Nursing (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 415 (US;IL) Community and Family Health Nursing (4)** Therapeutic nursing care and health promotion concepts to families, groups and populations in the community.

**NURS 415 Community and Family Health Nursing--Concepts and Applications (4)  
(US;IL)**

NURS 415 US;IL focuses on nursing care of clients in the community and the family. This course allows students to work independently providing and improving health care of population groups within a diverse society. Upon completion of this course, the student will be able to synthesize knowledge from nursing, public health, family, and community theory as a foundation for culturally congruent community health nursing practice; utilize the nursing process and principles of primary, secondary, and tertiary prevention that are culturally appropriate in the care of community based clients who differ in terms of age, developmental stage, health beliefs values and practices; demonstrate interpersonal skills necessary for collaboration with and among culturally diverse consumers, community agencies, health professionals, and health related resources in the community; demonstrate the management and safety of client, family, and community care through appropriate use of concepts of leadership, case management, and group process; demonstrate understanding of epidemiological methods in gathering, analyzing, and utilizing data and be able to apply to diverse populations in the community; use coherent comprehensive, culturally sensitive and age appropriate communication in oral and written form; analyze biostatistical/epidemiological data and nursing evidence-based research findings to improve/enhance the delivery of nursing care to diverse populations in the community; identify recommended health screenings and immunizations and health promotional strategies throughout the life span; analyze the impact of culture as a significant influence on the health perceptions, interpretations, and behaviors of diverse groups; demonstrate the ability to perform comprehensive and risk assessments, to make critical decisions, and to take appropriate nursing actions in the area of community health; demonstrates the ability to practice the principles of health and safety in a caring manner to maximize client care outcomes across the lifespan.

Teaching strategies include lecture, audiovisuals, student presentations, discussion, clinical experiences, guest speakers, laboratory simulation and clinical experiences in varied clinical settings where the students are responsible for assessing, planning, implementing, and evaluating the care of families within the context of a community. Students have the opportunity to analyze the impact of culture on health perceptions, interpretations, and behaviors of diverse groups. The course is offered fall and spring semester of the senior year with approximately 120 students (60 at UP and 60 at HMC enrolled in clinical sections limited to 10 students per section.

General Education: None

Diversity: US;IL

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note :** Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 417 (US;IL) Family and Community Health Concepts (4)** Study of the concepts of family and community based nursing care emphasizing multicultural influences on health practices.

**NURS 417 Family and Community Health Concepts (4)  
(US;IL)**

Upon completion of the course the student will be able to (a) Synthesize knowledge from nursing, public health, family, and community theory as a foundation for culturally congruent community health nursing practice that is sensitive to race, religion, gender, disability and sexual orientation; (b) Utilize the nursing process and principles of primary, secondary and tertiary prevention that are culturally appropriate in the care of community based clients who differ in terms of health beliefs, values, and practices; (c) Develop skill in the use of independent/interdependent nursing actions to deliver care to clients across the life span; (d) Demonstrate the management of client, family, and community care through appropriate use of concepts of leadership, case management and group process; (e) Describe collaboration at the collegial level with nurses and other members of the health care team to provide continuity of care through culturally appropriate communication, consultation, and referral; (f) Use coherent, comprehensive and culturally sensitive communication in oral and written form; (g) Analyze biostatistical/epidemiological data and nursing research findings to improve/enhance the delivery of nursing care to diverse populations in the community; (h) Analyze the impact of culture as a significant influence on the health perceptions, interpretations, and behaviors of diverse groups.

Students will spend 40 hours practicing in a clinical setting. In that setting they will be responsible for assessing, planning, implementing and evaluating the care of families within the context of a community. Students will have the opportunity to analyze the impact of culture on health perceptions, interpretations, and behaviors of diverse groups.

Evaluation methods: Students will be evaluated both theoretically and clinically by use of the following: (a) Guided study of complex family and community health patterns using collaboration case analysis; (b) Case findings and analysis; (c) Direct care to culturally diverse families in the community setting.

Relationship/linkage of course to other courses: This course applies and integrates family and community nursing concepts to culturally diverse clients in the community. It is offered at the senior level and incorporates previously learned theoretical and clinical nursing knowledge with an appreciation for how diversity influences the health care behaviors of families and communities as they relate to the health care system.

Relationship of course to major: This senior level nursing course is one of the components of the Advanced Standing Option. It is a required course that provides students with the opportunity to develop skill in delivery of health services to globally diverse populations across the life span. It is also designed to increase the student's knowledge base related to the community based client including relationships, lifestyle and kinship patterns. Lastly, it provides an arena for community health planning for diverse populations.

Special facilities required to teach the course: The clinical arena which will be used to teach this course includes but is not limited to high risk populations in the community, senior or special housing projects, prisons and missions.

Frequency of offering an enrollment: The course will be offered every semester and enrollment varies from 10 to 20 students.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 420** Mental Health Nursing (4) Emphasizes clinical application of mental health theory in nursing care of patients with acute and chronic mental health problems.

#### **NURS 420 NURS 420 Mental Health Nursing (4)**

NURS 420 focuses on care of clients experiencing mental health problems and emphasizes the clinical application of mental health theory in nursing care of patients with acute and chronic mental health problems. Upon completion of this course, the student will be able to synthesize knowledge from nursing and the social, health and behavioral sciences to describe the nature of mental adaptations throughout the lifespan; demonstrate effective therapeutic communication skills when dealing with clients, groups and families experiencing maladaptive responses to stress; assess the strengths and weaknesses of the client and family in the context of a group and community environment; demonstrate the ability to perform comprehensive and risk assessments, to make critical decisions, and to take appropriate nursing actions in the area of psychiatric mental health; utilize the nursing process as related to the Standards of Psychiatric and Mental Health Nursing practice; collaborate with nursing colleagues, mental health professionals and consumers in the practice of psychiatric mental health nursing; analyze individual and societal forces that effect nursing research and evidence based practice in the area of psychiatric mental health nursing; demonstrate the knowledge of self needed to be an effective therapeutic agent and a client advocate; demonstrate cultural competency and the ability to provide holistic psychiatric mental health nursing care; perform the principles of psychiatric mental health and safety in a caring, nonjudgmental manner; demonstrate a current and relevant knowledge base of legal and ethical issues that can be applied to psychiatric mental health nursing; identify and support mental health promotion and mental health educational activities to maximize client care outcomes and evaluate psychiatric mental health nursing as a professional specialty. Teaching Strategies include lecture, process recordings, discussion, selected readings, audiovisuals, laboratory simulation and clinical experiences. NURS 420 is offered fall and spring semesters with an annual enrollment of approximately 120 students (60 at UP and 60 at HMC) with clinical sections limited to 10 students each.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 430** Organization and Administration for the Nurse Manager (3) Introduction to organizational theory and principles of practice in the administration of nursing services and patient care.

#### **NURS 430 Organization and Administration for the Nurse Manager (3)**

NURS 430 is the first of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 430 includes a study of the history of American management and the influences on management styles and approaches. Topics covered in the course includes: Leadership theory, Change theory, Health care organizational structure and functions, Legal and Ethical issues, Nursing Management structure, function, and roles, Power and politics; Communication; and Nursing care delivery systems. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examination, case studies, and student projects or presentations as assigned by the faculty. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 431** Data Management for Nurse Managers (3) Analysis of information systems to manage nursing service organizations; includes financial management, the budgeting processes, and productivity measurement.

**NURS 431 Data Management for Nurse Managers (3)**

NURS 431 is the second of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 431 includes a study of information systems and financial aspects of managing health care organizations and patient care delivery. Topics covered in the course include: Information systems in health care, Electronic medical record, Security and portability of health care information. Topics related to budget and finance include, operating and capital budget management, nurse staffing systems and productivity. Lab activities enable students to develop proficiencies with spreadsheet software. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examination, case studies, and student projects or presentations as assigned by the faculty. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 432 Nursing Management of Human Resources (3)** Human resource management and related factors in nursing service organizations.

**NURS 432 Nursing Management of Human Resources (3)**

NURS 432 is the third of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 432 includes a study of human resource management with an emphasis on application to nursing and health care organizations. Topics covered in the course include: Employment laws, hiring, termination and managing staff turnover, conflict management, staff development and productivity, organized labor and unions, the impaired nurse, and discussion of nursing standards, ethics, delegation and the nursing shortage. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examinations, case studies, and student projects or presentations as assigned by the faculty. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 433 Seminar for Nurse Managers (3)** Course focuses on the application of management principles in the role of the nurse manager.

**NURS 433 Seminar for Nurse Managers (3)**

NURS 433 is the fourth of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 433 is designed to allow the student to explore issues that challenges individuals in the nurse manager role. Designed with a seminar approach the student will study the following topics: The future of nursing leadership, mentoring, networking, stress management for the nurse manager and avoiding burnout, managing patient care quality and regulatory compliance, and implementing change. Students also complete a field observational study with a nurse manager or nurse executive in a health care organization. It is recommended that students complete at least one of the previous nursing management (NURS 430, NURS 431, NURS 432) courses prior to enrolling in this course. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examinations, case studies, and student projects or presentations as assigned by the faculty. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 440 Trauma/Critical Care Nursing (3)** Focuses on the impact of and the nursing care of persons experiencing acute trauma and/or critical illness.

**NURS 440 Trauma/Critical Care Nursing (3)**

NURS 440 is designed as an introductory study of the impact of like-threatening physical problems across the life-span utilizing the nursing process. The course focuses on problems encountered in the hospital critical care setting and is a nursing elective. Upon completion of this course, the student will be able to meet the following objectives: Integrate knowledge from nursing and related disciplines into case study format for persons with life-threatening illnesses; Explore practice, ethical, legal and interpersonal dimensions within the critical care setting. Identify problems for nursing critical care research. Study the most common illnesses in the critical care setting for the neurological, respiratory, cardiac, renal, gastro-intestinal, trauma and multiple system organ failure systems. Students incorporate academic learning with some case study review to simulate the critical care setting. Success in the course is evaluated by in-class examinations, assigned research readings, and written critiques. NURS 440 is offered in the spring semester only, with an average enrollment of 40 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 450A Professional Role Development III: Leadership and Management (2)** Study of leadership roles and various styles of nursing management and their implications for the professional nurse.

**NURS 450A - Professional Role Development III: Leadership and Management (2)**

NURS 450A is the senior level professional role development course that focuses on delegation of care, leadership and management. Upon completion of the course, the student will be able to analyze influences which impact on role development and nursing practice; recognize the significance of professional, ethical, regulatory and legal codes within the context of nursing practice; recognize nursing skills necessary to respond to the client's needs throughout the life span including end of life issues; recognize current and relevant knowledge of leadership and management theory as it relates to the health care environment; recognize current and relevant knowledge of ethical, legal, national and international policies as it relates to the health care environment; demonstrates current knowledge of nursing research and modern technologies to recognize nursing care that is rigorous and evidence based; assess the nursing profession's responsibility for self-regulation and accountability in order to maximize client care outcomes; demonstrates the ability to promote, support, and facilitate the health, well being, and comfort of vulnerable populations as to enhance the quality of service delivery; recognize the principles of leadership, accountability and delegation that promote the well being, safety and security of patients and coworkers; recognize and promote the ability to communicate effectively (including the use of technology) with patients, families, social groups and the health care team; demonstrates increased awareness of the nurse generalist role and the value of life- long learning. Teaching strategies include lecture, audiovisuals, student presentations, discussion, guest speakers, simulation and role-playing. The course is offered each fall semester with approximately 120 students enrolled.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 450B Professional Role Development III: Clinical Capstone (3)** Senior level clinical capstone course that emphasizes the integration and application of theory and evidence based practice.

**NURS 450B Professional Role Development III: Clinical Capstone (3)**

NURS 450B is the clinical capstone course for the Nursing Program. Students will spend 135 hours practicing in a clinical setting, where they will be responsible for assessing, planning, implementing and evaluating the care of clients. Students will have the opportunity to employ management and delegation skills in the care of clients. Upon completion of this course, the student will be able to demonstrate the ability to practice in a holistic, culturally competent and caring manner; demonstrate the ability to practice within the context of professional, ethical, regulatory and legal codes of nursing practice; demonstrate the ability to promote, support, and facilitate the health, well being, and comfort of vulnerable populations so as to enhance the quality of service delivery; demonstrate the ability to perform comprehensive and systematic assessments and take appropriate actions; demonstrate the ability to utilize evidence based practice and modern technologies to assess and respond appropriately to patient needs; utilize nursing skills to provide optimum care and to practice principles of health and safety in a caring, nonjudgmental manner; utilize nursing skills to respond to a person's needs throughout the life span, i.e. life choices, disability, and end of life issues; demonstrate current and relevant knowledge of the social, health, and behavioral sciences that can be applied to nursing practice; demonstrate current and relevant knowledge of ethical, legal, national, and international policies that can be applied to nursing practice; demonstrate current knowledge of nursing research to provide nursing care that is rigorous and evidence based; demonstrate the ability to communicate effectively (including the use of technology) with patients, families, social groups and the health care team; identify, manages and support health promotion and health educational activities to optimize patient safety and well being; demonstrate the ability to lead and coordinate a team, delegating care appropriately; demonstrate the ability to assess risk and actively promote the well being, safety, and security (patients and coworkers) in the work environment; demonstrate increased confidence in the nurse generalist role and in the value of life-long learning.

Teaching strategies include laboratory simulation and clinical experiences and pre and post clinical seminars. The course is offered each spring semester and is a one on one preceptor based clinical experience.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 452 (US) (BB H 452, WMNST 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

### **Women's Health Issues (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 452 (US) (BB H 452, WMNST 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

### **Women's Health Issues (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 458 Ethical Challenges in Healthcare Informatics (3)** A case based collaboratory designed for the exploration and analysis of the ethical dilemmas facing healthcare informatics practitioners.

### **Ethical Challenges in Healthcare Informatics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 459 Legal and Professional Issues in School Nursing (3)** Legal and professional issues of school nurses and delivery impact of health care in school environment.

## **NURS 459 Legal and Professional Issues in School Nursing (3)**

This course is part of the school nurse series. This course encompasses the synthesis and analysis of the legal and professional issues faced by school nurses and other professionals in the school setting. Strategies on the legal and professional delivery of health care in the school environment are integral to the course. Objectives include: explore legal and ethical issues influencing school nursing practice; analyze attributes of the legal and professional issues faced by school nurses and other professionals; develop strategies for addressing school nursing, interdisciplinary or health care issues; analyze issues that impact the resolution of special problems in school-age populations; identify



resources and management strategies available to the school nurse and other professionals in meeting the needs of at risk school-aged populations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 460** Advanced Concepts in Clinical Nursing Informatics (3) An exploration of clinical informatics tools to support informatics practice.

**NURS 460 Advanced Concepts in Clinical Nursing Informatics (3)**

Advanced Concepts in Clinical Nursing Informatics prepares nurses to support, promote, and assist in the implementation and efficient and safe use of informatics tools in the fast-paced, technology rich clinical healthcare environment. Students will explore electronic health records, clinical decision support tools, database management and data mining, patient safety technologies, and the clinical workflow implications and meaningful use of each. Students will learn principles of health care organizational culture, change theory, and the System Development Life Cycle (SDLC) to prepare them to assist with project management as informatics tools are introduced in the clinical environment. The use of informatics tools to support knowledge management in an organization is also emphasized. Students will discover the benefits and barriers of Health Information Exchange (HIE) in the promotion of public health. Finally, students will discover the competencies, skills, roles, and standards of informatics nursing practice.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:  
 Concurrent: NURS 458

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 461** Perioperative Nursing (4) Comprehensive introduction regarding fundamental principles and practices of the Operating Room Nurse when managing the care of the surgical patient.

**NURS 461 Perioperative Nursing (4)**

Comprehensive introduction regarding fundamental principles and practices of the Operating Room Nurse, when managing the care of the surgical patient. Upon completion of this course, the student will be able to define the roles and responsibilities of the circulating and scrub nurse and the other members of the surgical team; practice aseptic technique as related to the roles of the Perioperative Nurse; integrate knowledge from the sciences to function in a Perioperative setting with the specialized environment, procedures and equipment; discuss types of anesthesia and medications used in the Perioperative period; utilize the nursing process in meeting the physical, psychological, and educational care of the surgical client; discuss the various methods of sterilization related to the care of the surgical patient; recognize the complexity of the Operating Room environment related to patient safety; identify the legal and ethical responsibilities of the professional nurse related to the rights of the surgical patient.

Course topics will specifically cover the roles and responsibilities of the perioperative nurses and the Operating Room team, aseptic technique, specialized environment, procedures and equipment, communication, documentation and legal issues, safety, medications an anesthesia, and specialty areas of the Operating Room. Since the course is a clinical preparation course for RNs, the clinical takes place in the Operating Room. Teaching strategies may include seminar/discussion, films/videos, guest speakers, student presentation. The course may be offered spring, summer or fall semesters.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 462** Psychotropic Drugs and Children/Adolescents (1) Study of psychotropic medications used to treat children and adolescents, including indications, actions, adverse reactions and implications for school nurses.

**NURS 462 Psychotropic Drugs and Children/Adolescents (1)**

Study of psychotropic drugs that are used to treat children and adolescents. The major drug classifications of

psychotropic drugs including stimulants, selective norepinephrine reuptake inhibitors, antidepressants, antipsychotics, alpha 2 Adrenergic Agents, anti-anxiety agents, lithium and antiepileptic agents will be reviewed. Upon completion of this course, the student will be able to explain the mechanism of action of the major psychotropic drug classes; list the indications for the use of psychotropic drugs in children and adolescents; recognize the possible adverse reactions that may occur in children/adolescents who are taking psychotropic drugs; and explain the role of the school nurse in monitoring the effectiveness and side effects of psychotropic drugs.

Teaching strategies may include lecture, discussion, audiovisuals, selected readings. This course may be offered in the Spring, Summer or Fall semesters.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 463** Compassionate Counseling for Children/Adolescents Dealing with Dying, Death, Other Life Crises (3) Explores issues involving dying, death and life crises which occur in today's world and affect school communities.

### **NURS 463 Compassionate Counseling for Children/Adolescents Dealing with Dying, Death, Other Life Crises (3)**

This course is part of the school nurse series. The school nurse series is anticipated to be offered in the summers throughout PA by Penn State Outreach: Professional and Organizational Development and the School of Nursing as an outreach mission. This course explores the complex issues involving death in today's world as faced by children and adolescents. Content includes: counseling skills for nurses; child and adolescent development in the understanding of dying, death, and other life crises; exploring dying, death, and crises that are present in the lives of children and adolescents in the modern world; discussions of risks of death in the modern world including suicide, accidents, disasters, violence, war, and communicable diseases; description of death rituals and how societies cope with dying and death; identifying effective strategies to assist children and adolescents in coping with dying, death, and other life crises. The societal and school issues that affect not only an individual student but the milieu of the school and other students, parents, teachers, advisers, and administrators are inherent in the content. This course expands knowledge and interventions for those working with children and adolescents in the school setting. Presentations and examinations compose the evaluative methods.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 464** (US;IL) Dying and Death (3) Explores attitudes toward death and dying; concept of grief; responsibilities to the dying person and the family.

### **Dying and Death (3)**

General Education: None

Diversity: US;IL

Bachelor of Arts: None

Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 465** Health Concepts for Adults with Complex Health Care Needs (3) In-depth study and application of the theoretical principles and roles of adult clients and families with complex healthcare needs.

### **NURS 465 Health Concepts for Adults with Complex Health Care Needs (3)**

NURS 465 focuses on the application of those concepts that relate to the adult high-risk client, family, or significant other in a complex health care setting. Course prerequisites include Introduction to Computing and Nursing Informatics and Transition and The Professional Nursing Role. The student selects a clinical nursing practice experience related to complex health care of the adult high-risk client and, based on course objectives, develops clinical practice objectives in collaboration with the course faculty. Evaluation of the course is by grading of written assignments and achievement of clinical nursing practice objectives. The course is offered in fall and/or spring semesters of the senior year. Upon completion of this course, the student will be able to: 1. Integrate theory and knowledge of nursing and related disciplines as a basis for professional nursing practice with adult high-risk clients. 2. Demonstrate interpersonal skills to support and guide clients/families/significant others in the selection of appropriate health patterns. 3. Utilize the nursing process to analyze complex adult high-risk situations occurring in acute care, transitional care, and/or community settings. 4. Apply critical thinking skills to clinical nursing practice situations involving the high-risk client/families/significant others. 5. Collaborate with colleagues in the design, implementation, and evaluation of nursing

interventions. 6. Demonstrate in the clinical nursing practice setting the role of the professional nurse as case manager, change agent, advocate and researcher with the adult high-risk client/families/ significant others. 7. Demonstrate a comprehensive understanding of opportunities for clinical nursing research with the adult high-risk client/families/significant others. 8. Demonstrate nursing practice within the legal and ethical guidelines for professional nursing practice with the adult high-risk client.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 467 Medication Update and Health Teaching Interventions for School Nurses (1)** Study of current pharmacologic concepts, including health teaching, prescribed for acute and chronic conditions commonly encountered in school nursing.

**NURS 467 Medication Update and Health Teaching Interventions for School Nurses (1)**

The course addresses the current pharmacologic therapies and related health teaching that school nurses commonly encounter in the student population. The most commonly used medications in the school-age student include the following categories: the Respiratory System, the Central Nervous System, the Cardiovascular System, the Digestive System, the Endocrine System, the Dermatologic System, and medications used to treat and prevent infections/infestations. Upon completion of this course, the student will be able to identify the classifications of commonly used medications; discuss the pharmacologic treatment of specific ambulatory pediatric health problems; develop patient teaching plans for students taking medications. Teaching strategies may include lecture, discussion, audiovisuals, and selected readings

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 468 Client Education Strategies for Nurses and Other Health Care Providers (3)** Explores current and emerging roles of client education in the knowledge era.

**NURS 468 Client Education Strategies for Nurses and Other Health Care Providers (3)**

This course explores current and emerging roles of client education in the knowledge era. Emphasis is placed on the application of teaching and learning strategies that deliver empowering and engaging health education to promote wellness, prevent health problems, and manage chronic illness. Upon completion of this course, the student will be able to:  
assess the challenges and issues facing nurses and health care providers enacting the role of client educator in the knowledge era; explore the promotion of client health at all levels of prevention: primary, secondary, tertiary; integrate the client education process for individuals, families, groups, and communities; assess learner motivation, readiness, and situational impacts such as psychosocial factors and cultural beliefs that affect the client education process; implement sound, effective teaching and learning strategies in selected clinical settings with special populations; develop teaching plans using taxonomies of educational objectives; select specific teaching strategies and delivery systems, including technology, appropriate for the developmental stage and needs of the learner; describe methods for evaluation of teaching; identify appropriate communication and documentation of the process and outcomes; and list topics in client education which can be further explored through research.

This course may be used as a nursing elective or by nurses or other health care workers to increase knowledge and promote successful health teaching to clients. Continuing education has been the delivery mode, plus it has been offered at other campuses through the school of nursing. The course could be with approximately 20 – 30 students. This course has been run through continuing education last semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 470 Autism Spectrum Disorders: Care Overview (1)** Overview of autism spectrum disorders including resources related to children with autism spectrum disorders.

**Autism Spectrum Disorders: Care Overview (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 471** Issues in Bullying for Health Professionals (1) Explores the impact of bullying on individuals, schools, teachers, families, of the target and the bully.

#### **NURS 471 Issues in Bullying for Health Professionals (1)**

In this course, Bullying: Identification and Intervention, students will explore the impact of bullying on individuals, schools, teachers, and families of the target and the bully. Details of cyber-bullying are included. Students will review current research findings on bullying including witnesses/bystander behavior and factors contributing to the behaviors. The use of screening and assessment tools for prevention along with early identification will be emphasized to help students understand the steps a professional may take in these situations. Students will learn methods of prevention and intervention. Finally, the reporting of bullying and legal and ethical issues will be analyzed.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 472** Relational Aggression in the Healthcare Setting (3) An exploration of research and interventions for relational aggression in the healthcare setting.

#### **Relational Aggression in the Healthcare Setting (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 475** Integrated Concepts in Nursing Practice (3) Project-based capstone course for application of nursing concepts to health promotion/disease prevention in populations.

#### **NURS 475 Integrated Concepts in Nursing Practice (3)**

NURS 475 is a project-based capstone clinical course with a focus on the application of nursing concepts. The course is designed to provide opportunity for students to synthesize and apply the art and science of nursing to health promotion and disease prevention in culturally diverse populations in varied clinical settings of the global community. Upon completion of this course, the student will be able to synthesize knowledge from nursing and related sciences for application to evidence based nursing practice; interpret legislative and regulatory processes relevant to the capstone project; collaborate with members of the health team to provide continuity of care through appropriate communication, consultation, and referral; communicate effectively using written, verbal, nonverbal and emerging technology methods; apply biostatistical, epidemiological, and research findings to enhance the delivery of evidence based nursing care; provide evidence based nursing care that contributes to safe and high quality patient outcomes within healthcare Microsystems; participate in the development and implementation of theory- based and a population-focused health promotion project; facilitate change in the healthcare microsystems affecting the provision of nursing care to diverse populations throughout the lifespan; demonstrate accountability in the delivery of professional nursing care; and integrate the concept of life-long learning into professional nursing practice. Teaching strategies include: seminar discussions, population-based nursing practice project and preceptored nursing practicum. NURS 475 is the final nursing course and contrives to craft future nursing career goals for RN to BS students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 492** Emergency Care and Safety (3) A comprehensive first aid course designed to provide knowledge of prehospital emergency care at the First Responder level.

#### **NURS 492 Emergency Care and Safety (3)**

NURS 492 is a comprehensive emergency care and safety course that incorporates basic first aid skills and knowledge and advanced topics such as oxygen therapy, hazardous materials, farm/rural incidents, disaster planning, incident command, triage, and mass casualty incidents. The course includes discussion of infectious diseases and the standard precautions utilized by rescuers to prevent the transmission of disease. Critical thinking and decision-making skills are utilized throughout NURS 492 in practical exercises using various scenarios to enhance the rescuers response in emergency situations. Students are evaluated by written examination and practical skill testing. Cards in First Aid/Emergency Care and CPR for the Healthcare Provider/Professional CPR will be issued to the student upon successful completion of the course. NURS 492 is a complimentary course to NURS 203, which is a basic first aid/community CPR general education elective course designed for the non-nursing major who is required to have first aid/CPR certification for their course of study. NURS 492 provides the student an alternative to NURS 203 by providing emergency care at a higher level of training. NURS 492 is an excellent course for nursing students with advanced health care knowledge, community health care providers (i.e., school nurses), and any non-nursing major interested in emergency medical services (i.e., Kinesiology). NURS 492 is offered fall and/or spring semesters and enrollment is limited to 30 students. The course objectives follow.

Upon completion of this course, the student will be able to:

- a. Recognize and state signs and symptoms of both non-urgent and life-threatening illnesses and injuries.
- b. Demonstrate an ability to treat injuries and illness until Emergency Medical Service (EMS) help arrives by utilizing critical thinking skills to make correct decisions, integrate knowledge and improvise materials as necessary.
- c. Demonstrate the correct procedure of CPR for the Adult, Child, and Infant victim of cardiac arrest, including Obstructed Airway.
- d. Recognize the special cultural and technical barriers of providing first aid in a rural setting and a farm environment.
- e. Demonstrate an awareness of hazardous materials at a first responder level of competency.
- f. Demonstrate appropriate triage decisions in single or multiple person accidents.
- g. Demonstrate an awareness of primary and secondary prevention of trauma, especially with farming incidents.
- h. Demonstrate an awareness of safety by conducting a safety inspection of the home or work place.
- i. Design and plan a shelter for victims in the event of a man-made or natural disaster.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 494H** Honors Thesis (1-6 per semester/maximum of 6) Independent honors research project related to student's interests directed by faculty supervisor and culminating in production of thesis.

#### **Honors Thesis (1-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 495** Nursing Study in Specialized Setting (1-12) Designed to provide student with in-depth study and practice in clinical specialty area of choice.

#### **Nursing Study in Specialized Setting (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496A** Nurse Residency 1 (1) This course provides the foundational information needed in developing the role of the nurse preceptor.

**Nurse Residency 1 (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496A** Nurse Residency 1 (1) This course provides the foundational information needed in developing the role of the nurse preceptor.

**Nurse Residency 1 (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496B** Nurse Residency 2 (2) This course provides advanced knowledge needed in developing the role of the nurse preceptor.

**Nurse Residency 2 (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496B** Nurse Residency 2 (2) This course provides advanced knowledge needed in developing the role of the nurse preceptor.

**Nurse Residency 2 (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496C** Behavioral Health Services (1-6) Exploring behavioral health services in the greater erie community.

**Behavioral Health Services (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496C** Behavioral Health Services (1-6) Exploring behavioral health services in the greater erie community.

**Behavioral Health Services (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496D** Wound Care Management and Certification (1-6) Indepth study on wound care management and certification.

**Wound Care Management and Certification (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496D** Wound Care Management and Certification (1-6) Indepth study on wound care management and certification.

**Wound Care Management and Certification (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496E** Trauma Nursing Comprehensive Course in the Care of Post Trauma Events (1-6) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

**Trauma Nursing Comprehensive Course in the Care of Post Trauma Events (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 496E** Trauma Nursing Comprehensive Course in the Care of Post Trauma Events (1-6) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

**Trauma Nursing Comprehensive Course in the Care of Post Trauma Events (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497A** Business of Nursing (3) Teaches students basic business principles as they apply to nursing and health related entrepreneur.

**Business of Nursing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497A** Business of Nursing (3) Teaches students basic business principles as they apply to nursing and health related entrepreneur.

**Business of Nursing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497A** Business of Nursing (3) Teaches students basic business principles as they apply to nursing and health related entrepreneur.

**Business of Nursing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2014 Ending: Summer 2014 Future: Summer 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497B** Ethical and Legal Context of Nursing (3) Explores the legal and ethical dimensions of clinical nursing practice and research.

**Ethical and Legal Context of Nursing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497B** Ethical and Legal Context of Nursing (3) Explores the legal and ethical dimensions of clinical nursing practice and research.

**Ethical and Legal Context of Nursing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497B** Ethical and Legal Context of Nursing (3) Explores the legal and ethical dimensions of clinical nursing practice and research.

**Ethical and Legal Context of Nursing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497C** Nurse Preceptorship (3) This course provides practical application of the theories of precepting in the clinical setting.

**Nurse Preceptorship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 497D** Relational Aggression in the Healthcare Setting (3) This course considers the emerging research related to relational aggression, bullying and power structures within the healthcare setting. Concepts of leadership, mentoring, assertiveness training and other options are explored as tools to address the issue of relational aggression.

**Relational Aggression in the Healthcare Setting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 499** (IL) Foreign Study--Nursing (1-9) Study of nursing issues in a foreign country.

**Foreign Study--Nursing (1-9)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 501** Issues in Nursing and Health Care (3) Analysis and evaluation of the health care system with emphasis on health policy and economic issues affecting nursing practice.

**NURS 501 Issues in Nursing and Health Care (3)**

This course will focus on the state of the U.S. health care system within global, health policy, and economic perspectives. The course will cover current and complex issues and trends specific to nursing, and in the broader context of interdisciplinary health care. Master's level nurses will develop beginning mastery over the concepts and principles of health care policy, and the leadership skills necessary to influence policy changes in health care within organizations and on a national, state or local level.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 502** Advanced Health Assessment of Adult Populations (3) Advanced nursing assessment and diagnosis of physical, psychosocial and developmental health for adults and families across the adult age spectrum.

**Advanced Health Assessment of Adult Populations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 502A** Advanced Health Assessment of Pediatric Populations (1) Advanced nursing assessment and diagnosis of

physical, psychosocial and development health for individuals and families across the pediatric age spectrum.

### **Advanced Health Assessment of Pediatric Populations (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

Concurrent: NURS 502

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 503** Pathophysiology (3) Integration of advanced physiology, genetics, and pathophysiology as related to specific disease entities and alterations in functioning.

### **Pathophysiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 504** Pharmacologic Therapy (3) Use of pharmacologic therapies in advanced practice nursing.

### **NURS 504 Pharmacologic Therapy (3)**

This course is designed to meet the needs of the advanced practice nurse prescriber in the primary and other healthcare settings, building upon previously, and/or concurrently acquired knowledge from nursing, pathophysiology, and affiliated sciences. The development of clinical decision-making skills essential to safe and effective pharmacologic intervention is the focal point of the course. Current concepts in pharmacologic therapies as part of the treatment of health problems will be stressed.

Upon completion of the course, the student will be able to:

1. Understand the clinical use of broad categories of medications in provision of primary, secondary, and tertiary care.
2. Describe the dose-response relationship of medications commonly used in the practice setting.
3. Define pharmacologic concepts and principles relevant to the use of medications in the practice setting.
4. Analyze the impact of client motivation in seeking and adhering to medical prescriptions, with focus on the special needs of rural and medically underserved populations.
5. Individualize the prescription of drugs to meet client needs.
6. Discuss economic considerations in prescription of medications, including the special needs of rural and medically underserved clients.
7. Develop teaching strategies for use in special populations.
8. Consider the legal aspects of advanced practice, focusing on the needs of an advanced practice nurse.

This is a required course for all nurse practitioner students before all Nurse Practitioner Practicum courses. It may be chosen as an elective course by students in other nursing specialty areas. This course fulfills the pharmacology requirement for licensed nurse practitioners to earn prescriptive authority from the Pennsylvania State Board of Nursing. Evaluation methods include examinations (case studies and multiple choice objective tests), a case presentation, and class participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 508** Perspectives in Population-Based Health (3) Theories and strategies for promoting health in community aggregates with emphasis on vulnerable and underserved populations of diverse backgrounds.

### **Perspectives in Population-Based Health (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 510** Theoretical and Scientific Foundations of Advanced Nursing Practice (3) Examines the relationship of nursing theories to the development of nursing science, as well as current scientific advances that guide nursing practice and research.

**Theoretical and Scientific Foundations of Advanced Nursing Practice (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 510** Theoretical and Scientific Foundations of Advanced Nursing Practice (3) Examines the relationship of nursing theories to the development of nursing science, as well as current scientific advances that guide nursing practice and research.

**Theoretical and Scientific Foundations of Advanced Nursing Practice (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 512** Nursing Research (3) A nursing research course with emphasis on research design, data collection methods, and evaluation of research studies.

**NURS 512 Nursing Research (3)**

Nursing 512 is a research course designed to build on nursing theory taught in Nursing 510. This course provides students with an overview of the role of nursing research in the development of nursing practice as well as sound ethical principles related to the conduction and utilization of nursing research in all areas of health care. Principles guiding the conduction, application and utilization of both qualitative and quantitative studies will be emphasized. Nursing 510 is a prerequisite for the course. Nursing 512 will be offered in the Spring semester and is taken in the second semester of full-time study.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 512** Nursing Research (3) A nursing research course with emphasis on research design, data collection methods, and evaluation of research studies.

**NURS 512 Nursing Research (3)**

Nursing 512 is a research course designed to build on nursing theory taught in Nursing 510. This course provides students with an overview of the role of nursing research in the development of nursing practice as well as sound ethical principles related to the conduction and utilization of nursing research in all areas of health care. Principles guiding the conduction, application and utilization of both qualitative and quantitative studies will be emphasized. Nursing 510 is a prerequisite for the course. Nursing 512 will be offered in the Spring semester and is taken in the second semester of full-time study.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 522** Comprehensive Assessment of the Older Adult (3) Advanced nursing assessment of biological, physical, clinical, functional, cognitive, psychological, and social changes associated with aging.

**Comprehensive Assessment of the Older Adult (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 523** Interventions for Common Health Problems in Older Adults (3) Discussion of common acute and chronic health problems experienced by older adults and development of evidence-based interventions for management.

**Interventions for Common Health Problems in Older Adults (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 527** Promoting Healthy Lifestyles in the School-Age Population (3) This course will focus on promoting health lifestyles for the school age population.

**NURS 527 Promoting Healthy Lifestyles in the School-Age Population (3)**

This course will focus on promoting healthy lifestyles for the school age population. The most prevalent health problems of the school age population include issues of physical inactivity, nutrition, and obesity; physical health problems of asthma, diabetes, and attention deficit hyperactivity disorder; and mental health problems of depression, eating disorders, and substance abuse. This course provides a broad overview of these health problems and discusses the role of the school nurse as a partner with families to promote a healthy lifestyle for the child.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 580** Epistemology of Nursing Science (3) Examines the development and organization of nursing knowledge; nursing theories are critically analyzed in relationship to the substantive structure of nursing science.

**Epistemology of Nursing Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 581** Developing Theoretical Constructs Relevant to Nursing (3) This course provides experience in concept analysis as one mechanism facilitating the development of nursing knowledge.

**Developing Theoretical Constructs Relevant to Nursing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 582** Scientific Basis for Nursing Practice (3) Critical appraisal of the scientific basis of selected areas of nursing practice.

**Scientific Basis for Nursing Practice (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 583** Advanced Seminar in Nursing Science (3) Intense interactive seminar for synthesizing prior content into the design of dissertation research.

### **Advanced Seminar in Nursing Science (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 585** Qualitative Methods in Health Research (3) Provides an overview of advanced qualitative research methodologies useful in the conduct of social and behavioral health research.

### **Qualitative Methods in Health Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 586** Quantitative Methods in Health Research (3) An overview of methodological considerations specific to quantitative health research.

### **Quantitative Methods in Health Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 587** Ethics in Nursing Research (1) Provides the theoretical and practical knowledge needed to design and conduct ethically responsible social and behavioral health research.

### **Ethics in Nursing Research (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or

small-group basis.

**Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for

supervised and graded teaching experience in undergraduate nursing courses.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 818** Clinical Nurse Specialist I: Concepts and Theory (4) Development of a conceptual foundation for advanced nursing practice as a Clinical Nurse Specialist.

**Clinical Nurse Specialist I: Concepts and Theory (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 819** Clinical Nurse Specialist II: Analysis and Application (4) Analysis and application of nursing interventions for individuals, families, and aggregate groups in varied health care delivery settings.

**Clinical Nurse Specialist II: Analysis and Application (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 821** Nurse Practicum: Clinical Nurse Specialist (4-8 per semester/maximum of 8) Integration and synthesis of specialty knowledge and theories into the CNS role.

**Nurse Practicum: Clinical Nurse Specialist (4-8 per semester/maximum of 8)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 823** Interventions for Common Health Problems in the Adult/Older Adult (4) Discussion of common health

problems experienced by adults/older adults and development of evidence-based interventions for management.

#### **Interventions for Common Health Problems in the Adult/Older Adult (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 840** Nursing Education Theories and Strategies (3) Theoretical foundation and evidence-based strategies for nursing education.

#### **NURS 840 Nursing Education Theories and Strategies (3)**

This course provides a foundation in the role of the nurse educator and evidence-based strategies for nursing education. Students will explore various theoretical perspectives of teaching and learning, as well as practical application of strategies to meet the diverse needs of learners. The course is intended to prepare students to employ effective teaching strategies in classroom, clinical, and on-line educational settings. Discussion of managing various challenges related to nursing education will be included throughout the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 841** Assessment and Evaluation in Nursing Education (3) Methods for assessment, measurement, and evaluation of student learning in academic and clinical settings.

#### **NURS 841 Assessment and Evaluation in Nursing Education (3)**

This course provides a foundation in assessment, measurement, and evaluation strategies for nursing education. Students will explore the theoretical basis for evaluation, as well as practical application of the strategies. The course is intended to prepare students to utilize strategies of measurement and evaluation in developing tests, interpreting test results, assessing clinical performance, and evaluating written assignments. Discussion of legal and ethical issues related to evaluation in nursing education will be included throughout the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 842** Curriculum and Program Development in Nursing Education (3) Curriculum design and evaluation, educational program development, and accreditation.

#### **NURS 842 Curriculum and Program Development in Nursing Education (3)**

This course provides a foundation in curricular design, program development, and curriculum evaluation in nursing education. Students will explore internal and external contextual factors influencing curriculum design and implementation. This course is intended to prepare students to utilize foundational principles and concepts for the development and evaluation of nursing curricula in academic settings. This course will also prepare students for program development and evaluation in nursing education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 843** Synthesis and Application of the Nurse Educator Role (4) Practicum in the application of the nurse educator role in academic and healthcare settings.

#### **NURS 843 Synthesis and Application of the Nurse Educator Role (3)**



This course involves the practical application of knowledge acquired in previously completed courses related to nursing education. Students will work with a preceptor in an educational setting to demonstrate multiple aspects of the nurse educator role. The practicum experience will be developed to fulfill mutually agreed-upon objectives based on students' previous experiences and identified learning needs.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 845** Healthcare Economics and Policy for Nurse Administrators (3) Concepts of healthcare economics and policy for nurse administrators

**Healthcare Economics and Policy for Nurse Administrators (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 846** Leadership Concepts and Theories for Nurse Administrators (3) Concepts and theories of leadership for nurse administrators.

**NURS 846 Leadership Concepts and Theories for Nurse Administrators (3)**

This course provides a foundation in nurse leadership roles, concepts, and theories. Students will explore the theoretical basis of leadership and change, as well as analyze organizational structure, power, and politics. This course is intended to provide students with a theoretical and evidence-based foundation for leadership roles within health care organizations. Discussion of communication, decision-making, and problem-solving strategies for nurse administrators is included throughout the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 847** Human Resource and Work Force Issues for Nurse Administrators (3) Human resource management and work force issues for nurse administrators.

**NURS 847 Human Resource and Work Force Issues for Nurse Administrators (3)**

This course provides a foundation in human resources within health care organizations. Students will examine ethical and legal issues related to collective bargaining, unions, and staffing. This course is intended to prepare students to utilize leadership strategies for recruiting, retaining, developing, and evaluating a diverse, multidisciplinary work force in complex healthcare environments. Discussion of evidence-based strategies for conflict resolution will be included throughout the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 848** Synthesis and Application of the Nurse Administrator Role (4) Practicum in the application of the nurse administrator role in health care settings.

**NURS 848 Synthesis and Application of the Nurse Administrator Role (4)**

This course involves the practical application of knowledge acquired in previously completed courses related to nurse administration. Students will work with a preceptor in a health care setting to demonstrate multiple aspects of the nurse administrator role. The practicum experience will be developed to fulfill mutually agreed-upon objectives based on

students' previous experiences and identified learning needs.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 860 Adult Gerontology Acute Care Nurse Practitioner Role I (3)** Acute Care Nurse Practitioner role across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions to restore or maximize health.

**NURS 860 Adult Gerontology Acute Care Nurse Practitioner Role I (3)**

This course focuses on utilization of a collaborative approach to enhance Acute Care Nurse Practitioner effectiveness with restorative care and synthesis of theoretical, scientific, and clinical knowledge required for the assessment, diagnosis, management, and treatment options of patients with complex acute, critical, and chronic illness across the continuum of care. Content will focus on patients with acute and chronic cardiovascular, pulmonary, infectious disease, and nutrition problems, as well as related ethical, legal, and professional practice issues. This course is designed to be taken concurrently with the Adult Gerontology Acute Care Nurse Practitioner Practicum I (NURS 862) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:  
 Concurrent: NURS 862

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 861 Adult Gerontology Acute Care Nurse Practitioner Role II (3)** Continuation of Acute Care Nurse Practitioner role across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions to restore or maximize health.

**NURS 861 Adult Gerontology Acute Care Nurse Practitioner Role II (3)**

This course continues the focus on utilization of a collaborative approach to enhance Acute Care Nurse Practitioner effectiveness with restorative care and synthesis of theoretical, scientific, and clinical knowledge required for the assessment, diagnosis, management, and treatment options of patients with complex acute, critical, and chronic illness across the continuum of care. Content will focus on patients with acute and chronic neurologic, gastrointestinal, renal, hematologic, and endocrine problems, as well as special topics. This course is designed to be taken concurrently with the Adult Gerontology Acute Care Nurse Practitioner Practicum II (NURS 863) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:  
 Concurrent: NURS 863

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 862 Adult Gerontology Acute Care Nurse Practitioner Practicum I (4)** Adult Gerontology Acute Care Nurse Practitioner practicum with patients across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

**NURS 862 Adult Gerontology Acute Care Nurse Practitioner Practicum I (4)**

This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role through application of theoretical knowledge and psychomotor skills taught in NURS 860 and all prior courses. Emphasis is given to development of advanced clinical competency and clinical decision making abilities. This practicum course for the Adult Gerontology Acute Care Nurse Practitioner option involves student rotations through clinical sites providing care for adults and older adults with acute and critical illness.

Clinical conferences will enable students to discuss their unique clinical experiences and topics that emerge from their clinical practice. Minimum clinical conference time is 15 hours per semester.

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:  
 Concurrent: NURS 860

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 863 Adult Gerontology Acute Care Nurse Practitioner Practicum II (4)** Adult Gerontology Acute Care Nurse Practitioner practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

**NURS 863 Adult Gerontology Acute Care Nurse Practitioner Practicum II (4)**

This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role through application of theoretical knowledge and psychomotor skills taught in NURS 861 and all prior courses. Emphasis is given to development of clinical competency and clinical decision making abilities. This practicum course for the Adult Gerontology Acute Care Nurse Practitioner option involves student rotations through clinical sites providing care for adults and older adults with acute and critical illness. Student rotations will include both medical and surgical clinical sites by completion of Practicum I and Practicum II.

Clinical conferences will enable students to discuss their unique clinical experiences and topics that emerge from their clinical practice. Minimum clinical conference time is 15 hours per semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:  
 Concurrent: NURS 861

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)** Adult Gerontology Acute Care Nurse Practitioner integrative practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

**NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (6)**

This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role and demonstrate synthesis of theoretical, scientific and contemporary clinical knowledge learned in all courses of the Adult Gerontology Acute Care Nurse Practitioner Option. This practicum allows the student to integrate the roles of the Adult Gerontology Acute Care Nurse Practitioner and demonstrate clinical competency and clinical decision making abilities. The setting for clinical rotation may include any acute or critical care area and may be chosen based on the student's preferred specialty area. Clinical conferences will be utilized to discuss clinical issues identified by students from their specific sites, synthesize all previously learned knowledge, and discuss role development. Minimum clinical conference time is 15 hours per semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)** Adult Gerontology Acute Care Nurse Practitioner integrative practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions.

**NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (6)**

This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role and demonstrate synthesis of theoretical, scientific and contemporary clinical knowledge learned in all courses of the Adult Gerontology Acute Care Nurse Practitioner Option. This practicum allows the student to integrate the roles of the Adult Gerontology Acute Care Nurse Practitioner and demonstrate clinical competency and clinical decision making abilities. The setting for clinical rotation may include any acute or critical care area and may be chosen based on the student's preferred specialty area. Clinical conferences will be utilized to discuss clinical issues identified by students from their specific sites, synthesize all previously learned knowledge, and discuss role development. Minimum clinical conference time is 15 hours per semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 865** Pharmacology for Acute Care Nurse Practitioners (1) Principles of clinical pharmacology as applied to management of complex acute, critical, and chronically ill adult and older adult patients.

**NURS 865 Pharmacology for Acute Care Nurse Practitioners (1)**

This course focuses on pharmacologic therapies specific to critically ill adult and older adult patients. Emphasis is placed on proper prescribing regimens and monitoring in critical illness. This course is designed to be taken concurrently with Pharmacologic Therapy (NURS 504) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

Concurrent: NURS 504

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 866** Health Assessment of the Adult Gerontology Population in Acute Care (1) Physical assessment and diagnostics for physical and psychosocial health of adult and older adult individuals and families with acute and critical illness.

**NURS 866 Health Assessment of the Adult Gerontology Population in Acute Care (1)**

This foundational course is designed to assist the advanced practice nurse in learning comprehensive assessment of adult and older adult individuals and families with acute and critical illness. Performance and interpretation of related diagnostic tests and procedures is integrated in the course. Emphasis is placed on development of competence to perform a comprehensive health assessment, develop differential diagnosis, and demonstrate diagnostic reasoning in evaluation of acutely and critically ill patients. This course is designed to be taken concurrently with Physical Assessment Across the Lifespan (NURS 502) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing. The didactic and laboratory components of the course are offered concurrently to allow for the application of knowledge.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

Concurrent: NURS 502

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 870** Nurse Practitioner Role with Healthy Individuals and Families (3) Nurse Practitioner role to promote health, prevent illness, and manage common acute/episodic health problems across the adult-older adult age spectrum.

**Nurse Practitioner Role with Healthy Individuals and Families (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:  
Concurrent: NURS 872 or NURS 872A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 871** Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems (3) Nurse Practitioner role with individuals and families to maximize health and manage complex and/or chronic health problems.

**Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:  
Concurrent: NURS 873 or NURS 873A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 872** Family Nurse Practitioner Practicum I (3) Family Nurse Practitioner practicum with individuals and families across the life span experiencing common acute/episodic health problems.

**Family Nurse Practitioner Practicum I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:  
 Concurrent: NURS 870 NURS 875

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 872A** Adult Gerontology Primary Care Nurse Practitioner Practicum I (4) Adult Gerontology Primary Care Nurse Practitioner practicum with individuals and families across the adult/older adult age spectrum experiencing common acute/episodic health problems.

**Adult Gerontology Primary Care Nurse Practitioner Practicum I (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:  
 Concurrent: NURS 870

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 873** Family Nurse Practitioner Practicum II (4) Family Nurse Practitioner practicum with individuals and families across the life span experiencing complex and/or chronic health problems.

**Family Nurse Practitioner Practicum II (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:  
 Concurrent: NURS 871

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 873A** Adult Gerontology Primary Care Nurse Practitioner Practicum II (4) Adult Gerontology Primary Care Nurse Practitioner practicum with individual/families across the adult/older adult age spectrum experiencing complex and/or chronic health problems.

**Adult Gerontology Primary Care Nurse Practitioner Practicum II (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:  
 Concurrent: NURS 871

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 874** Family Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6) Family Nurse Practitioner integrative practicum with communities and individuals/families across the life span experiencing health and illness.

**Family Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 874** Family Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6) Family Nurse Practitioner integrative practicum with communities and individuals/families across the life span experiencing health and illness.

**Family Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 874A** Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)  
 Adult Gerontology Primary Care Nurse Practitioner integrative practicum with communities and individuals/families experiencing health and illness.

**Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 874A** Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)  
 Adult Gerontology Primary Care Nurse Practitioner integrative practicum with communities and individuals/families experiencing health and illness.

**Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (2-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 875** Nurse Practitioner Role with Children and Families (2) Nurse Practitioner role with children and their families to promote health, prevent illness, and manage acute or chronic health problems.

**Nurse Practitioner Role with Children and Families (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:  
 Concurrent: NURS 576

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NURS 876** Family Nurse Practitioner Practicum with Pediatric Populations (2) Family Nurse Practitioner practicum with pediatric populations/families during health or experiencing acute and chronic health problems.

**Family Nurse Practitioner Practicum with Pediatric Populations (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:  
 Concurrent: NURS 870 NURS 872

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Nutrition (NUTR)**

**NUTR 400** Introduction to Nutrition Counseling (1) No description.

**Introduction to Nutrition Counseling (1)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Fall 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 401 Nutrition Clinic Practicum (1-3)** To provide qualified nutrition students with the opportunity to practically apply nutrition counseling skills in a supervised environment.

**NUTR 401 Nutrition Clinic Practicum (1-3)**

This course is designed to provide qualified nutrition students with the practical application of nutrition counseling skills, in an outpatient setting, under the supervision of a registered dietitian. The Nutrition Clinic offers counseling services to university students, faculty and staff with health concerns such as: cardiovascular disease, diabetes, weight control, vegetarianism, fitness, and eating disorders.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 407 Nutrition for Exercise and Sports (3)** Interactions between nutrition, food selection, and timing of eating as they apply to exercise training and recreational physical activity.

**Nutrition for Exercise and Sports (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 421 (US;IL) Food Culture and Health Trends (3)** Social-political, historic, and geographic roots of food patterns, featuring specific cuisine areas and nutritional disease patterns; includes foods laboratory.

**NUTR 421 Food, Culture, and Health Trends (3)  
 (US;IL)**

Food, Culture, and Health Trends is a survey of the development of cuisine, and of ethnicity and health patterns as they are expressed through food and cuisine. This is also a laboratory course, where each week representative foods from diverse cultures are experienced, prepared by the students into dishes representative of the cuisine, and then consumed. The first third of the course follows the development of food patterns from hunter gathering and agricultural development through trade, conquest, and the globalization of foods. The second two thirds examines particular cuisine clusters as they have affected US food patterns. The course focuses on the physical, historical, social-political, and cultural factors that affect food choice in a specific area, such as geography, colonization, trade, migration, slavery, and religion. The nutritional outcomes of today's cultural food patterns, specifically the epidemiology of nutrition-related diseases, is another focus, particularly how cultural groups adjust to the US diet. The objectives of the course are to create an appreciation and understanding of the diverse origins, changing nature, and strengths of traditional cuisines, the nutritional problems arising from cuisine transitions, and a respect for the role of food in cultural expression. This course provides the cultural awareness needed by dietitians and any student of food and culture to participate in dietary exploration and change. Evaluation methods include weekly essay quizzes, laboratory participation and performance, 5 group activities, 2 essay tests, and a group library, web and informant based evaluation of one culture's cuisine. Two sections are offered each Spring Semester. Enrollment is limited to 36 students per section.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 425 (IL) Global Nutrition Problems: Health, Science, and Ethics (3)** Examines causes of malnutrition and health problems in low-income countries; explores international cultures and ethical issues related to hunger.

**Global Nutrition Problems: Health, Science, and Ethics (3)**

General Education: None  
 Diversity: IL

Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 430 (IL) (S T S 430) Global Food Strategies: Problems and Prospects for Reducing World Hunger (3)** Technological, social, and political solutions to providing basic food needs; food resources, population, and the environment; current issues.

**NUTR (S T S) 430 Global Food Strategies: Problems and Prospects for Reducing World Hunger (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Global Food Strategies examines opportunities for the world's poor to improve their health, nutrition, and physical environment by focusing on their own cultural strengths and organization, reassessing the opportunities within their environment, evaluating the appropriateness of new and old technologies, and gaining a renewed respect for their own abilities. Measures of appropriateness used throughout the course are ecological sustainability and cultural sensitivity. Approximately one third of the course focuses on the historical basis of underdevelopment up to and including the post-modern era. Topics include economic colonization, the industrialization of agriculture, the impacts of globalization, trade priorities and debt loads on the poor, population and ecological issues; and a critique of the economics of scarcity. The second two thirds focuses on micro-strategies for poverty alleviation. Topics include culturally-appropriate people centered development women's empowerment needs including microlending (small loans), the prospects and rationales for biological agriculture vs. industrialized agriculture, successful models of health and population control, the impact of American consumerism, and ecological footprint analysis. The goals of the course are to 1) awaken the student's interest in hunger and poverty issues and the cultural dimensions of poverty, 2) acquaint the student with viable and sustainable strategies for hunger and poverty alleviation for the very poor, and 3) enable the student to understand enough about globalism that he/she can critically analyze and evaluate international affairs articles in national newspapers. The classes integrate lecture information with films that help with the visualization of poverty problems and prospects, readings, current events, and small group discussion around issues and case studies. Readings are drawn from development classics and from a wide range of recent literature on poverty and change. Evaluation includes student responses to three essay tests posed by the instructor over the semester, and journal keeping. The class project is designed to promote citizenship/leadership skills. Students will make a contract to perform a particular citizen action relating to hunger and poverty alleviation, which they will describe in an oral report and written format. Participation is evaluated. The class is offered fall semester only. Enrollment is limited to 60 students.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 445 Nutrient Metabolism I (3)** Nutrients, their sources, metabolism, interrelationships and requirements with focus on carbohydrates, lipids, and proteins.

**Nutrient Metabolism I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 446 Nutrient Metabolism II (3)** Continuation of NUTR 445; nutrients, their sources, metabolism, inter- relationships and requirements with focus on vitamins and minerals.

**Nutrient Metabolism II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1994  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 451 Nutrition throughout the Life Cycle (3)** Application of basic principles of nutrition to nutritional and physiological needs throughout the life cycle from prenatal to aging.

**Nutrition throughout the Life Cycle (3)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 452** Nutritional Aspects of Disease (3) Disturbances in metabolism related to human disease processes; principles of nutrition in therapy.

### **Nutritional Aspects of Disease (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 453** Diet in Disease (3) Nutrient and energy controlled diet programs. Implications for nutrition counseling and education.

### **Diet in Disease (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 456 (US)** Community Nutrition (3) Programs and policies of nutrition-related activities of community agencies; factors pertinent to nutrition education; relationship of cultural and social identity to foods and nutrition.

### **NUTR 456 Community Nutrition (3) (US)**

Programs and policies of nutrition-related activities of community agencies; factors pertinent to nutrition education; theory and practice of community nutrition within the dietetics, nutritional sciences, and public health nutrition professions; emphasis on differences in United States values, traditions, attitudes, beliefs and customs and United States social identities in relation to one another within a community-based framework.

This course provides knowledge in the content area of community nutrition which is tested on the national registration examination for registered dietitians.

Students are evaluated based assessments designed to increase personal cultural awareness and sensitivity, literacy level of nutrition education materials, credible resources for nutrition information, community needs assessment and community nutrition intervention programming and assessment. In particular, the assessment of a community's nutritional needs and the design of a nutrition intervention serve to highlight the cultural diversity within the United States and increase the student's ability to locate and evaluate information about nutrition and food practices of diverse groups living in the United States. Students will focus on immigrant groups, ethnically- or racially-diverse groups, Native American tribes or loosely affiliated groups of people who have common socioeconomic status or food practices or food patterns (e.g., poverty, food insecure with/without hunger, vegans, vegetarians, Kosher).

Community nutritional needs assessment and interventions assignments also serve to assess whether the United States cultures objectives of this course are successfully met. In addition, each assignment requires that students consider cultural and socioeconomic factors as determinants of diet, nutritional status and health status.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 490W** Nutrition Seminar (3) Use of selected materials from the scientific literature to prepare a term paper and an oral report.

### **Nutrition Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 494H** Senior Honors Thesis (1-6) Independent study related to a student's interests directed by a faculty supervisor and culminating in the production of a thesis.

#### **Senior Honors Thesis (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 495** Advanced Field Experience in Nutrition (1-6) Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity is required.

#### **Advanced Field Experience in Nutrition (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 501** Regulation of Nutrient Metabolism I (4) Integration of nutritional, biomedical, biochemical, physiological, and hormonal processes involved in carbohydrate, lipid, and protein metabolism.

#### **Regulation of Nutrient Metabolism I (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 502** Regulation of Nutrient Metabolism II (3) Complementary to NUTR 501 with an emphasis on metabolic roles of vitamin and mineral elements.

#### **Regulation of Nutrient Metabolism II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 506** (AN SC 506) Ruminology (3) Physiological, biochemical, and microbiological activities occurring within the rumen and the relation of rumen function to animal response.

#### **Ruminology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 508** (PHSIO 508) Critical Readings in Molecular Nutrition (1.5 per semester/maximum of 6) Understanding of approaches, methods and current concepts in molecular biology and nutrition through critical readings of current primary literature.

#### **Critical Readings in Molecular Nutrition (1.5 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

Concurrent: NUTR 445 or NUTR 446

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 511** Maternal and Child Nutrition (3) Role of nutrition in female fertility, during pregnancy and lactation, as well as during infancy and early childhood.

#### **NUTR 511 Maternal and Child Nutrition (3)**

This course is designed to provide an understanding of the nutritional recommendations during preconception, pregnancy, lactation, early infancy, and childhood. In this course, students will acquire a broad understanding of the role and regulation of nutrient metabolism and effects of genetic variation on nutritional needs during these unique physiological periods. These concepts will be discussed from molecular, clinical and applied perspectives that will guide further graduate-level inquiry. Lectures and readings will explicate 1) how nutrient metabolism affects pregnancy outcomes, lactation sufficiency and infant development; 2) how nutrition affects common early childhood conditions, such as obesity, allergy and autism; 3) how fetal/postnatal nutrition affects long-term health; and 4) the role of genetics in

nutritional requirements during these times in the lifecycle. Students will gain an appreciation for the contribution of nutrition during the fetal/postnatal periods on long-term health and the incidence of disease through understanding the role of nutrients in a translational framework.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 511 Maternal and Child Nutrition (3)** Role of nutrition in female fertility, during pregnancy and lactation, as well as during infancy and early childhood.

### **NUTR 511 Maternal and Child Nutrition (3)**

This course is designed to provide an understanding of the nutritional recommendations during preconception, pregnancy, lactation, early infancy, and childhood. In this course, students will acquire a broad understanding of the role and regulation of nutrient metabolism and effects of genetic variation on nutritional needs during these unique physiological periods. These concepts will be discussed from molecular, clinical and applied perspectives that will guide further graduate-level inquiry. Lectures and readings will explicate 1) how nutrient metabolism affects pregnancy outcomes, lactation sufficiency and infant development; 2) how nutrition affects common early childhood conditions, such as obesity, allergy and autism; 3) how fetal/postnatal nutrition affects long-term health; and 4) the role of genetics in nutritional requirements during these times in the lifecycle. Students will gain an appreciation for the contribution of nutrition during the fetal/postnatal periods on long-term health and the incidence of disease through understanding the role of nutrients in a translational framework.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 513 Atherosclerosis and Nutrition (2)** The etiology and pathophysiology of atherosclerotic cardiovascular disease, with emphasis on nutritionally-related aspects.

### **Atherosclerosis and Nutrition (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 514 (VB SC 514) Prostaglandins and Leukotrienes (3)** Biochemical, physiological, and nutritional aspects of arachidonic acid and related essential fatty acid metabolism. Structure-activity relationships of prostaglandins, prostacyclins, thromboxanes, and leukotrienes.

### **Prostaglandins and Leukotrienes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 515 Mathematical Modeling in Nutrition (2)** Study of the theory and application of mathematical modeling of the tracer and tracee kinetics of nutrients and their metabolites in animals and man.

### **Mathematical Modeling in Nutrition (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 520** Readings in Nutrition (1 per semester/maximum of 2) Readings and reports of selected topics in nutrition.

**Readings in Nutrition (1 per semester/maximum of 2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 532** (HD FS 532) Childhood Obesity (3) This course addresses how genetic predispositions, behavioral and environmental factors affect children's obesity risk and examines strategies for obesity prevention.

**NUTR (HD FS) 532 Childhood Obesity (3)**

This course will examine the epidemic of obesity, particularly childhood obesity, and how various behavioral and environmental factors place children at risk of becoming overweight. Sources of influence that will be examined include: children's nutrition and physical activity behaviors, the family environment, the school environment and community characteristics. Media, social policy and economic factors will also be addressed. In addition, the health and psychosocial consequences of obesity, ethnic and socioeconomic disparities in the prevalence and predictors of obesity among children and adolescents will be addressed. At its conclusion, this course will examine policy initiatives and obesity prevention programs.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 533** (HD FS 533) Adult Obesity (3) Important current and emerging topics in obesity research relevant to government policy and general public education; emphasis on adult obesity.

**NUTR (HD FS) 533 Adult Obesity (3)**

This course will examine the epidemic of obesity, particularly adult obesity. Obesity: Causes, Consequences and Treatment will provide a forum to introduce and discuss current and emerging topics in adult obesity research, with emphasis on policy, prevention and treatment. Focus will be given to determinants of adult obesity and translation into government policy and efforts to educate the general public on the most effective strategies for body weight regulation, obesity prevention and treatment. Sources of influence that will be examined include: environment, genetics, neural, peripheral and sensory mechanisms, food properties and food supply, and therapies and treatment of adult obesity.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 551** Seminar in Nutrition (1-6) Selected topics and recent advances in nutrition.

**Seminar in Nutrition (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 581** Regulation of Nutrient Metabolism I (4) Integration of nutritional, biomedical, biochemical, physiological, and hormonal processes involved in carbohydrate, lipid, and protein metabolism.

**Regulation of Nutrient Metabolism I (4)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 583** Nutritional Epidemiology (3) Epidemiological principles and methodology to study nutritional determinants of disease.

### **Nutritional Epidemiology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 595A** Application of Community Nutrition -- Internship (3) Application and integration of community nutrition theories in a practicum environment under the supervision of preceptors in community agencies.

### **Application of Community Nutrition -- Internship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 595B** Application of Food Service Management -- Internship (3) Application and integration of food service management principles and motivation theories in a practicum environment under the supervision of preceptor.

### **Application of Food Service Management -- Internship (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 595C** Dietetic Enrichment Experience - Dietetic Internship (1) The enrichment experience is designed for interns to plan and implement a rotation of interest in the nutrition field.

### **Dietetic Enrichment Experience - Dietetic Internship (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 595D** Application Clinical Nutrition -- Internship (6) Application and integration of clinical nutrition theories in a practicum environment under the supervision of preceptor who is a registered dietitian.

### **Application Clinical Nutrition -- Internship (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 595E** Introduction to Nutrition Research -- Internship (1) Introduction of nutrition research to assist in the understanding of planning and conducting research studies in a variety of nutrition research laboratories.

**Introduction to Nutrition Research -- Internship (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 595F** Professional Portfolio Internship (1) Designing and completing a professional portfolio to assist in the employment process in the field of dietetics.

**Professional Portfolio Internship (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597B** Eating and Weight Disorders (2) This seminar will review and discuss historical theories and current literature on eating and weight disorders.

**Eating and Weight Disorders (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597D** Critical Readings in Molecular Nutrition (1.5) Critical Readings in Molecular Nutrition uses a guided readings approach to critically evaluate current topics in molecular nutrition.

**Critical Readings in Molecular Nutrition (1.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597G** Critical Readings in Molecular Nutrition (1.5) Critical Readings in Molecular Nutrition uses a guided readings approach to critically evaluate current topics in molecular nutrition.

**Critical Readings in Molecular Nutrition (1.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597G** Critical Readings in Molecular Nutrition (1.5) Critical Readings in Molecular Nutrition uses a guided readings approach to critically evaluate current topics in molecular nutrition.

**Critical Readings in Molecular Nutrition (1.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597I** Nutritional Immunology (3) Role of nutritional factors in the modulation of inflammation and immunity, with a focus on infectious disease, auto immunity and cancer.

**Nutritional Immunology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 597K** (FD SC 597K) Food Addiction: Fact or Fiction? (3) Original literature using both human subjects and animal models relevant to the topic of food addiction will be discussed.

**Food Addiction: Fact or Fiction? (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 601** Ph.D. Dissertation Full-Time (0) No description.



**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for a supervised and graded experience for graduate students in teaching undergraduate courses in nutrition.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**NUTR 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Obstet/Gynecology-Hy (OBGYN)**

**OBGYN 700** Obstetrics and Gynecology (10) Required clerkship providing supervised clinical experience in obstetrics and gynecology.

**Obstetrics and Gynecology (10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBGYN 701** OBGYN Externship/Subinternship (5) An elective to provide advanced clinical experience involving community hospital OB/GYN, ambulatory OB/GYN, or selected subspecialties.

**OBGYN Externship/Subinternship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**OBGYN 710** Clinical Gynecologic Oncology (5) Active participation in evaluation and management of patients with gynecologic malignancies.

**Clinical Gynecologic Oncology (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBGYN 720** Ambulatory and Adolescent Gynecology Elective (5) This course involves active participation in a community outpatient obsteric and gynecology practice.

**Ambulatory and Adolescent Gynecology Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBGYN 720A** Reproductive Endocrinology & Infertility Elective (2.5) This course provides exposure to basic concepts of diagnosis and management of infertility, and of reproductive endocrinologic disorders of women including hyperandrogenicity and anovulation.

**OBGYN 720A Reproductive Endocrinology & Infertility Elective (2.5)**

This course is designed to introduce third year medical students to the basic evaluation of human infertility, and expose them to current technologies for addressing the problem. Additionally, students will be introduced to clinical reproductive endocrinology in women, including the underlying biochemical and hormonal basis of normal function, and the recognition and management of common disorders. This will include exposure to genetic and clinical research, and the interplay between what are seen as reproductive endocrine disorders and broader human endocrinology. Experiences will include participation in infertility clinics, endocrinology clinics, vaginal ultrasound sessions, and egg retrieval and embryo transfer procedures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBGYN 721** Clinical Endocrinology/Infertility (5) Active participation in evaluation and management of outpatient/endocrinology/ infertility problems.

**Clinical Endocrinology/Infertility (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBGYN 722** Clinical Perinatal Medicine Elective (5) Management of women with pregnancies complicated by maternal and/or fetal disease will be learned in a high-risk pregnancy environment.

**Clinical Perinatal Medicine Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBYN 722A** Perinatology Elective (2.5) This course provides exposure to basic concepts of management of high risk pregnancies and medical complications of pregnancy.

**OBYN 722A Perinatology Elective (2.5)**

This course is designed to introduce third year medical students to the basic concepts of high risk obstetrics, and expose them to current technologies for monitoring fetuses and diagnosing prenatal disorders. They will review the human physiologic adaptations of pregnancy, and understand the relevance to everyday clinical situations. They will be exposed to genetic counseling, screening, and diagnosis, including the ethical impact of current knowledge and technologies. Finally, they will be exposed to the impact of pregnancy on systemic disorders, such as hypertension, and the impact of those disorders on the health and development of the fetus.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBYN 796** OB/GYN Individual Studies (5) A forum for collaborative research on an individual basis in areas of obstetrics and gynecology, including reproductive biology and endocrinology.

**OB/GYN Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBYN 796A** OB/GYN Individual Studies for 3rd Year (2.5) OBYN individual studies for 3rd year.

**OB/GYN Individual Studies for 3rd Year (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OBYN 797** OB/GYN Special Topics (5) Formal courses given on a topical or special interest subject which may be offered infrequently.

**OB/GYN Special Topics (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Operations Managemnt (OPMGT)

**OPMGT 510** Operations Management (3) Integration and application of decision making to operational and policy problems within the business firm.

**Operations Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**OPMGT 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPMGT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPMGT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPMGT 599** (IL) Foreign Study--Operations Management (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Study--Operations Management (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPMGT 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Operations Mmgt-Bd (OPMAN)**

**OPMAN 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPMAN 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Operations Research (O R)**

**O R 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Ophthalmology (OPHTH)**

**OPHTH 760** Ophthalmology Elective (5) This course is designed to provide a broad experience in ophthalmology for any students, regardless of their future career goals.

### **Ophthalmology Elective (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPHTH 796** Ophthalmology Individual Studies (5) Ophthalmology Individual Studies

### **Ophthalmology Individual Studies (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPHTH 796A** Ophthalmology Individual Studies 3rd Year (2.5) Ophthalmology Individual Studies for Year 3 Medical Students.

### **Ophthalmology Individual Studies 3rd Year (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**OPHTH 797** Ophthalmology Special Topics (5) Ophthalmology Special Topics

### **Ophthalmology Special Topics (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Orthopaedics (ORTHO)**

**ORTHO 710** Adult Orthopaedics for Third Year Students (5-15) An in-depth experience in general adult orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

### **Adult Orthopaedics for Third Year Students (5-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 711** Pediatric Orthopaedics for Third Year Students (5) An in-depth experience in pediatric orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

### **Pediatric Orthopaedics for Third Year Students (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 730** Adult Orthopaedics Acting Internship (5) An in-depth experience in general adult orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

### **Adult Orthopaedics Acting Internship (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 731** Pediatric Orthopaedics Acting Internship (5) An in-depth experience in pediatric orthopaedics that can be tailored for students interested in orthopaedics or in primary care.

### **Pediatric Orthopaedics Acting Internship (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 740** Rehabilitation Medicine Elective (5) An in-depth experience in rehabilitation medicine providing clinical experience in both the outpatient clinics and the inpatient unit.

**Rehabilitation Medicine Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 741** York-Orthopedic Sports Medicine Elective 3rd or 4th Year Elective (5) Course provides 4 week exposures to basic concepts for diagnosis and management of sports related injuries and conditions.

**York-Orthopedic Sports Medicine Elective 3rd or 4th Year Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 741A** York-Orthopedic Sports Medicine Elective (3rd Year) (2.5) Course provides 2 week exposure to basic concepts for diagnosis and management of sports related injuries and conditions

**York-Orthopedic Sports Medicine Elective (3rd Year) (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 796** Orthopaedics Individual Studies Elective (5) Creative projects including non-thesis research supervised on an individual basis and which fall outside the scope of formal courses.

**Orthopaedics Individual Studies Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 796A** Orthopaedics Individual Studies for 3rd Year (2.5) Orthopaedics individual studies for 3rd year students.

**Orthopaedics Individual Studies for 3rd Year (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**ORTHO 797** Orthopaedics Special Topics Elective (5) Formal courses given on a topical or special interest subject which may be offered infrequently and/or offered off-campus.

**Orthopaedics Special Topics Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **P-Based Learn Fac-Hy (PBL)**

**PBL 720** Case Development in Medical Education (5) This course will teach the major steps in creating a clinical case scenario.

### **Case Development in Medical Education (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PBL 743** Problem-based Learning Facilitation (5) Development of skills in facilitation of small group learning (PBL) and introductory understanding of educational theory supporting PBL.

### **Problem-based Learning Facilitation (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Pathology-Hy (PATH)**

**PATH 520** Biology of Neoplasia (5) Detailed examination of the initiation and pathogenesis of animal neoplasms with emphasis on the relationship to human neoplasia.

### **Biology of Neoplasia (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 590** Colloquium (1) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

### **Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 770** Anatomic Pathology (1-15) Study of tissues received daily by the surgical pathology laboratory. Students will assist in and then perform autopsies under supervision.

### **Anatomic Pathology (1-15)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 796** Pathology Individual Studies (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

#### **Pathology Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 796A** Pathology Individual Studies for 3rd Year (2.5) Pathology individual studies for 3rd year students.

#### **Pathology Individual Studies for 3rd Year (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 797** Pathology Special Topics (5) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Pathology Special Topics (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PATH 801** (AGBIO 801) Veterinary Infectious Disease Diagnostic and Surveillance Systems (3) This course provides knowledge of diagnostic and surveillance systems used to detect infectious diseases and protect against animal agricultural biological attack.

#### **Veterinary Infectious Disease Diagnostic and Surveillance Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Pediatrics-Hy (PED)**

**PED 700** Pediatric Clinical Clerkship (10) Clinical experience in the management of the newborn, of the normal infant, and children with acute and chronic illness.

#### **Pediatric Clinical Clerkship (10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 710** Pediatric Hematology/Oncology Acting Internship (5) Clinical and laboratory evaluation and treatment of hematologic and oncologic diseases in children. Conferences and rounds. One detailed topic review.

#### **Pediatric Hematology/Oncology Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 710A** Pediatric Hematology/Oncology Elective (3rd year) (2.5) This course provides exposure to the pediatric cancer patient and the field of Pediatric Oncology by closely following several patients through their full range of illness experiences.

#### **PED 710A Pediatric Hematology/Oncology Elective (2.5)**

This course is designed to introduce third year medical students to the field of Pediatric Oncology in a unique way. Students will be assigned selected patients under treatment for cancer or hematologic disease. Students will follow these patients and their families closely for the 2-week selective, but in addition to focusing on the medical care, the student will follow each patient through his or her entire experience. The student will be expected to research the primary disease and other medical issues of their assigned patients, attend daily rounds, and will also accompany and observe the patient through experiences related to their illness. These may include diagnostic tests, physical therapy, dietary, pharmacy, social work contact, play activities, and clinic visits and home visits if the patient is discharged. The student's experience will require contact with multiple consultants and departments involved in the care of their patients, including physicians, nurses, pharmacists, the team psychologist, teachers, social workers, child life, dieticians and others. Each student will meet at least weekly to discuss the assigned patients with one of the Pediatric Hematology/Oncology attendings and with the team psychologist. Rather than write daily notes, the student will keep a journal and prepare a written or oral presentation on at least one of their patients.

The overall goal of the elective is to allow students to appreciate the scope of Pediatric Hematology/Oncology through the eyes of the patient and the entire medical team. This unique approach should lead the student to integrate knowledge and gain insight into the medical field not available through any other rotation.

Evaluation will be by faculty but may include comments by the patients, their families, and other members of the medical team, as well as the quality of the student's final presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 715** Infectious Disease (5-10) Principles of host defense mechanisms, parasite interactions, manifestations of infections in children, systematic approach to the problem-solving, rational use of antibiotics.

#### **Infectious Disease (5-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 720** Pediatric Endocrinology (5) Clinical applications of basic endocrine concepts, gland functions, and effects upon growth; evaluation of endocrine tests in disease states.

#### **Pediatric Endocrinology (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 726 Clinical Genetics (5-10)** Mendelian and molecular principles of human genetics; genetic bases of human disease, quantitative human genetics, prenatal diagnosis, genetic counseling.

**Clinical Genetics (5-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 727 Neonatology Acting Internship (5)** Acting Internship emphasizing physiology of the newborn infant; concepts, practice, and procedures of intensive perinatal life support.

**Neonatology Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 728 Pediatrics--Milton Hershey School Elective (5)** This is an outpatient exposure to primary care medical problems of children in grades K-4 through 12.

**Pediatrics--Milton Hershey School Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 739 Pediatric Cardiology Elective with Global Health Experience (5)** This course provides exposure to basic concepts for diagnosis and management of children with cardiovascular diseases and cardiac abnormalities with a global health experience.

**Pediatric Cardiology Elective with Global Health Experience (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 740 Pediatric Cardiology Elective (4th year) (5)** This course provides exposure to basic concepts for diagnosis and management of children with cardiovascular diseases and cardiac abnormalities.

**Pediatric Cardiology Elective (4th year) (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 741 Pediatric Pulmonary and Sleep Medicine Elective (5)** This course provides experience in basic concepts of the pathophysiology and clinical management of children with respiratory conditions and sleep neurobehavioral abnormalities.

**Pediatric Pulmonary and Sleep Medicine Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 742** Pediatric Developmental & Behavioral Elective (5) This course provides exposure to basic concepts for diagnosis and management of children with behavior problems and developmental delays.

**Pediatric Developmental & Behavioral Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 745 (SURG 745)** Pediatric Cardiothoracic Surgery Elective (5) This fourth-year elective provides an introduction to the operative repair and peri-operative management of simple and complex congenital heart disease.

**PED (SURG) 745 Pediatric Cardiothoracic Surgery Elective (5)**

This elective in pediatric cardiothoracic surgery is offered to fourth-year medical students with an interest in congenital heart disease. It is principally targeted at students who plan a career in pediatrics, surgery, or pediatric or adult cardiology. The course is offered year-round on a monthly basis, with enrollment limited to 1-2 students per rotation. Students will work exclusively with attending surgeons in the clinical environment, and will participate in the comprehensive surgical management of infants, children, and adults with congenital heart disease. Clinical exposure will be provided to the initial surgical consultation, the judgment and rationale for operative versus non-operative management, the preoperative family counseling meeting and informed consent process, and the formulation of the operative plan. In the operating room, students will second-assist with pediatric heart surgery and will gain first-hand appreciation of the anatomic defects and their surgical repair. Postoperatively, students will participate in clinical rounds on pediatric heart surgery patients, and will follow the patients to discharge. The elective will emphasize the multi-disciplinary approach to the management of congenital heart disease, with collaborative exposure to pediatric cardiology, pediatric critical care, cardiac anesthesia, and cardiology for adults with congenital heart disease. Didactic lectures, case presentations, and reviews will be provided to students as an introduction to the major heart defects. Students will gain skill in the interpretation of echocardiograms, and will have the opportunity to view, in real-time, intraoperative transesophageal echo images, and correlate those images to the live, beating heart. Students will also gain skill in interpretation of cardiac MRI and CT angiography. The course is offered as an elective for students seeking an advanced introduction to surgery for congenital heart defects. The course is not intended as an acting-internship; thus, there is no in-house call, and limited night or weekend clinical requirements. A pre-test and a post-test will be administered.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 747 (MED 747)** Pediatric Allergy, Asthma and Immunology Elective (5) This course provides exposure to basic concepts for diagnosis and management of children and adults with allergic and immunologic diseases and respiratory and cutaneous abnormalities.

**Pediatric Allergy, Asthma and Immunology Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 750** Pediatric Nephrology/Diabetes (5-10) Outpatient and inpatient clinical concepts/diagnosis and management of children with acute and chronic renal disease or renal electrolyte abnormalities.

**Pediatric Nephrology/Diabetes (5-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PED 750A Pediatric Nephrology Elective (3rd year) (2.5)** This course provides exposure to basic concepts for diagnosis management of children with kidney disease or fluid/electrolyte abnormalities.

**PED 750A Pediatric Nephrology Elective (2.5)**

This course is designed to introduce third year medical students to the basics of evaluation and management of children with kidney disease or hypertension, and to specifically to solidify skills gained in fluid and electrolyte management during the third year core clerkships including Pediatrics or Medicine, and in the year II Renal block. Students on this elective will serve as an integral part of the Pediatrics Nephrology team, personally evaluating and discussion management of patients on the inpatient, consult, and outpatient Pediatric Nephrology services. Didactic experiences will include daily, one-on-one discussions with the attending physician(s) on the Pediatric Nephrology service. Students will be expected to demonstrate evidence of independent reading in Pediatric Nephrology topics, and to attend scheduled Pediatric Nephrology and selected Pediatrics conferences.

The overall goal of this elective is to allow students to attain the basic skills and knowledge necessary for initial evaluation of common Pediatric Nephrology problems encountered in primary care and in-patient pediatrics settings. Focus will be placed on review of renal physiology as it pertains to patient care, and to fluid and electrolyte management. Students will also be encouraged to hone their skills in obtaining a pediatric history and performing a pediatric physical exam.

Evaluation methods will include a pre-test and post-test as well as subjective evaluation of students' funds of knowledge and patient care skills by the attending pediatric nephrology faculty. This course will be offered throughout the entire academic year.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 751 Pediatrics, Child Abuse Pediatrics Elective (5)** This course provides the student with an exposure to the assessment and management of children alleged to be abused or neglected, the manifestations of child abuse and neglect, and the interface between medicine and other agencies (Child Protection, law enforcement, and legal professionals).

**Pediatrics, Child Abuse Pediatrics Elective (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 765 Pediatric Neurology (5-10) Rounds, conferences, and clinics and experience in electroencephalography, electromyography, neuroradiology, neuro-ophthalmology, psychometric testing, and otolaryngology, as clinically appropriate.**

**Pediatric Neurology (5-10)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 770 Pediatric Critical Care Medicine Acting Internship (5)** Experience in pediatric critical care medicine.

**Pediatric Critical Care Medicine Acting Internship (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 780 Pediatrics Acting Internship (5)** Reinforces and expands the principles of inpatient pediatric care for fourth-year medical students motivated to perform as acting interns.

**Pediatrics Acting Internship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 796** Pediatric Individual Studies (5) Individually supervised creative projects, including basic or clinical pediatric research.

**Pediatric Individual Studies (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 796A** Pediatric Individual Studies for 3rd Year Medical Students (2.5) Pediatrics Individual Studies for 3rd Year Medical Students.

**Pediatric Individual Studies for 3rd Year Medical Students (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PED 797** Pediatrics Special Topics (5) Basic or clinical electives in pediatrics at non-affiliated institutions.

**Pediatrics Special Topics (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Perspectives (PERSP)**

**PERSP 949** Higher Education Law (3) This course examines the legal issues applicable to American colleges and universities. Topics include academic freedom and tenure, affirmative action in admissions decisions, intercollegiate athletics, issues of student privacy, sexual harassment, and intellectual property.

**PERSP 949 Higher Education Law (3)**

This course examines the legal issues applicable to American colleges and universities. Topics include academic freedom and tenure, affirmative action in admissions decisions, intercollegiate athletics, issues of student privacy, sexual harassment, and intellectual property.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 951** The Rise of the Administrative State (3) This course will provide a survey of selected topics in the twentieth-century history of American law, with a focus on the rise of the modern administrative state. Among the topics expected to be covered: legal formalism and its progressive and legal-realist critiques; the rise of corporations; the labor

and liability explosion; the New Deal and the rise of banking and securities regulation; and deregulation in the 1980s.

### **The Rise of the Administrative State (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 972 Sports and Public Policy (3)** The course introduces students to fundamental concepts of law, economics, and business strategy necessary to understand and evaluate legal doctrine and public regulatory policy with regard to professional and major intercollegiate sports.

### **Sports and Public Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 973 Biotechnology Law (3)** This course will provide students a comprehensive understanding of the legal issues posed by developments in genetic technologies. The course will provide an overview of the history and technical foundations of the field and examine the legal dimensions of biotechnology. Generally, the course will examine how the law reacts to legal problems that arise from new technologies and examine whether the law is capable of anticipating such problems and acting prospectively.

### **Biotechnology Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 978 Native American Law (3)** This course has several segments covering such matters as federal and state power over Native American affairs; personal rights and liberties under tribal law; and the history of treaties with and legislation concerning Native Americans.

### **Native American Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 979 Animal Law (3)** In this course we will address how legal systems and administrative agencies make decisions that affect nonhuman animals. The course will focus on the origins, background, and evolution of animal law and address specific substantive areas involving animals such as the concept of animals as property; contract and tort issues related to animals, animal protection laws; constitutional law issues; animal exploitation and the government regulation of animals.

### **Animal Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 982 Economic Analysis of Law (3)** This course will introduce students to the economic analysis of law and legal issues. No prior training in economics is assumed, though students with such training are welcome to enroll. Students will be instructed in the nature of economic reasoning and will learn to use fundamental principles of economics to explain legal doctrines and solve legal problems. The course will focus primarily on a positive analysis, investigating whether legal doctrines can best be explained as attempts to promote efficiency, and only secondarily on the normative question of

whether law ought to promote efficiency. After a brief survey of microeconomics, the course will address the major common law areas of property, contracts, torts, and criminal law as well as the legal process.

### **Economic Analysis of Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 994 The Right To (1)** This minicourse will consider the notion of right in the context of personal choice. It will examine costs to individuation, both necessary and excessive, that are exacted in the process of establishing and perpetuating the uniformity and stability of legal and political regimes. Topics that will be considered include relative definitions of normalcy and privacy, physical characteristics and their exploitation, religious activities, prostitution, obscenity/pornography and personal expression, racial identity and discrimination, gambling, controlled substances, the use of force, and terrorism.

### **The Right To (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 995 Special Topics (1-9)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 996 Independent Study (1-4)** In this course the student, under the supervision of a full-time member of the faculty, will be permitted to do research and write a paper of a substantial nature on a significant subject.

### **Independent Study (1-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 997 Special Topics (1-9)** Special topics.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 997A National Security Law (3)** This course examines the domestic and international legal framework governing the use of national security powers by the U.S. government. After examining the shared powers of the President, Congress, and the courts, the course will carefully examine the role of international law in U.S. national security decision-making; the use of force abroad; the law of armed conflict; intelligence collection both abroad and within the United States; and the challenges of detaining, interrogating, and prosecuting terrorist suspects. Throughout the course, consideration will be given to the appropriate balance between liberty and security, the proper allocation of power between the three branches of government, and the potential tension between national security objectives and international obligations.



**National Security Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 997A National Security Law (3)** This course examines the domestic and international legal framework governing the use of national security powers by the U.S. government. After examining the shared powers of the President, Congress, and the courts, the course will carefully examine the role of international law in U.S. national security decision-making; the use of force abroad; the law of armed conflict; intelligence collection both abroad and within the United States; and the challenges of detaining, interrogating, and prosecuting terrorist suspects. Throughout the course, consideration will be given to the appropriate balance between liberty and security, the proper allocation of power between the three branches of government, and the potential tension between national security objectives and international obligations.

**National Security Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 997B Energy Law and Policy - National and International (3)** This course is the introductory course in the regulation of energy in the United States. It also considers some of the international impact of U.S. energy policy. The course examines each significant form of energy (oil, natural gas, nuclear power, electricity, coal and renewables) in terms of the manner in which each form is regulated by various government institutions. To understand the various forms of regulation, we will also consider a substantial amount of economic, political and social/psychological information. Each segment of the course will be presented in terms of specific problems that participating students will help analyze and solve. At each stage of the course, we will consider the current policies and attempt to develop regulatory goals and positions that will improve those policies.

**Energy Law and Policy - National and International (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PERSP 999 Sports Law (3)** This course explores how various areas of the law impact the sports industry. The "law" that is used by most sports lawyers is principally the application of settled principles of other legal fields to the sports industry: contract law, labor law, tax law, products liability law, intellectual property law, etc. The Sports Law course, then focuses on important areas that provide the foundational principles that drive the outcome of most legal disputes arising in the sports industry. The course also examines on certain areas of the law such as antitrust, labor, and constitutional law, that have specific and unique applications to sports.

**Sports Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Petrol & Min Engineer (P M E)**

**P M E 590 Colloquium (1)** Courses teaches students how to engineer their technical presentations.

**Colloquium (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Petroleum and Natural Gas Engineering (P N G)

**P N G 405** Rock and Fluid Properties (3) Reservoir rock properties, rock and fluid properties (interaction between rock and fluids), flow behavior in reservoir, and fluid properties.

### **P N G 405 Rock and Fluid Properties (3)**

The objective of this course is to introduce students to basic reservoir rock and fluid properties. The course is divided into three sections: rock properties, rock and fluid properties (interaction between rock and fluids), and fluid properties. In the rock properties, Lithology of Reservoirs, Porosity and Permeability of Rocks, Darcy's Law, and Distribution of Rock Properties are discussed. In Rock and Fluid Properties Section, Existence of Multi-phases, Saturation, Wettability, Capillary Pressure, Effective and Relative Permeability, concepts are covered. Fluid properties topics include Phase Behavior of Single and Multi Component Systems, Compositional and Black-Oil models, Solution Gas-Oil Ratios, Formation Volume Factor, Compressibility, Density, Viscosity, and Interfacial Tension. This is also the first course that Petroleum and Natural Gas Engineering students take in the major. Therefore, an introduction to petroleum and natural gas engineering is also made.

This course is a pre-requisite for most of the Petroleum and Natural Gas Engineering major courses. It is an elective course for majors such as Environmental Systems Engineering. It is offered every Fall semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 406** Rock and Fluid Laboratory (1) Systematic study of oil reservoir rocks and fluids; their interrelation applied to petroleum engineering.

### **Rock and Fluid Laboratory (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:  
Concurrent: P N G 405

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 410** Applied Reservoir Engineering (3) Analysis and prediction of reservoir performance by use of material balance and steady and nonsteady state flow equations.

### **Applied Reservoir Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 411** Introduction to Petroleum and Natural Gas Extraction (1) Introduction to the design and implementation of the systems used in the extraction of oil and gas. Not intended for petroleum and natural gas engineering majors.

### **Introduction to Petroleum and Natural Gas Extraction (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 420** Applied Reservoir Analysis and Secondary Recovery (4) Application of material balance equations/transient flow solutions to water influx problems; displacement theory as it applies to design/behavior of flooding.

**P N G 420 Applied Reservoir Analysis and Secondary Recovery (4)**

This course addresses two major issues in petroleum engineering: water influx and water flooding. The displacement of oil or gas by water is a complicated physical process that has a great impact on recovery efficiencies. The first objective of the course is to merge the material balance method and transient flow solutions for the aquifer into one analysis tool for understanding and predicting water influx cases. Several analytical and numerical methods are presented including: linear and radial diffusion equation solutions, super position, Hurst simplified, Schilthuis and Hurst modified. The material is followed by an analysis and design project that focuses on a field in the Gulf of Mexico.

The second objective of the course is to understand the fundamentals of displacement theory and practice. The extension of the Buckley and Leverett water flooding theory is presented for three-phase flow. Three-phase relative permeabilities are determined from experimental data. Several geometrical patterns are discussed in the course including: five spots, staggered line drive, direct line drive, four spots, seven spots, and nine spots. The efficiency of each pattern is determined. Strategies for selecting a pattern for special cases are presented. The behavior of each pattern with time, including oil recover, is an integral part of the course.

The students use our computational facility throughout the course. They write material balance models and use large reservoir simulators for studying water influx cases.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 425** Principles of Well Testing and Evaluation (3) Mathematical basis for pressure analysis. Theory and practice of pressure testing techniques.

**Principles of Well Testing and Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 430** Reservoir Modeling (3) The numerical simulation of petroleum reservoir processes by the use of models; scaling criteria and network flow.

**Reservoir Modeling (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 440W** Formation Evaluation (3) Study of those methods used to evaluate the engineering properties of oil and gas bearing reservoir formations.

**Formation Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 450** Drilling Design and Production Engineering (3) Design and analysis of oil-field drilling operations and equipment.

**Drilling Design and Production Engineering (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 451 Drilling Laboratory (1)** Practice in well-control procedures. Measurement of drilling fluid properties.

### **P N G 451 Drilling Laboratory (1)**

This course is serves as the laboratory component for PNG 450 Students will apply the concepts and skills gained from lectures and discussions in PNG 450. The aim is for student to become familiar with drilling fluids and with how to quantify the fluid properties analytically. Students will also receive practical experience with drilling equipment, and will practice solving practical well-control problems in the laboratory. Students in this course will gain experience using our state-of-the-art rig floor simulator and drilling fluid and cement laboratory, which are equipped with the advanced facilities currently used in the oil and gas industry.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: P N G 450

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 451 Drilling Laboratory (1)** Practice in well-control procedures. Measurement of drilling fluid properties.

### **P N G 451 Drilling Laboratory (1)**

This course is serves as the laboratory component for PNG 450 Students will apply the concepts and skills gained from lectures and discussions in PNG 450. The aim is for student to become familiar with drilling fluids and with how to quantify the fluid properties analytically. Students will also receive practical experience with drilling equipment, and will practice solving practical well-control problems in the laboratory. Students in this course will gain experience using our state-of-the-art rig floor simulator and drilling fluid and cement laboratory, which are equipped with the advanced facilities currently used in the oil and gas industry.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: P N G 450

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 475 Petroleum Engineering Design (3)** Design and selection of mechanical components used in the production of fluids from subsurface reservoirs.

### **Petroleum Engineering Design (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 480 Production Process Engineering (3)** Analysis and evaluation of surface production processes, fluid separation, storage, measurement, treating, custody transfer, transmission, disposal, corrosion, and other operations.

### **P N G 480 Production Process Engineering (3)**

Surface production engineering involves the extraction of reservoir fluids, their treatment at the surface and movement to a commercial market via a common carrier. It is the primary objective of this course to provide the fundamentals of surface production operations and underlying operational principles and design criteria for equipment utilized in the surface handling of petroleum production fluids. Surface production facilities are described in detailed as systems in charge of the separation of the wellstream fluids into three single-phase components (oil, gas, water) and of their transport and processing into marketable products or their disposal in an environmentally acceptable manner. A detailed

overview of hydrocarbon fluid behavior, analysis of hydrocarbon and water separation processes, analysis and design of surface transportation systems and flow assurance problems is provided along with a comprehensive look at the engineering aspects involved in surface production operations. Topics include purpose and description of onshore and offshore surface production facilities and the function of the equipment used in these processes, including wellheads and Christmas trees, gathering systems, production manifolds, field processing of crude oil, field processing of natural gas, phase separation of gas, oil and water, water-in-crude oil emulsification, heater-treaters and dehydration of crude oil, natural gas dehydration, stock tank batteries and transportation. Discussion includes oil and gas quality checks, oil and gas metering, typical contractual hydrocarbon sales specifications, and typical specifications for produced waters and other by-products. Hydrocarbon fluid behavior topics includes an overview of hydrocarbon thermodynamics, hydrocarbon PVT behavior, thermodynamics of liquid and vapor separation, and fluid behavior prediction models including modern cubic equations of state. In the context of surface facility design, a process simulation or compositional simulation is implemented to predict how the components the make up the well fluids react to changes in pressure and temperature as they are processed through the facility through a succession of phase changes where liquids flash to vapor or vapors condense into liquid. Equipment design topics comprise design of 2-phase and 3-phase vertical and horizontal separators, derivation of design equations, design of crude and condensate stabilization trains, design and operation of glycol dehydrator towers, and flow assurance topics such as hydrate, corrosion, and wax prevention. The ultimate purpose of surface equipment design is to recommend the most suitable and cost-effective equipment type and size that meets the specified service and system condition, contractual obligations, and industrial health and safety and environmental regulations.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 480** Production Process Engineering (3) Analysis and evaluation of surface production processes, fluid separation, storage, measurement, treating, custody transfer, transmission, disposal, corrosion, and other operations.

### **P N G 480 Production Process Engineering (3)**

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General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 482** Production Engineering Laboratory (1) Measurement and analyses of the physical and chemical properties of hydrocarbon fluid systems in a production environment.

### **P N G 482 Production Engineering Laboratory (1)**

The task of production engineers is to optimize the extraction, treatment and delivery rate of hydrocarbons. For this optimization to be realistic, quantitative values of some relevant parameters and properties that characterize the system should be known preferably by way of measurements. It is the primary objective of this laboratory course to give the student an understanding of the available measurement techniques; an opportunity to gain hands-on experience in carrying out the experiments as well as operating the apparatus and some practice in the art of technical report writing. The Production Engineering Laboratory has been designed to expose the student to the principles and procedures of production engineering for oil and gas analysis (physicochemical characterization and quality control) and the transport of fluids in pipes and conduits. The main objective is to familiarize students with the basic measurements that must be taken in production monitoring and control, as well as basic production engineering principles. It is also aimed to enhance the error analysis, critical evaluation and technical report writing skills of the student. Major pieces of equipment in this laboratory include: viscosimeters, oxygen bomb calorimeters, gas chromatograph, densitometers, centrifuges, dead weight testers, dew point testers, and a meter run setup. Laboratory experiences include, but are not limited to, the determination of density of clear organic substances and petroleum distillates that can be handled as liquids at test temperatures between 10 and 40 °C using digital density meters, the determination of the API gravity (or specific gravity) of crude oil, petroleum products normally handled as liquids (e.g. stabilized crude oil, stabilized gasoline, naphthane, kerosene, gas oils, lubricating oils, and non-waxy fuel oils) and alcohols using hydrometer and pycnometer methods, the calibration of Bourdon type pressure gauges by means of a dead weight testers and constructing of calibration charts for gauges that are not adjustable, the determination of water and sediment in crude oils by means of the centrifuge procedure, the determination of the heat of combustion of organic substances ranging in volatility including oil samples with volatiles ranging from that of distillates to that of residuals, the measurement of viscosity of crude oil and liquid petroleum products by means of measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscosimeter, the determination of water vapor content of gases by measurement of the dew point temperature and the calculation there from of the water vapor content, and the determination of a gas flow rates in pipelines by means of orifice plates and axial full-flow turbine meters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: P N G 480

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 482** Production Engineering Laboratory (1) Measurement and analyses of the physical and chemical properties of hydrocarbon fluid systems in a production environment.

### **P N G 482 Production Engineering Laboratory (1)**

The task of production engineers is to optimize the extraction, treatment and delivery rate of hydrocarbons. For this optimization to be realistic, quantitative values of some relevant parameters and properties that characterize the system should be known preferably by way of measurements. It is the primary objective of this laboratory course to give the student an understanding of the available measurement techniques; an opportunity to gain hands-on experience in carrying out the experiments as well as operating the apparatus and some practice in the art of technical report writing. The Production Engineering Laboratory has been designed to expose the student to the principles and procedures of production engineering for oil and gas analysis (physicochemical characterization and quality control) and the transport of fluids in pipes and conduits. The main objective is to familiarize students with the basic measurements that must be taken in production monitoring and control, as well as basic production engineering principles. It is also aimed to enhance the error analysis, critical evaluation and technical report writing skills of the student. Major pieces of equipment in this laboratory include: viscosimeters, oxygen bomb calorimeters, gas chromatograph, densitometers, centrifuges, dead weight testers, dew point testers, and a meter run setup. Laboratory experiences include, but are not limited to, the determination of density of clear organic substances and petroleum distillates that can be handled as liquids at test temperatures between 10 and 40 °C using digital density meters, the determination of the API gravity (or specific gravity) of crude oil, petroleum products normally handled as liquids (e.g. stabilized crude oil, stabilized gasoline, naphthane, kerosene, gas oils, lubricating oils, and non-waxy fuel oils) and alcohols using hydrometer and pycnometer methods, the calibration of Bourdon type pressure gauges by means of a dead weight testers and constructing of calibration charts for gauges that are not adjustable, the determination of water and sediment in crude oils by means of the centrifuge procedure, the determination of the heat of combustion of organic substances ranging in volatility including oil samples with volatiles ranging from that of distillates to that of residuals, the measurement of viscosity of crude oil and liquid petroleum products by means of measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscosimeter, the determination of water vapor content of gases by measurement of the dew point temperature and the calculation there from of the water vapor content, and the determination of a gas flow rates in pipelines by means of orifice plates and axial full-flow turbine meters.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:  
Concurrent: P N G 480

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 489 Engineering Evaluation of Oil and Gas Properties (3)** Application of present worth and rate-of-return analysis; reserve calculations; decline curve analysis; uncertainty and risk analysis to engineering project design and evaluation.

**P N G 489 Engineering Evaluation of Oil and Gas Properties (3)**

The objective of this course is to introduce to students the application of present worth and rate-of-return analysis to problems peculiar to oil and gas evaluation. The course is divided into four sections: introduction to present worth and rate-of-return analysis; the calculation of oil and gas reserves; the analysis of decline curves; and the application of uncertainty and risk analysis to engineering project design and evaluation. This course is the first course of a four-course sequence (P N G 489, 490, 491, 492) that culminates in a capstone engineering design project and is intended to be taken during the first semester of the junior year. As such the application of these principles elucidated above to engineering design will be emphasized.

This course is a pre-requisite for most of the Petroleum and Natural Gas Engineering Major Courses. It is an elective course for majors such as Environmental Systems Engineering. It will be offered every Fall semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 490 Introduction to Petroleum Engineering Design (1)** Introduction to the concepts of engineering design as applied to petroleum and natural gas projects.

**P N G 490 Introduction to Petroleum Engineering Design (1)**

The objective of this course is to introduce to the students the principles of engineering design as applied to petroleum and natural gas projects. The course focuses on the analysis of physical data with respect to error and use of this data in design. Other topics to be visited include a definition of what is a project deliverable and establishment of timelines for their implementation. The salient points of the course are as follows: (1)This course is the first capstone engineering design course in the sequence of three courses. In this portion of the course students' principal goal is to characterize the reservoir. In this process necessary basic sciences and engineering skills are utilized. (2)In reservoir characterization, students typically collect and analyze the data available in the literature and other related data provided by the operators. (3)In making a preliminary assessment towards field development students consider factors involving economic, environmental, social, ethical, health and safety considerations. (4)In this course, students work in teams. In each team, team members assume responsibilities as petrophysicist, drilling engineer, geologist, geophysicist production engineer, reservoir engineer and implement the necessary technical skill to fulfill their obligations. (5)This project starts from the ground level and ends with a complete field development plan. Within the context of the project (reservoir characterization) students have the opportunity to use the necessary skills to identify and formulate and solve the engineering problems and challenges that are faced. (6)In selecting the lease area the potential impact of project on the social and physical environments is considered and all the ethical responsibilities are studied in depth. (7)During every phase of the project the impact of decisions are considered within the framework of global, economic, environmental and societal context. (8)In this course the main contemporary issue the need for unconventional energy resources is the driving force behind the project. (9) In every phase of the project students are exposed to contemporary methodologies and engineering tools including forecasting, scenario planning and reservoir simulation. Also, whenever applicable the necessary engineering software is also incorporated in the development of the project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 490 Introduction to Petroleum Engineering Design (1)** Introduction to the concepts of engineering design as applied to petroleum and natural gas projects.

**P N G 490 Introduction to Petroleum Engineering Design (1)**

The objective of this course is to introduce to the students the principles of engineering design as applied to petroleum and natural gas projects. The course focuses on the analysis of physical data with respect to error and use of this data in design. Other topics to be visited include a definition of what is a project deliverable and establishment of timelines for their implementation. The salient points of the course are as follows: (1)This course is the first capstone engineering design course in the sequence of three courses. In this portion of the course students' principal goal is to characterize the reservoir. In this process necessary basic sciences and engineering skills are utilized. (2)In reservoir characterization, students typically collect and analyze the data available in the literature and other related data provided by the operators.

(3) In making a preliminary assessment towards field development students consider factors involving economic, environmental, social, ethical, health and safety considerations. (4) In this course, students work in teams. In each team, team members assume responsibilities as petrophysicist, drilling engineer, geologist, geophysicist production engineer, reservoir engineer and implement the necessary technical skill to fulfill their obligations. (5) This project starts from the ground level and ends with a complete field development plan. Within the context of the project (reservoir characterization) students have the opportunity to use the necessary skills to identify and formulate and solve the engineering problems and challenges that are faced. (6) In selecting the lease area the potential impact of project on the social and physical environments is considered and all the ethical responsibilities are studied in depth. (7) During every phase of the project the impact of decisions are considered within the framework of global, economic, environmental and societal context. (8) In this course the main contemporary issue the need for unconventional energy resources is the driving force behind the project. (9) In every phase of the project students are exposed to contemporary methodologies and engineering tools including forecasting, scenario planning and reservoir simulation. Also, whenever applicable the necessary engineering software is also incorporated in the development of the project.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 491 Reservoir Engineering Design (1)** Application of the concepts of reservoir and drilling engineering to petroleum engineering design projects.

#### **P N G 491 Reservoir Engineering Design (1)**

Engineering design by definition is the integration of knowledge and skills acquired through experience, reading and formal instruction into a final product, the design. To that end, this course is the second course of a 3-course, 3-semester, sequence that will result in a comprehensive capstone-engineering project. As such, P N G 491 will utilize the knowledge gained from P N G 405, 410, 450 and 489 to the project design initiated in P N G 490. Course materials will include introduction to the simulator, development of the computer model, and the use of history match in design.

The class will be divided into teams and students will be evaluated on the basis of their contribution to the team effort. All reports and presentations will be presented to the class as a product of the team.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 492 Petroleum Engineering Capstone Design (1)** Integration of petroleum and natural gas engineering concepts to project design.

#### **P N G 492 Petroleum Engineering Capstone Design (1)**

Engineering design by definition is the integration of knowledge and skills acquired through experience, reading and formal instruction into a final product, the design. To that end, this course is the third course of a 3-course, 3-semester, sequence that will result in a comprehensive capstone-engineering project. As such, P N G 492 will utilize the knowledge gained from three semesters of formal instruction to the project design initiated in P N G 490 and continued on in P N G 491. Course material will include the application of spreadsheet programming to petroleum and natural gas project design and its use in project economic analysis and risk analysis.

The class will be divided into teams and students will be evaluated on the basis of their contribution to the team effort. All reports and presentations will be presented to the class as a product of the team.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 494 Thesis (1-6)** A problem in petroleum engineering involving review of the literature and experimental data obtained in the field or laboratory.

#### **Thesis (1-6)**

General Education: None  
 Diversity: None



Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 494H** Thesis (1-6) A problem in petroleum engineering involving review of the literature and experimental data obtained in the field or laboratory.

#### **Thesis (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 501** Steady State Flow in Porous Media (3) The formulation and analytical solution of the problems of steady state fluid flow in porous media.

#### **Steady State Flow in Porous Media (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 502** Unsteady Flow in Porous Media (3) The formulation and analytical solution of the transient fluid flow in porous media.

#### **Unsteady Flow in Porous Media (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 511** Numerical Solution of the Partial Differential Equations of Flow in Porous Media (3) Differencing schemes for the partial differential equations of single-phase flow; application to flow of gas and mixing in porous media.

**Numerical Solution of the Partial Differential Equations of Flow in Porous Media (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 512** Numerical Reservoir Simulation (3) Mathematical analysis of complex reservoir behavior and combination drives; numerical methods for the solution of behavior equations; recent developments.

**Numerical Reservoir Simulation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 518** Design of Miscible Recovery Projects (3) Theory and design of miscible methods of oil recovery, current field applications, including hydrocarbon, CO<sub>2</sub>, micellar/polymer, alkaline, and inert gas.

**Design of Miscible Recovery Projects (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 520** Phase Relations in Reservoir Engineering (3) Phase relations as applied to condensate and retrograde condensate reservoirs and to other problems in petroleum production.

**Phase Relations in Reservoir Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 530** Natural Gas Engineering (1-3) Flow in producing or storage reservoirs; gas well testing; transmission systems; storage cycle; current developments.

**Natural Gas Engineering (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 590** (EME 590, F SC 590, MNG 590) Colloquium (1-3) Continuing seminars which consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

**P N G (EME/F SC/MNG) 590 Colloquium (1-3)**

The objective of the course is to expose students through a seminar format to a wide range of topics on energy and mineral engineering. The lectures would be presented by faculty, students and guest speakers. Students would be required to write a short summary of each presentation and provide a critique of the presentation. Seminar topics will cover aspects of energy production, processing, utilization, and conservation, and the associated environmental, health and safety, and policy, economics, and management issues. Students are expected to keep up with current developments on each topic and to actively participate in the discussions. Students will be evaluated based on their class participation, and written summary and critique of each presentation. This is a required course in the energy and mineral engineering graduate program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 595** Internship (1-15) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 597** Special Topics (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P N G 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Pharmacology-Hy (PHARM)**

**PHARM 504** Molecular Pharmacology II (4) Continuation of PHARM 503.

**Molecular Pharmacology II (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 520** Principles of Drug Action (2) Detailed analysis of basic parameters governing drug actions.

**Principles of Drug Action (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 550** Neuropharmacology (3) An in-depth discussion on the mechanism and pharmacokinetics of various neuroactive drugs.

**Neuropharmacology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 551** Anti-infective Therapeutics (1) This course covers general principles related to pharmacology of major classes of antimicrobial agents.

**PHARM 551 Anti-infective Therapeutics (1)**

This course focuses on the pharmacology of anti-microbial drugs. The overall goal of the course is to examine the mechanisms of action of these drugs as well as factors determining susceptibility, resistance, selection, host factors, pharmacokinetics, and adverse reactions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 552** Integrated System Pharmacology (1) This course covers principles related to pharmacology of major classes of drugs affecting the autonomic nervous, cardiovascular, pulmonary, and renal systems.

**PHARM 552 Integrated System Pharmacology (1)**

This course focuses on the pharmacology related to autonomic nervous, cardiovascular, pulmonary, and renal systems. The overall goal of the course is to present the mechanisms underlying the effects of drugs acting on these systems at various levels of biological organization (e.g., cell, tissue, and the whole body).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 553** Gastrointestinal and Immunomodulatory Therapeutics (1) This course focuses on pharmacology of drugs affecting gastrointestinal disorders, drugs used in therapy of inflammatory diseases, and immunomodulatory drugs for organ transplantation therapy.

**PHARM 553 Gastrointestinal and Immunomodulatory Therapeutics (1)**

This course covers the use of pharmacotherapies to treat gastrointestinal disorders, inflammation, and immune response. The emphasis is to examine the mechanisms underlying the effects of these drugs at various levels of biological organization (e.g., cell, tissue, and the whole body).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 554** Anticancer Therapeutics (1) This course provides an understanding of general principles of the induction, prevention and treatment of cancer.

**PHARM 554 Anticancer Therapeutics (1)**

This course introduces students to the concept of the multi-step process involved in carcinogenesis. Discussion of both synthetic drugs and naturally occurring compounds used in cancer prevention and cancer treatment is included. Potential future targets for cancer therapy are presented.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 561 Neuropharmacology (2)** This course introduces basic principles of human neuropharmacology, with primary emphasis on drugs active in the central nervous system.

**PHARM 561 Neuropharmacology (2)**

This course covers the use of pharmacotherapies to treat a variety of neuropsychiatric disorders and other disorders of central nervous system function. Discussion includes: 1) normal neurophysiology; 2) the neuropathology of common disorders; 3) mechanisms of action of drugs affecting the central nervous system and of drugs used to treat disorders of this system; 4) the experimental bases for our knowledge of the actions of these drugs; 5) animal models useful for drug discovery; and 6) the mechanisms underlying drugs of abuse.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 562 Endocrine Pharmacology (2)** This course presents basic principles of human endocrine pharmacology, emphasizing drugs active in the endocrine and reproductive systems.

**PHARM 562 Endocrine Pharmacology (2)**

This course covers pharmacotherapies used to treat disorders of the endocrine and neuroendocrine systems and to modulate reproduction. Discussion includes: 1) the physiological basis for normal endocrine homeostasis; 2) the pathology of common disorders; 3) the mechanisms of action of drugs affecting these systems and of drugs used to treat disorders of these systems; 4) the experimental bases of these drugs and therapies; and 5) animal models useful for endocrine drug discovery.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 581 (PSIO 581) Maintaining Homeostasis A: Heart and Vasculature (1)** Physiology of the cardiovascular system.

**PHARM (PSIO) 581 Maintaining Homeostasis A: Heart and Vasculature (1)**

This course will cover general principles related to cellular and systemic physiology and pharmacology related to the autonomic nervous system and the cardiovascular system. Materials will be presented through reading and study of textbook materials and the primary scientific literature, reinforced and assisted by lectures and discussions. Concepts of this course are generally organized by organ system designed to address important homeostatic control mechanisms, both neural and humoral, related to the cardiovascular system. Topics to be covered include the physiology of the autonomic nervous system; pharmacology (mechanisms and sites of action; receptors and associated cellular transduction cascades; toxicity; contraindications) of drugs that affect the autonomic nervous system including cholinergic-activating and cholinesterase-inhibiting drugs, cholinergic-blocking drugs, adrenoceptor agonists and antagonists; synaptic transmission; mechanical properties of skeletal, cardiac and smooth muscle; and the regulation of cardiac function and microcirculation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 583 (PSIO 583) Maintaining Homeostasis C: Kidney (1)** Renal physiology and pharmacology.

**PHARM (PSIO) 583 Maintaining Homeostasis C: Kidney (1)**

This course will cover general principles related to cellular and systemic physiology and pharmacology (mechanisms and sites of action; receptors and associated cellular transduction cascades; toxicity; contraindications) of drugs that affect the pulmonary and renal systems. Materials will be presented through reading and study of textbook materials and the primary scientific literature, reinforced and assisted by lectures and discussions. Concepts of this course are generally organized by organ system designed to address important homeostatic control mechanisms related to the lung and kidney. Topics to be covered include the physiology and pharmacology of the pulmonary and renal system; mechanics of breathing, alveolar ventilation, blood flow to the lung, ventilation-perfusion relationships, diffusion and transport of gases, control of breathing, glomerular filtration and renal blood flow, renal transport mechanisms involved in reabsorption and secretion, regulation of effective circulating volume and salt balance, regulation of potassium balance, regulation of acid-base balance during health and disease, principles of pharmacology related to pulmonary and renal systems; principles of gastrointestinal physiology related to drug disposal and action. The course objectives are to assist students in understanding and mastering the basic concepts related to the functions of the lung and kidney, to assure that students obtain a thorough comprehension of basic pharmacological principles, and then to have students apply this knowledge to problems and case studies relevant to pathophysiology and drug action.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 584 (ANAT 584) Human Anatomy and Development A: Gross Human Anatomy (1)** Explore gross human anatomy providing orientation to organs and the overall relationship of organs and structures within the human body.

**PHARM (ANAT) 584 Human Anatomy and Development A: Gross Human Anatomy (1)**

This course will provide a concise but thorough description of the gross human anatomy. With the use of pre-dissected prosection or model representations of the human body, anatomic position, orientation (e.g., retroperitoneal, superficial, deep, ipsilateral), and identification of structures within major body cavities (thorax, abdomen) of the human body will be conducted. Evaluation of the musculoskeletal system will include structure of bones, classification of bones in the axial and appendicular skeleton, discussion of joints, skeletal muscles, and accessory structures related to muscle action including fascia. Evaluation of digestion system will include components involved with alimentary canal as well as accessory organs. Evaluation of the cardiovascular system will focus on the communication network, heart anatomy and blood flow through its chambers, pulmonary and systemic circulation, as well as relationship of arteries, veins, capillaries to the heart. Evaluation of the nervous system will identify and discuss major structures of the central nervous system including the brain and spinal cord, peripheral nervous system, and enteric nervous system. For each system, the focus will be knowledge necessary for understanding, utilizing, and appreciating the role of the human body in biomedical and translational research.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 585 (ANAT 585) Human Anatomy and Development B: Human Development (1)** Explores human embryology and organogenesis beginning at the third week of gestation through parturition.

**PHARM (ANAT) 585 Human Anatomy and Development B: Human Development (1)**

This course will provide a concise but thorough description of embryology of the major systems in the human. It will provide an awareness of how genetics, environment, and maternal-fetal relationships impact on normal human development, and the importance of understanding embryology for biomedical and translational research. An emphasis will be placed on the role of molecular biology in normal embryology and human development. Primary literature will be consulted for a description of major signaling pathways and key signaling molecules associated with each system. Some discussion of abnormal development will be included.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 586 (ANAT 586) Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine (1)** Exploration of stem cell biology and the role of stem cells in regenerative medicine.

**PHARM (ANAT) 586 Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine (1)**

This course will provide an evaluation of stem cell biology and regenerative medicine. In particular, discussions will focus on the five sources of embryonic stem cells (adult stem cells, amniotic fluid-derived stem cells, embryonic stem cells derived using *in vitro* fertilization technologies, somatic cell nuclear transfer cloning-derived stem cells, and stem cells derived by parthenogenetically-activating oocytes). In addition to providing detailed information on the biology underlying stem cells, group discussions will focus on ethical advantages and disadvantages for each of the five distinct types of stem cells. Work will then turn to current understanding of changes in transcriptome and proteome control of differentiation. As well, discussions will focus on attempts to use stem cells in regenerative medicine. This course will be designed as a mixture of didactic lectures with a particular focus on the current literature. This latter aspect of the course is essential in that much of our current understanding of stem cells has not yet made it into any common text books.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHARM 611** Ph.D. Dissertation Part-Time (0) No description.

#### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Philosophy (PHIL)**

**PHIL 401** (AM ST 421) American Philosophy (3) Survey of key figures and movements in American thought including the Transcendentalists, the Pragmatists, and contemporary developments.

#### **American Philosophy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 402** European Philosophy (3 per semester, maximum of 6) Survey of key figures and movements of Europe, including phenomenology, existentialism, structuralism and post-structuralism, and critical theory.

#### **European Philosophy (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 403** Environmental Ethics (3) Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

#### **Environmental Ethics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 405** Philosophy of Law (3) Examines philosophical views of the nature of law, legal ethics, law and society through questions regarding definition, interpretation, and institutions.

**Philosophy of Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 406** Business Ethics (3) Examines the moral justification of business practices and economic systems through critical analyses of case studies and applied ethical theories.

**Business Ethics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 407** (S T S 407) Technology and Human Values (3) Interrelationships of twentieth-century technological change and human values. Emphasis on the social and ethical aspects of technological progress.

**Technology and Human Values (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 408W** Social and Political Philosophy (3) Historical and philosophical foundations of political organization, authority, and justice, and contemporary issues of rights, community, and culture.

**Social and Political Philosophy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 409** Aesthetics (3) Studies concepts of beauty, truth, value, representation, production and reproduction, and reality through philosophical theory and works of art.

**Aesthetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 410** Philosophy of Science (3) Historical and contemporary foundational and methodological issues such as causality, relativity and epistemological relativism, teleology, and the nature of reality.

**Philosophy of Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 413** Philosophy of Literature (3) Discusses truth, belief, illusion, imagination and creativity through philosophical literature, as well as problems of philosophical writing.

**Philosophy of Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 416** Philosophy of Social Science (3) Examines the philosophical nature and foundations of methodology, structures and objects, value-neutrality and objectivity in the social sciences.

**Philosophy of Social Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 418** Ethics (3) Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

**Ethics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 418W** Ethics (3) Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

**Ethics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 424** Philosophy of Religion (3) Examines the relation between faith and reason, the nature of religious experience, the problem of evil, the existence of God.

**Philosophy of Religion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 425W** Epistemology (3) The nature of cognition and perception, the conditions of experience, and the justification and truth of belief.

**Epistemology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities

Effective: Summer 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 426W** Metaphysics (3) Examines the nature of reality, the existence of freedom, and the nature of matter, mind, and values.

### **Metaphysics (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Summer 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 427** Philosophy of Mind (3) Investigates problems of mind from the standpoint of traditional metaphysical views, modern scientific psychology, neuroscience, and artificial intelligence.

### **Philosophy of Mind (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Spring 1999

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 432** (S T S 432) Medical and Health Care Ethics (3) Examines ethical, political, and social issues in the research, implementation, and practice of medicine, medical technologies, and healthcare.

### **Medical and Health Care Ethics (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Fall 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 433** (S T S 433) Ethics in Science and Engineering (3) Ethical issues arising in the practice of science and engineering and their philosophical analysis.

### **Ethics in Science and Engineering (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 435** (S T S 435) The Interrelation of Science, Philosophy, and Religion (3) The historical and transformative interactions between science and Western philosophical and religious views of nature, humanity, and God.

### **The Interrelation of Science, Philosophy, and Religion (3)**

General Education: None

Diversity: None

Bachelor of Arts: Humanities

Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 437** (IL) World Philosophies and Cultures (3) Philosophical traditions, problems, and authors in African, Asian, Middle- Eastern, Native American, or other non-Western cultures and intellectual traditions.

### **World Philosophies and Cultures (3)**

General Education: None

Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 438** (WMNST 438) Feminist Philosophy (3) Examines the central currents of feminist philosophy, selected problems and concepts regarding difference, gender and sex, identity, and political culture.

**Feminist Philosophy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 439** (IL) Asian Philosophies and Issues (3) Exploration of the traditions, problems, and authors of one or more of the philosophical systems of Buddhism, Hinduism, Taoism, and Confucianism.

**Asian Philosophies and Issues (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 441** Capstone Course in Philosophy (3) This course is intended as the Capstone Course for Philosophy majors and is to be taken during their senior year or during the last semester of their junior year.

**Capstone Course in Philosophy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 453** Topics in Ancient Philosophy (3 per semester, maximum of 6) Examines the philosophy of central figures in ancient philosophy from the pre-Socratics to the post-Aristotelians and Neoplatonists.

**Topics in Ancient Philosophy (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 455** Topics in Modern Philosophy (3 per semester, maximum of 6) Descartes to Kant, including mind and reality, space and time, God and nature, morality and autonomy.

**Topics in Modern Philosophy (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 456** Topics in Nineteenth Century Philosophy (3 per semester, maximum of 6) Hegel to Nietzsche, including nature and spirit, history and human nature, ideology and morality.

**Topics in Nineteenth Century Philosophy (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 457** Topics in Twentieth Century Philosophy (3 per semester, maximum of 6) Topics in the philosophy of figures such as Husserl, James, Russell, Wittgenstein, Heidegger, Merleau-Ponty, and Dewey.

**Topics in Twentieth Century Philosophy (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 458** Topics in Contemporary Philosophy (3 per semester, maximum of 6) Topics in the philosophy of contemporary figures such as Foucault, Habermas, Rorty, Derrida, Rawls, Davidson, and MacIntyre.

**Topics in Contemporary Philosophy (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 460 (US;IL) (AF AM 460)** African American Philosophy (3) Major works by African American Philosophers, on topics of race, freedom, citizenship, nationhood, law and society.

**PHIL (AAA S) 460 African American Philosophy (3)  
 (US;IL)**

African American philosophers and social activists have produced important texts that both take their place in the philosophical canon and revise the canon and indeed how we understand the practice of philosophy. This course surveys twentieth century African American philosophy, from Du Bois's *Souls of Black Folk* and *Dusk of Dawn*, to King's *Why We Can't Wait*, to Davis's *Women, Race and Class*, to Boxill's *Blacks and Social Justice*. The books refer back to both liberal democratic and socialist philosophical treatises, as well as theological and jurisprudential writings, in order to construct new conceptions of race, citizenship, freedom, the rule of law. Moreover, they are all grounded in the concrete, problematic situation of African Americans in twentieth century America, so that they raise with special urgency the question of how philosophical reflection can address social change. In classroom debate, students will rediscover and critically examine how the history of racial strife and reconciliation affects local, national and international civic life. One constant feature of this course is that white students and students of color become aware of differing perspectives that are hard to reconcile; this helps them to re-examine their own social identities and those of their classmates. When the course is team-taught (with one white faculty member and one faculty member of color) the same dynamic occurs between the instructor: watching them reconcile their views in discussion and pedagogy helps the students as well. It is hoped that this course will often or always be team-taught.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 461** Plato (3 per semester, maximum of 6) Examines the metaphysics, epistemology, politics, aesthetics, and moral theory of this central figure in the history of philosophy.

**Plato (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 473** German Idealism (3 per semester, maximum of 6) Critically examines the philosophy of central German idealists, including Kant, Fichte, Schelling, and Hegel, and its impact on later philosophy.

**German Idealism (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 474** Kant (3 per semester, maximum of 6) Critical examination of the metaphysics, epistemology, aesthetics, legal and moral philosophy, and influence of Immanuel Kant.

**Kant (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 476** Hegel (3 per semester, maximum of 6) Critical examination of the metaphysics, moral theory, epistemology, and philosophy of history of this central figure of 19th-century philosophy.

**Hegel (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 479** Critical Theory (3 per semester, maximum of 6) Examines the ontology, political and social thought of the Frankfurt School from Horkheimer and Adorno to Marcuse and Habermas.

**Critical Theory (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 485** Heidegger (3 per semester, maximum of 6) Studies Heidegger's metaphysical thought from his early to later works regarding being, history, subjectivity, aesthetics, language, and his influence.

**Heidegger (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 486** Wittgenstein (3 per semester, maximum of 6) Examines Wittgenstein's early and late work, including logical atomism, meaning, language games, forms of life, and the private-language argument.

**Wittgenstein (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities

Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 487** Analytic Philosophy (3 per semester, maximum of 6) Analytic philosophy's founding by Frege, Russell, Moore, Wittgenstein; and its contemporary development by Quine, Kripke, Dummett, and Davidson.

**Analytic Philosophy (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 490** Dewey (3 per semester, maximum of 6) Critically examines the metaphysics, epistemology, ethics, logic, aesthetics, education theory, and social and political philosophy of this major American pragmatist.

**Dewey (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 491** Merleau-Ponty (3 per semester, maximum of 6) Merleau-Ponty's phenomenological anti-dualism through his studies on the body and the flesh, aesthetics, political philosophy, and late ontology.

**Merleau-Ponty (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 493** Phenomenology and Hermeneutics (3 per semester, maximum of 6) Studies major figures and issues in phenomenology and hermeneutics, focussing on the work of Husserl, Gadamer, Heidegger, Merleau-Ponty, and Levinas.

**Phenomenology and Hermeneutics (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None



Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 496A** Advanced Topics in Contemporary Philosophy (1-6) Study controversial topics in contemporary philosophy.

**Advanced Topics in Contemporary Philosophy (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 498** Special topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 499** (IL) Foreign Study--Philosophy (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Study--Philosophy (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 501** American Philosophy Seminar (3 per semester/maximum of 6) Critically examines central figures in American philosophy including Emerson, Thoreau, Pierce, James, Royce, Dewey, Santayana, Mead, Quine, Davidson, and Rorty.

**American Philosophy Seminar (3 per semester/maximum of 6)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 502** European Philosophy Seminar (3 per semester/maximum of 6) Critically examines central European philosophers including Husserl, Heidegger, Sartre, Merleau-Ponty, Gadamer, Levinas, Foucault, and Derrida; course content varies with instructor.

**European Philosophy Seminar (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 503** Ethics Seminar (3 per semester/maximum of 6) Critical investigation of philosophical problems in ethics, and viability of historical and contemporary ethical positions; course content varies with instructor.

**Ethics Seminar (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 508** Social and Political Philosophy Seminar (3 per semester, maximum of 6) Critical examination of social and political philosophies, their historical context and relation to philosophic method; course content varies with instructor.

**Social and Political Philosophy Seminar (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 512** Seminar in Logic (3) This course covers topics in first-order symbolic logic with identity and advanced special topics in metatheory.

**Seminar in Logic (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 516** Aesthetic Seminar (3 per semester, maximum of 6) Critical examination of problems in philosophy of art including beauty, taste, value, politics, culture, interpretation; course content varies with instructor.

**Aesthetic Seminar (3 per semester, maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 525** Epistemology Seminar (3 per semester/maximum of 6) Studies problems, figures, and movements in epistemology from the ancient philosophers to contemporary thinkers; course content varies with instructor.

**Epistemology Seminar (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 538 (WMNST 538) Feminist Philosophy Seminar (3)** Critically examines feminist approaches to ethics, epistemology, philosophy of science, metaphysics, social/political philosophy, and the history of philosophy.

**PHIL (WMNST) 538 Feminist Philosophy Seminar (3)**

This course aims to give students an understanding of the philosophical concepts and problems of feminist philosophy. The course will focus on major topics, such as the history of philosophy, ethics, social/political philosophy, epistemology and philosophy of science, and metaphysics, and figures within 20th century feminist philosophy with the concurrent goal of bringing them to bear on contemporary issues involving gender's relationship to race, sexuality, class, disability, nationality and age. This course builds upon PHIL 438 Feminist Philosophy and counts towards the requirements of the dual title degree in Philosophy and Women's Studies. Evaluation methods include preparation for and participation in class meetings, two short discussion papers, and a final term paper. The course will be offered at least once every four semesters with an enrollment goal of 20. Specific course content will vary with instructor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 539 Critical Philosophy of Race (3 per semester/maximum of 6)** The study of philosophical issues raised by racism and by the concept of race and other related concepts.

**PHIL 539 Critical Philosophy of Race (3 per semester/maximum of 6)**

This course provides an intensive examination of a major area of philosophical research: the philosophical examination of racism and of our thinking about race. It will investigate philosophical debates about such topics as mixed-race identity, going beyond the Black-White binary, the distinction between racism and xenophobia, the distinction between race and ethnicity, the debate about the reality of race, as well as questions about the nature and genealogy of racism. The course will have a historical component that will show how thinking in terms of the concept of race first developed and was transformed across time as well as addressing contemporary issues that includes an examination both of the dominant theories and definitions or racial identity and of ethical and political questions raised by the persistence of the notion of race. The course will also examine debates about the complicity of certain canonical figures in the history of philosophy, such as Immanuel Kant and Georg Wilhelm Friedrich Hegel in the conceptualization of race and the spread of philosophical racism. In addition to these two philosophers the following authors will be among those studied: Johann Friedrich Blumenbach, Frederick Douglass, Antenor Firmin, W. E. B. Du Bois, Anna Julia Cooper, Alain Locke, Paulette Nardal, Jean-Paul Sartre, Frantz Fanon, Anthony Kwame Appiah, Gloria Anzaldua, Bernard Boxill, and Angela Davis. Race will be examined in its relation to other ways of thinking about human difference, including class, gender, nationality, religion, and sexuality. Attention will be given to diverse experiences in the US context, such as those of African Americans, Latina/os, Asian Americans, Native Americans, Irish Americans, and so on. In addition to examining the role race has played and continues to play in the United States of America, the ways in which race is approached in other parts of the world, for example in China, will also be the subject of investigation. The course content will vary, dependent upon the instructor

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 553 Ancient Philosophy Seminar (3 per semester/maximum of 6)** Analyzes specific concerns and texts of ancient philosophy including those of Plato and Aristotle; course content varies with instructor.

**Ancient Philosophy Seminar (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 554** Medieval Philosophy Seminar (3 per semester/maximum of 6) Critical examination of medieval texts and philosophers, including Augustine, Anselm, Aquinas, Duns Scotus, and Ockham; course content varies with instructor.

**Medieval Philosophy Seminar (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 555** Modern Philosophy Seminar (3 per semester/maximum of 6) Examines rationalism, empiricism, and other philosophical movements from Bacon and Descartes to Kant and Mill; course content varies with instructor.

**Modern Philosophy Seminar (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 556** 19th-Century Philosophy Seminar (3 per semester, maximum of 6) Examination of philosophy from Hegel to Nietzsche on history, dialectic, ideology, existence, science, and art; course content varies with instructor.

**19th-Century Philosophy Seminar (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 557** 20th Century Philosophy Seminar (3 per semester/maximum of 6) Central problems in works of twentieth-century philosophers including Russell, Dewey, Wittgenstein, Heidegger, Foucault, Levinas; course content varies with instructor.

**20th Century Philosophy Seminar (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 558** Contemporary Philosophy Seminar (3 per semester, maximum of 6) Critically investigates diverse recent figures and problems of continental, pragmatic, and analytic philosophy; course content varies with instructor.

**Contemporary Philosophy Seminar (3 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 561** Major Figures in Ancient Philosophy (3 per semester/maximum of 12) Close study of a major figure in ancient philosophy (6th BCE to 4th CE) through one central or several important texts.

**Major Figures in Ancient Philosophy (3 per semester/maximum of 12)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 562 Major Figures in Modern Philosophy (3 per semester/maximum of 12)** Close study of a major figure in modern philosophy through one central or several important texts.

**Major Figures in Modern Philosophy (3 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 563 Major Figures in Nineteenth-Century Philosophy (3 per semester/maximum of 12)** Close study of a major figure in nineteenth-century philosophy through one central text or several important texts.

**PHIL 563 Major Figures in Nineteenth-Century Philosophy (3 per semester/maximum of 12)**

This course provides an intensive examination of one major figure in nineteenth-century philosophy, such as Friedrich Wilhelm Schelling, Georg Friedrich Hegel, Arthur Schopenhauer, Auguste Comte, William James, Karl Marx, Charles Sanders Peirce, and Friedrich Nietzsche. Regardless of the figure selected, the course focuses on one major text written by that figure (such as in the case of Hegel the *Phenomenology of Spirit* or in the case of Schopenhauer *The World as Will and Representation*) or on two complementary texts by a major figure (for example, Schelling's *First Outline of a System of the Philosophy of Nature* and his *The Ideas for a Philosophy of Nature* or Nietzsche's *Beyond Good and Evil* and *The Genealogy of Morals*). Possible topics covered in relation to the figure selected would include as appropriate to the figure: knowledge; reason; language; subjectivity; logic; nature and spirit; dialectics; ideology; philosophy of history; religion; truth; ethics; aesthetics; and genealogy. The students will also be introduced to the major secondary works written about this author and the controversies they have generated. The course content will vary, dependent upon the instructor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 564 Major Figures in Twentieth-Century Philosophy (3 per semester/maximum of 12)** Close study of a major figure in twentieth-century philosophy by means of one central text or several important texts.

**PHIL 564 Major Figures in Twentieth-Century Philosophy (3 per semester/maximum of 12)**

The course aims to provide students with a "building block" in their knowledge of the history of philosophy. That is, the students will achieve an expert's understanding of the central ideas of one figure in twentieth-century philosophy. On this basis, students will be able to develop a comprehensive understanding of the figure's entire corpus and complete range of ideas. Moreover, students will be able to develop a comprehensive understanding of the historical period. There are many possible figures for this course: Edmund Husserl, Martin Heidegger, Emmanuel Levinas, Hans-Georg Gadamer, Jean-Paul Sartre, Maurice Merleau-Ponty, Simone de Beauvoir, Jacques Derrida, Gilles Deleuze, Michel Foucault, Julia Kristeva, Alain Badiou, John Dewey, Jurgen Habermas, Rudolf Carnap, Wilfred Sellars, W. V. O. Quine, Hilary Putnam, and Richard Rorty. In relation to Husserl, for example, students will master the problems (relativism and skepticism) to which phenomenology is responding; the phenomenological method (the *epoche*, the reductions, eidetic variation); and how the transcendental position of phenomenology at once responds to the question of knowledge and to the question of being. This knowledge will allow students to develop an understanding of the phenomenology's crucial role in the development of twentieth-century philosophy, influencing not only existentialism, structuralism, and post-structuralism, but also analytic philosophy. In relation to Merleau-Ponty, for example, students will learn how embodied perception attempts to respond to the traditional problem of mind-body dualism. This knowledge will allow students to develop an understanding not only of Merleau-Ponty's view of language but also his view of politics. From this developed understanding of Merleau-Ponty, students will be able to understand how Merleau-Ponty differs from Bergson, Merleau-Ponty's predecessor, from Sartre, Merleau-Ponty's contemporary, and from Foucault, Merleau-Ponty's inheritor. The course content will vary, dependent upon the instructor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PHIL 571 (BIOET 501) Perspectives and Methods in Bioethics (3)** This course explores a variety of theories and methods in bioethics and applies them to a selection of current topics.

**PHIL 571 (BIOET 501) Perspectives and Methods in Bioethics (3)**

This course explores the broad range of disciplinary, theoretical and methodological approaches employed in bioethics today through their application to a variety of contemporary issues. The course also examines the intellectual, cultural and disciplinary history of bioethics, the frontiers of the field (e.g. genetics and ethics, neuroethics and transhumanism) as well as current debates about its politics, ethics and future. This course complements BIOET 502 PERSPECTIVES IN MACRO-BIOETHICS, and is a core requirement for the dual-title Ph.D. in bioethics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 572 (BIOET 502) Perspectives in Macro-Bioethics (3)** This course explores systemic and structural issues in bioethics, and the theories and methodologies required to address them.

**PHIL 572 (BIOET 502) Perspectives in Macro-Bioethics (3)**

This course aims to provide students with an understanding of macro-ethical issues in bioethics, and the theoretical and methodological tools necessary to address them. The course broadens the traditional discussion of the ethical obligations of individuals considered in isolation (micro-ethics) to include the ethical obligations of individuals as members of institutions, communities and other collectives, and the collective ethical obligations of these larger entities (macro-ethics). The course explores macro-ethical perspectives related to biomedical research and delivery of health care, as well as the ethical implications of potential threats to public health, the broad social determinants of health, and the systemic and structural challenges to health and health care from global perspectives. Topics may include the ethical challenges presented by industry-sponsored research, biomedical research on vulnerable populations and in the developing world, access to health care and health care reform, public health emergencies, and the relationship between environment and health, and food and health.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 573 (BIOET 573) Ethics and the Responsible Conduct of Biomedical Research (3)** Provides an understanding of ethical issues arising in the responsible conduct of biomedical research and frameworks for critically analyzing them.

**PHIL 573 (BIOET 503) Ethics and the Responsible Conduct of Biomedical Research (3)**

This course is designed to instill an awareness of ethical issues inherent in the conduct of biomedical research. The course will discuss the research process including conception and design, data collection, analysis, and reporting from the perspective of ensuring research integrity. The goal is to enable students to identify ethical issues (ethical awareness/sensitivity) and to develop moral reasoning skills to reach ethically justifiable decisions. The course will be both retrospective and prospective: it will draw on historical examples of egregious or questionable practices in the conduct of biomedical research to better understand the evolution of research ethics in the 20th century, and it will explore the challenges for research ethics in the 21st century.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 580 Phenomenology (3 per semester/maximum of 6)** A critical study of one or more thinkers, ideas, or movements in modern phenomenology.

**Phenomenology (3 per semester/maximum of 6)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 589** Philosophical Translation Seminar (2) Studies philosophical works in their original (non-English) languages; course content varies with instructor.

#### **Philosophical Translation Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

#### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 594** Research Technique (1) A course utilizing research sources and techniques relevant to philosophical studies. Taken in the first semester of graduate study.

#### **Research Technique (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Students will teach introductory logic course--i.e., Phil 1--and other introductory level courses as required by staffing.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHIL 803** (HLS 803) Homeland Security: Social and Ethical Issues (3) This course will examine the social, political, legal, and ethical issues that arise in the context of homeland security.

**PHIL (HLS) 803 Homeland Security: Social and Ethical Issues (3)**

PHIL (HLS) 803 provides a foundation for applying philosophical and ethical understanding to homeland security



professions by drawing on both theoretical and practical approaches. It includes an overview of philosophical theories of ethics, political philosophy, and legal theory relevant to security practices and policies, as well as opportunity to develop critical thinking and communication skills in their application to particular cases related to homeland security through analysis and discussion. Historical and contemporary material will be examined to investigate issues such as the right to privacy, the nature and value of freedom, the justification of state security, and legal rights and responsibilities. Because the course is designed as a core offering in the Intercollege Masters of Homeland Security (IMP HLS), it must provide a basis for critical analysis of ethical issues faced by professionals in the homeland security arena.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Phys Med&Rehabilitat (PMR)

**PMR 730** Physical Medicine and Rehabilitation Elective (3rd and 4th year) (5) This elective is for 3rd and 4th year medical students interested in gaining experience in the field of Adult and Pediatric Physical Medicine and Rehabilitation, improving diagnostic skills related to the complications of disability, and improving neurologic and musculoskeletal examination skills.

### Physical Medicine and Rehabilitation Elective (3rd and 4th year) (5)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Physics (PHYS)

**PHYS 400** Intermediate Electricity and Magnetism I (3-4) Electrostatics and magnetostatics in vacuum; electrical and magnetic properties of matter; electrodynamics, Maxwell's equations, conservation laws, electromagnetic waves and radiation.

### PHYS 400 Intermediate Electricity and Magnetism I (3-4)

A second undergraduate course in electricity and magnetism, required of all physics majors who typically take it in their fifth or sixth semester. The course includes a review of vector calculus, and in-depth discussions of electrostatics, magnetostatics, in vacuum and in matter, time-varying electric and magnetic fields and electrodynamics, leading to Maxwell's equations. Discussions of conservation laws for charge, energy, and momentum, electromagnetic waves (in vacuum and in matter and at boundaries), electromagnetic vector and scalar potentials and fields, and an introduction to radiation are included.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:  
 Concurrent: MATH 230 OR MATH 231 ; PHYS 204

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 402** Electronics for Scientists (4) Circuit and network theory; active devices; amplifiers; introduction to digital electronics; noise theory.

### PHYS 402 Electronics for Scientists (4)

A junior-senior theory/laboratory course providing a survey of modern electronics from a data acquisition and analysis point of view. One of several possible lab-based courses taken by physics majors in several options to satisfy a lab requirement, typically taken by physics majors in their senior year. This course is very useful for students interested in experimental research work and includes examples such as digital data acquisition, the lab study of various electronic devices, fast Fourier transform methods and other topics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 406** Subatomic Physics (3) Introductory treatment of elementary particles, fundamental strong and electroweak interactions, nuclear structure, accelerators, particle detection, nuclear astrophysics.

### **Subatomic Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 410** Introduction to Quantum Mechanics I (3-4) Basic postulates; Schrodinger wave equation; stationary states; variational method; scattering in one dimension; orbital angular momentum; hydrogen atom; numerical methods.

### **Introduction to Quantum Mechanics I (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 411** Introduction to Quantum Mechanics II (3) General theory of angular momentum; approximation methods; scattering theory; radiation theory; applications to atomic, molecular, condensed matter, nuclear and particle physics.

### **Introduction to Quantum Mechanics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 412** Solid State Physics I (3) Crystal symmetry, x-ray structure analysis, lattice vibrations, thermal properties, free electron transport theory, elementary one-electron quantum theory of solids.

### **Solid State Physics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:  
Concurrent: PHYS 410

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 413** Solid State Physics II (3) Quantum theory of electronic and optical properties of solids, semiconductors, dielectrics, magnetic properties, crystal imperfections, low- temperature effects, and superconductivity.

### **Solid State Physics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1986  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 414** Solid State Physics (3) Crystal structure; reciprocal lattice; X-ray diffraction; lattice vibrations; thermal properties; free electron gas model; energy bands; semiconductors; magnetism.

**Solid State Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 419** (MATH 419) Theoretical Mechanics (3) Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions.

**PHYS (MATH) 419 Theoretical Mechanics (3)**

A second course in classical mechanics, required of all physics majors who typically take it in their 5th or 6th semester. The course includes a review of relevant mathematics, detailed discussions of advanced topics in Newtonian mechanics, introductions to Lagrangian and Hamiltonian dynamics, and applications to such forced oscillations, orbital motion, vibrational motion and normal modes, rigid body motion, and collisions.

It is a prerequisite for Physics 461, which is a second semester extension. It is also a valuable background for most 400-level physics courses, especially Physics 410.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 420** Thermal Physics (3) Basic postulates of statistical mechanics and thermodynamics, microscopic quantum states and macroscopic parameters; partition functions; Maxwell- Boltzmann and quantum statistics.

**Thermal Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 421W** Research Methods in Physics (3) Methodology focusing on the theory of measurement and experiment design.

**Research Methods in Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 443** Intermediate Acoustics (3) Vibration and simple vibrating systems, sound wave propagation, acoustic instruments, recent developments.

**PHYS 443 Intermediate Acoustics (3)**

An intermediate acoustics course, used as an elective by Physics majors in many options and used as a requirement by Physics majors in the Acoustics option. Building on classical wave theory learned in the 200-level introductory sequence, this course discusses such topics as the mathematical foundations of wave equations, basic acoustic systems, acoustics in fluids, attenuation and the fluctuation-dissipation theorem, and acoustical radiation and scattering. The emphasis is on the basics of mathematical and physical acoustics rather on applied acoustics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 444** Topics in Contemporary Physics (2) Modern research topics and career opportunities in physics; employment, graduate education, and tailoring the physics curriculum to meet career goals.

#### **PHYS 444 Topics in Contemporary Physics (2)**

A course required of all Physics majors, designed to be taken in the Spring semester of the junior year. Introduces students to modern research areas in physics at Penn State and elsewhere. Provides background on career choices available with an undergraduate physics degree, including employment opportunities, planning for graduate study, and tailoring the physics curriculum to meet career goals. The course structure is typically comprised of talks by Penn State faculty, outside visitors, students panels, and other information speakers, with students writing short and long reports using the class presentations discussions, and research from outside sources (research journals, internet, etc.) as background material.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 446** The Year in Physics: A Seminar on the Latest Research (1) Discussion recent research in physics.

#### **The Year in Physics: A Seminar on the Latest Research (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 457** Experimental Physics (1-3) Selected experiments in various fields of physics.

#### **PHYS 457 Experimental Physics (1-3)**

An intermediate laboratory course, required of all Physics majors and taken by other students, typically in their junior/senior years, this course provides an introduction to modern laboratory techniques and instrumentation used in research labs. Typical 'short' experiments include X-ray diffraction, Compton scattering, velocity of light determination, high-temperature superconductors, Raman scattering, Hall effect, scanning tunneling microscopy (STM), and many others, as well as long experiments. This three-credit course also serves as the writing intensive course at the 400-level for most physics majors. One- and two-credit versions of 457 (without the writing-intensive component) are taken by science and education students outside of physics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 457W** Experimental Physics (3) Selected experiments in various fields in physics.

#### **PHYS 457W Experimental Physics (3)**

An intermediate laboratory course, required of all Physics majors and taken by other students, typically in their junior/senior years, this course provides an introduction to modern laboratory techniques and instrumentation used in research labs. Typical 'short' experiments include X-ray diffraction, Compton scattering, velocity of light determination, high-temperature superconductors, Raman scattering, Hall effect, scanning tunneling microscopy (STM), and many others, as well as long experiments. This three-credit course also serves as the writing-intensive course at the 400-level for most Physics majors. One- and two-credit versions of Physics 457 (without the writing-intensive component) are taken by science and education students outside of Physics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PHYS 458 Intermediate Optics (4)** Geometrical and physical optics: theory of lens systems, aberrations, apertures, interference, diffraction, polarization.

**PHYS 458 Intermediate Optics (4)**

An intermediate optics course which builds on the wave and optics used in the 200-level introductory course, this course (which includes a lab component) focuses on physical and geometrical optics, propagation of light and its interaction with matter, polarization, interference, and diffraction. Optical components such as lenses, mirrors, prisms, fiber optics, spectrometers, and interferometers are discussed and employed. The laboratory component includes a number of 1-2 period experiments designed to illustrate the principles of applied geometrical and physical optics. Longer (5 period) experiments are also included which utilize modern, computer-controlled multi-channel detection systems and are applied to such systems as thin-film optics and the optics of semi-conductors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 461 (MATH 461) Theoretical Mechanics (3)** Continuation of Math.(Phys.) 419. Theoretical treatment of dynamics of a rigid body, theory of elasticity, aggregates of particles, wave motion, mechanics of fluids.

**Theoretical Mechanics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1986

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 462 Applications of Physics in Medicine (3)** Applications of physics in human physiology and in instrumentation for medical diagnosis and treatment.

**PHYS 462 Applications of Physics in Medicine (3)**

This course is a general survey of applications of physics in understanding the physiology of the human body--for example, the function of the eye, ear, and electrical conduction. Physical principles behind diagnostic medical measurement are covered, including imaging modalities: X-ray, nuclear, magnetic resonance, and ultrasound. Treatment applications such as laser surgery and radiation therapy are also covered. The course is appropriate for students intending work in a health profession.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 472 Elements of Nuclear Physics and its Applications to Medical Imaging and Treatments (3)** Introduction to the theory of nuclei, interactions with fast particles, and applications to medical imaging and radiation oncology.

**PHYS 472 Elements of Nuclear Physics and its Applications to Medical Imaging and Treatments (3)**

Modern physics tools are used now in numerous medical diagnostic methods, for various treatments of tumors, and so on. The class will focus several aspects of modern physics relevant to medical applications: (i) mechanisms of interaction of high energy particles, i.e. photons, electrons, protons, neutrons, and nuclei, with materials and methods of generating beams of such particles, (ii) applications of such beams for obtaining images of the body, (iii) radioactive decays of nuclei and use of the nuclear decays for imaging of dynamical processes in the body, (iv) shell structure of nuclei and applications of nuclear magnetic resonance in imaging. The course will allow students to understand the physics underlying the medical application of modern physics and physics of a wide range of new tools used in medicine, including computer tomography, positron emission tomography, and magnetic resonance imaging, as well as use of photon, proton and nuclear beams for tumor treatments.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 479 (MATH 479) Special and General Relativity (3)** Mathematical description, physical concepts, and experimental tests of special and general relativity.

**PHYS (MATH) 479 Special and General Relativity (3)**

This course is intended as an elective course (within the undergraduate Physics program) for Physics majors to be taken in their senior year. Intended to be cross-listed with MATH, it can also be used in support of a Mathematics minor and, in some options, within the Math program as a program elective as well. The course significantly expands upon the introduction to Special Relativity (SR) seen in PHYS 237, including discussions of experimental tests of SR and applications to relativistic mechanics. It then introduces students to the mathematical machinery required to understand General Relativity (GR), starting with the description of curved spacetimes and geodesics. It discusses solutions to the Einstein equations and surveys the classic tests which established the validity of General Relativity. It concludes with applications of GR in such areas as black hole physics, the generation and detection of gravitational waves, other topics (such as cosmology, relativistic astrophysics, etc.).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 494** Physics Research Project (1-12) Investigation of an original research problem, including a literature search. Preparation of a formal thesis is optional.

**Physics Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 494H** Physics Research Project (1-12) Investigation of an original research problem, including a literature search. Preparation of a formal thesis is optional.

**Physics Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 496H** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 497A (BIOL 497A)** Networks in Life Science (3) Introduction of network analysis and modeling techniques applied to molecular and cellular-level interaction networks.

#### **Networks in Life Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 499 (IL)** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 499A (IL)** Low-Dimensional Electronic Materials (1) This course will provide an introduction to physics of low-dimensional electronic materials, combining intensive learning in a classroom with a supervised project of independent research. This course is taught by Penn State faculty at the Shanghai Jiao Tong University in Shanghai, China, and is offered to undergraduate students majoring in physics, chemistry, mathematics, and related fields who have finished at least two (preferred) but not more than three academic years of study. SJTU is a premier university in China with a long history and strong tradition in academics and research. The course, to be offered with the Zhiyuan College (honors college) and the Department of Physics at SJTU, will provide students the opportunity to work together in an international setting.

#### **Low-Dimensional Electronic Materials (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 510** General Relativity I (3) Foundations of general relativity, elements of differential geometry, Einstein's equation, Newtonian limit, gravity waves, Friedmann cosmologies and Schwarzschild solution.

**General Relativity I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 511** Topics in General Relativity (3) Selected topics from: Cauchy problem, Hamiltonian formulation, positive energy theorems, asymptotics, gravitational radiation, singularity theorems, black-holes, cosmology, observational tests.

**Topics in General Relativity (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 512** Quantum Theory of Solids I (3) Electrons in periodic potentials; single electron approximations; lattice dynamics; electrical, optical, and magnetic properties of solids; transport theory.

**Quantum Theory of Solids I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:  
 Concurrent: PHYS 517

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 513** Quantum Theory of Solids II (3) Electron-phonon interaction, BCS theory; Landau Fermi-liquid theory; disorder and localized states; spin-wave theory; many-body theory.

**Quantum Theory of Solids II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 514** Physics of Surfaces, Interfaces, and Thin Films (3) This course focuses on interfacial and surface phenomena; structural, electronic, vibrational and thermodynamic properties; physisorption and chemisorption; phase transitions and ultrathin film nucleation; and growth phenomena.

**Physics of Surfaces, Interfaces, and Thin Films (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 517** Statistical Mechanics (3) Thermodynamics, classical and quantum statistics; Bose and Fermi gases; Boltzmann transport equation; phase transitions, critical phenomena; Ising model.

**Statistical Mechanics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**PHYS 518 Critical Phenomena and Field Theory (3)** Critical phenomena using field theoretical and renormalization group techniques; solvable statistical models and conformal field theory; fluctuations and random processes.

**PHYS 518 Critical Phenomena and Field Theory (3)**

The application of field theoretical methods, in particular, the renormalization group approach, has profoundly influenced our understanding of the physics of continuous phase transitions. In particular, they reveal the origin of universality between seemingly unrelated phase transitions, and the reason for the failure of the Landau Ginzburg theory close to the critical point. This course will begin with the concepts of the order parameter and spontaneous symmetry breaking, and the shortcomings of the Landau Ginzburg theory that neglects fluctuations of the order parameter. Subsequently, we will introduce field theoretical techniques and Feynman diagrams, and the basic foundations of the renormalization group method for integrating out rapidly fluctuating modes of the order parameter. These concepts will be applied to various classes of phase transitions, including the Heisenberg ferromagnet, nonlinear sigma model, and the Kosterlitz-Thouless model. Epsilon expansion will be performed in detail starting from both four and two dimensions, and a connection will be made to experiments, such as superfluid transition in thin helium films. No prior knowledge of field theory is required. The course grade will be based upon homework assignments and a term paper.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 524 Physics of Semiconductors and Devices (3)** Electronic structure, optical and transport properties of crystalline and amorphous semiconductors, quantum wells, superlattices; quantum devices; quantum Hall effect.

**Physics of Semiconductors and Devices (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 525 Methods of Theoretical Physics I (3)** Complex variables, Hilbert spaces, linear operators, calculus of variations, Fourier analysis, Green's functions, distributions, differential equations, and special functions.

**Methods of Theoretical Physics I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 526 Methods of Theoretical Physics II (3)** Finite and Lie groups, representations and application to condensed matter and particle physics; selected topics from differential geometry.

**Methods of Theoretical Physics II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 527 (ASTRO 527) Computational Physics and Astrophysics (3)** Introduction to numerical methods for modeling physical phenomena in condensed matter, atomic and high energy physics, gravitation, cosmology and astrophysics.

**PHYS (ASTRO) 527 Computational Physics and Astrophysics (3)**

This course provides an introduction to applications of numerical methods and computer programming to physics and astrophysics. Numerical calculations provide a powerful tool for understanding physical phenomena, complementing laboratory experiment and analytical mathematics. The main objectives of the course are: to survey of the computational methods used for modeling concrete physical and astrophysical systems; to assess the reliability of numerical results

using convergence tests and error estimates; and to use scientific visualization as a tool for computer programming development and for physical understanding of numerical results.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 530** Theoretical Mechanics (3) Newtonian mechanics, noninertial coordinate system, Lagrangian mechanics, small oscillations, Hamiltonian formulation, canonical transformations, Hamilton-Jacobi theory, dynamical systems.

### **Theoretical Mechanics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 533** Theoretical Acoustics (3) Wave propagation in complex systems and materials: viscoelastic fluids, superfluids, elastic solids, periodic and random media, nonlinear media.

### **Theoretical Acoustics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 541** Elementary Particle Phenomenology (3) Baryons and mesons; leptons and quarks; electromagnetic and weak interactions and their unification; quantum chromodynamics; experimental techniques.

### **Elementary Particle Phenomenology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 542** Standard Model of Elementary Particles Physics (3) Weinberg-Salam model of electroweak interactions, spontaneous symmetry breaking, quantum chromodynamics; selected topics from grand unified theories and superstring theory.

### **Standard Model of Elementary Particles Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 545** (ASTRO 545) Cosmology (3) Modern cosmology of the early universe, including inflation, the cosmic microwave background, nucleosynthesis, dark matter and energy.

### **PHYS (ASTRO) 545 Cosmology (3)**

Cosmology is the scientific study of the universe as a whole: its physical contents, principal physical processes, and evolution through time. Modern cosmology, which began in the early 20th century, is undergoing a renaissance as a precision science as powerful ground- and space-based telescopes allow us to observe the formation of the first stars, galaxies and galaxy clusters; the echoes of the inflationary epoch as they are impressed upon the cosmic microwave background; and evidence for and clues to the nature of the mysterious dark energy, which is driving the accelerating expansion of the universe. This course will introduce students to the key observations and the theoretical framework

through which we understand the physical cosmology of the early universe.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 555 (MATSE 555) Polymer Physics I (3)** Introduction to the fundamental concepts needed to understand the physics applicable to polymer melts, solutions and gels.

### **PHYS (MATSE) 555 Polymer Physics I (3)**

This course develops fundamental understanding of the conformations of polymers in solution and melt states. We start with ideal chains that have random walk statistics. Next excluded volume is introduced to understand the self-avoiding walk conformation and collapsed conformation of real chains. The behavior ideal and real chains are studied in extension, compression and adsorption. While positive excluded volume leads to swelling, negative excluded volume leads to collapse and phase separation. The phase behavior of polymer mixtures and solutions is described in detail. Semidilute solutions are understood in terms of two length scales where each chain changes its conformational statistics. Scattering is used to determine the conformation of chains, their molar mass and their interactions with surroundings. Percolation theory is introduced to model the statistics of random branching and gelation. The rubber elasticity of fully developed networks is understood in terms of the stretching laws for network chains. Entanglement effects, swelling and viscoelasticity are discussed in detail. Once the conformations of polymers are understood, dynamics of polymer liquids are considered. In dilute solutions hydrodynamic interactions dominate and the viscoelasticity predicted by the Zimm model is derived. In unentangled melts of short chains, hydrodynamic interactions are screened and the Rouse model is used to understand viscoelasticity. Unentangled polymers in semidilute solutions have Zimm dynamics on small length scales and Rouse dynamics on longer length scales. Dynamic scattering techniques are discussed for measuring polymer dynamics. Entanglement effects are described using the tube model, where surrounding chains confine the motion of a given polymer to a tube-like region. The effects of concentration, chain length and polydispersity of linear chain polymer liquids are discussed in detail. The effects of branching on polymer dynamics are introduced at the level of simple structures such as star polymers and comb polymers.

The course assumes some prior knowledge of polymers, usually obtained through an introductory undergraduate course. The students should attain a working understanding of the basic concepts of polymer physics in this course, allowing them to tackle more difficult problems in their research. Such skills are reinforced through homework and take-home examinations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 557 Electrodynamics (3)** Special relativity, electromagnetic fields, Maxwell's equations, conservation laws, electrostatics and magnetostatics.

### **PHYS 557 Electrodynamics (3)**

The first half of the course starts from special relativity and uses Hamilton's principle to derive relativistic dynamics and Maxwell's equations. This approach, developed by Landau and Lifshitz, sets classical electrodynamics in a broad base of theoretical physics, and provides insights to solving many interesting problems that might be hard to solve starting from the traditional approach of deriving Maxwell's equations empirically through Coulomb's law, the law of Biot and Savart, Faraday's law, and Maxwell's inclusion of displacement current. The second half is based on the classic textbook by Jackson, and is devoted to application of electrodynamics in various settings. This includes dynamics of charged particles in given electromagnetic fields, with special emphasis on problems with symmetry and the guiding center dynamics. Examples of such topics include electromechanical problems with the use of Lagrangian; fields generated by given distributions of charges and currents, especially for case of small sources, and the use of multiple expansions; polarization and magnetization, and Maxwell's equations in continuous media; boundary value problems; electromagnetic waves with single frequency in vacuum and medium; wave guides and resonant cavities; the generation of electromagnetic radiation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 559 Graduate Laboratory (2)** Study and applications of techniques and instrumentation used in modern physics

laboratories.

### **Graduate Laboratory (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 561** Quantum Mechanics I (3) Postulates of quantum mechanics, Hilbert space methods, one dimensional potentials, spin systems, Harmonic oscillator, angular momentum, Hydrogen atom.

### **Quantum Mechanics I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 562** Quantum Mechanics II (3) Addition of angular momenta, perturbation theory, variational principle, scattering theory, density matrices, identical particles, interpretations of quantum mechanics, Dirac theory.

### **Quantum Mechanics II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 563** Quantum Field Theory I (3) Canonical and functional integral quantization of relativistic and non- relativistic field theories; Feynman diagrams; spontaneous symmetry breaking; renormalization group.

### **Quantum Field Theory I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 564** Quantum Field Theory II (3) Abelian and non-Abelian gauge theories; renormalization group and operator product expansions; BRST quantization; scattering theory, other related topics.

### **Quantum Field Theory II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 565** Interface of General Relativity and Quantum Physics (3) Limitations of perturbative methods, conceptual problems; selected topics from black hole thermodynamics, canonical quantum gravity, loop space methods and string-theory.

### **Interface of General Relativity and Quantum Physics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 571 Modern Atomic Physics (3)** Light-atom interactions, atomic structure, laser cooling and trapping, interferometry, and Bose-Einstein condensation.

**PHYS 571 Modern Atomic Physics (3)**

Students will learn the physics behind most of the major recent developments in the field of atomic physics, at the level required for research at the graduate level. Material to be covered will include selected topics from the following list: Light-atom interactions, atomic structure, laser cooling, atom trapping and atomic optics, atom interferometry, precision measurements with atoms, quantum computing with atoms, atomic Bose-Einstein condensates, degenerate Fermi gases, reduced dimensionality systems, simulating condensed matter physics with atoms. Students will enhance their technical writing and presentation skills. Students will use the background they have acquired to develop an oral presentation related on a research advance related to modern atomic physics.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 572 Laser Physics and Quantum Optics (3)** Theory of modern lasers, non-linear and quantum optics, photon statistics, laser spectroscopies, pulsed lasers.

**PHYS 572 Laser Physics and Quantum Optics (3)**

Students will learn the basic physics of lasers, how they work and how they are used, primarily for physics research at the graduate level. They will become familiar with a broad array of the most important topics of laser physics including mode competition, pulsed lasers, pulse propagation, non-linear laser spectroscopy, laser stabilization, and the quantum nature of laser light. Students will enhance their technical writing and presentation skills. Students will use the background they have acquired to develop an oral presentation related on a research advance related to lasers.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 580 Elements of Network Science and Its Applications (3)** Introduction to elements of network theory used to describe and model complex networks; applications in social, biological, and technological networks.

**PHYS 580 Elements of Network Science and Its Applications (3)**

Network Science is the study of network representations of physical, biological, and social phenomena leading to predictive models of these phenomena. This class will focus on four main questions asked by network science: (i) How do we use data analysis methods to determine or infer the interaction graphs underlying complex systems? (ii) How can we characterize the organizational features of large-scale networks? (iii) What are the mechanisms that determine the common topological features of a wide variety of networks? (iv) To what extent does the organization of the interaction network underlying a complex system determine the dynamical behavior (e.g. steady state or oscillations) of the system? Applications in social, biological and technological networks will be examined. As Network Science is an interdisciplinary field of research, the course is open and should be of interest to a wide range of graduate students in degree programs in physics, social sciences, life sciences, mathematics, engineering, and computer science.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHYS 897A** Hands-On Particle Astrophysics (2) This workshop features hands-on explorations of high-energy phenomena, highlighting ongoing experiments in Antarctica, the Argentine Pampas, and the upper reaches of the Earth's atmosphere. Strategies for classroom implementation will be highlighted.

### **Hands-On Particle Astrophysics (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Physiology (PHSIO)**

**PHSIO 508** (NUTR 508) Critical Readings in Molecular Nutrition (1.5 per semester/maximum of 6) Understanding of approaches, methods and current concepts in molecular biology and nutrition through critical readings of current primary literature.

### **Critical Readings in Molecular Nutrition (1.5 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

Concurrent: NUTR 445 or NUTR 446

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 510** Physiological Adaptations to Stress (3) Students will learn how to address problems in physiological adaptations to stress through parallel molecular, cellular, and systemic approaches.

### **Physiological Adaptations to Stress (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 567** (KINES 567) Advanced Exercise Physiology (3) Physiological changes during exercise with emphasis on the effects of physical conditioning and training.

### **Advanced Exercise Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 571** (BIOL 571) Animal Physiology (3) Mammalian cardiovascular, respiratory, renal, and gastrointestinal systems.

**Animal Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 572** (BIOL 572) Animal Physiology (3) Mammalian nervous, endocrine, metabolic, and reproductive systems.

**Animal Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 577** (KINES 577) Cardiovascular Physiology (3) In-depth study of the heart and circulatory system with emphasis on the effects of exercise on cardiovascular function.

**Cardiovascular Physiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 578** (KINES 578) Physiology and Mechanical Behavior of Skeletal Tissues (3) In-depth examination of the structure, composition, and material behavior of the basic skeletal tissues, including bone, cartilage, tendon, and ligament.

**Physiology and Mechanical Behavior of Skeletal Tissues (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 595** (EXSCI 595) Internship in Exercise Physiology and Cardiac Rehabilitation (1-15) Clinical and related research aspects of exercise physiology and exercise prescription with respect to cardiac and cardiovascular rehabilitation.

**Internship in Exercise Physiology and Cardiac Rehabilitation (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**PHSIO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHSIO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Physiology-Hy (PSIO)

**PSIO 501** Scientific Analysis and Presentation (1) Journal club format used to develop critical analytical and presentation skills for understanding and clearly presenting current scientific data.

### Scientific Analysis and Presentation (1)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 503** Cellular Physiology (1) PSIO 503 is a physiology course that focuses on cellular aspects of physiology.

### PSIO 503 Cellular Physiology (1)

The course in Cellular Physiology is a one semester, one credit course that will cover aspects of physiology that are cellular-based. Topics in organ physiology will be included in more comprehensive 3 credit course (PSIO 504). The course will meet for 1 hour sessions, three times per week for approximately one month. The course will be offered in the fall semester. It is designed for graduate students in other disciplines who are interested in integrating the cellular aspects of physiology into their graduate education. Although there are no prerequisites for the course, prior courses in physiology and/or biochemistry is beneficial.

The course will expand upon material in an assigned physiology textbook. Text chapters will be assigned as reading material prior to each meeting. The instructor will review the assigned material during the beginning of each meeting, after which more detailed aspects of the material will be discussed.

The course will have one final examination. The exam will be composed of a mixture of short essays, multiple choice and problem-solving questions. The lectures in PSIO 503 form the first block of the lectures in the more comprehensive PSIO 504 course. Students should enroll in either PSIO 503 or PSIO 504.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 504** Cellular and Integrative Physiology (3) PSIO 504 is a physiology course that integrates cellular and organ-based physiology concepts.

### PSIO 504 Cellular and Integrative Physiology (3)

The course in Cellular and Integrative Physiology is a one semester, three credit course that will cover all major aspects of physiology. A special emphasis will be placed on how cellular aspects of physiology are integrated with organ physiology. The course will meet for 1 hour sessions, three times per week. The course will be offered in the fall semester. It is designed for graduate students that either major in Physiology or are interested in integrating physiology concepts into their graduate education. Although there are no prerequisites for the course prior introductory courses in physiology and/or biochemistry are beneficial.

The course will expand upon material in an assigned physiology textbook. Text chapters will be assigned as reading material prior to each meeting. The instructor will review the assigned material during the beginning of each meeting, after which more detailed aspects of the material will be discussed.

The course will have three examinations. The exams will be composed of a mixture of short essays, multiple choice and problem-solving questions. The lectures in PSIO 503 form the first block of the lectures in the more comprehensive PSIO 504 course. Students should enroll in either PSIO 503 or PSIO 504.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 505** Cellular and Integrative Physiology II (3) This is a physiology course that integrates cellular and organ-based physiology concepts.

### PSIO 505 Cellular Integrative Physiology II (3)

The course, is a one-semester, 3-credit-course that will cover major aspects of physiology not covered in Cellular and Integrative Physiology I. A special emphasis will be placed on how cell function and differentiation are integrated with organ physiology. The course will meet for one-hour sessions, three times per week. The course will be offered in the spring semester. It is designed for graduate students that either major in Physiology or are interested in integrating physiology concepts into their graduate education. PSIO 504 (Cellular and Integrative Physiology I) is a prerequisite for the course. Prior introductory courses in physiology and/or biochemistry are beneficial.

The course will expand upon material in an assigned physiology textbook. Text chapters will be assigned as reading material prior to each meeting. The instructor will review the assigned material during the beginning of each meeting, after which more detailed aspects of the material will be discussed.

The course will have two examinations. The exams will be composed of a mixture of short essays, and multiple-choice and problem-solving questions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 522 Physiological Adaptations to Stress (3)** Students will learn how to address problems in physiological adaptations to stress through parallel molecular, cellular, and systemic approaches.

### **Physiological Adaptations to Stress (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 581 (PHARM 581) Maintaining Homeostasis A: Heart and Vasculature (1)** Physiology of the cardiovascular system.

### **PSIO (PHARM) 581 Maintaining Homeostasis A: Heart and Vasculature (1)**

This course will cover general principles related to cellular and systemic physiology and pharmacology related to the autonomic nervous system and the cardiovascular system. Materials will be presented through reading and study of textbook materials and the primary scientific literature, reinforced and assisted by lectures and discussions. Concepts of this course are generally organized by organ system designed to address important homeostatic control mechanisms, both neural and humoral, related to the cardiovascular system. Topics to be covered include the physiology of the autonomic nervous system; pharmacology (mechanisms and sites of action; receptors and associated cellular transduction cascades; toxicity; contraindications) of drugs that affect the autonomic nervous system including cholinergic-activating and cholinesterase-inhibiting drugs, cholinergic-blocking drugs, adrenoceptor agonists and antagonists; synaptic transmission; mechanical properties of skeletal, cardiac and smooth muscle; and the regulation of cardiac function and microcirculation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 583 (PHARM 583) Maintaining Homeostasis C: Kidney (1)** Renal physiology and pharmacology.

### **PSIO (PHARM) 583 Maintaining Homeostasis C: Kidney (1)**

This course will cover general principles related to cellular and systemic physiology and pharmacology (mechanisms and sites of action; receptors and associated cellular transduction cascades; toxicity; contraindications) of drugs that affect the pulmonary and renal systems. Materials will be presented through reading and study of textbook materials and the primary scientific literature, reinforced and assisted by lectures and discussions. Concepts of this course are generally organized by organ system designed to address important homeostatic control mechanisms related to the lung and kidney. Topics to be covered include the physiology and pharmacology of the pulmonary and renal system; mechanics of breathing, alveolar ventilation, blood flow to the lung, ventilation-perfusion relationships, diffusion and transport of gases, control of breathing, glomerular filtration and renal blood flow, renal transport mechanisms involved in reabsorption and secretion, regulation of effective circulating volume and salt balance, regulation of potassium balance, regulation of acid-base balance during health and disease, principles of pharmacology related to pulmonary and renal systems; principles of gastrointestinal physiology related to drug disposal and action. The course objectives are to assist students in understanding and mastering the basic concepts related to the functions of the lung and kidney, to assure

that students obtain a thorough comprehension of basic pharmacological principles, and then to have students apply this knowledge to problems and case studies relevant to pathophysiology and drug action.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 584 Practical Bioinformatics A: Analysis of Biological Databases (1)** Understanding and using protein, nucleotide, structure and human disease databases.

**PSIO 584 Practical Bioinformatics A: Analysis of Biological Databases (1)**

The proposed course is designed to give graduate students an introductory knowledge on existing biological databases and how such databases can be used in modern research. Topics will include basic navigation through the databases as well as more advanced trainings to uncover novel gene/protein annotations. Literature surveys will be used to familiarize students with the use of database analyses to understand complex biological problems. Topics will include understanding viral gene functions from host counterparts, genes and mutations in human diseases and novel pathways in human.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 585 Practical Bioinformatics B: Protein and Structural Biology (1)** Understanding and using protein structure databases; advanced topics include basic biological switches, protein:protein interactions and molecular modeling.

**PSIO 585 Practical Bioinformatics B: Protein and Structural Biology (1)**

The proposed course is designed to give graduate students interested in protein a basic knowledge of using the current protein structure database. More advanced topics will expose students to specific examples structural information on basic biological switches, protein:protein interactions and molecular modeling.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 586 Practical Bioinformatics C: Gene and Protein Expression (1)** Understanding modern techniques to address gene and protein expression; using database searching or data collection to obtain such information.

**PSIO 586 Practical Bioinformatics C: Gene and Protein Expression (1)**

Students will learn about modern techniques to address gene and protein expression and how such information can be obtained via database searching or by data collection. Advanced topics will include how post-translational modifications can be assessed by mass spectrometry and how alterations in expression and modifications may be assessed.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 596** Individual Studies (1-9) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSIO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Plant Biology (PLBIO)

**PLBIO 512** Plant Resource Acquisition and Utilization (4) Advanced study of plant resource acquisition and utilization considering molecular, physiological, and whole plant perspectives through lectures and problem solving.

### Plant Resource Acquisition and Utilization (4)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 513** Integrative Plant Communication and Growth (4) Advanced study of plant communication, growth, and development considering molecular, physiological, and whole plant perspectives through lectures and problem solving.

### Integrative Plant Communication and Growth (4)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 514** (HORT 514) Modern Techniques and Concepts in Plant Ecophysiology (2) An intensive introduction to concepts of plant ecophysiology and modern techniques used in this field.

### Modern Techniques and Concepts in Plant Ecophysiology (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 515** Modern Techniques and Concepts in Plant Cell Biology (2) An intensive introduction to concepts of plant cell biology and modern techniques used in this field.

### Modern Techniques and Concepts in Plant Cell Biology (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 516** Modern Techniques and Concepts in Plant Molecular Biology (2) An intensive introduction to contemporary molecular biology methods as applied to the study of plants.

### Modern Techniques and Concepts in Plant Molecular Biology (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PLBIO 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Plant Pathology (PPATH)

**PPATH 405** Microbe-Plant Interactions: Plant Disease and Biological Control (3) Survey of microbe-plant interactions causing plant disease, mechanisms of pathogenesis, disease control, and microbial and molecular biological control strategies.

### Microbe-Plant Interactions: Plant Disease and Biological Control (3)

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999 Ending: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 412** Turfgrass Disease Management (3) Introduction to biology of turfgrass pathogens and management of cool- and warm-season turfgrass disease.

### PPATH 412 Turfgrass Disease Management (3)

This course will provide an introduction to concepts of disease processes in plants and biology of plant pathogens, principles of turfgrass disease diagnosis based on symptom development, recognition of signs and microscopic structures of the pathogens, environmental and cultural management factors influencing disease development, significance of pathogen life cycle in disease epidemic development, and integrated turfgrass disease management practices for root and foliar disease. Disease of various turf types for golf courses, residential lawns, landscapes, and athletic fields will be discussed. Disease topics will include diseases that commonly occur in winter, disease that develop in spring and persist into summer, and disease that initiate in summer and remain active until late fall in most regions of North America. A number of non-infectious disorders of turf caused by extreme environmental conditions and improper cultural practices will also be discussed.

Students will be evaluated by the use of two hour exams and a final exam.

The course will be offered fall semester with an expected enrollment of 55 to 60 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008 Ending: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 416** Plant Virology: Molecules to Populations (3) A exploration of the molecular biology and population dynamics of the virus-plant interaction.

### PPATH 416 Plant Virology: Molecules to Populations (3)

This will be the departmental foundation course for plant viruses, one of the four major pathogen groups. The course will entail an exploration of the history, nature, cause, socioeconomics, symptomatology, physiology, diagnosis, ecology, epidemiology, and control of viral diseases on plants. Special emphases will be placed on the nomenclature taxonomy, replication, and evolution of plant viruses, molecular biology of the virus-plant interaction, replication, virus-like agents (viroids & prions), natural and genetically engineered disease resistance, virus-vector relationship, and population dynamics.

Grade assignment will be based on student performance involving written examinations, special projects, and an oral presentation.

The course will be offered in the fall semester of odd years and with an enrollment limit of 24 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005 Ending: Fall 2013  
 Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 417** Phytobacteriology (3) Lecture and lab coverage of how bacteria cause plant diseases.

### **PPATH 417 Phytobacteriology (3)**

This course covers the genetic, molecular, and physical, and physiological mechanisms of bacterial pathogenesis in plants. We will examine how the tools of microbiology are used to deduce the pathogenic mechanisms behind various plant diseases caused by bacteria. Topics include: motility; attachment; evasion of host defense; toxins; enzymes and proteins; biofilms; and bacterial communication. Readings include research and review articles. The course includes weekly hands-on laboratory activities that cover handling bacteria, isolating bacteria from plants, monitoring bacterial growth in plants, monitoring plant symptoms, and the genetic control of bacterial and plant interactions.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2009 Ending: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 419** Plant Nematology (2) The biology of plant pathogenic nematodes, the diseases they cause, and their control.

### **PPATH 419 Plant Nematology (2)**

The course provides a comprehensive overview of important plant-parasitic nematodes causing economic damage to food, fiber and ornamental crops. Major topics include, identification, taxonomy, biology, ecology, plant-nematode interactions, symptomatology and nematode management. The laboratory portion of the course provides hands-on experience extracting nematodes from soil and plants and preparing them for microscopic examination. The course will provide students with sufficient background information to make a preliminary nematode disease diagnosis and control recommendations. The course will also present a broad overview of other important nematode groups found in the soil including free-living, predatory and entomopathogenic forms. Throughout the course, students will be introduced to important scientific literature on nematodes.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2009 Ending: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 425 (BIOL 425) Biology of Fungi (4)** A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to humans.

### **PPATH (BIOL) 425 Biology of Fungi (4)**

This course is a hands-on survey of fungal diversity, covering a wide variety of topics in fungal biology: phylogenetics, morphology, ecology, evolution, population biology, fungi as food, fungi as sources of toxins, ethnomycology, fungi as agents of plant and animal disease, fungi as sources of pharmaceuticals, and industrial uses. All fungi will be discussed, from mushrooms and other fleshy fungi to molds to slime molds. The laboratory portion of the course will center mostly around handling and manipulating freshly collected and living fungi and microscopic analysis of their major features. There will be approximately 4-5 required field trips to local forests during the laboratory period, to observe fungi in their natural habitats and collect them for further analysis in the laboratory. Students will come out of the course with a broad base of knowledge about fungi and their diversity and the ability to handle them in the laboratory and observe them using the microscope.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2002 Ending: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 427** Mycotoxins: Effects of Fungal Toxins on Human and Animal Health (3) Description and history of mycotoxicoses. Mycotoxin formation, occurrence, control, economic and social impacts, and regulatory issues.

### **PPATH 427 Mycotoxins: Effects of Fungal Toxins on Human and Animal Health (3)**

This course will provide a comprehensive overview of the multi-disciplinary subject of mycotoxicology. Mycotoxins are

chemicals produced by fungi that are toxic to humans and animals. Students will become familiar with the history and description of mycotoxins and mycotoxicoses, formation of mycotoxins, biology of mycotoxigenic fungi, methods of mycotoxin analysis, fate of mycotoxins in food processing, management and prevention of mycotoxins, regulations, and economic and social impacts. This course is appropriate for students who wish to learn more about fungi beyond the introductory level, as well as for those with interests in animal science and husbandry. The subject of mycotoxicology involves most aspects of the agriculture-food system so students of food science, crop and soil science, entomology and plant pathology will find relevant topics in mycotoxicology. Biology and microbiology students especially those with interests in plant-associated microbes and ecology will also benefit from this course. Course format will be two lectures per week and one period of discussion that will include laboratory activities, field trips, case study discussions, and student presentations. Students will be evaluated by a midterm exam, final exam, research paper, oral presentation on the research topic and participation in class discussion. The course will be offered each spring semester with an anticipated enrollment of 20 students per semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007 Ending: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 430 (E R M 430) Air Pollution Impacts to Terrestrial Ecosystems (3)** An overview of direct and indirect effects of air pollution on terrestrial plants and ecosystems.

### **PPATH (E R M) 430 Air Pollution Impacts to Terrestrial Ecosystems (3)**

Pollutant sources, transport, meteorology, and temporal and spatial trends of pollution dispersion and deposition are introduced. An overview is presented of the direct and indirect effects of air pollutants on terrestrial ecosystems with an emphasis on plant life. The effects of ozone, sulfur dioxide, nitrogen oxides, particulate matter, halogens, and combined pollutants leading to acidic atmospheric depositions are presented. Emphasis is placed on air pollutants as plant pathogens leading to symptoms and eventual long-term accumulative effects to entire ecosystems. Methods of diagnostics, factors affecting plant response, ecosystem decline and resiliency, pest interactions, assessment of loss and cost/benefit analysis leading to abatement follows. Final parts of the course include perspectives of public awareness, development of National Ambient Air Quality Standards, compliance prevention of significant deterioration, and the Clean Air Act reforms of 1990. Evaluations of student performance are made by unannounced quizzes and two scheduled examinations. The course is offered every Spring semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2004 Ending: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983 Ending: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983 Ending: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 497A Ecology of Viruses (Virus Ecology) (3)** In this course students will learn about the interplay of viruses, hosts and the environment. All known life forms are hosts to viruses; viruses are the most abundant life entity on our planet, and the most understudied and unknown. Although most of virology has been devoted to the study of those that cause

disease, viruses also can be beneficial to their hosts, and a majority of viruses probably do not cause disease. Viruses play an important role in the ecology of the planet, including carbon cycles, host adaptation to extreme environments, host health or disease, and host evolution. We will use specific examples to understand basic principles of virus ecology and we will explore viruses of plants, animals, fungi and other microbial eukaryotes, bacteria and archaea. Students also will learn to critically read the scientific literature, and will present a paper to the class.

### **Ecology of Viruses (Virus Ecology) (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 502 Plant Disease Diagnosis (3)** Field and laboratory techniques used in diagnosing plant diseases caused by various types of pathogens with emphasis on fungi.

### **Plant Disease Diagnosis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 505 Fundamentals of Phytopathology (2)** An in-depth tutorial of the fundamental theories and concepts of plant pathology.

### **PPATH 505 Fundamentals of Phytopathology (2)**

Using the primary literature of the discipline, students will explore, in-depth, the knowledge base of plant pathology. Students will write a 3-5 page paper each week summarizing the major points of the topic covered in the primary literature assigned as related to 4 pathogens/diseases chosen by each student from an approved list. Students will also answer, in writing, 1-2 specific questions posed by the instructor each week. These writings constitute 90% of the grade. 5% of the grade is based upon a written final exam and 5% on oral participation in class.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 505 Fundamentals of Phytopathology (2)** An in-depth tutorial of the fundamental theories and concepts of plant pathology.

### **PPATH 505 Fundamentals of Phytopathology (2)**

Using the primary literature of the discipline, students will explore, in-depth, the knowledge base of plant pathology. Students will write a 3-5 page paper each week summarizing the major points of the topic covered in the primary literature assigned as related to 4 pathogens/diseases chosen by each student from an approved list. Students will also answer, in writing, 1-2 specific questions posed by the instructor each week. These writings constitute 90% of the grade. 5% of the grade is based upon a written final exam and 5% on oral participation in class.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 522 Professional Development & Ethics in Plant Pathology (1)** Graduate students will develop key professional skills and ethics through a combination of lectures, discussions, and assignments.

### **PPATH 522 Professional Development & Ethics in Plant Pathology (1)**

This course is designed to help graduate students acquire key professional skill and ethics through a combination of lectures, case study discussions on various ethics and professionalism issues, dialogs with invited guests about their

professional experience, and mock exercises of paper and proposal reviews. Topics to be covered include: (a) the process and ethics of publishing, (b) how peer review of papers and grant proposals works, (c) plagiarism, (d) scientific misconduct, (e) oral and poster presentation skill, and (f) successful strategies in grant proposal writing and proposal review.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 533** Molecular Genetics of Plant-Pathogen Interactions (3) In depth discussion/review of the primary literature on the mechanisms of plant-pathogen interactions at the molecular and cellular levels.

### **PPATH 533 Molecular Genetics of Plant-Pathogen Interactions (3)**

The main objective of this 3-credit course is to help students gain (a) firsthand knowledge of various techniques used in studying the molecular basis of plant-pathogen interactions and (b) knowledge of the current concepts and theories on the nature and mechanisms of the plant-pathogen interactions. In addition, this course will help students develop an ability to integrate and synthesize various areas of knowledge in solving plant health related problems. This course will serve the needs of students in Plant Pathology and other departments/programs who require an in-depth understanding of the molecular basis of plant-pathogen interactions for their program of study. This course will be offered in fall of even numbered years, and its expected enrollment is 8-10. Grading will be based on class participation, paper presentations, assignments, and a mid-term exam.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 533** Molecular Genetics of Plant-Pathogen Interactions (3) In depth discussion/review of the primary literature on the mechanisms of plant-pathogen interactions at the molecular and cellular levels.

### **PPATH 533 Molecular Genetics of Plant-Pathogen Interactions (3)**

The main objective of this 3-credit course is to help students gain (a) firsthand knowledge of various techniques used in studying the molecular basis of plant-pathogen interactions and (b) knowledge of the current concepts and theories on the nature and mechanisms of the plant-pathogen interactions. In addition, this course will help students develop an ability to integrate and synthesize various areas of knowledge in solving plant health related problems. This course will serve the needs of students in Plant Pathology and other departments/programs who require an in-depth understanding of the molecular basis of plant-pathogen interactions for their program of study. This course will be offered in fall of even numbered years, and its expected enrollment is 8-10. Grading will be based on class participation, paper presentations, assignments, and a mid-term exam.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 540** Plant Disease Control (3) Principles of plant disease control, including theoretical considerations involved in control by chemical and nonchemical means.

### **Plant Disease Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 542** Epidemiology of Plant Diseases (3) Disease development in populations of plants, with emphasis on the impact of environment and control practices on rate of development.

**Epidemiology of Plant Diseases (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 543** Pathogen Variation and Host Resistance (3) Mechanisms and implications of genetic variation in plant pathogens related to breeding for disease resistance in plants by genetic means.

**Pathogen Variation and Host Resistance (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 544** Fungal Genetics (4) Fungal breeding systems, mating types, asexual restrictions and recombination, tetrad analysis, gene conversion and extra genetic elements.

**PPATH 544 Fungal Genetics (4)**

Fungal genetics will focus on the classical genetics of fungi starting with the expected inheritance ratios and patterns for single gene and multiple genes on various fungal traits. The methods of establishing crosses and obtaining progeny will be covered in the examples provided. Mating type and breeding systems are an important trait for obtaining the sexual phase, therefore an emphasis will be placed on the genetic determination of breeding methods and mating type, and what is known of mating type switching. There are several unique phenotypes associated only with fungi (pokey, senescent fungi, killer character and others) inherited by mitochondrial DNA and induced by plasmids or transposons. The determination of inheritance and the importance will be examined. Fungi provide the unique opportunity to conduct tetrad analysis in determination of inheritance and mapping of traits. In the laboratory, crosses will be set up by students to obtain data to conduct tetrad analysis and to visualize unusual tetrads brought about by gene conversion. Exchange of genetic material occurs without the sexual cycle through heterokaryosis and the parasexual cycle but may be limited by vegetative incompatibility. These difficult concepts will be discussed as well as visualized by conducting experiments in the laboratory. In discussions, an emphasis will be placed on plant pathogenic fungi and inheritance of virulence which is an important plant pathogen trait. Finally topics on population genetics of fungi including determination of genetic diversity, allele frequencies, genotype frequencies will be studied. Evaluation of student performance will be based on problems sets provided throughout the semester, laboratory reports, student projects and presentations, and a final examination. The problem sets are designed to help students solve genetic problems based on the concepts learned in lecture. The laboratory experiments are designed to complement the lectures and allow students to visualize difficult concepts from lecture. Students will be assigned a plant pathogenic fungus and will explore the literature especially any relevant genetic information on that fungus. The final examination will focus on short answer questions requiring the student to synthesize information. The course will be offered every other spring semester even years. Expected enrollment is 10 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised preparation and presentation of materials in lectures and laboratories, preparation and supervision of exams and student consultation and evaluation.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 802 (AGBIO 802) Plant Protection: Responding to Introductions of Threatening Pests and Pathogens (3)** This course provides knowledge of plant biosecurity, plant disease, regulations, and technologies using case study examples.

**PPATH (AGBIO) 802 Plant Protection: Responding to Introductions of Threatening Pests and Pathogens (3)**

This course covers agricultural biosecurity relevant to plant based agriculture. Topics include the size and scope of plant agriculture domestically and globally, the concept of plant disease, threats to plant health, transmission of pests and pathogens and the role of government. Information on the regulatory component of plant protection will be included. Case studies of introductions of threatening pests and pathogens will be reviewed in depth and comprise the majority of the course. These cases are selected to represent different means of introduction and different types of pests of pathogens. Detection and tracking, sampling, response approaches, technologies, communication and outcomes will be considered and compared. Finally, an assessment of readiness for future introductions will be synthesized and presented.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PPATH 853 (TURF 853) Interpreting Turfgrass Science Literature (3)** Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results.

**PPATH (TURF) 853 Interpreting Turfgrass Science Literature (3)**

This course will provide an introduction to literature search in turfgrass management, identification of most pertinent peer-reviewed journals for each area of interest/specialty in turfgrass management, and utilization of other resources such as technical journals, trade journals, online and resident educational material resources, extension bulletins/circulars from various institutions/organizations that addresses various topics on turfgrass management. This course will prepare the students for analyzing research questions or rationale formulated by an investigator, for understanding how the study was devised to address the objectives adequately and the results were obtained and presented in the publication, and for identifying the take-home message in the publication. Emphasis will be made on the criteria used for data collection, the significance of methods employed in statistical analyses of the data, and presentation of results in the publications to effectively convey the information to readers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Political Science (PL SC)

**PL SC 403 The Legislative Process (3)** Analysis of the policy process within the legislative system; the effects of environmental factors on policy alternatives and legislative decision making.

**The Legislative Process (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 405 The American Presidency (3)** An examination of the selection methods for, and powers of, the American presidency, as well as other chief executives.

**The American Presidency (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 410 Strategy and Politics (3)** This course examines political behavior using social choice theory and game theory.

**PL SC 410 Strategy and Politics (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Strategic behavior is central to politics. It is common for political outcomes to be determined by the interaction of individuals seeking goals in an environment in which goal attainment is complicated by the choices of other actors. This course introduces various methods for analyzing strategic behavior using social choice and game theories. We will employ these approaches to better understand a wide range of political phenomena in international politics, comparative politics, and American politics, such as war, terrorism, voting, electoral competition, government formation, and democratic transitions. By the end of the course, students will, among other things, have experience using games to analyze a range of political behaviors and institutions. The course assumes no prior knowledge of social choice theory or game theory.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 411W Principles of International Cooperation (3)** An exploration of the forces that make conflict, or cooperation, more likely in international relations.

**PL SC 411W Principles of International Cooperation (3)**

This course explores the forces and conditions that make conflict, or cooperation, more likely in international relations. Since international anarchy prevents actors from trusting one another cooperation should be rare or nonexistent. In spite of the logic and prevalence of such arguments, international cooperation does exist. While there is no definitive explanation for the persistence of cooperation in a world without central authority, we will pursue several arguments about how and why it does emerge. These arguments are based upon characteristics of the international system along with concepts developed principally from game theoretic approaches to the study of politics. By the end of the course students should have a basic grasp of game theory in international relations as well as examples of cooperation and conflict around the world. The game theoretic approach will enable students to understand why countries with often common interests and good intentions nevertheless fail to cooperate. Students will be expected to write essays that demonstrate their mastery of these theoretical constructs and ability to apply them to real world situations about which they have done independent research.

Political Science 411W fulfills the related course requirements for the revised International Politics Major and International Relations and 400 level course requirement for the Political Science major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 412 International Political Economy (3)** The transnational politics of trade, investment, aid, raw materials, and the environment; nation-states, multinational corporations, and the U.N.

**PL SC 412 International Political Economy (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is an introduction to the scientific study of international political economy (IPE), an interdisciplinary field related to international politics and international economics. Some exemplary issues IPE addresses include the collective action problem among nation states, the management and openness of international economy, the determinants of foreign economic policies, and the causes and consequences of economic globalization. IPE examines the interaction between politics and economics at the international level as well as between the international and domestic levels, involving various political and economic actors (governments, MNSs, interest groups, as well as individuals). The course aims to develop the analytical skills of students in explaining theoretically international political and economic events.



General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 413** The Rise and Fall of the Soviet Union (3) Background, organization, and operation of the Communist Party and the government of the Soviet Union.

### **The Rise and Fall of the Soviet Union (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 414** Dictators and Their Demise (3) Dictators and Their Demise examines the political economy of authoritarian rule.

### **PL SC 414 Dictators and Their Demise (3)**

Dictators and Their Demise provides a broad exploration about how non-democratic governments throughout the world rule. We examine: the conditions that give rise to authoritarianism; the variety of authoritarian regimes; the strategies authoritarian leaders use to stay in power; the consequences of different types of authoritarianism for outcomes such as economic growth and human development; and the domestic and international sources of authoritarian demise. The course covers cases of authoritarian rule in: Chile, the Dominican Republic, Egypt, Malaysia, Mexico, and the former Zaire (now the Democratic Republic of the Congo or DRC).

The course builds knowledge about the governments under which most people in the Global South lived during the 20th century. Even today, roughly half of the world's population lives under some form of non-democratic government. Yet almost all courses currently in the curriculum, particularly in the field of comparative politics, focus exclusively on democratic forms of government. This course therefore examines a new topic not currently offered in the curriculum.

In addition to learning about different types of authoritarian rule, students form an understanding of how common foreign policy tools, such as economic sanctions, foreign aid, and human rights shaming, are likely to affect domestic politics in these countries. This knowledge helps students critically evaluate foreign policy relationships between democracies, such as the United States, and dictatorships.

Course materials cover theoretical approaches to the study of authoritarian rule, in-depth case studies (including novels, biographies, and documentary), and empirical research. This course requires student presentations, weekly reading assignments, descriptive analysis of quantitative data in graphs, multiple written assignments, and a final take-home essay exam. Students develop analytic skills through the weekly written homework assignments in which they apply the broad theoretical concepts to analyze counterfactual situations from specific cases of authoritarian rule. Oral presentations develop inter-personal skills and require students to research specific cases of authoritarian rule currently in the news. This helps students critically evaluate current events.

Finally, the written assignments require students to develop skills working with real data. Students collect and graphically present basic descriptive data about economic and human development in non-democratic countries: economic data, infant mortality, literacy, and indicators of women's well-being. Using real world data to make international comparisons helps students develop skills to form and articulate complex arguments, and teaches them the basics of research design.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 415** International Organization: Political and Security Functions (3) Theory and evolution of international organization; political and security functions of the United Nations and regional organizations.

### **International Organization: Political and Security Functions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 417** American Local Government and Administration (3) Organization, powers, functions, and problems of American cities and metropolitan areas; modern trends and developments.

**American Local Government and Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 418** International Relations Theory (3) A survey of traditional and contemporary conceptual frameworks and theoretical approaches for the analysis of international relations.

**International Relations Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 418W** International Relations Theory (3) A survey of traditional and contemporary conceptual frameworks and theoretical approaches for the analysis of international relations.

**International Relations Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 419** The Bureaucratic State (3) Overview of structural, technological, decision-making, behavioral, and political subsystems of bureaucracy; emphasis on bureaucratic dynamics within larger environmental, interorganizational contexts.

**The Bureaucratic State (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 420** State Making (3) Students learn about how national states arise, expand the territory and population they control, and persist or fail.

**State Making (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 422** Comparative Urban Politics (3) Relationships between structure and evolution of city systems and patterns of political behavior.

**Comparative Urban Politics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 423** Post-Soviet Politics (3) Aspects of political transition and institutions of the fifteen Soviet successor republics; emphasis on Russia and republican confederation.

### **Post-Soviet Politics (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 424** Topics in Comparative Government and Institutions (3) Topics in the comparative analysis of representative contemporary Western and non-Western governmental institutions.

### **Topics in Comparative Government and Institutions (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 425** Government and Politics of the American States (3) Comparative analysis of political processes; executive, legislative, and judicial decision making and behavior; examination of systems functioning; selected public policies.

### **Government and Politics of the American States (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 426** Political Parties and Interest Groups (3) Interest group basis of American politics, analysis of party and group behavior in electoral politics and the policy process.

### **Political Parties and Interest Groups (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 427** Political Opinion (3) Nature and development of mass attitudes and opinions; political socialization; voting behavior; relation between opinions and public policy.

### **Political Opinion (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 428 (US;IL) (WMNST 428)** Gender and Politics (3) Gender in politics in the United States and around the world; major areas of women and politics research.

### **PL SC (WMNST) 428 Gender and Politics (3) (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is designed as an overview to the field of women and politics. It examines the role that women play in politics in the United States and around the world. Students will begin by examining how women are socialized differently from men and how that socialization effects women's political attitudes and participation. Then students will focus on women in different political offices and how their behavior compares to that of their male counterparts. Students will then analyze the women's movement in the United States. Finally, students will turn to different theories of the ideal position of women and men in politics and use those theories to explore the issue of pornography. Students will be evaluated on a final exam, short essays ( 4 3-5 page essays), class participation, and a research paper (15 pages). This is an advanced course with 6 credits prerequisite in Women's Studies or Political Science. This course fulfills the American Politics and Comparative Politics distribution as well as the advanced course requirement for the Political Science major. It is an elective for a Women's Studies major. It also fulfills an International/Intercultural competency requirement. This course will be offered once a year with 35 seats per offering.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 429** Analysis of Electoral Politics (3) The new politics, its technology, and the strategic perspectives that underlie it.

**Analysis of Electoral Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 430** Selected Works in the History of Political Theory (3) Detailed examination and analysis of a selected major work, thinker, or tradition in the history of political theory.

**Selected Works in the History of Political Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 430W** Selected Works in the History of Political Theory (3) Detailed examination and analysis of a selected major work, thinker, or tradition in the history of political theory.

**PL SC 430W Selected Works in the History of Political Theory (3)**

The course will examine the tradition of "liberal" political philosophy, focusing principally on the social contract tradition in Western political philosophy. We will examine the work of the "classic" social contract theorists -Hobbes, Locke, Rousseau, and Kant - and discuss some more recent variants. We will then consider broad contemporary critiques of this tradition. In particular, we will consider charges of exclusion, parochialism, and biased conceptions of the self allegedly manifested in liberal theories, especially as those charges that center on considerations of race and gender.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 431** Ancient, Medieval, and Renaissance Political Theories (3) Political theories of Plato and Aristotle; selected Greek, Roman, medieval, and Renaissance theorists through Machiavelli.

**Ancient, Medieval, and Renaissance Political Theories (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 432** Modern and Contemporary Political Theories (3) Political theories of the seventeenth through the twentieth centuries, including Hobbes, Locke, Rousseau, Marx, Mill, Mosca, Weber, and selected theorists.

### **Modern and Contemporary Political Theories (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 433** Political Foundations of the Early American Republic (3) The course introduces students to the major political and philosophical movements that influenced the founders of the early American republic.

### **PL SC 433 Political Foundations of the Early American Republic (3)**

The course introduces students to the major political and philosophical movements that influenced the founders of the early American republic. The first section of the course, set in the ancient world, will examine the earliest experiments in democratic government in both Greece and the Roman Republic. In addition to studying the structure and traditions of ancient governments, students will consider competing theories for why these early democratic experiments ultimately failed. The second section of the course traces the gradual evolution of representative democracy in Britain from the signing of Magna Carta to the quiet subjugation of the monarchy in the 19th Century. Recognizing that the theoretical structures of political power remain somewhat fixed in this period, students will consider how legal precedent can gradually transform seemingly static political institutions. The third section of the course examines American efforts to establish stable representative institutions in the aftermath of the Revolutionary War. Looking back at both ancient and modern constitutional traditions, students will examine how prior democratic experiments heavily influenced the deliberations of the founders both at the Constitutional Convention and in the establishment of the new federal republic.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 434 (IL) (AFR 434)** War and Development in Africa (3) This course will examine the relationship between war and development in sub-Saharan Africa in the post colonial era.

### **PL SC (AAA S) 434 War and Development in Africa (3) (IL)**

This course will examine the relationship between development and war in sub-Saharan Africa in the modern era. Specifically, it will analyze the extent to which the processes of state building, nation building, and international intervention have contributed to the incidence of both civil war and international conflict in Africa. We will begin with a review of several theoretical arguments on the causes of warfare in Africa and then turn to a discussion of theses on African political development. This course complements present offerings in international relations and comparative politics in the PL SC department and can serve as an advanced undergraduate offering in the African Studies concentration in AAAS. The course directly complements our present offerings in international conflict given that we don't have a regularly offered course that focuses on conflict in a specific region. In addition, it will augment our comparative politics offerings with an examination of prominent issues in comparative politics such as political development, democracy, and modernization. The course will fulfill the IL requirement and encourage students understanding of the historical background as well as the political, economic, and cultural factors that influence African politics. African conflicts are often viewed as "ethnic conflicts" and in this class students have an opportunity to assess the extent to which ethnic, linguistic, or religious factors influence the likelihood of conflict and contribute to development in African states. Students will also be required to write essays evaluating the contribution of a range of theoretical arguments on Africa's conflicts in order to assess the degree to which cultural more than political or economic factors contribute to their onset. Students will then have the opportunity to conduct more extensive research on a specific African case to develop their analyses further. These exercises will often require that students reevaluate their beliefs about social identities such as race (e.g. in Rwanda the difference between Tutsi and Hutu is often viewed as a "racial" difference between black Africans, which is at odds with most Western conceptions of race). They also require students to challenge stereotypes regarding the subordination of African values in conflicts to a simple concern with "tribe". Students will gain a broader knowledge and appreciation of the different values, traditions, and cultures evident in Africa and understand how these can both exacerbate and mitigate conflict. Evaluation in the course will consist largely of examination of the students' brief expository essays and larger case studies for which students will be encouraged to conduct original research. The course should be offered biannually with a class limit of about 40 students.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 435** Foundations of American Political Theory (3) Political theories of colonial, revolutionary, and constitutional periods presented through works of selected thinkers and analysis of particular political problems.

### **Foundations of American Political Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 435W** Foundations of American Political Theory (3) Political theories of the revolutionary and constitutional periods presented through works of selected political thinkers and political issues.

### **Foundations of American Political Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 436** Civil Wars (3) This course examines factors influencing the onset, duration, severity, termination, recurrence, and consequences of civil wars around the world.

### **PL SC 436 Civil Wars (3)**

This course provides a broad exploration of the causes, characteristics, and consequences of civil wars. In particular, it investigates what makes civil wars more likely to occur, what influences how long they last, how severe they are, and how likely they are to recur, while also considering their consequences for the states that experience them. It considers the scholarly research on this topic over the past decade or more, and builds an awareness both for what are the known regularities as well as what are the continuing uncertainties about the place of civil war in the contemporary international system. It does this specifically within the context of scientific research about civil wars, and thus also advances student knowledge about how social scientists learn what they know about how the world works. Building on this perspective, and after absorbing the lessons to be learned from the literature, students will gain even greater appreciation for the quality of knowledge about civil wars by conducting their own detailed analysis of a civil war (each student will study one civil war of their choosing) asking how well the civil war they study fits patterns identified by the literature. This course complements, without duplicating, existing political science courses about militarized political conflict, and qualifies as one course majors can take to satisfy their 400-level course hours requirement. In addition to political science majors, it should be of interest to international politics majors, students in other social science majors, and perhaps Masters students in the School of International Affairs as well.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 437** War in World Politics (3) Causes, resolution, and consequences of crises and wars; testing theories of conflict using both case and statistical studies.

### **War in World Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1997  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 438** National Security Policies (3) Impact of national security on U.S. government and foreign policy; roles and interaction of President, Congress, government agencies, interest groups.

**National Security Policies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 439** (CRIMJ 439) The Politics of Terrorism (3) Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

**The Politics of Terrorism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 440** (US;IL) (AFR 440, I B 440) Globalization and Its Implications (3) This course explores the socioeconomic implications of globalization.

**PL SC (AAA S/I B) 440 Globalization and Its Implications (3)  
 (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores the socioeconomic implications of globalization and some fundamental changes that have taken place in the global socioeconomic system. The bipolar configuration of global power has been radically altered, market-state relations have been reformulated, and global systems of production and finance have been reorganized. Given these recent changes in the world's structure, globalization as a socioeconomic force is examined with a special emphasis on its implications on social issues, capital-labor relations, the roles of unions and trans-nationals, unemployment issues, poverty and inequality, gender and ethnicity issues, race relations, and democratization around the world. This course also allows students to explore how different countries, communities, social classes, business firms and even institutions are affected differently by globalization. The implications of globalization on African communities is given special attention.

The course is organized into three parts: A) The first part of the course attempts to define globalization and identify its essential characteristics in light of social and economic change. This part attempts to answer questions such as what constitutes globalization, how do we know if globalization is taking place, and what aspects of it are new. B) The second part of the course attempts to assess the implications of the different aspects of globalization (identified in the first part) on many critical social issues, including capital-labor relations, the roles of unions and transnational corporations, problems of unemployment, poverty and inequality, gender, ethnic, and race relations, and democratization. C) The third part of the course examines the implications of globalization to African communities.

This course exposes students to the economic, social, political, and cultural implications of the unfolding global order. It allows them to explore how different countries, communities, social classes, business firms and even institutions are affected differently by globalization. Evaluation will be based on daily attendance, along with a class presentation of a design of a research paper; an actual research paper, a mid-term exam and a final exam.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 441** Transnational Corporations and Other Organizations in International Relations (3) Analysis of the effects of transnational actor behavior on international relations.

**Transnational Corporations and Other Organizations in International Relations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 442** American Foreign Policy (3) Principles of American foreign policy; processes of policy formulation; roles of the President, Congress, the State Department, and other government agencies.

**American Foreign Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 443 (IL) (AFR 443)** Ethnic Conflict in Africa (3) This course explores the various causes and impacts of ethnic conflicts in the African context.

**PL SC (AAA S) 443 Ethnic Conflict in Africa (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Ethnic conflict is presently a pervasive worldwide phenomenon. Ethnic groups in various regions of the world contest the terms of their incorporation into the 'nation' state and the world order. Such contests have often erupted into violent conflicts crossing national borders. The objectives of this course are to examine the problems of state building, the evolving nature of the state, and ethnic conflicts in the African context. The course explores the factors that contribute to violent ethnic conflicts and the factors that mitigate such conflicts. The course largely evolves around the following two general questions. What are the most important internal and external factors that cause ethnic conflicts? The second is what political systems and arrangements tend to mitigate or resolve ethnic conflicts? In an effort to deal with these two general questions the course examines a number of case studies from different parts of Africa. The course is organized into three parts. The first part surveys general theories on the causes of ethnic conflicts and how democracy relates to ethnic conflict. The second part examines several case studies from Africa and attempt to construct a general hypothesis on the major causes of ethnic conflicts and how democratization or lack of it impacts the conflicts. The third part examines measures that may contribute in the resolution of ethnic conflicts and enhance the process of state building in Africa. Students in groups of two or three will choose a case and give a class presentation on the most important issues involved in a given conflict.

This course compliments other courses that deal with African politics, politics of developing areas, and social movements. It also supplements courses in African and African American Studies, Sociology, and Political Science that deal with issues of ethnic and race relations, as well as issues of nation building (state building).

This course exposes students to the various internal and external factors that precipitate ethnic conflicts in Africa and the economic, social, and political implications of these conflicts. It allows students to explore how different states attempt to address the problem. Evaluation will be based on attendance (5%), a class presentation of a design of a research paper (10%), a research paper (35%), a mid-term exam (25%) and a final exam (25%). This course will be offered once a year.

General Education: None  
Diversity: IL  
Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 444** Government and the Economy (3) Interactions of governmental and economic activity in American life. Survey of governmental (national, state, local) promotional, regulatory, and ownership policies.

**Government and the Economy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 445Y (US) (AF AM 445Y, LER 445Y)** Politics of Affirmative Action (3) Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S.

**PL SC (AAA S /LER) 445Y Politics of Affirmative Action (3)  
(US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**



The objectives of this course are to introduce students to the relationship between affirmative action and other policies purportedly designed to end racial inequality in the U.S. This course approaches the study of affirmative action in the context of the historic racial discrimination and inequality that Black Americans have faced since the founding of the Nation. The purpose of this course is to help students think about how contemporary and historic affirmative action policies relate to race, concepts racial inequality, the historic and continuing causes for racial inequality, public opinion, American politics and economic thought. The course materials will lead students through scholarly and popular articles, books and video presentations on the topic. It is hoped that students will become familiar with the history of affirmative action from its conception. Students will gain an intimate understanding of affirmative action economic and social outcomes on various racial groups. No prior knowledge is assumed, however a knowledge of civil rights history, quantitative methods, and constitutional law will be useful. The Politics of Affirmative Action satisfies the requirements for major and minor electives for the African American Studies, and major and minor electives for Political Science, and Labor Studies and Industrial Relations. Students are evaluated on the basis of an examination, term paper, class participation and class presentations of papers.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 450H Genocide and Tyranny (3)** This course focuses on the conceptualization and socio-political determinants of genocide and tyrannical regimes, with an emphasis on the Holocaust.

### **Genocide and Tyranny (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 452 Government and Politics of Central Europe (3)** Politics and society in the Communist Era, the revolutions of 1989, and problems of adjustment to democracy and market.

### **Government and Politics of Central Europe (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 453 (IL) Political Processes in Underdeveloped Systems (3)** Comparative analysis of the political, social, and economic problems characteristic of underdeveloped systems.

### **Political Processes in Underdeveloped Systems (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 454 (IL) (AFR 454) Government and Politics of Africa (3)** Contemporary African politics, institutions, and ideologies; patterns of change, social forces, and nation building in selected African states.

### **PL SC (AAA S) 454 Government and Politics of Africa (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In this course, we will discuss the current democratization trend in Africa by focusing on the experiences of African countries.

The course is divided into three sections. Part One considers a range of factors that affect politics in Africa. We will discuss in depth the following factors: colonialism, nationalism, the relationship between state and society, ruler-ship, the military, political parties, and economic development. Then, we will consider the experiences of our four cases, to gain a

historical background. In part two, we will focus on democratic transitions. We will discuss the factors that enable transitions to occur, as well as the process that transitions follow. Then, we will consider four transitions: two that resulted in the installation of a democratic government (Nigeria in 1979, Sudan in 1986) and two that ended in continued authoritarianism (Angola in 1992, Kenya in 1978). Part three considers the prospects of democracy. We will discuss the probability of a democratic transition occurring in the near future.

The goals of this class are four fold. First, students will gain detailed knowledge about four African countries. Second, we will learn how to compare countries. Third, students will have a better understanding of the democratization process in general, and will be able to explain or predict democratization beyond the four cases discussed in this class. Finally, the experiences of these four countries offer a deeper understanding of what democracy is and provide students with greater flexibility to fulfill requirements in either the African and African American Studies major or the Political Science/International Politics major. PL SC 454 will be offered once per year with 35-50 seats per offering.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 455** Governments and Politics of Western Europe (3) Comparative analysis of political and governmental structures of major West European nations; main functions and processes of such structures.

### **Governments and Politics of Western Europe (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 456** Politics and Institutions of Latin-American Nations (3) Social forces and processes, governmental institutions, foreign policies of major states of Latin America.

### **Politics and Institutions of Latin-American Nations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 457** International Politics of Latin America (3-6) Relationships among the nations of Latin America and the social forces which determine and shape their direction.

### **International Politics of Latin America (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 458** Government and Politics of East Asia (3-6) Examination of political institutions, democratic and communist revolution, political leadership, political processes of major states of East Asia.

### **Government and Politics of East Asia (3-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Other Cultures and Social and Behavioral Sciences  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 459** (IL) (AFR 459) Culture and World Politics (3) Role of culture in world politics.

**PL SC (AAA S) 459 Culture and World Politics (3)  
(IL)**

This course examines the role of culture in world politics through an analysis of the varying dimensions of culture and their respective impact on the likelihood of cooperation and conflict among the state and non-state actors in the global system. Specifically, we examine the impact of culture in terms of social boundaries, political associations and the likelihood of an emergent global culture defined largely in terms of customs and practices related to international trade and economic production. We also examine the role of culture as a mechanism for the dissemination and maintenance of patterns of hierarchy. Integrating these different conceptions of culture, we examine the relationship between culture and foreign policy in the US.

General Education: None  
Diversity: IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 460** (S T S 460) Science, Technology, and Public Policy (3) The all-pervasive importance of science and technology policy in modern societies and mechanisms and processes by which it is made.

**Science, Technology, and Public Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 461** (IL) Politics of the European Union (3) This course introduces students to the history, institutions and politics of the European Union.

**PL SC 461 Politics of the European Union (3)  
(IL)**

This course introduces students to the history, institutions and politics of the European Union. We will survey the central theories of political and economic integration, and compare them to how European integration has unfolded. We will analyze the EU's institutions and political processes, and review major EU policy areas.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 462** Marxist and Socialist Political Theory (3) Analysis of major problems and key works in the Marxist and Socialist tradition; dialectical materialism, alienation, class warfare, etc.

**Marxist and Socialist Political Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 464** (IL) (AFR 464) Globalization, Extractive Industries, and Conflict in Africa (3) Socioeconomic and environmental impacts of extractive industries in Africa.

**PL SC (AAA S) 464 Globalization, Extractive Industries, and Conflicts in Africa (3) (IL)**

Globalization has brought increased investments in extractive industries in many African countries. Investments in extractive industries are also likely to continue to increase rather rapidly, given the rising intensity in the competition for African resources, brought about by growing involvement of countries, such as China and India. The terms African countries obtain from corporations for mineral rights have been generally unfavorable. The unfolding competition for African resources brought about by investments from China and India may, however, help African governments to renegotiate the terms of mining concessions corporations to obtain better deals for their resources. Despite the rather poor terms African governments currently have, investments in extractive industries have stimulated economic growth in several countries. Some African countries, including Equatorial Guinea, Botswana, Gabon, Angola, Cameroon, and the Sudan, are experiencing what might be regarded as resource-based economic boom.

Such growth has, however, intensified compulsory acquisition of communal lands by African governments for concessions to extractive industries exposing large numbers of rural communities to evictions from the land they traditionally owned. The expropriations, which purportedly take place for public and development purposes, have led to serious socioeconomic problems, including unemployment and poverty of those evicted from their land, disintegration of traditional institutions of governance, civil wars, communal conflicts, human rights violations, high levels of corruption, and alarming rates of environmental degradation. The conflicts have ravaged many African counties and are likely to continue to occur until mechanisms that allow rural communities to become partners of the transformation are developed. This course examines the socioeconomic and environmental problems associated with land expropriations and extractive industries.

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 467** International Relations of the Middle East (3) The international relations of the Middle East, stressing national security policies of regional and outside actors, and major contemporary conflicts.

**International Relations of the Middle East (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 1985

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 470W** Legal Brief Writing (3) Writing of legal briefs as practiced in American courts.

**Legal Brief Writing (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 1998

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 471** American Constitutional Law (3) The origins of judicial review, landmark decisions of the Supreme Court, and their impact on the American form of government.

**American Constitutional Law (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 472** The American Legal Process (3) Analysis of the roles, procedures, and policies characterizing the American legal system.

**The American Legal Process (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 473** American Judicial Behavior (3) Analyzes behavior of judges and other participants in the legal process; examines how and why courts function as policymaking bodies.

**American Judicial Behavior (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 474** Civil Liberties and Due Process (3) Fundamental problems relating to civil liberties and due process.

**Civil Liberties and Due Process (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 480W** Congress and the Presidency (3) Basic characteristics and processes of the national legislature and executive; roles and interaction of these institutions in the policy process.

**Congress and the Presidency (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 481** Global Political Economy (3) This course examines states, markets, power, production, and the relations between the various transnational agents who act in these areas. Students may not receive credit for PL SC 481 and PL SC 412.

**PL SC 481 Global Political Economy (3)**

Changes in the international system in the 1970s led to increased interest on the part of students of international relations in the political economic processes underlying change. Important debates among scholars in both mainstream theoretical traditions and in critical theory gave rise to International Political Economy as an increasingly visible sub-field in International Relations. This seminar tracks the historical relations between the development of capitalism as an economic system and the emergence and transformation of global politics, using concepts developed in the study of political economy. Seminar discussion, examinations, and a short research paper will be used to evaluate students' learning.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 482** American State and Urban Politics (3) Explores basic characteristics and processes of American state and urban politics; nature of intergovernmental relations involving these governmental levels.

**American State and Urban Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 484W** The Foreign Policy of Soviet Successor States (3) Relations between Russia and The Newly Independent States (NIS); Russia's relations with selected foreign states and political Institutions; regional impact of the NIS in Baltic, Asian, and Central Asian areas.

**The Foreign Policy of Soviet Successor States (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 486 (IL)** (HIST 489, ASIA 489) International Culture in East Asia (3) Study of the role of culture in East Asian regional and East-West international relations.

**PL SC 486 (ASIA 489/HIST 489) International Culture in East Asia (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will examine the place of culture in international history through a comparative look at the role of cultural circulation and exchange in relations among China, Korea, and Japan (and between East Asia and the West) from the propagation of Buddhism in the first century A.D. to present-day circulation of popular music, movies, and comics. We will explore the international politics of culture and the politics of international culture, considering questions of what constitutes culture, whether it is ever entirely separate from politics, and how that separation has evolved over time. These larger themes of the course will be tackled by following the historical movement of concrete objects and people throughout the region. This is a course in international history; historical events, problems, and issues will be at the center of our weekly discussions. But it also seeks to explore aspects of international relations.

This course is intended to examine the role of cultural exchange in international relations. The goals of the class are not only to gain an understanding of the uses and impact of culture in international relations, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through readings, discussions, presentations, and the final project, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing.

Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen student's appreciation of the assigned readings, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytic and expressive abilities. Evaluation will emphasize student performance on a day-to-day basis and as expressed in a final research project. A possible break down would be as follows:

This course is designed to respond to strong student interest in East Asian international history. This course will complement and extend popular survey and upper-level courses such as HIST 172/174/175/480/481/483/484/485/486.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 487** International Law and Organizations (3) Major topics and issues of international law with special attention to institutional arrangements (international organizations) through which that law operates.

**PL SC 487 International Law and Organizations (3)**

The course is useful in two distinct ways. First, it aids in the understanding of how countries conduct their relations with one another. Second, studying international law--it is a distinct system of law-- helps students to assess whether they might be suited for law school.

The course introduces international law and international governmental organizations (the two are closely linked) and

their role in the management of peaceful relations among countries as well as during international conflict. Both the contributions and limitations of international law will be analyzed. International law is viewed both as a body of norms countries feel an obligation to follow and as a means of communication among countries.

Major topics covered include sources of international law, human rights law, environmental law, economic law, law of the sea, and the use of force. There are several hundred major intergovernmental organizations. Several of the most prominent will be discussed including the UN, the WTO, the European Union, the International Labor Organization, and the International Court of Justice.

Examinations are principally of the essay variety although a command of factual information is essential to success in the course. Students also prepare critiques of important international legal cases (many of which have been decided by national courts) and of treaties (the principal modern manifestation of international law).

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 488 Comparative Public Policy (3)** Comparative methodology and public policy implementation in postindustrial societies; selected case studies of policy output.

### **PL SC 488 Comparative Public Policy (3)**

Comparative Public Policy is an upper level political science course that includes components of comparative politics, public administration, and descriptive economics. The course presumes that developed industrial democracies confront common challenges in meeting human needs and that policy comparison is worthwhile despite distinctive societies and political cultures. For example, government involvement in the provision of health care varies widely from Britain's National Health Service to the largely private approach of the United States. Nevertheless all health care systems confront rising technology costs, an ageing population, and rising performance expectations. A primary purpose of the course is to consider the origin and development of individual country programs while assessing the common challenges. Cross national comparison becomes relevant to the course by including some available data on costs, implementation and outcomes. Because the course includes about six distinct areas, e.g., education, taxation, urban planning income support, and overall macroeconomic policy, the course will depict profiles of policymaking in Europe, North America and Japan. Ideally comparison should help students to evaluate the effectiveness of policy choices of a particular country and government.

A second objective of the course will be to examine the national approaches to the relationship between the state and private economic activity. Not only does government expenditure amount to nearly half of some country's total output, government choices create distinctive legal environments for business activity. Antitrust, health, wage, and consumer regulation offer an excellent point of comparing different incentives for economic activity in the United States and Europe. Apart from policy choices mentioned in the first paragraph, the regulation of economic activity has cumulative results for employment and the distribution of income. This portion of the course is intended to be somewhat more elementary than the first because of the probability that students will be less familiar with its content. The primary objective will be to help students understand the variations among market economies and reasons for their description as "neo-liberal," "social market," or "corporatist."

Finally, the course will examine some current ideas about recent changes in the global economy and their consequences for national policy. Clearly "globalization" has become a matter of political concern owing to its consequences for the creation of wealth, employment, growth and distribution. While the course cannot devote detailed or exclusive to the European Union, Europe's response to rapid movements in short term capital and investment presents an interesting point of comparison with the United States and Japan. The course should enable students to understand the meaning and criticism of "globalization" as a factor in shaping some national policies.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 489 Public Administration (3)** A survey of the major approaches to the management of most governmental agencies.

### **PL SC 489 Public Administration (3)**

Government Management is a three-credit Political Science course that teaches the role and function of bureaucracy. Although some investigation is made about state and local government functions, the primary focus of the course is on the federal bureaucracy. In particular, the course illustrates how the interrelationship between the three branches of government exists using the various federal agencies as functionaries.

The course first examines the basic functions of bureaucratic agencies in the modern world; primarily their distributive, re-distributive and regulatory activities. In addition to these functions, the various external and internal political forces

that form the mission of the agencies are examined. Next the internal function of a bureaucracy is examined by highlighting the various roles of the people who comprise a typical large agency. The roles of the political appointee, the career professional, the general civil servant and the union laborer are examined, with the GS system of the federal government used as a guide to show the hierarchy that exists in a large agency.

By highlighting both the functions of a typical agency and examining its role in the larger government structure, and by looking inside the bureaucracy to see the various short and long term roles of the people who comprise those agencies, the student appreciates how large bureaucracies are at the same time always changing, and always staying the same.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 490** Policy Making and Evaluation (3) Advanced analysis of public policy, emphasizing policy evaluation and the factors that determine policy success and failure.

### **Policy Making and Evaluation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 491** Peace and Conflict Studies Seminar (3) Advanced study of major contemporary issues of peace and conflict; includes anthropological, technological, psychological, and economic perspectives.

### **Peace and Conflict Studies Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 495** Political Science Internship (1-6) Combining experience in government offices, related agencies, or law firms, with appropriate readings and a research paper/report.

### **Political Science Internship (1-6)**

General Education: None



Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497A** Post-Communist Transitions (3) This course explores their different reform (or non-reform) paths, asking what conditions have helped to promote or retard political and economical change.

### **Post-Communist Transitions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497A** Post-Communist Transitions (3) This course explores their different reform (or non-reform) paths, asking what conditions have helped to promote or retard political and economical change.

### **Post-Communist Transitions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497B** Democratization in Asia (3) This seminar addresses the literature on democracy and democratization and then applies it in Asia. Since 1974, over thirty countries around the world started a transition toward democracy. As a result of these dramatic events, comparative scholars have studied these, and earlier transition cases, to understand why some countries become democratic while others do not, and why some new democracies show signs of consolidating while others collapse. This seminar then, addresses the recent work in the field of democratization. First, we will review works that define and measure key concepts, such as authoritarianism, democracy, and democratic consolidation. Then, we will consider a range of factors to explain the installation, consolidation, or failure of democracy in specific Asian countries. The goals of this seminar are three-fold.

### **Democratization in Asia (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497B** Democratization in Asia (3) This seminar addresses the literature on democracy and democratization and then applies it in Asia. Since 1974, over thirty countries around the world started a transition toward democracy. As a result of these dramatic events, comparative scholars have studied these, and earlier transition cases, to understand why some countries become democratic while others do not, and why some new democracies who signs of consolidating while others collapse. This seminar then, addresses the recent work in the field of democratization. First, we will review works that define and measure key concepts, such as authoritarianism, democracy, and democratic consolidation. Then, we will consider a range of factors to explain the installation, consolidation, or failure of democracy in specific Asian countries. The goals of this seminar are three-fold.

### **Democratization in Asia (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497C** The Politics of Human Rights (3) This course examines the politics of human rights and repression, focusing on the causes and consequences of human rights violations. The core questions considered include: Are human rights universal? Why do governments choose to repress individuals within their jurisdiction? Have level of repression changed over time? What strategies have international institutions, non-state actors, and individuals used to uncover and reduce the use of repressive actions? Students will learn to identify and critically evaluate human rights issues as they arise in different time periods and regions of the world. Course material will draw from the diverse research methodologies that have been applied to the study of human rights.

### **The Politics of Human Rights (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497C** The Politics of Human Rights (3) This course examines the politics of human rights and repression, focusing on the causes and consequences of human rights violations. The core questions considered include: Are human rights universal? Why do governments choose to repress individuals within their jurisdiction? Have level of repression changed over time? What strategies have international institutions, non-state actors, and individuals used to uncover and reduce the use of repressive actions? Students will learn to identify and critically evaluate human rights issues as they arise in different time periods and regions of the world. Course material will draw from the diverse research methodologies that have been applied to the study of human rights.

### **The Politics of Human Rights (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497D** Political Psychology (3) This course will present a genuinely interdisciplinary approach to the study of political psychology. We will draw on work in social, developmental and clinical psychology, as well the cognitive neurosciences, biological anthropology, genetics, evolution and behavioral economics to examine existing problems relevant to the field. Specifically, this class will investigate how political elites and the mass publics think and act, including the reasoning processes that come into play when human beings try to make sense of their political world. We will address political world. We will address political identity, cooperation, risk and conflict. We will look at leaders and leadership, motivation, and intergroup behavior.

### **Political Psychology (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497D** Political Psychology (3) This course will present a genuinely interdisciplinary approach to the study of political psychology. We will draw on work in social, developmental and clinical psychology, as well the cognitive neurosciences, biological anthropology, genetics, evolution and behavioral economics to examine existing problems relevant to the field. Specifically, this class will investigate how political elites and the mass publics think and act, including the reasoning processes that come into play when human beings try to make sense of their political world. We will address political world. We will address political identity, cooperation, risk and conflict. We will look at leaders and leadership, motivation, and intergroup behavior.

### **Political Psychology (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497E** Political Representation (3) Purpose of course is to acquaint students with significant concepts and ideas regarding political representation. Questions pertaining to the representation of citizens' interests and to the responsiveness of government to citizen preferences are central to our understanding of American politics. Indeed, assessments of the nature and quality of democratic governance hinge, at least to some extent, on the degree to which government officials are responsive to citizen concerns and attentive to their interests. Throughout the course we will be attentive to how normative considerations shape expectations about representation in practice.

### **Political Representation (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497E** Political Representation (3) Purpose of course is to acquaint students with significant concepts and ideas regarding political representation. Questions pertaining to the representation of citizens' interests and to the responsiveness of government to citizen preferences are central to our understanding of American politics. Indeed, assessments of the nature and quality of democratic governance hinge, at least to some extent, on the degree to which government officials are responsive to citizen concerns and attentive to their interests. Throughout the course we will be attentive to how normative considerations shape expectations about representation in practice.

### **Political Representation (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497F** Business-Government Relations (3) In this class, we will study what drives the structure and behavior of business relations with governments in various kinds of political systems. We will trace the nature of business-government interactions throughout the political process from election campaigns to policy formulation, and throughout the policy process from design to implementation. We will use cases from developed and developing countries and analyze three policy cases using the tools we develop.

### **Business-Government Relations (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497F** Business-Government Relations (3) In this class, we will study what drives the structure and behavior of business relations with governments in various kinds of political systems. We will trace the nature of business-government interactions throughout the political process from election campaigns to policy formulation, and throughout the policy process from design to implementation. We will use cases from developed and developing countries and analyze three policy cases using the tools we develop.

### **Business-Government Relations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497G** Introduction to Chinese Politics (3) This class aims to provide an overview of the politics of modern China. We will begin our study of Chinese Politics from the last years of the Ming dynasty and the rise of modern Chinese nationalism, the evolution of the Chinese Communist Party and, the emergence of the People's Republic of China. We will then explore in detail the main political event, the political dynamics driving them and the challenges the PRC has faced in subsequent decades. We will focus on three central themes - the state of economic development, political reforms over the years and, China's changing role within global politics.

### **Introduction to Chinese Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497H** Analysis of US National Elections (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Analysis of US National Elections (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 497I** Politics and the Media (3) This course is designed to introduce students to the interactive dynamics of the news media and the political system. We focus primarily on the news media as it is the dominant medium for political communication. We also examine the relationship between the historical development of mass media and its impact on democratic communication.

### **Politics and the Media (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 499** (IL) Foreign Study--Government (1-12) Study, in selected foreign countries, of political institutions.

### **Foreign Study--Government (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 501** Methods of Political Analysis (3) Survey of important methods and approaches to the study of politics; introduction to research design.

### **Methods of Political Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 502** Statistical Methods for Political Research (3) Basic concepts of statistics and their use in political research; data analysis, casual inference, regression analysis, computer applications.

**Statistical Methods for Political Research (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 503** Multivariate Analysis for Political Research (3) Analysis of selected issues in quantitative political analysis; introduction to advanced multivariate analysis techniques.

**PL SC 503 Multivariate Analysis for Political Research (3)**

This course is part of the methods sequence required of doctoral students in political science. The prerequisites are PL SC 501 and PL SC 502. The course has three objectives. First, students will acquire a theoretical/mathematical understanding of multivariate regression analysis. Such understanding is fundamental to applying appropriate applications of quantitative methodology to substantive problems. Students must acquire clear and correct conceptual understanding of the statistical ideas behind the mathematics in order to succeed in this course. Second, students will learn to program in SAS to relate statistical ideas to practice and develop a set of programming skills that will benefit their research over the long run. They are expected to acquire proficiency in SAS in terms of data management and statistical analysis, which will be useful when they find the need to pick up some other statistical software package in the future. Third, students will gain experience in quantitative research by applying their statistical and computing skills to substantive problems in political science. Students should aim at producing publishable quality work. They would also develop the ability to evaluate other scholars' use of quantitative methods.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 511** Professional Norms in Political Science (1.5) An introduction to professional norms, the fundamentals of good research, and the basic skills necessary for good teaching.

**PL SC 511 Professional Norms in Political Science (1.5)**

This course is the first of two courses in a required series on professional development in the graduate program in political science. The first course focuses specifically on fundamental knowledge and skills that will help graduate students throughout graduate school but also in their later careers as a scholar. The topics over the course of the semester fall into three main themes: 1) understanding the norms and requirements of the profession; 2) the fundamentals of good research; and 3) an introduction to teaching. Professionalization topics include planning your graduate school years, putting together a curriculum vita, communicating with senior scholars, and writing the MA; teaching topics including planning a course and recitation sections, preparing lectures or discussion classes, as well as documenting your teaching; and the research fundamentals that we will discuss include defining problems, crafting arguments, outlining and revising manuscripts.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 513** Writing and Professional Development in Political Science (1.5) Professional development focusing on publishing research, writing dissertations, and professional issues of advanced graduate students.

**PL SC 513 Writing and Professional Development in Political Science (1.5)**

This course is designed to help advanced graduate students surmount the challenges they face as they turn to writing a dissertation and prepare to become junior faculty. The course is designed to give practical advice on many of the issues faced by these students. Primary among these is learning to turn initial papers into research publishable in high quality peer reviewed journals. The course also focuses on practical advice on finishing comprehensive exams, starting a dissertation and early preparation for the job market.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 518** (SOC 518) Survey Methods I: Survey Design (3) Research design of social, behavioral and health surveys.

**PL SC (SOC) 518 Survey Methods I: Survey Design (3)**

This course is intended to provide graduate students the background to both evaluate published research using survey methods, and -- when combined with additional training -- to design their own surveys to collect data for their own research. Students will learn the essentials of sampling, questionnaire design, and how surveys may be implemented in different modes: telephone, face to face interviews, mail or other self-administered modes, and the internet. The course will emphasize how decisions of research design have important implications for the validity, reliability, and quantity of data that will be analyzed to answer key questions in the social, behavioral and health sciences. Sample design: 2 weeks; Questionnaire design and item analysis: 2 weeks; Telephone Surveys: 2 weeks; Face to face surveys: 2 weeks; Self administered and mail surveys: 2 weeks; Internet Surveys: 2 weeks; Ethics and human subjects protection: 1 week.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 519** (SOC 519) Survey Methods II: Analysis of Survey Data (3) Intermediate course on the statistical analysis of survey data: topics include weighting, complex surveys, missing data, and contextual analysis.

**PL SC (SOC) 519 Survey Methods II: Analysis of Survey Data (3)**

This is an intermediate level course in quantitative analysis. It is intended for graduate students who have completed 1-2 semesters of graduate-level statistics (not general research methods) and who are interested in the application of social statistics to the unique aspects of data collected by way of surveys. Surveys have a combination of qualities that represent challenges to valid inference. These include cluster and stratified sampling, under-representation of some groups due to differential response rates, missing data due to item non-response, cross-sectional design, and coarse measurement. Quite often we use surveys to test theories that the original survey designer did not intend to address, raising issues of validity and reliability of measurement. At the same time, surveys offer a number of opportunities and, when combined with other surveys (pooled cross sections) or merged with contextual data, can address a wide range of theoretical puzzles in the social sciences. This course provides an introduction to techniques in applied statistics that have developed specifically to address the special features of survey data. Examples of such techniques are: use of design weights, post-stratification weights, merging surveys with other surveys or auxiliary data, missing data imputation, challenges of causal inference. The class will blend an understanding of the core statistical issues with an emphasis on acquiring an intuition for the theory underlying the statistical models rather than focusing on proofs and estimation. This will provide a foundation for frequent hands-on applications in this seminar and for enrollment in more advanced or more in-depth courses offered by the Statistics department and the various social science departments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 534** (AFR 534) Political Economy of Energy and Extractive Industries in Africa (Oil and Mining) (3) Students will examine how the expansion of petroleum and mining industries has impacted Africa's political economics and external relations.

**Political Economy of Energy and Extractive Industries in Africa (Oil and Mining) (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 540** American Government and Politics (3) Survey of basic literature in major fields of U.S. government: public opinion, parties, voting, interest groups, presidency, congress, judiciary.

**American Government and Politics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 541** American Political Institutions (3-9) Research on a selected topic in United States political institutions such as the presidency, the courts, congress, bureaucracy, state governments.

**American Political Institutions (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 542** American Political Behavior (3 per semester/maximum of 9) Research on a selected topic in United States political behavior such as public opinion, voting, parties, socialization, judicial behavior.

**American Political Behavior (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 550** Comparative Politics: Theory and Methodology (3) Survey of basic literature and major research efforts in comparative political analysis.

**Comparative Politics: Theory and Methodology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 551** Comparative Political Institutions (3 per semester/maximum of 9) Comparative study of the institutional structures of different political systems: the state, party systems, administrative structures.

**Comparative Political Institutions (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 552** Comparative Political Behavior (3 per semester, maximum of 9) Research on aspects of comparative political behavior, such as political culture, political change and development, interest groups, public opinion.

**PL SC 552 Comparative Political Behavior (3 per semester/maximum of 9)**

This course will explore the nature of social movements and revolutions. We will look at the major theories that sociologists and political scientists have created to explain the development and outcomes of social movements and revolutions. How do we explain why people participate in revolutions or social movements? Why is it that some people never revolt although observers would say they are as bad off as others that do? What sorts of factors determine the tactics people will use once they decide something must be done? Can governments repress revolutions or social movements? What determines whether a social movement or revolution is successful? In examining these questions we

will read theoretical works, quantitative studies comparing many different social movements or revolutions, and case studies of particular social movements and revolutions. By the end of this course, you should have a good grasp of the theoretical debates about social movements and the methods which have been used to study revolutions and social movements, and you will have cursory knowledge of several different revolutions and social movements ranging from the French Revolution to the American Civil Rights Movement. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 553 Studies in Regional Politics (3 per semester/maximum of 9)** Research on political systems in selected regions of the world, such as Europe, Latin America, East and South Asia.

**Studies in Regional Politics (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 554 The Politics of Development (3)** The course explores the origins of modernity, its proliferation globally, and problems associated with initiating and sustaining development.

**PL SC 554 The Politics of Development (3)**

This graduate seminar is intended to provide a long-term and in-depth guide to questions of development in a global perspective. It begins with a consideration of the rise of modernity in political, economic, and social terms in the West. It then looks at how modernity proliferated globally through interstate conflict, reform and revolution across the great powers and then via colonization to other non-western areas of the globe. It then turns to several central topics in research about development in the social sciences. It begins with large statistical models about the sources of growth from economics. The next topic is how the political system affects economies by considering the impact of regime and state policies. A series of the topics are geared toward understanding non-mainstream conceptions of development including alternative ways of thinking about development (human capital, capabilities, freedom), does economic dependence matter, the role of gender in development, and post-modernity. The course concludes with a discussion of the current period of neoliberal globalization, exploring how it creates a more integrated world economy, but with consideration of certain negative externalities (inequality, vulnerability to external shocks, social disintegration, and institutional ). The course has been designed to expand the substantive, thematic offerings available to students studying comparative politics. This is a graduate course intended for majors and minors in the field of comparative politics. It is intended to develop competence in the literature to help students develop their own research questions and competence in the area, and to allow students whose primary research focus is elsewhere to integrate a developmental perspective into their other work. Student evaluation will be on a research paper.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 555 Comparative Regimes (3 per semester/maximum of 9)** This course provides an overview of comparative analyses of regimes as they relate to the field of political science.

**PL SC 555 Comparative Regimes (3 per semester/maximum of 9)**

This course focuses on the comparative study of particular types of regimes, including democracies and authoritarian regimes. It is designed for Ph.D. or M.A. students who have completed the foundational graduate statistical methods courses. The course examines current research on both the institutional structures of different political systems (e.g. the state, party systems, administrative structures) and on aspects of political behavior (such as political participation, interest groups and social movements, public opinion). Topics include theories of regimes, measures and typologies of regimes; formal theories of regimes; political institutions (legislatures, parties, and elections); political behavior; consequences of regimes for economics; and regimes place in current international relations research. Building on this literature, students will be expected to conduct replications or original research focused on these regimes.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 556 Civil Conflict (3)** This class addresses civil conflict, in terms of general theory regarding cooperation and conflict and also cross-regional cases of civil conflict.

**Civil Conflict (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 560 International Relations: Theory and Methodology (3)** Survey of major traditional and contemporary theory-building efforts and contemporary research techniques and orientations in international relations.

**International Relations: Theory and Methodology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 561 American Foreign Policy (3 per semester/maximum of 9)** Research on the institutions, dynamics, and major themes of United States foreign policy.

**PL SC 561 American Foreign Policy (3 per semester/maximum of 9)**

This course is an advanced option for graduate students in political science studying international relations. The course surveys important themes in U.S. foreign policy, including how that policy is made, the implementation of policy, and critiques of U.S. foreign policy. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 563 International Political Economy (3 per semester, maximum of 9)** Research on international political economy with a focus on theory building; analysis of political causes and consequences of economic behavior.

**PL SC 563 International Political Economy (3 per semester/maximum of 9)**

This course is a graduate seminar on international political economy. Topics covered include the major theoretical perspectives in international political economy and the political economy of international trade, finance, investment, and monetary policy. The aim is to familiarize students with theoretical and empirical literature in the field of international political economy. Students are expected to engage in constructive dialogues across the disciplinary boundaries of economics and political science, across different research methods, and among themselves, with the goal of producing publishable work. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 564 International Organization (3 per semester/maximum of 6)** Research on international governmental and non-governmental organizations in the international system, emphasizing the United Nations and collective security.

**International Organization (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 565** International Conflict (3) Research into the causes and consequences of international crises and wars, using various methodologies for theory assessment.

**International Conflict (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 566** Conflict Management, Termination, and Bargaining (3) Research on termination and resolution of international conflicts, focusing on theory building and empirical assessment of theories of conflict resolution.

**PL SC 566 Conflict Management, Termination, and Bargaining (3)**

This graduate seminar introduces and examines the dominant theories, hypotheses, and research concerning the termination and resolution of international and civil wars. Topics include international mediation, rational bargaining theory, conflict resolution vs. termination, third party intervention, peacekeeping, and peace duration. The focus is theoretical and research oriented; arguments about the causes of conflict resolution are assessed both logically and empirically, using both case study and statistical methods. The course examines whether and how theories of conflict management have been tested, and allows/encourages students to develop their own testable hypotheses about conflict management and termination. Existing research (primarily from political science, but also drawing on economics) is evaluated on its merits, and students then seek appropriate ways to extend that research.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 580** Modern Democratic Political Theory (3) Survey of major themes and problems in modern theories of democratic politics.

**PL SC 580 Modern Democratic Political Thought (3)**

This core seminar in political theory explores the continuing evolution of major traditions in democratic theory. We begin with classic models of democracy--representative, participatory, and direct--and selected canonical texts. We then examine prominent contemporary variations: pluralism and communitarianism; deliberative and agonistic democracy. We focus throughout on the changing meanings of contested concepts across democratic traditions: authority and legitimacy, liberty and equality, identity and community, discourse and power, reason and desire.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 581** History of Political Theory (3 per semester/maximum of 9) Research on selected political theorists or historical traditions of political thought.

**PL SC 581 History of Political Theory (3 per semester/maximum of 9)**

This seminar is a survey of American political thought. The course is designed (1) to introduce students to sources and techniques in researching and writing the history of political thought and (2) to prepare its participants for teaching American political thought courses to undergraduates. We will discuss a variety of persuasive works (sermons, speeches, essays, autobiographies, poetry, plays, films, etc.) to examine how Americans have conceptualized key political ideas (e.g., equality, liberty, autonomy, community, progress, the American dream) and how their views on the proper

organization of political society have changed from the seventeenth century to today. We will pay particular attention to the tradition of dissent in American political thought, and the corresponding political and social movements that have been built on demands for "liberty and justice for all." Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times. This course will be offered once a year with 16 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 583 Modern Political and Social Theory (3 per semester/maximum of 9)** Research on major developments and issues in modern political and social theory, such as critical theory, modernism, and postmodernism.

**PL SC 583 Modern Political and Social Theory (3 per semester/maximum of 9)**

This course will survey recent versions of liberal theory as well as critical appraisals of that tradition. Particular attention will be paid to the developments of liberalism in the most recent work of Rawls and Habermas. We will then consider critical appraisals of liberalism arising from various corners: communitarianism, identity politics, and post-modernism. Throughout, we will explore themes concerning the grounds of political theorizing and normative justification, models of the self and the person presupposed in political theories, questions of individualism and collective identity, and the very possibility of stable meanings and generalized theory construction. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times. This course will be offered once a year with 12 seats per offering.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 586 Theory of Bureaucratic and Administrative Politics (3 per semester/maximum of 6)** The role of the executive in government and politics; theories of administrative organization, organization behavior, and decision-making processes.

**Theory of Bureaucratic and Administrative Politics (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 594 Research in Political Science (1-6)** Supervised student activities on research projects identified on an individual or small group basis.

**Research in Political Science (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 595 Internship in Political Science (1-9)** Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship in Political Science (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 595A (SOC 595A) Survey Research Practicum (1-6 per semester/maximum of 6)** Practicum in Survey Research data

collection or management.

**Survey Research Practicum (1-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may used in each instance and will be entered on the student's transcript.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596A** Independent Study in American Politics (1-18) Projects and non-thesis research in American Politics, supervised on an individual basis by a faculty expert in the American Politics field. This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in American Politics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596A** Independent Study in American Politics (1-18) Projects and non-thesis research in American Politics, supervised on an individual basis by a faculty expert in the American Politics field. This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in American Politics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596B** Independent Study in Comparative Politics (1-18) Projects and non-thesis research in Comparative Politics, supervised on an individual basis by a faculty expert in the Comparative Politics field. This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in Comparative Politics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596B** Independent Study in Comparative Politics (1-18) Projects and non-thesis research in Comparative Politics, supervised on an individual basis by a faculty expert in the Comparative Politics field. This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in Comparative Politics (1-18)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596C** Independent Study in International Relations (1-18) Projects and non-thesis research in International Relations, supervised on an individual basis by a faculty expert in the International Relations field, This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in International Relations (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596C** Independent Study in International Relations (1-18) Projects and non-thesis research in International Relations, supervised on an individual basis by a faculty expert in the International Relations field, This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in International Relations (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596D** Independent Study in Political Methodology (1-18) Projects and non-thesis research in Political Methodology, supervised on an individual basis by a faculty expert in the Political Methodology field. This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in Political Methodology (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 596D** Independent Study in Political Methodology (1-18) Projects and non-thesis research in Political Methodology, supervised on an individual basis by a faculty expert in the Political Methodology field. This will give a specific title to the students transcript, given more details then just Individual Studies.

**Independent Study in Political Methodology (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597A** Africa and World Politics (3) While often marginalized in mainstream analyses of world politics, Africa was once at the centerpiece of seminal issues at the core of academic study in the nascent field of world politics in the US, such as imperialism, anarchy, balance of power, war, national self-determination, racism, international organization, and democratization. This graduate seminar examines sub-Saharan African's international relations--primarily in the post-colonial era, through an examination of the domestic and foreign policies of African states and the interaction of African states and non-state actors with non-African entities especially the superpowers, the former colonial powers, IGOs, NGOs, and IFIs.

### **Africa and World Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597A** Africa and World Politics (3) While often marginalized in mainstream analyses of world politics, Africa was once at the centerpiece of seminal issues at the core of academic study in the nascent field of world politics in the US, such as imperialism, anarchy, balance of power, war, national self-determination, racism, international organization, and democratization. This graduate seminar examines sub-Saharan African's international relations--primarily in the post-colonial era, through an examination of the domestic and foreign policies of African states and the interaction of African states and non-state actors with non-African entities especially the superpowers, the former colonial powers, IGOs, NGOs, and IFIs.

### **Africa and World Politics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597B** Globalization and Development (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Globalization and Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597C** Mathematics for Political Science (1.5) This course provides a foundation in the basic mathematical principles needed to complete required coursework in statistical methods in the political science Ph.D. curriculum, and to undertake quantitative research and formal analysis in political science. Students will gain exposure to the mathematical language used in social science research and analysis, and develop the skills necessary to critically read and evaluate articles in political science and make informed choices about analytical approaches for their own research. Topics to be covered include basic principles of mathematics (including principles of arithmetic; mathematical notation and terminology; functions and equations; logarithms and exponents; Greek alphabet; and analytical geometry); calculus and linear algebra (including vectors and matrices; matrix operations; matrix structure).

### **Mathematics for Political Science (1.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597D** Multivariate Analysis for Political Research II (3) This course introduces a range of statistical models widely used in empirical political science that generalize from linear-normal regression. It is the third foundational course in statistical methods in the political science Ph.D. curriculum; students are expected to have completed the prior courses or their equivalents. The primary focus of the course is on models where the traditional assumptions or ordinary least-squares regression are violated because the dependent variable is non-continuous. Emphasis is given to maximum likelihood estimation of models of various kinds of limited-dependent and qualitative response variables including binary, multinomial, and ordered logit and probit, as well as Poisson and other models for event counts. Additional topics include models for survival (time-to event) data; panel and time series analysis; item response underlying those methods for

causal inference using observational data.

### **Multivariate Analysis for Political Research II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 597E** Big Data and The Law (3) This graduate-level course examines the social, political, and legal implications of "big data." Topics will include questions of agency and consent regarding personal information, privacy and confidentiality, and ethical issues raised by ubiquitous, real-time digital information. We will also discuss legal and judicial responses to big data, including its implications for standards of proof and liability, rules of evidence, criminal procedure, and intellectual property. Finally, we'll consider the impact of advances in data and analytics on the operation of law enforcement, the judicial system, and the legal services industry.

### **Big Data and The Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 599** (IL) Foreign Studies (1-12 per semester/maximum of 24) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

### **Foreign Studies (1-12 per semester/maximum of 24)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PL SC 836** Root Causes of Terrorism (3) Investigates the role economic, political and social factors play in determining patterns of international and domestic terrorism and terrorist activity.

**Root Causes of Terrorism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Portuguese (PORT)

**PORT 405** Advanced Composition and Conversation (3) Intended to strengthen the advanced student's ability to speak, read, and write in modern Brazilian Portuguese.

**Advanced Composition and Conversation (3)**

General Education: None



Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Summer 1981  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 476** Brazilian Literature, The Modern Era (1880 to the Present) (3) A survey of the major texts of Brazilian literature from romanticism to the present.

**Brazilian Literature, The Modern Era (1880 to the Present) (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Summer 1991  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 480** The Brazilian Novel (3) A survey of the Brazilian novel from its origins to the present.

**The Brazilian Novel (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Spring 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PORT 610** Thesis Research Off Campus (1-15) No description.

#### **Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Poultry Science (PTYSC)**

**PTYSC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual

basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PTYSC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PTYSC 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PTYSC 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Primary Care Medicine (PCMED)**

**PCMED 700** Primary Care Preceptorship (1) Participation in primary care settings of family medicine, general internal medicine, and general pediatrics.

### **Primary Care Preceptorship (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:  
Concurrent: MED 701 MED 702

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 731** Primary Care Clerkship (5) This course provides an opportunity for students to learn the principles of primary health care in rural, small town, and/or medically underserved communities.

### **Primary Care Clerkship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 741** Primary Care Elective - Medical Director-Practice Management Fishburn Family Medicine (5) This module was developed for those students interested in gaining experience working with a medical director in primary care to learn about managing a practice and with family physicians, nurse practitioners and physician assistants in primary care.

**Primary Care Elective - Medical Director-Practice Management Fishburn Family Medicine (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 742** Primary Care Longitudinal Advanced Elective (5) Longitudinal outpatient experience caring for patients over time (once/week over six months) emphasizing continuity of care.

**Primary Care Longitudinal Advanced Elective (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 743** Primary Care in PA (5) Four-week clinical experience with selected primary care physicians in PA.

**Primary Care in PA (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 744** Primary Care, Continental U.S. Sites (5) Four-week Primary Care related experience in an outpatient clinic within the continental U.S. that meets the student's individual needs.

**Primary Care, Continental U.S. Sites (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 745** Primary Care, Indian Health Service (5) Four-week clinical experience with primary care physicians located at Indian Health Service sites.

**Primary Care, Indian Health Service (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 746** Primary Care, International (5) Four-week clinical experience with primary care physicians located at International sites.

**Primary Care, International (5)**

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Summer 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 747** Primary Care Elective - Leadership in Community Module (5) This module was developed for those who have both the interest and potential to become leaders in the health care of hi-risk children and their families, and to meet the challenges and opportunities of community-oriented primary care.

**Primary Care Elective - Leadership in Community Module (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 748** Primary Care Elective - Penn State Orthopaedics and Sports Medicine (5) This module was developed for those students interested in gaining experience working in the areas of primary care sports medicine.

**Primary Care Elective - Penn State Orthopaedics and Sports Medicine (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PCMED 749** Primary Care Sports Medicine, Hershey (4th year) (5) This course provides exposure to concepts utilized in the evaluation and initial treatment of common sports medicine conditions.

**Primary Care Sports Medicine, Hershey (4th year) (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Profession Of Medici (POM)

**POM 711** Profession of Medicine (1-2) A prologue to the student's medical school experience and an introduction to the medical profession.

**Profession of Medicine (1-2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Psychiatry-Hy (PSCHT)

**PSCHT 700** Psychiatry Clinical Clerkship (5) Clinical experience in the management of patients with psychiatric disorders.

**Psychiatry Clinical Clerkship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 771** Adult Psychiatry Inpatient Acting Internship (5) Students are assigned selected adult inpatients and receive close individual supervision in diagnosis and treatment, including psychotherapy and drug therapy.

**Adult Psychiatry Inpatient Acting Internship (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 773** Child Psychiatry Inpatient Acting Internship (5) Students are involved, under faculty supervision, in diagnostic evaluation and treatment planning and implementation of selected child and adolescent outpatients.

**Child Psychiatry Inpatient Acting Internship (5)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 774** Child Psychiatry Outpatient Elective (5-15) Students are involved, under faculty supervision, in diagnostic evaluation and treatment planning and implementation of selected child and adolescent inpatients.

**Child Psychiatry Outpatient Elective (5-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 775** Consultation/Liaison Psychiatry Elective (5-15) Students evaluate medical/surgical patients where psychiatric consultation is requested and receive supervision in diagnosis and short-term psychiatric treatment.

**Consultation/Liaison Psychiatry Elective (5-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1985

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 783** Research in Physiology and Pathology of Sleep (5-15) Participation in experimental and clinical studies of normal and disordered sleep and the evaluation, diagnosis and treatment of sleep disorders.

**Research in Physiology and Pathology of Sleep (5-15)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 796** Psychiatry Individual Studies (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Psychiatry Individual Studies (5)**

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 796A** Psychiatry Individual Studies for 3rd Year Students (2.5) Psychiatry Individual Studies for 3rd Year Students.

### **Psychiatry Individual Studies for 3rd Year Students (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSCHT 797** Psychiatry Special Topics (5) Psychiatry Special Topics.

### **Psychiatry Special Topics (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Psychology (PSY)**

**PSY 501** Seminar in General Psychology (1) Orientation course for first-year graduate students in Psychology.

### **Seminar in General Psychology (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 502** (BB H 502) Health: Biobehavioral Perspectives (3) Introduction to the role of psychology in maintaining health and in treating nonpsychiatric disorders.

### **Health: Biobehavioral Perspectives (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 507** Analysis of Psychological Data I (3) Overview of analysis techniques for psychological data.

### **PSY 507 Analysis of Psychological Data I (3)**

Research in psychology employs a variety of methods, many of which are unique to the study of the mind and behavior. This course assumes some familiarity with psychological research and concerns the analysis of psychological data, including the results from self-report and observational studies, factorial and repeated-measures experiments, and designs that mix two or more types of factor or measure. An introduction to the current methods of describing and reporting psychological data will be provided, as will a primer on the special issues surrounding data reduction and measurement error that arise when working with human subjects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 508** Analysis of Psychological Data II (3) Overview of advanced analytic techniques for psychological data.

### **PSY 508 Analysis of Psychological Data II (3)**

This course deals with the analysis and interpretation of multivariate data of the sort often obtained in psychological research. It discusses data analysis when there are multiple independent variables (e.g., various applications of multiple regression), when there are multiple dependent variables (e.g., multivariate analysis of variance), and when the aim of the data analysis is to understand the latent structure of a set of variables (e.g., factor analysis, structural equation modeling). The course uses a number of data-analytic platforms, focusing on: (1) using SPSS syntax to structure complex analyses, and (2) using AMOS to carry out analyses involving both latent and observed variables.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 511** Seminar in Contemporary Psychology (1-3 per semester/maximum of 12) Critical review of readings on a topic of current interest, either in content or methodology, within psychology.

### **PSY 511 Seminar in Contemporary Psychology (1-3 per semester/maximum of 12)**

The Seminar in Contemporary Psychology is designed to provide a seminar experience for graduate students in Psychology and related programs. Topics will vary by semester and instructor. Each section will provide an in-depth look at a current area of scientific research in psychology. Assigned readings will include material from the original scientific literature (journal articles, chapters, or books). Evaluation methods vary by section, but are writing-based and typically include a combination of short writing assignments (30%), class participation (10%), and longer papers requiring library research in the original literature (60%).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 517** Advanced Social Psychology (3) Problems of theory and of research methods with emphasis on persisting issues relevant to contemporary developments in social psychology.

### **Advanced Social Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 520 (LING 520)** Seminar in Psycholinguistics (3 per semester/maximum of 9) Considerations of theoretical and research issues relevant to psychological aspects of language sounds, syntax and semantics, and other cognitive support.

### **PSY (LING) 520 Seminar in Psycholinguistics (3 per semester/maximum of 9)**

In this seminar, psycholinguistic approaches to bilingualism will be examined. Bilingualism is of interest for a number of reasons. First, despite the prevalence of monolinguals in the United States, most people of the world are bilingual. To have a genuinely universal account of human cognition will therefore require a detailed understanding of the relations between language and thought in individuals who speak and understand more than one language. It will be essential that research on basic cognitive functions in bilinguals examines both the course and the consequence of second language acquisition. Second, bilingualism provides a unique vantage point from which the relations between thought and language may be viewed. Historically, this issue was the focus of the debate over the Whorfian hypothesis (i.e., does language determine thought?). In contemporary psychology, it has emerged as a central issue in the debate over modularity. Understanding the form of language and memory representation in the bilingual may provide an important set of constraints in modeling the fundamental categories of the mind. Finally, bilingualism can provide a research tool for examining cognitive functions that are sometimes impenetrable within an individual's first language. The examination of the mapping of form to meaning in constructing syntactically well-formed sentences in two languages with contrasting syntax, or in understanding the meaning of words that have similar form but differ in meaning in two languages, provides a tool for developing converging sources of evidence to test theories of language comprehension and memory. Topics to



be covered include second language acquisition in children and adults, language comprehension and memory in second language, code switching and language mixing, the consequences of bilingualism, and the neuropsychology of bilingualism.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 521** Cognitive Studies (3) Survey of theories, methods, and issues in cognitive science.

**Cognitive Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 522** Personnel Selection and Appraisal (3) Evaluation of models for personnel selection, placement, and performance appraisal in business and industry.

**Personnel Selection and Appraisal (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 523** Social-Organization Psychology in Industry (3) Analysis of the role of social and organizational variables as they affect employee performance and employee attitudes.

**Social-Organization Psychology in Industry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 524** Proseminar in Cognitive Psychology (3) An historical introduction to theories and critical findings in the field of cognitive psychology.

**Proseminar in Cognitive Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 525** COG PSY SEM (3 per semester/maximum of 12) An advanced seminar in a topical or research area in the field of cognitive psychology.

**COG PSY SEM (3 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PSY 526** (HD FS 526) Measurement in Human Development (3) Principles and methods for assessment of human developmental processes across the life span.

**Measurement in Human Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 528** (HD FS 528) Observational Methodologies for Development (3) Design and application of observational methods in developmental research.

**Observational Methodologies for Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 529** (HD FS 529) Seminar in Child Development (1-6) Readings and reports on recent findings in child development.

**Seminar in Child Development (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 534** Practicum in Industrial/Organizational Psychology (1-3) Supervised application of psychological principles in industrial and governmental settings.

**Practicum in Industrial/Organizational Psychology (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 536** (HD FS 536) Research Methods in Developmental Processes (3) Methodological issues in research on varying stages of development across the individual life-span.

**Research Methods in Developmental Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 538** Psychology of Personnel Development (3) Industrial training in relation to psychological learning theory and experimental findings.

**Psychology of Personnel Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 540 Seminar in Clinical Problems (1-9)** Contemporary psychological theory, research, and methodology in relation to clinical psychology.

**Seminar in Clinical Problems (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 541 Personality Theory (3-4)** Contemporary theories of personality; relevant research.

**Personality Theory (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 542 Psychopathology (3-4)** Theories of pathological behavior with reference to clinical and experimental data.

**Psychopathology (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 543 Research Design in Clinical Psychology (3)** Experimental and quasi-experimental designs, methodological problems, and techniques of experimental control in clinical psychology research.

**Research Design in Clinical Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 547 Fundamentals of Social Development (3)** An introduction to theories, current issues, and critical psychological research findings relating to social and emotional development.

**PSY 547 Fundamentals of Social Development (3)**

This course will focus on children's social and emotional development with an emphasis on the various agents that play a part in children's socialization. An important assumption underlying this course and guiding its content is that growth in social and emotional competence emerges from children's experiences in their relationships with other people, especially parents, siblings, and friends. In addition, we will assume that socialization is bi-directional, that is, that children influence their relationships even as their relationships influence them. The goals for the course are as follows: To enhance understanding and familiarity with the methods and findings of the scientific literature on social development; to provide an understanding of the how of theory and cultural assumptions influence empirical research and how to recognize the implications of theory for research; to enhance understanding of the variability that exists among individuals in terms of social experiences and the growth and development of social competence; to develop or extend students' skills for scholarly communication by providing opportunities to make presentations and produce written work in formats that mimic those used by professionals in the field.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 549** (HD FS 549) Developmental Theory (3) Conceptual frameworks and major contributions to the study of individual development across the life-span.

### **Developmental Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 554** Clinical Assessment (3) Development of psychological measures; evaluation of reliability and validity. Predictive utility of tests in clinical settings emphasized.

### **Clinical Assessment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 555** Theory and Practicum in Clinical Assessment (3-9) Theoretical issues and research in clinical assessment with special reference to administration and interpretation of testing procedures and clinical interviewing.

### **Theory and Practicum in Clinical Assessment (3-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 556** Neuropsychological Assessment (4) Survey of human neuroanatomy, neuropathology, behavioral correlates of cerebral dysfunction, and the assessment of neurological disorders.

### **Neuropsychological Assessment (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 557** Introduction to Psychopharmacology and Survey of Biological Therapies (3) An introduction to the principles of psychopharmacology and to the medications used to treat psychopathologies.

### **Introduction to Psychopharmacology and Survey of Biological Therapies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 558** (PHP 558, HLS 558) Disaster Psychology (3) Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.

### **Disaster Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 560** Practicum in Clinical Methods (1-6) Supervised practice in the Psychology Clinic, including assessment, therapy, report writing, and staff participation.

**Practicum in Clinical Methods (1-6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1987

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 561** Clinical Practicum with Children (1-6) Diagnosis and counseling of child-parent problems of learning and adjustment.

**Clinical Practicum with Children (1-6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 563** Behavior Modification I (3) Conceptual foundations of principles, assessment methods, and research strategies.

**Behavior Modification I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 564** Behavior Modification II (3) Survey and empirical evaluation of treatment strategies.

**Behavior Modification II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 565** Seminar in Community Psychology (3) Application of social psychological research methods and principles to prevention and alleviation of behavior disorders in family and community settings.

**Seminar in Community Psychology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 566** Cultural Psychology (3) Experimental and descriptive research on culture and behavior in both Western and non-Western settings.

**Cultural Psychology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 569** Advanced Theory and Practicum in Counseling and Psychotherapy (3-9) Theoretical issues, research, and practicum experience in psychotherapy.

### **Advanced Theory and Practicum in Counseling and Psychotherapy (3-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 571** Seminar in Social Psychology (3-12 per semester/maximum of 12) Historical development of theory and methods; determinants and principles of complex social or interactional behavior; contemporary problems and research.

### **Seminar in Social Psychology (3-12 per semester/maximum of 12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 572** Psychology of Gender (3) Theory and research on the psychology of gender, emphasizing gender in social interaction, and in individual identity.

### **PSY (WMNST) 572 Psychology of Gender (3)**

This seminar is a graduate-level introduction to the psychology of gender. Our goal is to understand what "gender" is, and how and when gender matters in our evaluations of ourselves and in our interactions with others. Gender is considered as a system of power relations, as an aspect of personality, and as a cue. The course provides a background and fundamental skills for more advanced courses on the topic or independent study. The course will serve as one of the regular seminars that students can take to meet graduate program requirements in Psychology. Students will be evaluated on preparation and participation (20%), weekly reaction papers (30%), individual research paper (30%), and class presentation on research paper or other topic (20%). This course will be offered once a year with 15 seats per offering.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 575** Clinical Child Psychopathology (3) Overview of developmental clinical child psychopathology; emphasis on social- emotional development, with review of abnormal development and social- emotional maladjustment.

### **Clinical Child Psychopathology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1988

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 576** Clinical Child Interventions (3) Clinical-child therapeutic techniques from a developmental-clinical perspective with emphasis on theoretical basis and empirical evaluation of various techniques.

### **Clinical Child Interventions (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1988

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PSY 577** Clinical Child Assessment (3) Overview of major methods used in clinical assessment of infants, pre-school children, and grade-school children with emphasis on social-emotional functioning.

**Clinical Child Assessment (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 583** Designing Research in Social Psychology (3) Designs and procedures useful in social psychology and cognate disciplines; quasiexperimental designs and analysis, field experimentation, validity of inferences.

**Designing Research in Social Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 584** (SOC 584) Attitude Formation and Change (3) Theory and method in research on attitude formation and change with emphasis on critical analysis.

**Attitude Formation and Change (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 585** Interaction Processes Within and Between Groups (3) Interactions in personal, group, and intergroup relations; theory and observational methods.

**Interaction Processes Within and Between Groups (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 589** Social Cognition and Social Perception (3) Overview of how social behavior and social perception (e.g., impression formation, attitudes, the self, stereotyping) are influenced by cognitive processes.

**Social Cognition and Social Perception (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 591** Seminar on Teaching Psychology (1-3) Objectives and content of psychology; organization and presentation of material; teaching aids and techniques.

**Seminar on Teaching Psychology (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 597A** TIES Fellowship Seminar (1-2) Graduate seminar focuses on topics related to publishing scientific studies in the interdisciplinary educational sciences as a key component to the TIES Program. For the Fall 2013 semester the course will offer two 1 credit topics, students may choose to participate in one credit (attend one topic) or two credits (attend both topics) as needed.

**TIES Fellowship Seminar (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 597B** Multilevel Theory, Measurement and Analysis (3) This class is designed to provide doctoral students with an introductory treatment of multilevel theory building and testing. Issues to be discussed include: multilevel theory building, composition and compilation models, aggregation, aggregation bias, the role of within-group agreement in multilevel modeling, cross-level inference, cross-level interactions, and hierarchical linear modeling. If time permits, we will discuss other special topics based on class interest (e.g., HLM & dyadic data, HLM & missing data, HLM and ordinal data, multilevel mediation). Students will be evaluated on class participation, presentations, and a final research paper.

**Multilevel Theory, Measurement and Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**PSY 597C** The Art and Science of Psychology: A Professional Development Seminar (3) This is a professional development seminar for graduate students interested in academic careers in the social sciences. This course will provide instruction in basic and applied research methods, logic and reasoning, strategies for data analysis, and professional ethics. This is a writing intensive course with a strong emphasis on how to produce, conduct, and present research. Students enrolled in this course will develop a novel hypothesis, plan research to evaluate their ideas, write for publication, and evaluate the original research of others. This course is intended for Ph.D. students in the social sciences and is intended to facilitate students' productivity while providing students with experience submitting for publication, reviewing for journals, writing original ideas, and presenting research orally.

**The Art and Science of Psychology: A Professional Development Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised training in lecture content and presentation, examination construction, and individual instruction.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSY 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Psychology-CI (PSYC)

**PSYC 500** Ethics and Professional Practice in Psychology and Counseling (3) This course will familiarize students with the standards of ethical conduct related to research and practice in psychology and counseling.

### **PSYC 500 Ethics and Professional Practice in Psychology (3)**

The purpose of PSYC 500 *Ethics and Professional Practice in Psychology* is to introduce students to the standards of the American Psychological Association regarding acceptable practices in research, assessments, and interventions. Relevant laws and regulations in the Commonwealth of Pennsylvania will be presented and discussed in class. This course is a required course for students admitted to the Master of Arts programs in Applied Clinical Psychology and Applied Psychological Research. Admission to one of those programs is a prerequisite for taking this course. This course is a prerequisite for enrollment in a clinical internship. The overall objectives are to familiarize students with the legal and professional standards associated with working with people as research participants, colleagues, or clients in mental health settings.

Students will be expected to understand the Guidelines and Principles of Ethical Conduct in Psychology, the laws of the Commonwealth of Pennsylvania, and to be able to apply them in novel situations. Throughout the semester, students will be presented with examples of possible breeches of ethical standards, and be asked to critically evaluate the scenarios to identify the issues involved and procedures to follow to ensure compliance with accepted standards of conduct. Prior to each class, students are to write a brief paper reflecting on their understanding of the issues underlying the weekly reading assignments and critically evaluate at least one of the moral issues involved in the readings. In addition students will be expected to write an analysis of a professional situation in which two or more ethical standards appear to be in conflict, and demonstrate their critical thinking skills in coming to a resolution of the conflict.

Grades will be based on two examinations, weekly commentaries on the readings, written vignette analysis, and the quality of participation in class discussion.

The class will be offered once a year with an enrollment of 25 students per offering. The frequency will be adjusted if enrollments trends suggest an adjustment is necessary.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 501** Cultural Competency in Psychology (3) This course will familiarize students with the need for sensitivity to individual and group differences associated with culture and ethnicity.

### **PSYC 501 Cultural Competency in Psychology (3)**

PSYC 501 *Cultural Competency in Psychology* is intended to provide a broad perspective on some of the major ways in which people are different from one another. This course will demonstrate some of the ways in which one's heritage interacts with individual differences and impacts on the person's beliefs, attitudes, and behaviors. The overall objectives of this course are to increase sensitivity to diversity issues, assist students in recognition of their own cultural biases, and lay the groundwork for learning to work with people who are different from one's self. Appreciation for both individual and population differences, and learning to work effectively with those differences, are the goals of this course.

PSYC 501 is a required Psychology Core course in both the Applied Clinical Psychology and Applied Psychological Research programs. It is intended to raise awareness of the fundamental issues with which researchers and mental health professionals need to be attentive to as the population increases in diversity. This course will provide a perspective on population issues which impact on the entire field of psychology, and thus should be taken early in the program of study. Admission to either the Applied Clinical Psychology or Applied Psychological Research program is a prerequisite for this course. Students in related areas may request permission of the instructor to register for this class on a space available basis.

Students will be evaluated on the quality of their class participation, examination performance, and a major research paper covering issues relevant to working with people who are from a different background than the student. The course will be offered annually with an enrollment limit of 25 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 502** Applied Social Psychology (3) An examination of social psychological applications to areas such as health, law, interpersonal relations, environment, politics, and other social issues.

**Applied Social Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 510** Human Development and Growth (3) The course covers human development across the life span.

**PSYC 510 Human Development and Growth (3)**

The course is designed to meet the requirements for Pennsylvania Mental Health Counselor licensure. The course will review methods of developmental and lifespan research, and encourage critical analysis of developmental research. In addition, a research paper either reviewing a significant development process, or proposing significant development research will also be required. The course will be offered annually with an anticipated enrollment of 25 students. It will be offered more often if enrollment patterns warrant such an increase.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 514** Preventive Psychology (3) This course focuses on the theoretical, conceptual, programmatic, and empirical issues currently in preventive psychology.

**Preventive Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 515** Clinical Health Psychology (3) This course examines wellness maintenance, early detection, and the impact of health care on individuals and the community.

**Clinical Health Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 516** Child Health Psychology (3) This course will familiarize students with health issues in the context of child development and family systems.

**PSYC 516 Child Health Psychology (3)**

PSYC 516 *Child Health Psychology* provides an overview of the major threats to the health and well-being of children and youth, in the context of child development and family systems theories. Health psychology adheres to the biopsychosocial model, which means that the course will stress how biological, psychological, and social factors interact to maintain wellness or foster illness. The focus will be on primary prevention of illness and injury wherever possible, including accident prevention and fostering healthy lifestyle behaviors such as good nutrition and exercise.

When illness or injuries occur, they will be discussed in the context of the child's development. Comprehension of the illness is influenced by the child's cognitive abilities, social development, prior experience with illness, and family response. Examination of how developmental processes impact on the illness and the illness impacts on the developmental processes will be a theme underlying all the health threats studied.

This is a required course for students in the M.A. in Applied Clinical Psychology program who elect the Health Psychology concentration. The overall objectives are to provide a background for development of programs to maintain health and

wellness in children and youth, to facilitate the understanding of the impact of illness and disability on children and their families, and to prepare students to work with children and families in a medical environment.

Grades will be based upon two examinations, a prevention proposal, an analysis of the literature relevant to an illness or injury from both the biopsychosocial and developmental perspectives, and class participation.

The class will be offered biennially, with an enrollment limit of 25 students. The frequency will be adjusted if enrollment trends suggest an adjustment is warranted.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 517 Psychopathology (3)** A broad spectrum view of psychopathology including biological, social, cognitive, psychological, and neuropsychological approaches, is emphasized, with an applied focus.

### **PSYC 517 Psychopathology (3)**

This course will cover a broad spectrum of all aspects of psychopathology including the earned, social, biological, emotional, cognitive, affective, and cultural factors, which may be relevant to the understanding and diagnosis of mental disorders. The varied theoretical views of abnormal behavior and psychopathology will be critically reviewed, with emphasis on the current dominant theories. Approaches reviewed will include biological, behavioral, social, cognitive, psychological, existential, medical, and neuropsychological theories.

Students will learn to make differential diagnoses based on the current Diagnostic and Statistical Manual and to code the disorders appropriately. Successful completion of the course requires the demonstration of competence in understanding the nature of psychopathology. Psychopathology is a required course for students in the M.A. in Applied Clinical Psychology program, and is restricted to students in the M.A. in Applied Clinical Psychology program. This course will be a prerequisite for PSYC 518, 519, and 540. The objectives of this course are to prepare students for working with a variety of clients in therapeutic settings.

Methods of evaluating student performance will be explained on the syllabus, and may include components such as examinations, written papers, oral presentations, videotaped and live demonstrations of diagnostic role plays, and other in-class exercises.

This course is offered once a year with an enrollment limit of 15 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 518 Interviewing and Counseling (3)** This course covers basic clinical interviewing and counseling techniques from both the didactic and experiential perspectives.

### **PSYC 518 Interviewing and Counseling (3)**

In this course students will begin to practice eliciting information from classmates, or volunteer undergraduate students, simulating individuals presenting with a variety of issues, use that information to make an appropriate diagnosis, and work with their mock client to set goals and develop a concrete plan to achieve those goals. Guidelines for report writing will be presented. Students will submit an initial draft of a report based on the first interview session, and a full report of the client contact from initial interview through implementation of treatment plan and discharge.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 519 Theories and Models of Psychotherapy (3)** An advanced level of psychotherapies and applications in diverse settings.

### **PSYC 519 Theories and Models of Psychotherapy (3)**

It is a required course for students in the M. A. in Applied Clinical Psychology program. The objectives of this course are to prepare students for working with a variety of clients in therapeutic settings. Students will be evaluated on written

papers and in-class exercises.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 520** Research Methods (4) The course will review experimental, quasi-experimental designs, program evaluation, between subject designs, and within subject or intra-subject designs.

#### **Research Methods (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 521** Statistics (4) The nature, computation, computer analysis, interpretation, and APA-style write-up will be discussed for a number of statistical tests.

#### **PSYC 521 Statistics (4)**

This course is intended to provide students in the Applied Psychology program with the statistical skills they will need to be applied masters-level psychologists. The course will follow PSYC 520, the graduate research methods course, and will be a prerequisite for PSYC 530, the masters paper. The course will begin with a review of basic statistical methods. Since the more advanced statistical techniques are extensions of these basic tests, it is crucial that students have a firm grasp of the latter before being exposed to the former. For each test, the conditions of use, the nature of the null and alternative hypotheses, computation of relevant test statistics, interpretation of results, test assumptions, strength of the relationship, SPSS analysis, reading SPSS output, and APA Results section writeup will be discussed. Much of this is advanced material that students will not have encountered in their previous statistics courses. The course will then continue with a discussion of the following advanced techniques: nonparametric statistics, analysis of covariance, one-way repeated measures analysis of variance, factorial analysis of variance, and multiple regression. In addition, students will be introduced to such multivariate techniques as factor analysis and MANOVA. The information noted above will again guide the class presentations. Consistent with the applied nature of the program, the goals of this course are for students to become good consumers of the types of statistical information they are likely to encounter in their work, to be able to select and apply the appropriate test when called on to analyze data, and to be able to generalize their basic statistical skills to new techniques, as necessitated by their career demands. Evaluation will consist of some combination of assignments and examinations, as determined by the instructor. This course will be required of all Applied Psychology students, and will be made available to other qualified students on a space-available basis, with permission of the program.

This course will be taught once every academic year. Expected enrollment is approximately 15 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 524** Biological Basis of Behavior (3) This course focuses on biological determinants of behavior, including evolution, hormones, sensory systems, internal states, reproduction, emotions, learning, and memory.

#### **PSYC 524 Biological Basis of Behavior (3)**

PSYC 524 *Biological Basis of Behavior* is intended for graduate students majoring in psychology. This course focuses on the biological determinants of behavior. Students will learn the major theories underlying research in biological psychology, including such topics as neuroanatomy and brain anatomy, evolution, behavior genetics, hormones and reproductive behavior, sensory systems, internal states, emotions, learning, and memory. Students will be taught to use critical thinking skills when interpreting and evaluating research in biological psychology. Students will use these skills and knowledge gained during the semester to develop a research proposal or integrative review paper on a biological psychology topic.

Students will initially learn basic neuroanatomy and brain anatomy as a basis for understanding more complex biological behavior. The remainder of the semester will cover theories underlying more advanced topics in biological psychology. Students will learn how genes, hormones, and neurotransmitters determine some behaviors. They will also learn how biology interacts with the environment to produce behaviors such as reproduction, emotion, learning, and memory.

Examinations will include questions designed to ascertain students' knowledge of the theories covered in class as well as critical thinking skills used to interpret and evaluate research in biological psychology. During the course of the semester, students will use the knowledge they have gained to a) formulate a research question based on a topic covered in class; b) perform a literature search on the topic; and c) design a research proposal or integrative review paper based on the topic. Writing the paper will give students experience in formulating research questions, evaluating research critically, and writing in APA (American Psychological Association) style.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 525 Forensic Psychology (3)** This course will explore social, cognitive, civil and criminal issues related to forensic psychology.

### **PSYC 525 Forensic Psychology (3)**

The purpose of PSYC 525 *Forensic Psychology* will be to explore the general principles of forensic psychology. Social Psychological, clinical and cognitive processing theories will be examined as they pertain to the legal system. This course will include a brief overview of the judicial system. Competency issues will be defined, and the clinical assessment of competency will be examined in the course. Specific competency issues will include competency to stand trial, to plead, to confer and to testify. There will be an overview of the insanity defense, describing the history and contemporary status of the defense. Issues such as automatism, unconsciousness and diminished capacity will be explored. The contribution of the mens rea and intoxication will be described. M'Naughton rules and the ALI rules for insanity will be described. Evaluation techniques for forensic assessments will be described and role- played by the course participants. Interview techniques, developmental and historical information gathering, and psychological testing will be reviewed in terms of utility for the forensic evaluation. Special issues such as amnesia, recovered memories, and malingering will also be covered in the course. Other issues including assessment of dangerousness, and civil commitment will be reviewed. The rule of the expert and the status of scientific information in the forensic context will be described.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 526 Behavioral Systems in Criminal Justice (3)** The impact of crime on the offender, the victim, and society will be studied from the psychological perspective.

### **PSYC 526 Behavioral Systems in Criminal Justice (3)**

The purpose of PSYC 526 *Behavioral Systems in Criminal Justice* is to facilitate a critical analysis of the criminal-victim process. Students will be presented with the concept that in order to work effectively with either victims or offenders, professionals must understand the criminal justice process, issues of confidentiality, and crime control policies. Ways in which offenders engage in coercive treatment as a basis for their freedom will be presented. The process by which victims seek out treatment and support as a means of achieving reintegration after their victimization will be explored. The need of community agents working with both populations to comprehend reciprocal issues within criminality will be discussed. The complexities of the criminal act, the impact upon individuals, the social cost to the community and the role of mental health professionals will be studied from an interdisciplinary perspective.

This course is required for students in the Applied Clinical Psychology program who elect Forensic Psychology as their clinical concentration. Admission to the Applied Clinical Psychology program is a prerequisite for this course.

A take home examination will be used to test assimilation and analysis of the assigned readings. In addition, students will write two research based papers integrating the disciplines of psychology and criminal justice. The first paper will be a critical review of the literature relevant to one form of criminal behavior. The format for the second paper will be consistent with the kinds of writing students may have to do after completion of the program. Examples are development of an in-service training program for an agency charged with treating victims and offenders, or documenting the ways in which the criminal justice system ignores the victimization of children until they become victimizers and presenting an intervention proposal to stop the cycle.

The class will be offered biennially with an enrollment limit of 25 students. The frequency will be adjusted if enrollment trends suggest an adjustment is necessary.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PSYC 530** Research Paper (3) Supervised research in psychology for degree candidates.

**Research Paper (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 535** Behavioral Management (3) Analysis of determinants of behavior and behavioral ecology. Emphasis on data collection and data evaluation techniques.

**Behavioral Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 540** Group Interventions (3) This course covers applications of psychotherapeutic techniques to a group setting.

**PSYC 540 Group Interventions (3)**

This course introduces the application of therapeutic techniques to a group setting. Selection and formation of groups, leadership skills, and group process will be examined. Adaptations required for specialized groups, such as children and adolescents, will be presented.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 571** Tests and Measurements (3) Administration, analysis, and interpretation of psychological evaluation methods will be reviewed.

**PSYC 571 Tests and Measurements (3)**

This course builds on the critical appraisal of the nature of psychological evaluation and allows the student to develop sound abilities in the administration and interpretation of psychological instruments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 572** Neuropsychological Assessment (3) This course will review the biological bases of behavior, emphasizing brain-behavioral relationships and assessment of these relationships.

**PSYC 572 Neuropsychological Assessment (3)**

*Neuropsychological Assessment* builds on the assessment skills introduced in PSYC 571, *Tests and Measurement*. Test batteries designed to measure neuropsychological functioning such as the Halsted-Reitan Neuropsychological Battery, the Wechsler Memory Scales, and the Woodcock-Johnson Test of Cognitive Ability will be taught.

Evaluation will be based upon demonstrations of skills in test administration and scoring, written examinations, and written assignments such as assessment reports. This course is offered in the fall of odd numbered years, more often if enrollment patterns warrant, with an enrollment limit of 15 students.

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 592** Current Topics in Applied Psychology (3 per semester/maximum of 99) Advanced topics in applied psychology will be taught through readings, research, and practice.

**Current Topics in Applied Psychology (3 per semester/maximum of 99)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual or small group basis.

**Research Topics (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 595A** Clinical Practicum (1-18) Provides practicum experience component for interviewing and counseling course.

**PSYC 595A Clinical Practicum (1-18)**

The course is designed to aid meeting standards for Pennsylvania Mental Health counselor licensure. The standards include completing one hundred (100) hours of practicum time prior to placement in an internship. PSYC 595A represents that initial supervised experience. Students will typically complete this experience as part of the training component at the site for their first clinical internship placement, but prior to beginning the internship. Supervising faculty will be licensed in the Commonwealth of Pennsylvania. The on-site supervisors must meet the criteria for clinical supervision mandated by the Commonwealth of Pennsylvania.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 595B** Clinical Internship (1-18) Supervised clinical experience in a community setting. This course is repeatable.

**PSYC 595B Clinical Internship (1-18)**

The course is designed to aid meeting standards for Pennsylvania Mental Health counselor licensure. The standards include completing six hundred (600) hours of practicum time after completion of 100 clock hours of practica experiences. PSYC 595B represents the 600 hours of supervised experience following the practica. The internship experience builds on the initial practica experience, and is typically completed over two or three semesters, and thus may represent experience gained at more than one placement to increase the breadth of the student's training. Supervising faculty will be licensed in the Commonwealth of Pennsylvania. The on-site supervisors must meet the criteria for clinical



supervision mandated by the Commonwealth of Pennsylvania. This course is repeatable to enable students to spread the 600 hours over more than one semester, and across different settings.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PSYC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Public Administration (P ADM)**

**P ADM 401** Introduction to Homeland Security (3) This course provides foundational knowledge about homeland security, including policy, organization, and legal issues in the American context.

#### **P ADM 401 Introduction to Homeland Security (3)**

The Introduction to Homeland Security/Defense course provides a baseline of common knowledge for homeland security professionals. The course achieves this goal by focusing on homeland security/defense, the motivation and nature of terrorists, the policies established by governments, pertinent governmental plans to meet homeland security/defense goals, who the key players are across the homeland security/defense spectrum, and the relevant legal issues framing efforts to defend the nation's security. As an introduction to this broad area of study, this course serves as a basis for specialized study such as bioterrorism defense, critical infrastructure protection, cyber-security, and emergency response management. Understanding key principles will be measured through preparation of a written analysis of key homeland security/defense issues with alternative strategies consistent with current policy and legal constraints.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 404** Homeland Security and Defense in Practice (3) This course analyzes, evaluates, and critiques homeland security plans in practice.

#### **P ADM 404 Homeland Security and Defense in Practice (3)**

The focus of the course is to apply lessons learned in previous courses to actual organizations. Key material is reviewed, to provide context for the capstone experience that this course provides. Students will apply the Homeland Security framework (the National Response Plan and the National Incident Management System) to case studies, such as FEMA's response to Hurricane Katrina. The main theme of the course is the need for collaboration (interoperability) across state, local, and national governments as well as with the private sector and other relevant actors. A major portion of the course

examines the Commonwealth of Pennsylvania as a state-level case study. The course will culminate with a paper that applies the framework of Homeland Security and Defense to an organization of the student's choosing.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 500** Public Organization and Management (3) Development of basic concepts and issues in public administration; administrative theory and public policy processes.

### **Public Organization and Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 502** Governmental Fiscal Decision Making (3) Nature, function, and technique of governmental budgeting viewed as mechanism for allocating resources among alternative public uses.

### **Governmental Fiscal Decision Making (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 503** (H ADM 503) Research Methods (1-3) Examination of research methodologies relevant to administration, planning, and public policy.

### **Research Methods (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 505** Human Resources in the Public and Nonprofit Sectors (3) Concepts and approaches contributing to effective use of human resources in public and non-profit organizations; legal issues and requirements.

### **Human Resources in the Public and Nonprofit Sectors (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**P ADM 506** (H ADM 506) Management Information Systems for Public and Health Administration (3) The design, implementation, and purpose of computerized management information systems in public and non-profit organizations.

**P ADM (H ADM) 506 Management Information Systems for Public and Health Administration (3)**

The course is designed for the manager and the manager-to-be who need to develop the knowledge and skills that will result in the effective planning, design, management, and use of information systems resources. The course focuses on training managers to go beyond acquiring the expertise in conceptualizing and defining the information they need. Managers should also be able to plan strategically the appropriate management information technology infrastructure for supporting the information needs of the organization.

The course objectives are to develop students' knowledge concerning:

- Role of information technology in organizations and their environments, and for management
- Key aspects of the management of information resources
- Current technologies in information management
- Issues involved in developing IT applications to support organizational and managerial needs
- Emerging managerial and public policy issues in information technologies
- A range of personally and organizationally-relevant software applications

P ADM 506 is one of the core courses for the MPA degree and is offered fall and spring semester.

Grading will be based on class preparation and participation (10%), four article reports based on outside reading (10%), class presentations (10%), a term project to be published as a web page (10%), four application assignments (40%), and a final exam (20%).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 507** Introduction to Public Policy Analysis (3) Introduction to the analysis of public policy within its organizational and political contexts, including an emphasis on an economic perspective.

**P ADM 507 Introduction to Public Policy Analysis (3)**

The course is an introduction to the field of policy analysis that focuses on the process of public policy formulation, implementation, and modification. Basic principles of microeconomics are used to examine public policy-making. Students will review basic economic and microeconomic principles, theories, and models, with an emphasis on justification for government intervention. Students will understand the process of policy analysis, including problem formulation, selection of criteria, comparison of alternatives, political and organizational constraints, and implementation and evaluation. The course will be offered once per year and is projected to enroll about 20 students per section.

Course Objectives:

- a) to understand the economic rationale for government action
- b) to understand the economic component of policy analysis
- c) to understand government failure, such as inefficient pork-barrel decision-making and excessive bureaucratic red tape
- d) to understand better the practice of policy analysis
- e) to understand the stages of the policy process
- f) to understand the economic and political context in which policy analysis takes place

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 507** Introduction to Public Policy Analysis (3) Introduction to the analysis of public policy within its organizational and political contexts, including an emphasis on an economic perspective.

**P ADM 507 Introduction to Public Policy Analysis (3)**

The course is an introduction to the field of policy analysis that focuses on the process of public policy formulation, implementation, and modification. Basic principles of microeconomics are used to examine public policy-making. Students will review basic economic and microeconomic principles, theories, and models, with an emphasis on justification for government intervention. Students will understand the process of policy analysis, including problem formulation, selection of criteria, comparison of alternatives, political and organizational constraints, and implementation and

evaluation. The course will be offered once per year and is projected to enroll about 20 students per section.

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- d) to understand better the practice of policy analysis
- e) to understand the stages of the policy process
- f) to understand the economic and political context in which policy analysis takes place

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 510** (H ADM 510) Organizational Behavior (3) Examination of concepts of human behavior in formal organizations, systems analysis, conceptual models, and decision processes.

**Organizational Behavior (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 511** Organizational Change and Development (3) Theory of organizational change and development; case analysis of applications in actual situations.

**P ADM 511 Organization Change and Development (3)**

This course is designed to lead to the understanding of the process of introducing planned change into complex organizations.

Specific course goals include gaining an understanding of organization development (OD) as a specific type of change strategy acquiring knowledge of various OD approaches, learning how to assess organizations to enable effective organization change to be introduced, obtaining an understanding of the phases of the OD process and how to manage planned change efforts in organizations, and developing skills in applying the concepts learned to real-life organizational situations.

Students will receive "hands-on" experience in designing and implementing organizational change by completing individual reports on OD and the change project as well as a team project report.

Grading will be based on development of consulting skills and knowledge through involvement in class activities (10%), being an effective member of the project team (10%), demonstrating understanding of key OD concepts and processes via individual reports and contributions to project team work (40%), and by producing a high quality project based on evaluation of OD process, the final report, and class presentations (40%).

P ADM 511 is an elective course for the MPA degree and is offered every third semester.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 512** Issues in Human Resources (3) A survey of major human resource issues such as job stress, burnout, and the many forms of discrimination in organizations.

**P ADM 512 Issues in Human Resources (3)**

The course has three specific objectives: (1) to become familiar with the subtleties and complexities (interpersonal, legal/regulatory, and effectiveness) of the major human resource issues which confront the human resource manager in public and nonprofit organizations; (2) to develop a practical strategy for handling and coping with the major human resource issues; and (3) to improve research, analytical, and presentation skills.

This course will address the following major human resources issues: appraisal and reward systems; various types and forms of discrimination; sexual harassment; disabilities; alcohol and drug abuse; workplace violence; stress and burnout; workplace ethics; and reforming a human resource system.

Student grades are based on a final exam (40%); an issue paper (40%); and class participation (20%). P ADM 512 is an elective course for the MPA degree and is offered in a six-week session during the summer semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 512 Issues in Human Resources (3)** A survey of major human resource issues such as job stress, burnout, and the many forms of discrimination in organizations.

**P ADM 512 Issues in Human Resources (3)**

The course has three specific objectives: (1) to become familiar with the subtleties and complexities (interpersonal, legal/regulatory, and effectiveness) of the major human resource issues which confront the human resource manager in public and nonprofit organizations; (2) to develop a practical strategy for handling and coping with the major human resource issues; and (3) to improve research, analytical, and presentation skills.

This course will address the following major human resources issues: appraisal and reward systems; various types and forms of discrimination; sexual harassment; disabilities; alcohol and drug abuse; workplace violence; stress and burnout; workplace ethics; and reforming a human resource system.

Student grades are based on a final exam (40%); an issue paper (40%); and class participation (20%). P ADM 512 is an elective course for the MPA degree and is offered in a six-week session during the summer semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 514 Public Organization and Managerial Consultation (3)** This course will review the theories, approaches, methods, and expected outcomes of organization and management consultation.

**P ADM 514 Public Organization and Managerial Consultation (3)**

P ADM 514 is a course in organization and management consultation and problem-solving, covering philosophy, approaches, consulting techniques, and processes. Analyses are made of managerial and organizational problems through the use of recent developments in socio-technical systems analysis.

The specific objectives are to increase student knowledge of organization and managerial consultation and problem-solving systems thinking in relation to organization and managerial problem-solving and to introduce students to the design issues in organization and managerial consultation.

Grades are based on a mid-term (50%) and final examination (50%), case analyses, abstracts and presentations. P ADM 514 is an elective course for the MPA degree and is usually offered over the summer in a six-week session.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 514 Public Organization and Managerial Consultation (3)** This course will review the theories, approaches,

methods, and expected outcomes of organization and management consultation.

**P ADM 514 Public Organization and Managerial Consultation (3)**

P ADM 514 is a course in organization and management consultation and problem-solving, covering philosophy, approaches, consulting techniques, and processes. Analyses are made of managerial and organizational problems through the use of recent developments in socio-technical systems analysis.

The specific objectives are to increase student knowledge of organization and managerial consultation and problem-solving systems thinking in relation to organization and managerial problem-solving and to introduce students to the design issues in organization and managerial consultation.

Grades are based on a mid-term (50%) and final examination (50%), case analyses, abstracts and presentations. P ADM 514 is an elective course for the MPA degree and is usually offered over the summer in a six-week session.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 515 (MNGMT 515) Labor Management Relations (3)** Labor relations issues; collective bargaining agreement, negotiations, and administration; legal framework of collective bargaining; labor relations in larger social context.

**Labor Management Relations (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 516 Strategic Planning (3)** A survey of strategic planning purposes, approaches and methods, and expected outcomes in small and large organizations.

**Strategic Planning (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 516 Strategic Planning (3)** A survey of strategic planning purposes, approaches and methods, and expected outcomes in small and large organizations.

**Strategic Planning (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 517 Nonprofit Organizations: History and Evolution (3)** A study of the history, development and current role of nonprofit organizations as a distinguishing feature of American society.

**P ADM 517 Nonprofit Organizations: History and Evolution (3)**

This course is designed to trace the evolution of nonprofit organizations in the United States from colonial times to the present, focusing on the definition, legal foundations, missions, and accomplishments of these entities. The course will offer a review of various nonprofit sectors including healthcare, education, religion, human services, advocacy and the arts. Course objectives are to: - increase student knowledge and understanding of the history and nature of the broad spectrum of nonprofit organizations; - stimulate critical thinking about the role of nonprofit organizations in addressing public problems; and - examine and understand trends and challenges for nonprofit organizations in a market economy.

The course will include a combination of lectures, group discussions, review of readings, and student research. Course requirements involve a primary text, Lester M. Salaiilloil, *America's Nonprofit Sector, A Primer*, 2nd ed. New York: The Foundation Center, 1999, and secondary readings from such areas as history, law, economics, and public administration, e.g., Gronbjerg, Kirsten A., "The U.S. Nonprofit Human Service Sector: A Creeping Revolution," *Nonprofit and Voluntary Sector Quarterly*, Vol. 30, No. 2, June 2001, pp.279-297. Hammack, David C., "Introduction: Growth, Transformation, and Quiet Revolution in the Nonprofit Sector over Two Centuries," *Nonprofit and Voluntary Sector Quarterly*, Vol. 30, No. 2, June 2001, pp. 157-173. Independent Sector and National Center for Nonprofit Boards, *What you Should Know about Nonprofits*. Najam, Adil, "The Four-C's of Third Sector - Government Relations: Cooperation, Confrontation, Complementarity, and Co-optation," *Nonprofit Management and Leadership*, Vol. 10, No. 4, Spring, 2000, pp. 375-396. Smith, Jr., J. Kellum, "Prologue," in Brown, William G., Thomas L. Nygren, Sarah E. Turner, Elizabeth A. Duffy, *The Charitable Nonprofit: An Analysis of Institutional Dynamics and Characteristics*, Jossey-Bass, San Francisco, 1994. pp. xxxix-xxxvi. Weisbrod, Burton A., *Conclusions and Public Policy Issues: Commercialism and the Road Ahead*, in Weisbrod, Editor, *To Profit or Not to Profit: The Commercial Transformation of the Nonprofit Sector*, Cambridge University Press, United Kingdom, 1998. Young, Dennis R., "Alternative Models of Government-Nonprofit Sector Relations: Theoretical and International Perspectives," *Nonprofit and Voluntary Sector Quarterly*, Vol. 29, No. 1, March, 2000, pp. 149-172.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 517 Nonprofit Organizations: History and Evolution (3)** A study of the history, development and current role of nonprofit organizations as a distinguishing feature of American society.

### **P ADM 517 Nonprofit Organizations: History and Evolution (3)**

This course is designed to trace the evolution of nonprofit organizations in the United States from colonial times to the present, focusing on the definition, legal foundations, missions, and accomplishments of these entities. The course will offer a review of various nonprofit sectors including healthcare, education, religion, human services, advocacy and the arts. Course objectives are to: - increase student knowledge and understanding of the history and nature of the broad spectrum of nonprofit organizations; - stimulate critical thinking about the role of nonprofit organizations in addressing public problems; and - examine and understand trends and challenges for nonprofit organizations in a market economy. The course will include a combination of lectures, group discussions, review of readings, and student research. Course requirements involve a primary text, Lester M. Salaiilloil, *America's Nonprofit Sector, A Primer*, 2nd ed. New York: The Foundation Center, 1999, and secondary readings from such areas as history, law, economics, and public administration, e.g., Gronbjerg, Kirsten A., "The U.S. Nonprofit Human Service Sector: A Creeping Revolution," *Nonprofit and Voluntary Sector Quarterly*, Vol. 30, No. 2, June 2001, pp.279-297. Hammack, David C., "Introduction: Growth, Transformation, and Quiet Revolution in the Nonprofit Sector over Two Centuries," *Nonprofit and Voluntary Sector Quarterly*, Vol. 30, No. 2, June 2001, pp. 157-173. Independent Sector and National Center for Nonprofit Boards, *What you Should Know about Nonprofits*. Najam, Adil, "The Four-C's of Third Sector - Government Relations: Cooperation, Confrontation, Complementarity, and Co-optation," *Nonprofit Management and Leadership*, Vol. 10, No. 4, Spring, 2000, pp. 375-396. Smith, Jr., J. Kellum, "Prologue," in Brown, William G., Thomas L. Nygren, Sarah E. Turner, Elizabeth A. Duffy, *The Charitable Nonprofit: An Analysis of Institutional Dynamics and Characteristics*, Jossey-Bass, San Francisco, 1994. pp. xxxix-xxxvi. Weisbrod, Burton A., *Conclusions and Public Policy Issues: Commercialism and the Road Ahead*, in Weisbrod, Editor, *To Profit or Not to Profit: The Commercial Transformation of the Nonprofit Sector*, Cambridge University Press, United Kingdom, 1998. Young, Dennis R., "Alternative Models of Government-Nonprofit Sector Relations: Theoretical and International Perspectives," *Nonprofit and Voluntary Sector Quarterly*, Vol. 29, No. 1, March, 2000, pp. 149-172.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 518 Nonprofit Organizations: Management and Leadership (3)** A study of the theoretical and practical issues involved in management and leadership of nonprofit organizations.

### **P ADM 518 Nonprofit Organizations: Management and Leadership (3)**

This course is designed to study the intellectual foundations and application of leadership and management in nonprofit organizations. The course will explore organizational design, leadership, quality management, and performance measurement as applied in social enterprises. Course objectives are: - to increase student knowledge and understanding of the fundamental concepts of leadership and management in nonprofit organizations - to examine trends and challenges for leading and managing nonprofit organizations; and - to stimulate critical thinking about the application of nonprofit leadership and management concepts in a changing environment. The course will include a combination of lectures, group discussions, review of readings, and student research. Student grades will be determined by classroom participation (10%), weekly reading abstracts (10%), midterm examination (20%), major term paper (30%), and final

examination (30%). Course requirements involve a primary text and secondary readings from such areas as business, law, and public administration, as well as major term paper. The course is part of a nonprofit concentration in the public administration program and extends the collection of courses in the nonprofit organization area of public administration. Course is expected to be offered once each year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 518 Nonprofit Organizations: Management and Leadership (3)** A study of the theoretical and practical issues involved in management and leadership of nonprofit organizations.

**P ADM 518 Nonprofit Organizations: Management and Leadership (3)**

This course is designed to study the intellectual foundations and application of leadership and management in nonprofit organizations. The course will explore organizational design, leadership, quality management, and performance measurement as applied in social enterprises. Course objectives are: - to increase student knowledge and understanding of the fundamental concepts of leadership and management in nonprofit organizations - to examine trends and challenges for leading and managing nonprofit organizations; and - to stimulate critical thinking about the application of nonprofit leadership and management concepts in a changing environment. The course will include a combination of lectures, group discussions, review of readings, and student research. Student grades will be determined by classroom participation (10%), weekly reading abstracts (10%), midterm examination (20%), major term paper (30%), and final examination (30%). Course requirements involve a primary text and secondary readings from such areas as business, law, and public administration, as well as major term paper. The course is part of a nonprofit concentration in the public administration program and extends the collection of courses in the nonprofit organization area of public administration. Course is expected to be offered once each year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 519 Nonprofit Organizations: Resource Development and Management (3)** Process by which nonprofit organizations assure that resources are obtained and used effectively and efficiently toward the achievement of objectives.

**P ADM 519 Nonprofit Organizations: Resource Development and Management (3)**

Course Description: This course will examine theory, strategies and practices for securing and managing resources for a nonprofit organization. Students will study a variety of fund-raising and other resource acquisition strategies and will examine mechanisms for prudent management of these resources. Course objectives are to increase student knowledge and understanding of the fundamental concepts of resource development for long-term stability of nonprofit organizations and to stimulate critical thinking about the strategies for financial operations of nonprofit organizations in a changing environment. This course extends the collection of courses in the nonprofit concentration area of public administration and further develops the concentration. The course will include a combination of lectures, group discussions, review of readings, and student research. Course requirements involve a primary text and secondary readings from such areas as business, law, grantsmanship, and public administration. The course will be offered every third semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 522 Government Financial Management (3)** Theories and techniques of financial planning and control, with emphasis on their application in government and nonprofit agencies.

**P ADM 522 Government Financial Management (3)**

The focus of this course is on a laboratory in local government budget and financial analysis, concentrating on the theories and applications which also relate to hospitals, businesses, and nonprofit agencies. Applied methods of budgetary decision-making are employed to formulate and to implement a budget based on actual city data.



The course places the student in the role of a member of a budget department staff asked to prepare a budget for presentation, debate, and ultimate acceptance by a deliberative body. The work requires one to acquire knowledge of and apply financial management techniques without losing sight of the basic theories from which the techniques grew.

The final course grade consists of materials completed by students throughout the course (75%) and the final examination (25%). P ADM 522 is offered every spring semester as an elective in the government concentration of the MPA program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 523** Governmental and Nonprofit Accounting (3) Accounting, reporting, and auditing principles and procedures for public sector agencies and nonprofit organizations.

### **Governmental and Nonprofit Accounting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 524** Administrative Law (3) Statutory and judicial controls upon administrative discretion. Administration of rule making, rate setting, licensing, adjudication. Judicial review and citizen advocacy.

### **P ADM 524 Administrative Law (3)**

This course is intended to provide an overview of administrative law and the theories that underlie modern administrative law.

We will examine the growth of administrative law in modern society both from a legal and a political standpoint. The course will not only provide substantive knowledge about administrative law, but touch upon deeper questions and assumptions underlying the modern administrative state. Hopefully, this will promote a greater understanding of how administrative law affects and shapes policy.

In order to assist the process of understanding how this works in practice, students will be responsible for studying a particular state or federal administrative agency and how the concepts discussed in class apply to that agency by examining statutes and cases applicable to that agency.

Method of grading: briefs (5%); final exam (25%); mid-term exam (25%); class presentations (10%); paper (25%), and class participation (10%). P ADM 524 is an elective for the MPA degree and is offered every third semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 524** Administrative Law (3) Statutory and judicial controls upon administrative discretion. Administration of rule making, rate setting, licensing, adjudication. Judicial review and citizen advocacy.

### **P ADM 524 Administrative Law (3)**

This course is intended to provide an overview of administrative law and the theories that underlie modern administrative law.

We will examine the growth of administrative law in modern society both from a legal and a political standpoint. The course will not only provide substantive knowledge about administrative law, but touch upon deeper questions and assumptions underlying the modern administrative state. Hopefully, this will promote a greater understanding of how administrative law affects and shapes policy.

In order to assist the process of understanding how this works in practice, students will be responsible for studying a particular state or federal administrative agency and how the concepts discussed in class apply to that agency by examining statutes and cases applicable to that agency.

Method of grading: briefs (5%); final exam (25%); mid-term exam (25%); class presentations (10%); paper (25%), and

class participation (10%). P ADM 524 is an elective for the MPA degree and is offered every third semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 532 Urban Government (3)** Administrative processes and policy problems associated with managing urban communities; political, intergovernmental, fiscal, structural, and analytical concepts in urban government.

### **Urban Government (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 533 Local Planning Law and Administration (3)** Structure and function of local and regional government from perspective of local planning law and its administration.

### **P ADM 533 Planning Law and Administration (3)**

The course covers structure and function of local and regional government from the perspective of local planning law and its administration. Objectives: To develop students' abilities in (a) understanding state and local policies and laws related to planning and administration, local development, regionalism, and regionalization of services; (b) analytic ability, involving the process of careful, rigorous, and systematic thinking at both abstract (theoretical) and concrete (practical) levels; (c) perception of the studies processes from a theoretically informed point of view, through development and application of concepts, models and other course materials; and (d) application of models and techniques in course assignments. Evaluation: class participation (10%), portfolio, including literature review essay (60%), project/poster (30%). Frequency of offerings: every two years.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 533 Local Planning Law and Administration (3)** Structure and function of local and regional government from perspective of local planning law and its administration.

### **P ADM 533 Planning Law and Administration (3)**

The course covers structure and function of local and regional government from the perspective of local planning law and its administration. Objectives: To develop students' abilities in (a) understanding state and local policies and laws related to planning and administration, local development, regionalism, and regionalization of services; (b) analytic ability, involving the process of careful, rigorous, and systematic thinking at both abstract (theoretical) and concrete (practical) levels; (c) perception of the studies processes from a theoretically informed point of view, through development and application of concepts, models and other course materials; and (d) application of models and techniques in course assignments. Evaluation: class participation (10%), portfolio, including literature review essay (60%), project/poster (30%). Frequency of offerings: every two years.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 534 Managing Economic Development (3)** Theoretical and operational aspects of economic development emphasizing the role of local and regional government.

### **P ADM 534 Managing Economic Development (3)**

P ADM 534 is a course in managing regional economic development and growth, how and why an area tends to specialize in certain businesses or services, how trading patterns develop between areas, what factors influence growth and

development,  
and the types of government policies and their effect on economic growth and development.

The specific objectives of the course are to understand the type and size of an area's exports and imports; to explain growth and development; and to determine types of government policies that effect regional economic growth and development and to study the effects.

P ADM 534 is an elective course for the MPA degree and is usually offered during a 15-week semester every other year.

Grades are based on 6 mini-cases (20%), mid-term exam (20%), short paper (10%), comprehensive final exam (30%), and class participation (20%).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 534** Managing Economic Development (3) Theoretical and operational aspects of economic development emphasizing the role of local and regional government.

**P ADM 534 Managing Economic Development (3)**

P ADM 534 is a course in managing regional economic development and growth, how and why an area tends to specialize in certain businesses or services, how trading patterns develop between areas, what factors influence growth and development, and the types of government policies and their effect on economic growth and development.

The specific objectives of the course are to understand the type and size of an area's exports and imports; to explain growth and development; and to determine types of government policies that effect regional economic growth and development and to study the effects.

P ADM 534 is an elective course for the MPA degree and is usually offered during a 15-week semester every other year.

Grades are based on 6 mini-cases (20%), mid-term exam (20%), short paper (10%), comprehensive final exam (30%), and class participation (20%).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 535** Policy Analysis and Planning (3) The course will cover the theoretical issues in and basic methods of policy analysis and planning (prospective policy analysis).

**P ADM 535 Policy Analysis and Planning (3)**

Policy analysis is a systematic inquiry into the nature of policy problems and public policies. It offers a set of principles and methods that can be used in constructing public policies and evaluating their outcomes. This course covers the theoretical approaches and methods in prospective policy analysis and planning. Emphasis will be on the quantitative/analytical methods, but qualitative methods in individual and group problem solving and planning will also be covered. These methods and techniques will be discussed in their theoretical contexts. The course will be divided into three sections. The first section will provide students with an overview of the nature of public policy problems, history of policy analysis, and the current competing theories. The second section will focus on the problems in and methods of gathering and disseminating policy-analytical information. In the policy-analytical process, information is gathered and disseminated in political and cultural contexts; the characteristics of this process and its contexts will be covered in this section. In the third section of the class, the stages and some of the basic methods of policy analysis will be discussed. The focus will be on problem structuring and forecasting methods, cost-benefit analysis, decision trees, and implementation design.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 550 Policy and Program Evaluation (3)** The course will cover the theoretical issues in and basic methods of policy and program evaluation (retrospective policy analysis).

**P ADM 550 Policy and Program Evaluation (3)**

This course is designed to cover the theoretical issues and perspectives in policy and program evaluation, ethical issues in evaluation, and basic methods of evaluation research. The methods of needs assessment, monitoring social programs, impact assessment, and measuring efficiency will be discussed. Students will learn how to conduct randomized experiments, quasi-experiments, evaluation of full coverage programs, and efficiency measurement in evaluation research. The primary goal of this course is to help students become informed consumers of the products of evaluation research. They will also learn the basic skills of designing and conducting evaluation projects. Class time will be devoted mainly to discussions of theoretical concepts and examples. During the semester, students will be given written assignments. They will also conduct policy or program evaluation studies in the areas of their choice.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 556 State Government Administration (3)** Study of structures, systems, processes, problems, and issues affecting state government administration; case studies, field observations, and research.

**P ADM 556 State Government Administration (3)**

State Government Administration aims to provide students with an introduction to management tools and techniques for administering state government agencies and programs in the context of intersector and intergovernmental relations within a

system of representative democracy. The course deals both with management tools as well as policy and management leadership, focusing especially on the nexus between policy and management.

Specific course objectives: to foster understanding of the tools and techniques associated with the administration of state government within the context of the broader governance environment; to develop an understanding of the interaction among

politics, policy, and management processes at the state level and the role of state officials within institutions and processes; to

develop a working knowledge of appropriate tools, models, and concepts associated with state administration via the completion of applied assignments; and to improve communication, writing, and technical skills.

Students will be graded on overall discussion (15%), five written news analyses (15%), management papers (40%), and final exam (30%). P ADM 556 is an elective for the MPA degree and is offered every two years.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 556 State Government Administration (3)** Study of structures, systems, processes, problems, and issues affecting state government administration; case studies, field observations, and research.

**P ADM 556 State Government Administration (3)**

State Government Administration aims to provide students with an introduction to management tools and techniques for administering state government agencies and programs in the context of intersector and intergovernmental relations within a

system of representative democracy. The course deals both with management tools as well as policy and management leadership, focusing especially on the nexus between policy and management.

Specific course objectives: to foster understanding of the tools and techniques associated with the administration of state government within the context of the broader governance environment; to develop an understanding of the interaction among

politics, policy, and management processes at the state level and the role of state officials within institutions and processes; to

develop a working knowledge of appropriate tools, models, and concepts associated with state administration via the completion of applied assignments; and to improve communication, writing, and technical skills.

Students will be graded on overall discussion (15%), five written news analyses (15%), management papers (40%), and final exam (30%). P ADM 556 is an elective for the MPA degree and is offered every two years.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 557** Federalism and Intergovernmental Relations (3) Study of the impact of a federal system of government on the administration of public functions. National-state-local dimensions.

**P ADM 557 Federalism and Intergovernmental Relations (3)**

The course aims to develop students' abilities in four broad categories: (1) understanding of intergovernmental relations and management as it relates to past, present, and future trends in American governance and the historical, normative, and institutional context of American public administration; (2) analytic ability, involving the process of careful, rigorous, and systematic thinking at both abstract and concrete levels; (3) perception of public administration from a theoretical informed point of view, through development and application of concepts, models, and other course materials related to intergovernmental topics; and (4) application of specific information and skills, with emphasis on issue identification and problem solving. The course offers the students an opportunity to develop the self-awareness and personal capacities that are vital to becoming a dynamic public administrator.

The course will be graded on written and oral seminar participation (20%); research and presentations (40%); and two examinations (40%). P ADM 557 is an elective for the MPA degree and is offered every two years.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 557** Federalism and Intergovernmental Relations (3) Study of the impact of a federal system of government on the administration of public functions. National-state-local dimensions.

**P ADM 557 Federalism and Intergovernmental Relations (3)**

The course aims to develop students' abilities in four broad categories: (1) understanding of intergovernmental relations and management as it relates to past, present, and future trends in American governance and the historical, normative, and institutional context of American public administration; (2) analytic ability, involving the process of careful, rigorous, and systematic thinking at both abstract and concrete levels; (3) perception of public administration from a theoretical informed point of view, through development and application of concepts, models, and other course materials related to intergovernmental topics; and (4) application of specific information and skills, with emphasis on issue identification and problem solving. The course offers the students an opportunity to develop the self-awareness and personal capacities that are vital to becoming a dynamic public administrator.

The course will be graded on written and oral seminar participation (20%); research and presentations (40%); and two examinations (40%). P ADM 557 is an elective for the MPA degree and is offered every two years.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 558** Legislative Processes (3) Legislatures in American government, emphasizing comparative state legislatures: constitutional patterns; organization, administration; interaction with bureaucracy, constituencies, and organized interests.

**P ADM 558 Legislative Processes (3)**

The course examines development of the modern congress and the general assembly; campaigns and elections; party organization and the leadership; committees and the rules of procedure; the "Republicans take over congress;" congress, the President and the bureaucracy; the congressional campaign; congress, interest groups, and the congressional enterprise;

congress, the budget, and domestic policy making; the decline of representative democracy. The Pennsylvania state legislature will receive particular attention.

The course is designed to equip students to manage programs within the political environment of public and nonprofit administration.

The course is evaluated on two short, written reports (25% each); final exam (40%); class participation and presentations (10%). P ADM 558 is offered every third semester as an elective for the MPA degree.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 558 Legislative Processes (3)** Legislatures in American government, emphasizing comparative state legislatures: constitutional patterns; organization, administration; interaction with bureaucracy, constituencies, and organized interests.

**P ADM 558 Legislative Processes (3)**

The course examines development of the modern congress and the general assembly; campaigns and elections; party organization and the leadership; committees and the rules of procedure; the "Republicans take over congress;" congress, the

President and the bureaucracy; the congressional campaign; congress, interest groups, and the congressional enterprise; congress, the budget, and domestic policy making; the decline of representative democracy. The Pennsylvania state legislature will receive particular attention.

The course is designed to equip students to manage programs within the political environment of public and nonprofit administration.

The course is evaluated on two short, written reports (25% each); final exam (40%); class participation and presentations (10%). P ADM 558 is offered every third semester as an elective for the MPA degree.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 570 Scope and Methods of Public Administration (3)** Examination of theoretical approaches to public administration and the role of theory in the field.

**P ADM 570 Scope and Methods of Public Administration (3)**

Course objectives: At the conclusion of the semester, each participant should have gained a solid grasp of the literature of public administration; understand the major issues that have created the boundaries and horizons of the field; understand the importance of systematic research and methods of inquiry to the field of public administration; and have a sense of the likely directions research and practice will take in the future. Evaluation for the course will be: Class participation, 10%; individual reports (briefing papers on required assignments), 30%; final paper in the 25-35-page range, 30%; final examination, 30%. This course is the basic core course in the Ph.D. program and is a prerequisite course for the remaining core Ph.D. courses. It is offered each fall to incoming Ph.D. students, with an enrollment of 5-12 students.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 571 Seminar in Organizational Theory (3)** Selected theories of organizations and their applications to the study of public organizations.

**Seminar in Organizational Theory (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 573** Research and Theory in Public Policy and Governance (3) An introduction to policy analysis, the stages of the policy process, and key theoretical issues. applications to real world problems.

### **P ADM 573 Research and Theory in Public Policy and Governance (3)**

This seminar provides an introduction to policy analysis, basic stages of the policy process, and key theoretical issues associated with the subject. Among issues addressed in this course: ethics in policy analysis; policy analysis as a profession. The stages of the policy process will be considered in detail, from problem definition to termination. Key theories associated with each will be discussed. Additional concepts to be considered include: policy instruments, policy design, issue networks, policy typologies and the politics associated with each. The institutional context of these stages will be considered. Students will explore the impact of positivism and postpositivism on our understanding of policy. Finally, public policy will be examined in light of a variety of approaches to democratic theory and practice.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 574** Research and Theory in Public Management (3) Theoretical and empirical bases for selected functions of public managers.

### **Research and Theory in Public Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1988

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 575** Advanced Research Design (3) Experimental, quasi-experimental, survey, aggregate, and other research designs applied to organizational, managerial, and policy analysis research problems.

### **Advanced Research Design (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 576** Multivariate Statistical Methods (3) Multivariate statistical methods, with special emphasis on their use in organizational, managerial, and policy analysis research settings.

### **Multivariate Statistical Methods (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1988

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 579** Public Leadership and Ethics (3) Examination of theory and research in leadership and public ethics, and their application to the field of Public Management.

### **P ADM 579 Public Leadership and Ethics (3)**

This seminar examines theoretical and empirical research and writing in two areas of Public Management: leadership and public ethics. It builds upon a foundation of theory and research on the general subject of Public Management developed in P ADM 574, Research and Theory in Public Management. Key theories in each of the two areas and their application to the work of public managers are considered. Students examine different methodological approaches, including quantitative and qualitative research, normative political and social theory, and legal research. Students will be expected

to develop a significant research paper and/or designs for future research as products of the class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 591** Readings in Public Administration (3) Directed readings in selected areas of public administration.

### **Readings in Public Administration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 594** Research Topics (1-18) Supervised student activities on research projects identified on an individual basis.

### **Research Topics (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.



**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 597A** Homeland Security Law (3) Foundation for understanding homeland security law, its Constitutional basis, judicial interpretations, and current field of statutes.

**Homeland Security Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 597A** Homeland Security Law (3) Foundation for understanding homeland security law, its Constitutional basis, judicial interpretations, and current field of statutes.

**Homeland Security Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 801** (HLS 801) Homeland Security Administration: Policies and Programs (3) Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management

approaches.

**P ADM (HLS) 801 Homeland Security Administration: Policies and Programs (3)**

The evolution of Homeland Security (HS) policy and management before and after 9/11/2001 is examined. Legislation, executive organization, and management approaches are considered at all levels of the U.S. federal system, with emphasis on the national approach to homeland security that has evolved since 2001. HS is considered as an all-hazards responsibility including preparation for, response to, and mitigation of both natural and man-made catastrophic events. Different approaches to HS are explored, including policing, surveillance, inter-agency coordination, and risk analysis. HS is seen also in the global context, with examples drawn from a variety of national experiences. Students will be exposed to the range of disciplines that public policy and management of HS draw upon for guidance. Research on both the evolution of HS in general, and the policies and programs in a specific substantive area will be required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 802 Multifaceted Approaches to Homeland Security (3)** Examination of the roles of the public and private sectors and the military in preparing, mitigating, and responding to disasters.

**P ADM 802 Multifaceted Approaches to Homeland Security (3)**

Preparedness and responsiveness have long been part of the law enforcement and military lexicon; however 9/11 expanded the terms' application and the number of people who held responsibility for their implementation. The result is a growing interest surrounding the nature of the terrorist threat and how intelligence fusion is essential to prevention; the role of the military in civil society; cooperation among federal, state, and local agencies as well as the private sector in response to a catastrophic event; the importance of planning and exercises to improve the mitigation of such events. This course, Multifaceted Approaches to Homeland Security, introduces relevant perspectives and concepts related to these topics and develops a framework that demonstrates their interconnectivity. In addition to providing a conceptual understanding of key ideas, it familiarizes the students with the roles played by various entities (e.g., law enforcement, intelligence organizations, the military, and federal, state, and local agencies) and the and de facto framework in which they exercise their responsibilities. The course introduces students to intelligence and the importance of intelligence fusion as a counter-terrorism force as well as the need for collaboration among all relevant actors and the integration of actions and planning. Finally, it provides an opportunity to evaluate "table top" exercises, a key component in mitigating the impact of future events.

The course will motivate students to understand how to protect against and respond to the threats of the 21st century.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 803 Strategic Planning and Organizational Imperatives in Homeland Defense and Security (3)** The Homeland Security framework depends on strategic planning and organization. This course examines the key issues associated with these.

**P ADM 803 Strategic Planning and Organizational Imperatives in Homeland Defense and Security (3)**

The Strategic Planning and Organizational Imperatives in Homeland Defense and Security course builds on P ADM 401 and introduces the essential concepts of planning for the response to all hazards incidents. While the JPS is studied in-depth as a template for a logical planning sequence to organize and employ resources effectively and efficiently, it is not the only system available to municipalities to complete these tasks. The National Incident Management System (NIMS) and its companion policy guidance document, the National Response Plan (NRP), provide broad policy guidance for a comprehensive approach to domestic incident management to prevent, prepare for, respond to, and recover from all hazards incidents. Familiarity with the NIMS and the NRP are essential for individuals to integrate into and be a valuable member of destructive event mitigation and response, whether disasters are natural or human-caused. Critical infrastructure, key resources, and border protection provide the framework for the nation's homeland security and defense efforts. Over eighty percent of these resources reside in the private sector. This presents a challenge to the nation, particularly in the areas of policy guidance and information sharing between the public and the private sectors. These challenges will be presented and analyzed during this course. Participant's understanding of the principles presented will be measured through the preparation of an analysis of a key homeland security/defense issue related to the materials presented.

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**P ADM 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Public Admn (PUB A)**

**PUB A 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PUB A 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Public Health Preparedness (PHP)**

**PHP 410** (HLS 410) Public Health Preparedness for Disaster and Terrorist Emergencies I (3) Analyzes the history of terrorism and explores the preparation and response to specific terrorist threats, natural disasters, and conventional catastrophes.

### **Public Health Preparedness for Disaster and Terrorist Emergencies I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 510** Public Health Preparedness for Disaster and Terrorist Emergencies II (3) A public health perspective on the preparation necessary to develop a coordinated response to a disaster or terrorist emergency.

### **Public Health Preparedness for Disaster and Terrorist Emergencies II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 527** Public Health Evaluation of Disasters and Bioterrorism (3) Introduces students to the design of exposure assessment and health effect studies applicable to disasters and terrorism.

**Public Health Evaluation of Disasters and Bioterrorism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 530** (HLS 530) Critical Infrastructure Protection of Health Care Delivery Systems (3) Investigates the impact that terrorist incidents may have on healthcare facilities or their ability to deliver healthcare services.

**Critical Infrastructure Protection of Health Care Delivery Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 553** (CAS 553) Disaster Communication (3) This seminar provides students with a comprehensive understanding of the multifaceted nature of disaster communication across phases of a disaster.

**Disaster Communication (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 558** (PSY 558, HLS 558) Disaster Psychology (3) Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.

**Disaster Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 594** (HLS 594) Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 596** Individual Studies (1-9 per semester/maximum of 9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 597 Special Topics (1-3 per semester/maximum of 9)** Formal courses given on a topical or special interest subject which may be offered infrequently, several topics may be taught in one year or term.

**Special Topics (1-3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHP 597A After the Emergency Operation Plan: Exercises in Public Health Preparedness (3)** This course teaches students the fundamentals of emergency preparedness exercises, such as Orientation, Tabletop, Drill, Functional, and Full-scale exercises.

**After the Emergency Operation Plan: Exercises in Public Health Preparedness (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Public Health Sciences (PHS)

**PHS 500 Research Ethics for Clinical Investigators (1)** This course is designed for graduate students preparing for a career that will include clinical investigations.

**Research Ethics for Clinical Investigators (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 501 Principles of Public Health (3)** This course is designed to provide students with a foundation in public health principles.

**Principles of Public Health (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 504 Behavioral Health Intervention Strategies (3)** Evaluation of intervention strategies from a biobehavioral health context; theories of change processes in health.

**Behavioral Health Intervention Strategies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 505** Public Health Program Planning and Evaluation (3) Foundations in public health program planning and evaluation.

**Public Health Program Planning and Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 506** Behavioral Health Intervention Strategies II (3) This course provides instruction on how to design theory-driven public health interventions.

**Behavioral Health Intervention Strategies II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 510** Clinical Research Methods (3) Introduction to the design, implementation, analysis, and interpretation of health research, including observational and controlled trials.

**Clinical Research Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 511** Methods Used in Translational Research (1) This course is designed to familiarize clinicians with state-of-the-art laboratory techniques as they apply to translational research studies.

**Methods Used in Translational Research (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 516** Statistical Genetics (3) Basic theory and methods for statistical analysis, introduction to bioinformatics, principles and methods of statistical genetics, case-control association studies.

**Statistical Genetics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 518** Scientific Communication (2) A survey of the formats in which medical science is presented, with exercises in the preparation of abstracts, manuscripts, and grant applications, including illustrations.

**Scientific Communication (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PHS 519 Patient Oriented Research (2)** This course provides an overview of clinical research and an introduction to methods used to conduct clinical research.

**Patient Oriented Research (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 520 Principles of Biostatistics (3)** Introduction to the application of techniques and interpretation of results that are commonly used to plan, analyze, and report clinical and health services research.

**Principles of Biostatistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 521 Applied Biostatistics (3)** An intermediate course that provides more in-depth development of analytical topics covered in the Intro Biostats course, such as analysis of variance and regression techniques. Students will perform analyses, summarize, and interpret results.

**Applied Biostatistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 522 Multivariate Biostatistics (3)** This course focuses on advanced topics in biostatistics involving multivariate responses in biomedical research.

**Multivariate Biostatistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 523 Multivariate Analysis (3)** This course focuses on the theoretical and applied aspects of multivariate analyses that are relevant to biomedical research.

**Multivariate Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 524 Longitudinal Data Analysis (3)** This course focuses on the theoretical and applied aspects of longitudinal data analyses that are relevant to biomedical research.

**Longitudinal Data Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 525** Biostatistics for Lab Scientists (3) Basic theory and methods for statistical analysis, data presentation and experimental design, with a focus on biomedical applications.

### **Biostatistics for Lab Scientists (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 526** Categorical Data Analysis (3) This course focuses on statistical theory and methods for analyzing categorical data.

### **Categorical Data Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 527** Survival Analysis (3) This course focuses on the analysis of time-to-event data with a focus on biomedical research.

### **Survival Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 528** Bayesian Methods (3) Approaches to Bayesian modeling and computation with application to medicine and biomedical research.

### **Bayesian Methods (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 535** Quality of Care Measurement (3) Emphasizes the concept and measurement issues involved in assessing and improving the quality of health care.

### **Quality of Care Measurement (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 536** Health Survey Research Methods (3) This course provides instruction on how to design health research survey questionnaires and how to conduct survey studies.

### **Health Survey Research Methods (3)**

General Education: None

Diversity: None



Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 537 Health Policy and Law (3)** This course reviews processes related to health policy formulation, implementation, and advocacy.

### **Health Policy and Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 540 Decision Analysis I (1)** This course provides an introduction to the methods and applications of decision analysis in clinical decision making.

### **Decision Analysis I (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 541 Decision Analysis II (1)** This course provides an introduction to the methods and applications of decision analysis in clinical decision making.

### **Decision Analysis II (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 542 Environmental Health Sciences (3 per semester/maximum of 3)** Overview of the impact that chemical, physical, and biologic agents in the environment have on human health.

### **Environmental Health Sciences (3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 550 Principles of Epidemiology (3)** Topics include measurements, surveillance, outbreak investigation, bias, and study design.

### **Principles of Epidemiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 551 Advanced Epidemiological Methods (3)** Advanced methodological course providing in-depth discussions on applications of advanced methods to design, execution, data analysis, and epidemiological studies reporting.

### **Advanced Epidemiological Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 552** Molecular Epidemiology of Chronic Disease (3) This course provides instruction on molecular epidemiologic study design and methods in the study of chronic disease.

### **Molecular Epidemiology of Chronic Disease (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 553** Infectious Disease Epidemiology (3) Principles of infectious disease epidemiology and the use of epidemiologic methods to address infectious diseases of national and international importance.

### **Infectious Disease Epidemiology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 570** Health Economics and Economic Evaluation (3) An introductory course on applied economic evaluation, with emphasis on micro-economic theory, cost-effectiveness and economic modeling.

### **Health Economics and Economic Evaluation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 571** Health Services Organization and Delivery (3) Examination of health systems, organization, financing, and evaluation; trends, problems, and issues.

### **Health Services Organization and Delivery (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 580** Clinical Trials: Design and Analysis (3) This course stresses the concepts of statistical design and analysis in biomedical research, with special emphasis on the clinical trial.

### **Clinical Trials: Design and Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 581** Clinical Trials: Case Studies (1) This course emphasizes case studies in clinical trials design, conduct, and analysis.

**Clinical Trials: Case Studies (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 594** Research Topics (1-9) A closely monitored, clinical or population based research project that is conducted during the second year of the PHS MS curriculum.

**Research Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 595** Public Health Practice Internship (1-6 per semester/maximum of 6) This course provides Master of Public Health degree students with hands-on, "real-world" experience in the practice of public health.

**Public Health Practice Internship (1-6 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 596** Individual Studies (1-9) Creative projects including non-thesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 597** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be of topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 597B** Statistical Computing Using SAS (1) How to construct data queries using SAS statistical software.

**Statistical Computing Using SAS (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 597C** Principles of Health Services Research (1) This course is designed to introduce new graduate students to the

Health Services Research methodology.

### **Principles of Health Services Research (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 597D** Advanced Biostatistical Methods in Clinical Trials (3) A special topics course on advanced biostatistical methods in clinical trials.

### **Advanced Biostatistical Methods in Clinical Trials (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 598** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 598A** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 600** Thesis Research (3-6) Research training provided to enable the student to advance his or her knowledge about a selected topic in public health sciences.

### **Thesis Research (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 801** Data Management (1) Development and implementation of plans for managing clinical research data, collection and processing data, and ensuring data quality.

### **Data Management (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**PHS 807** Public Health Education Methods (3) Provides the knowledge and skills associated with the methods used to deliver successful public health education programs.

**Public Health Education Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 895A** Master of Public Health Internship (3 per semester/maximum of 6) Provides Master of Public Health (MPH) degree students with hands-on, real- world experience in the practice of public health.

**Master of Public Health Internship (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 897** Special Topics (1-9 per semester/maximum of 9) Formal courses offered infrequently on a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 897D** Special Topics: Capstone Experience (3) This course serves as a culminating experience option for students in the Master of Public Health in Public Health degree program.

**Special Topics: Capstone Experience (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**PHS 897F** Practice of Public Health (2) Examines key issues related to the practice of public health through discussion of case studies and students' practicum experiences.

**Practice of Public Health (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Pulmonary Medicine-Hy (PLM)**

**PLM 726** Pulmonary Medicine (3) Some of the areas studied will be: Symptoms and Signs of Respiratory Disease; Use of Common Diagnostic Tools to Evaluate Patients; Pathophysiology; COPD; Bronchial Asthma; Hypertension; Thromboembolism; Pediatric Pulmonary Disease; Infections; Diffuse Infiltrative Pulmonary Diseases; Acute and Chronic Respiratory Failure; Acute Respiratory Distress Syndrome; Lung Cancer: Pathology and Clinical Aspects; Environmental and Occupational Lung Disease.

**Pulmonary Medicine (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Quality and Manufacturing Management (QMM)**

**QMM 491** Introduction to Business Concepts for Manufacturing (3) Introduction to business, topics in marketing, accounting, and finance for nonbusiness students in manufacturing management.

**Introduction to Business Concepts for Manufacturing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 492** Introduction to Engineering Design Principles (3) Engineering principles including different engineering fields, graphics, design, solid modeling and failure analysis.

**Introduction to Engineering Design Principles (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 552** Applied Statistical Process Control and Experimental Design (3) Concepts and techniques of statistical process control and the design of experiments.

**Applied Statistical Process Control and Experimental Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 561** Manufacturing Systems Planning and Control I (3) Systems, components and configurations, flow of material and information in a manufacturing system.

**Manufacturing Systems Planning and Control I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 562** Manufacturing Systems Planning and Control II (3) Flow of material and information in a manufacturing system; emphasis on systems integration.

### **Manufacturing Systems Planning and Control II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 581** Manufacturing Processes of Materials (3) Characteristics of materials with respect to their properties and associated choices of processing to create a range of products.

### **Manufacturing Processes of Materials (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1996

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 582** Manufacturing and Supply Chain Strategy (3) Strategic decision context of manufacturing and its supply chains with linkage to corporate and business strategy.

### **Manufacturing and Supply Chain Strategy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 593** Field Experience in Manufacturing (1-2) Experiential learning through the firsthand study of manufacturing plants and by interacting with manufacturing leaders.

### **Field Experience in Manufacturing (1-2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 851** Quality Management (3) Concepts of design, assessment, and improvement of quality systems; customer needs analysis, identification of opportunities for application of measurement techniques.

### **Quality Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 871** Design Practice for Manufacturing I (3) Contemporary concepts in design and design practice with emphasis on engineering, business, and human strategic issues.

### **Design Practice for Manufacturing I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 872** Design Practice for Manufacturing II (3) Contemporary concepts in design and design practice with emphasis on logistics, risk, design and manufacturing readiness, and production.

### **Design Practice for Manufacturing II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 891** Communication and Leadership Skills for Manufacturing Managers (1-3) Applied principles of managerial, visual, and written communication that support the needs of manufacturing leaders.

### **Communication and Leadership Skills for Manufacturing Managers (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QMM 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Quantitative Analysis (QANLY)**



**QANLY 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**QANLY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Radiology (RAD)

**RAD 700** Pediatric Radiology (5) Tutorial course emphasizing interpretation, clinical correlation, indications, and limitations of imaging studies used in the evaluation of infants and children.

**Pediatric Radiology (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 771** General Radiology--Clinical Elective (5) Clinical elective including experience in diagnostic radiology, film interpretation, nuclear medicine, and radiation therapy.

**General Radiology--Clinical Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 772** Radiology Advanced Elective (5) Clinical experience in interpreting radiographs and imaging studies, , fluoroscopy, dictating and signing radiologic reports, and providing consultative services.

**Radiology Advanced Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 774** Radiation Oncology Elective (3rd or 4th year) (5) This course provides exposure to the scope of clinical Radiation Oncology.

**Radiation Oncology Elective (3rd or 4th year) (5)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 774A** Radiation Oncology Elective (3rd year) (2.5) This course provides 2 week exposure to the scope of clinical Radiation Oncology.

### **Radiation Oncology Elective (3rd year) (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 796** Radiology Individual Studies (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

### **Radiology Individual Studies (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 796A** Radiology Individual Studies for 3rd year Medical Students (2.5) Radiology Individual Studies for 3rd Year Medical Students.

### **Radiology Individual Studies for 3rd year Medical Students (2.5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RAD 797** Radiology Special Topics (5) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Radiology Special Topics (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Real Estate (R EST)**

**R EST 515** (I B 515) Property Rights in a Global Economy (2) Analysis of economic, financial, legal, and political factors affecting international real estate decision making.

### **Property Rights in a Global Economy (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 560** Real Estate Financial Analysis (2) This course provides a modern framework for the valuation and analysis of real property using both theoretical and empirical approaches.

**Real Estate Financial Analysis (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 570** Institutional Real Estate Investment (2) A survey of the latest developments of real estate as an institutional investment.

**Institutional Real Estate Investment (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 599** (IL) Foreign Study--Real Estate (1-12) Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

**Foreign Study--Real Estate (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**R EST 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) No description.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R EST 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Real Prop/Envrml Law (RP&EL)**

**RP&EL 960** Environmental Law (3) This course introduces some of the most important concepts, issues, and statutes in environmental law. After discussing the economic and ethical bases for environmental law. After discussing the economic and ethical bases for environmental law and briefly reviewing the relevant principles of constitutional and common law, students examine a representative selection of federal statutes, including the National Environmental Policy Act, the Endangered species Act, "Superfund," and the Clean Air Act.

**Environmental Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 962** Environmental Litigation (2) This course explores the various aspects of litigation, client counseling, and regulatory work that arise in the day to day practice of environmental law. Emphasis is on the practical aspects of the practice of law, with active class participation using problems designed to duplicate situations faced by environmental attorneys in their practices. Among other things, students will cross-examine scientific experts, prepare a plant manager for a deposition, and negotiate a civil penalty for environmental violations. Although environmental law is used a basis for the mock exercises, prior environmental classes are not a prerequisite, and the skills taught in this course will translate well to other types of litigation.

**Environmental Litigation (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 964** Real Estate Negotiation and Drafting (3) Students will learn to negotiate and draft multiple standard documents used in commercial real estate transactions.

### **Real Estate Negotiation and Drafting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 965** Oil and Gas Law (3) This course will address the basic concepts in oil and gas law within the United States as well as the specific legal issues associated with the development of the Marcellus Shale formation. This specific topics to be covered include the ownership of oil and gas, oil and gas leasing, oil and gas conservation laws, oil and gas interests, and government regulation of development.

### **Oil and Gas Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 973** Land Use Controls (3) The public regulation of private property raises some of the more interesting and difficult questions in property law. On one side of the debate is the government, which seeks to regulate land use in ways that it believes promote the public interest. On the other side are private property owners who often object to restrictions placed on their ability to use their property as they deem best. In studying this tension between public goals and private rights, the course will explore the constitutional limitations placed on governments in the area of land use regulations as well as topics such as variances, special use permits, vested rights, subdivision controls, exactions, and impact fees, exclusionary zoning, the rebuilding of urban cores, and the managing of growth in suburban areas.

### **Land Use Controls (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 980** Construction Law (2-3) This course examines the peculiar legal problems encountered on construction projects. It covers contract, tort and statutory law as adapted specifically to the construction industry. It analyzes the perspectives of an owner, developer, architect/engineer, contractor, subcontractor and bonding company, both in the context of private and public construction projects, commercial and residential. the principal areas of inquiry are contract structure, public bidding, theories of liability, payment and security mechanisms, claims related to time, disruption and extra work, and claims arising from construction defects. This course is designed to enable you to become familiar with construction law and the construction industry so that, whether you work in the public sector of private practice, you will be able to offer practical legal advice to construction professionals.

### **Construction Law (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 988** Natural Resources Law (3) This course provides a basic overview of federal and state regulations and the common law affecting title to and exploitation of such resources as water, coal, oil, gas, and public lands. Common mineral leasing provisions are given particular emphasis.

### **Natural Resources Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 997A** Law and Policy of Shale Gas Development (2) This course will address current legal and policy aspects of shale oil and gas development. Students will focus on the major policy issues that are shaping - and have shaped - the development of the law in the early years of the so-called "Shale Revolution." Among the topics expected to be covered: role of shale oil and gas in our national energy portfolio, determining the appropriate regulatory entity to oversee developmental activities; managing economic benefits at the individual community, and state level in the short and long term; environmental concerns; government role in developing new technologies and expanding markets for product; and international development.

### **Law and Policy of Shale Gas Development (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RP&EL 997B** Water Law and Policy (3) Water issues are a critical to human and ecosystem health throughout the world. Here in the United States, it has been identified as a critical resource for national security and as a key regional issue in many parts of the nation. This course provides an overview of U.S.-focused legal and policy questions related to water. The course will cover generally the legal and policy challenges facing water resources today, including the allocation of water supplies under the riparian and prior appropriation doctrines; protection of water quality under the Clean Water Act, and the Chesapeake Bay; and special topics with a water law and policy connection such as a climate change, flooding and drought, drinking water and infrastructure, and energy.

### **Water Law and Policy (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Recreation, Park and Tourism Management (RPTM)**

**RPTM 410** Marketing of Recreation Services (3) Theoretical/practical application of marketing/advertising strategies in the development/delivery of recreation services.

### **RPTM 410 Marketing of Recreation Services (3)**

The primary objective of this course is to provide students with an overview of marketing in general and recreation/tourism marketing in particular. Supplemental objectives are to (a) provide students with a review of different marketing theories and practices and (b) help students apply marketing principles to practical recreation/tourism situations.

Main topics typically include:

- \* Introduction to marketing and its evolution
- \* Parameters of the recreation/tourism experience and how this affects marketing practices
- \* Defining and segmenting the consumer market
- \* The marketing mix
- \* Conducting marketing research in an effort to develop effective marketing strategy
- \* Service quality and its impact on marketing strategy
- \* Customer loyalty and its impact on marketing strategy
- \* Recognizing and responding to the changing needs of consumer markets

This is a required course for RPTM majors, generally taken after completion of the introductory courses in the major. Students in other majors, including those pursuing the Liberal Arts Business minor, are welcome after RPTM majors have scheduled.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 415 Commercial Recreation Management (3)** Planning, developing, and managing profit-oriented recreation opportunities.

### **RPTM 415 Commercial Recreation Management (3)**

Building upon subject matter presented in many of the core RPTM courses, the primary objective of this course is to provide students with an understanding of strategic management processes and how they apply to recreation/tourism businesses. A second objective is to develop students' decision-making and analytical abilities.

Main topics typically include:

- \* An overview of the strategic management process
- \* Having the mindset of an entrepreneur/intrapreneur
- \* The "ins and outs" of conducting feasibility studies
- \* The pros and cons of different forms of business
- \* Generating and setting short- and long-term goals and objectives for recreation/tourism businesses
- \* Capitalizing, financing and budgeting for recreation/tourism businesses
- \* Planning, organizing, managing and controlling recreation/tourism businesses
- \* Regulations, taxation and licensure of recreation/tourism businesses
- \* Recognizing the importance of developing and maintaining relationships with various constituencies
- \* Options for strategic growth

This course is required of RPTM majors in the Commercial and Community Recreation Management option. Students take this course after or concurrent with RPTM 410. Students in other majors who have met the pre-requisites, including those pursuing the Liberal Arts Business minor, are welcome after RPTM majors have scheduled.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 425 Principles of Interpretive Materials (3)** Principles, practices, application of non-personal interpretive activities common to natural/cultural history, including exhibits, audio-visual and illustrative materials.

### **RPTM 425 Principles of Interpretive Materials (3)**

The primary objective of this course is for students to follow the exhibit creation process from conceptualization through construction to completion. Along the way, students will present their works-in-progress to fellow students and instructors for modification and improvement. Their final products will be used in a practical environment in the exhibit room at Shaver's Creek Environmental Center and at various educational functions around the state - PA State Farm Show, Central PA Festival of the Arts, Penn State's Ag Progress Days, etc.

Main topics to be covered:

- \* Topics vs. Themes: narrowing the unifying concepts in exhibit design
- \* Flow in an exhibit and museum space: how to guide logical progression of thought in both an exhibit and exhibition area
- \* Color Schemes
- \* Computer aided design techniques
- \* Woodworking skills

This course is one of the selections for RPTM majors in the environmental interpretation emphasis of the Outdoor Recreation option. Students from other majors may enroll in this course if they have met the pre-requisite (RPTM 325).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 430 Environmental Education Methods and Materials (3)** Methods and materials for developing, implementing, and evaluating environmental education programs within formal and non-formal educational settings.

**RPTM (AEE) 430 Environmental Education Methods and Materials (3)**

The primary objective of this course is to provide students with an introduction to Environmental Education (EE) methods (pedagogy) and materials for both formal and non-formal settings. A second objective is to provide the student with an opportunity to apply specific methods and materials to practical situations at Shaver's Creek Environmental Center. These opportunities include Outdoor School, School Day Programs, Maple Harvest Festival, and Scout Programs. A third objective is to provide information about gaining access to EE materials through web-based, written, and personal contacts.

Main topics typically include:

- \* Introduction to the history, definition, and philosophy of Environmental Education (EE)
- \* Differences between formal and non-formal EE settings
- \* PDE Environment & Ecology Standards
- \* Models of EE pedagogy
- \* Place-based-education labs covering: The Land, Water Resources, Fauna, and Flora
- \* "Keystone Aquatic Resource Education" teacher resource workshop (or other national curricula- i.e. P WILD, PLT, Project WET, etc.)
- \* EE Resources available at SCEC, the web, and other EE centers

This course is one of the selections for RPTM majors in the environmental interpretation emphasis and adventure-based programming emphasis within the Outdoor Recreation option. Students from other majors may enroll in this course if they have met the pre-requisite (RPTM 325).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 433W Program Evaluation and Research in Recreation Services (3)** Systematic, structured problem-solving process for decision making in recreation and parks. Research techniques/evaluation procedures; quantitative, qualitative methodologies; deductive, inductive reasoning.

**RPTM 433W Program Evaluation and Research Services (3)**

The goal of this course is to provide students with the background necessary to understand and evaluate research reports and to conduct research projects of moderate complexity in the field of recreation, parks, and tourism management. The research focus of the class is on evaluation and assessment. Class topics include introductions to the philosophy of science, including the nature of theories, hypotheses, concepts and constructs, to measurement theory, to applied sampling techniques, and to methods of scale construction. Both quantitative and qualitative research methods are addressed. In-class activities include the conceptualization and execution of an applied evaluation project. This project involves practice in interviewing, in-class focus groups, survey questionnaire development, data collection, and data analysis. The course will provide students with a conceptual map of how research is conducted, the resources available to them, the vocabulary of research, and guidance in writing a research report.

Additionally, this is a Writing Across the Curriculum class. Students will prepare several short writing projects, some based on interviews or observational studies that they have conducted, as well as a final report based on the evaluation research conducted by the entire class.

The course material is divided into units of study with topical areas within each unit sequentially presented to parallel the research process itself. Students are expected to have read assigned materials and to attend class prepared to discuss them. Classes involve lectures, discussions, and in-class activities such as focus groups, survey questionnaire development and presentations of research results.

This class is required of all undergraduate majors in Recreation, Park and Tourism Management. RPTM 356 and a 3-credit course in statistics are prerequisites for this course. Students from other majors are welcome in this course, providing they have met the pre-requisites.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 435 Recreation Facilities Planning and Management (3)** Planning and management of selected facilities with emphasis upon maintenance, activity, and support provisions.



**RPTM 435 Recreation Facilities Planning and Management (3)**

The purpose of this course is to introduce students to planning, design, and maintenance practices at recreation and park facilities. This course will emphasize the activity and support provisions of recreation facilities and will identify standards of design and maintenance. Compliance with accepted risk management practices and the Americans with Disabilities Act (ADA) will also be stressed in this course.

Specific topics covered in this course include:

- \* Maintenance management practices and risk management procedures
- \* Monitoring and reporting recreation and park facility use
- \* General planning considerations of selected recreation facilities, parks and tourism attractions
- \* Special materials and apparatus required for specific park and recreation facilities
- \* Support facilities necessary to complement developments that offer these activities (e.g., vehicular circulation and parking, lighting, emergency provisions, etc.)

This is a required course for RPTM majors in the park management emphasis within the Outdoor Recreation Option. The course is also on the department list of the Commercial and Community Recreation Option. Students in other majors are welcome providing there are seats available after RPTM majors have been scheduled.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 440 Adventure-based Programming and Administration (3)** Utilization of wilderness/backcountry environments and participant challenge; history, models, theories; survey of organizations; program design, administration; and issues.

**RPTM 440 Adventure-Based Programming and Administration (3)**

The first objective of this course is to promote awareness of the history and evolution of adventure-based programming and to look at how this process has impacted the state of programming today. Secondly, through experiential, in-classroom activities students are expected to apply their knowledge of the various outdoor topics and theories examined in class throughout the semester. Third, students learn about the hiring and interview process as they create resumes and explore the currently listed jobs in the field. Fourth, various topics related to current issues in the field are debated, discussed and considered while looking at the future of adventure-based programming.

Main topics to be covered:

- \* History of Experiential Education/Adventure-based Programming
- \* Risk Management in relation to outdoor programming: looking at accidents, forms, and client screening
- \* Hiring/interviewing/looking at resumes
- \* Programming for various audiences: youth at risk, elderly, people with disabilities, women, college student orientation programs, and experiential education in the classroom
- \* Staff training: topics/skills to be covered, leader problems, and burnout
- \* Current Issues: controversial issues, what is in the news, media, gender roles/stereotypes

RPTM 440 is a selection for RPTM majors in the adventure-based programming emphasis of the Outdoor Recreation option. The pre-requisite for this course is RPTM 330 or RPTM 356.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 460 Political and Legal Aspects of Recreation Services (3)** Role of local, state, federal government in provision of recreation services. Legislative and judicial systems.

**RPTM 460 Political and Legal Aspects of Recreation Services (3)**

The primary objective of this course is to examine the governmental systems that influence the delivery of recreational services. The formal structure of government is considered along with the day-to-day political processes that determine public policy. All three levels of government-federal, state, and local--are studied. Particular attention is given to the judicial systems of these governments. The course also gives considerable attention to tort liability by examining case law as it relates to recreation facilities and services. The course also explores federal and state laws pertaining to employer/employee relations and administrative responsibilities. An additional objective is to investigate land use planning as it impacts recreation services.

Main topics include:

- \* The Court Systems, legislative branches
- \* Planning: historical perspective, land use, zoning, mandatory dedication, easements, building codes

- \* Liability: elements of negligence, situations giving rise to law suit, product liability, defenses & risk management, review
- \* Personnel laws; Federal laws, State Human Relations Acts, Civil Service, Hatch Act, FLSA, finance, garnishment & bankruptcy
- \* Public Relations Law: copyright, photography, lotteries, libel, slander, privacy
- \* Administrative Law: purchasing, entrepreneurship, Federal Tax laws

This is a required course for all students majoring in Recreation, Park and Tourism Management. It is open to students of other majors, providing they have met the pre-requisite.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 470** Recreation and Park Management (3 Management of recreation and park services in public/non-profit settings; planning, budgeting fiscal development, resources allocation, decision- , making, computer applications.

### **RPTM 470 Recreation and Park Management (3)**

The primary objective of this course is to provide advanced standing RPTM students with an understanding of management and administration procedures that are essential to operating and managing park facilities and recreation programs. Secondly, students will be given an opportunity to be exposed to park and recreation governance processes and will be asked to synthesize the roles that key stakeholders play in the management of public-sector park and recreation organizations.

Key topics covered in this course include:

- \* A historical account of park and recreation operating environment as well as trends in park support and positioning of the field
- \* Inter-organizational partnerships and collaborations in the park and recreation field
- \* Financing, budgeting and fiscal control processes
- \* Human resource management principles and policies
- \* Creating effective working relationships with community stakeholders and park and recreation board members
- \* Comprehensive recreation, park and open space planning

This course is required for RPTM majors in the park management emphasis within the Outdoor Recreation Option. Students in other majors are welcome providing there are seats available after RPTM majors have been scheduled.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 480** Senior Management Seminar (1) Current management issues will be examined relative to professional management strategies, ethics, and leadership in leisure services.

### **RPTM 480 Senior Management Seminar (1)**

This course is a seminar about current issues in outdoor recreation management. The course objective is to provide students with an opportunity to read about and discuss issues including outdoor recreation management goals and techniques, liability and risk management, leadership, ethics, the place of outdoor recreation in multiple-use management of natural resources, public participation in resource management, and career opportunities.

Topics for the semester are typically selected by the instructor in consultation with students. Examples that have been selected in the past include:

- \* Managing potential conflict between motorized and non-motorized recreation
- \* Leadership and risk management in outdoor adventure activities
- \* Commercial recreation on public lands and waters
- \* Politics, policy, and public involvement in managing public lands and waters;
- \* Recreation and the management of wildlife, timber, minerals, water, and grazing
- \* Career opportunities in teambuilding and leadership development
- \* Concession operations in public parks and forests
- \* Planning and developing a new National Monument
- \* Public employment and civil service requirements.

This is a required course for RPTM majors in the Outdoor Recreation Option. Students are required to have sixth semester standing or higher and have completed RPTM 320. The course is not open to students from other majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 494H** Senior Honors Thesis (1-6 per semester/maximum of 6) Senior Honors Thesis

**Senior Honors Thesis (1-6 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 495A** Internship in Recreation Services (12) Meet educational objectives through participation in organized practical experience; direct observation and professional supervision in full-time work experience.

**RPTM 495A Internship in Recreation Services (12)**

The primary objective of this course is to provide students with an opportunity to meet their educational objectives through participation in well-planned and organized practical experience. Secondary objectives include individualizing the practical experience based upon the student's intended professional career; structuring the experience to facilitate increases in professional skills and competencies as related to the student's professional goals; providing the student with professional supervision and mentoring; and offering the student a diversity of professional responsibilities, including direct leadership and administrative opportunities, in order to prepare the student for successful career entry.

Main topics typically include:

- \* Orientation to the Internship Agency
- \* Development of individualized practicum goals/educational objectives
- \* Critical analysis of professional issues and events
- \* Comparison and contrast of complementary and competing agencies/organizations
- \* In-depth study of the student's practicum agency
- \* Development and implementation of a "special project"

This is a required course for RPTM majors (except Golf Management option) usually taken after a student has completed the majority of the courses in the major. Students must complete RPTM 394 (Orientation to Internship) prior to enrollment. The course is not open to students from other majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 495B** Internship in Golf Management (1-4) Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

**RPTM 495B Internship in Golf Management (1-4)**

The primary objectives of this course are to complete a 40-hour per week internship at an approved golf property. While on internship the student will complete assignments involving philosophy and swing concepts of teaching, and supervising and delegating.

Main topics include:

- \* Philosophy and Swing Concepts of Teaching: group lessons, teaching evaluation, lesson plan, lesson series with disability populations, physical training.
- \* Supervising and Delegating: performance problems, joint problem solving, motivating assignments, and delegation.

This is a required course for all RPTM majors in the Golf Management Option. The internship is not open to students of other majors.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 495C** Internship in Golf Management (1-4) Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

#### **RPTM 495C Internship in Golf Management (1-4)**

The primary objective of this course is to complete a 40-hour per week internship at an approved golf property. While on internship the student will complete assignments involving merchandising and inventory management, food and beverage control, and portfolio development.

Main topics include:

- \* Merchandising and Inventory Management: creating an open-to-buy plan, pricing, sales, inventory, displaying
- \* Food and Beverage Control: customer survey, labor pro forma, costing, storage, and regulations
- \* Port Folio Development: industry problem statement and presentation

This is a required course for RPTM majors in the Golf Management Option. The internship is not open to students of other majors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 495D** Internship in Golf Management (1-4) Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

#### **RPTM 495D Internship in Golf Management (1-4)**

The primary objective of this course is to complete a 40-hour per week internship at an approved golf property. While on internship the student will complete an initial report, midterm and final evaluations, an agency evaluation, activity logs, and application for membership into the PGA of America.

Main Topics Include:

- \* Observation and participation under supervision in golf operations in public, private, municipal, resort or military settings
- \* Complete Membership Application for PGA of America

This is a required course for RPTM majors in the Golf Management Option. The internship is not open to students of other majors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497A** Social and Environmental Sustainability: applications in the Tourism Industry (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Social and Environmental Sustainability: applications in the Tourism Industry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497A** Social and Environmental Sustainability: applications in the Tourism Industry (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Social and Environmental Sustainability: applications in the Tourism Industry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497C** RPTM 497C - Outdoor Consortium (2) The purpose of the Outdoor Recreation Consortium is to provide students with hands-on exposure to outdoor recreation resources management in a major National Park that is facing complex challenges.

**RPTM 497C - Outdoor Consortium (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497D** RPTM 497D - Peer Mentoring (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**RPTM 497D - Peer Mentoring (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497G** Golf Operations (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Golf Operations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497I** Canoeing Leadership (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Canoeing Leadership (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497J** Peer Mentoring (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Peer Mentoring (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 497K** Administration of Golf Operations III (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Administration of Golf Operations III (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 498D** Backpacking Leadership (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Backpacking Leadership (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 498F** Rock Climbing Leadership (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Rock Climbing Leadership (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 498G** Player Development/Tournament Golf (2 per semester/maximum of 16) Formal courses given infrequently to

explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Player Development/Tournament Golf (2 per semester/maximum of 16)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 498G** Player Development/Tournament Golf (2 per semester/maximum of 16) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Player Development/Tournament Golf (2 per semester/maximum of 16)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 498K** Advanced Golf Instruction and Business (2) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Advanced Golf Instruction and Business (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 499** (IL) Foreign Studies (1-12 per semester/maximum of 12) Foreign Studies in RPTM.

**Foreign Studies (1-12 per semester/maximum of 12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 501** Leisure Studies Foundations (3) This course provides general background knowledge about the literature and research methods central to the field of leisure studies.

**Leisure Studies Foundations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 510** Tourism Behavior: An interdisciplinary Approach (3) An exploration of the various approaches that have been taken in the social sciences to understand tourism behavior.

**Tourism Behavior: An interdisciplinary Approach (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 525** Behavioral Patterns of the Outdoor Recreationist (3) Patterns of time and space use; user characteristics; meaning of participation; facilitation of environment-use enhancement.

**Behavioral Patterns of the Outdoor Recreationist (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 527** Social Psychology of Leisure (3) Application of the methods, constructs, and theory of social psychology to the study of leisure, outdoor recreation, and therapeutic recreation.

**Social Psychology of Leisure (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 530** Research Methods in Leisure Studies (3) Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in the leisure studies field.

**Research Methods in Leisure Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 533** Leisure Studies, Surveys, and Appraisals (3) Advanced procedures related to leisure, recreation, and park research.

**Leisure Studies, Surveys, and Appraisals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 540** Public and Private Recreation Lands and Waters (3) Public and private roles and interactions, allocation of resources, use policies, open space concepts, private enterprise developments, legal controls.

**Public and Private Recreation Lands and Waters (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 545** Philosophical and Social Bases of Leisure (3) Philosophical and social bases of leisure; analysis of critical issues of leisure for philosophical and social implications.

**Philosophical and Social Bases of Leisure (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 560** Administrative Problems of Leisure Service Organizations (3) Special problems of recreation and park departments; legal powers and liability; departmental organization, financing, personnel policies, and staff development.

**Administrative Problems of Leisure Service Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 570** Conceptual Bases for Therapeutic Recreation (3) Issues in the application of concepts in therapeutic recreation from a multidisciplinary perspective; evaluation and research.

**Conceptual Bases for Therapeutic Recreation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 597A** Foundations of Tourism (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Foundations of Tourism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 597C** Leisure and Culture (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Leisure and Culture (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 597F** Qualitative Research Methods (3) Graduate students will be introduced to and have the opportunity to apply many techniques employed by qualitative social science researchers. Of particular emphasis will be fieldwork-based research methods, including participant observation and on-site interviewing. Students will participate in discussion of assigned reading material as well as shared experiences associated with the preparation of course materials. Assignments will involve both small projects conducted locally using various methods as well as a more elaborate proposal for research involving qualitative methods. The course will be of particular value to students preparing for future thesis or dissertation research utilizing qualitative methods. Though qualitative research is often associated with an interpretivist or humanistic research paradigm, participants espousing a scientific/positivist paradigm are also encouraged to enroll, as are students from outside of RPTM.

**Qualitative Research Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RPTM 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Religious Studies (RL ST)**

**RL ST 400** Theories of Religion (3) Comparative and interdisciplinary study of two or more systematic theories of religion: anthropological, psychological, sociological, philosophical/theological.

**Theories of Religion (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 405 (IL) (J ST 405)** Ancient Jewish Traditions and Modern Food Movements (3) Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times.

**RL ST (J ST) 405 Ancient Jewish Traditions and Modern Food Movements (3) (IL)**

This course examines Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. These tenets of the Jewish tradition presently underwrite modern movements concerned with land use and food sustainability, as well as ethical behaviors in food production. The goal of the course is to understand how Jewish tradition can inform and contribute to improvements in the modern food system.

The starting point is the ancient world of the Israelites,. Students will study agrarian interpretations of the Hebrew Bible as well as extra-biblical sources and archaeological data. The biblical attitudes toward food, eating, and agricultural practices are then traced into the post-biblical period and rabbinic periods. The course then jumps ahead to the present day, to shed light on a number of modern Jewish agricultural and food initiatives concerned with issues such as healthy land use, sustainability, and justice in food production and distribution. These movements proceed from various interpretations of Jewish law and custom, and illustrate how some modern Jewish attitudes toward food and eating are responsible for reimagining, and in some cases reinvigorating, biblical ideas and practices.

At the conclusion of this course, students will be able to identify and understand the historical and theological significance of diet and eating practices of ancient Israelites and will understand the development of Jewish food laws and practices in the post-exilic and early rabbinic eras. Students will be able to evaluate the extent to which ancient Jewish thought has influenced modern Jewish attitudes and actions regarding food and social responsibility, and will be able to envision the ways in which Jewish tradition, both ancient and modern, can contribute to current progress and future improvement in our systems of food production, distribution and consumption. While a wide variety of derivative topics will be discussed, this course is particularly appropriate for students pursuing programs of study dealing with the biblical world, the development of early Judaism, Jewish ethics, and/or modern Jewish thought, as well as those studying agriculture and food systems who are interested in how Jewish tradition addresses these universal concerns.

Evaluation will be based on weekly 1-2 page written responses to the assigned readings (45%), a midterm exam (15%), final project (30%), participation (10%). No special facilities are required. Course will be offered each term, enrollment limited to 20 students.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 407Y (IL) (HIST 409Y, J ST 409Y)** European Anti-Semitism from Antiquity to the Present (3) Surveys the history of anti-Semitism in Europe from antiquity through the Middle Ages to the present.

**RL ST 407Y (HIST 409Y, J ST 409Y) European Anti-Semitism from Antiquity to the Present (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course analyzes major episodes in the history of anti-Semitism and tries to clarify the Motives and dynamics involved. It seeks to understand what these episodes have in common, and what is unique in each case. Is there a single universal, eternal anti-Semitism? Or are there rather anti-Semitisms", each belonging to a unique historical context? Is there a single

continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates?

We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire's essays, German philosophical texts from Kant to Marx, Wagner's racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher.

The major part of the grade will depend on a short research paper, which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 408** (US;IL) Hindu Studies (3) Special topics in Hindu studies.

**RL ST 408 Hindu Studies (3)**  
**(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Religious Studies 408 (Hindu Studies) provides a critical examination of selected philosophical and devotional systems within the diversity of Hindu religious traditions within the context of south Asian history. This course explores the nature of Hindu Darshana or outlook through textual analysis of some of its primary scriptures (in translation), as well as (in English) works by more recent Hindu thinkers and philosophers. Students will trace the emergence of ethical, moral, and social ideals of Hinduism through a detailed study of its belief systems as they had evolved through the ages. For example, a typical research project may involve writing a series of two papers, one focusing on the religious roots of non-violence in heterodox ideals of Jainism of fifth century B.C.E, and a second one, exploring the modern relevance of non-violence in political discourse as represented in the writings of Mohandas Gandhi. Students will be evaluated on a mid-term and a final exam, two research papers and debates. RL ST 408 serves as one of the courses fulfilling the 6 credits requirement of the 400-level course for a Religious Studies major. It also fulfills the United States Cultures and International Cultures designation.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 409** (US;IL) Buddhist Studies (3) Special topics in Buddhist studies.

**Buddhist Studies (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Other Cultures and Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 410** (US;IL) (HIST 410, J ST 410) Jews in the Medieval World (3) Trends in medieval Jewish society under Islam and Western Christendom.

**RL ST 410 (Jews in the Medieval World (3))**  
**(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The Jews lived in widely scattered communities under Christian and Islamic rule in the medieval period. This course will examine how Jews adapted the traditions they developed in Palestine and Babylonia in the early centuries C.E. to the new conditions they encountered in Europe and the Mediterranean region from the ninth to the fifteenth centuries. It will focus on the general problem of how traditional societies survive in rapidly changing circumstances, particularly when their members are a minority population. The course will aim at developing students' skills in comparative analysis as they compare the adaptive strategies of Jews in different cultural spheres (the Franco-German region versus Spain, for example). They will also be asked to compare the different polemical stances Jews adopted vis-a-vis Christianity, on the

one hand, and Islam, on the other. They will be encouraged to understand the ways in which Jews internalized certain aspects of the majority culture and rejected others. It is hoped that they will come to see how deeply Jewish history was intertwined with medieval Christian and Islamic history, despite inter-religious hostilities and the frequent need for Jews to defend against majority aggression.

The course will be linked to most of the courses taught in the field of Jewish Studies, especially J ST 111 (Early Judaism), J ST 114 (Modern Judaism), and J ST 118 (Modern Jewish History from 1492). It will also be linked to offerings in Religious Studies: RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), RL ST 107 (Introduction to Islam), RL ST 124 (Early and Medieval Christianity), and RL ST 165 (Introduction to Islamic Civilization). Further, it would complement HIST 001 and 002 (The Western Heritage), HIST 107 (Medieval Europe), HIST 108 (The Crusades), HIST 407 (Early Medieval Society) HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), and HIST 471W (Classical Islamic Civilization, 600-1258).

The course will count for 3 credits toward: a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 411** (US;IL) (J ST 411) Jewish Studies (3) Study of the life and thought of a particular period or movement in the history of Judaism.

### **Jewish Studies (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 412** (J ST 412) American Judaism (3) The development of Jewish religion and culture in America from the colonial era to the present.

### **American Judaism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 420** Major Christian Thinkers (3) Systematic inquiry into the religious thought of one or more Christian thinkers, such as Paul, Augustine, Luther, Calvin, Kierkegaard, or Tillich.

### **Major Christian Thinkers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 422** (AM ST 422) Religion and American Culture (3 per semester/maximum of 6) Selected topics, problems, or historical movements in American religion. Relation between religion and American culture.

### **Religion and American Culture (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**RL ST 424H** (HIST 424H, J ST 424H) **Monotheism and the Birth of the West (3)** The birth of monotheism and its relation to social organization, the idea of individuality, and science.

**RL ST (J ST/HIST) 424H (PHIL 434H) Monotheism and the Birth of the West (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Learn about the formation of Western culture, while learning to analyze the texts and other evidence about its formation from a critical, rather than naive, viewpoint. The idea of monotheism probably arose very early, and was even briefly implemented as a state cultic policy in Egypt in the 14th century BCE. Why, then, did it take another seven centuries to become widespread--appearing in ancient Judah, Babylon, and Ionia almost simultaneously? To answer this question, the course focuses on several developments, through the medium of primary texts and archaeology: the shift from a state hinterland based in extensive agriculture and household processing to one organized for intensive agriculture and industrial processing the rise of recognizably modern science; the promotion of individuation and an international elite culture in the context of Assyrian and Babylonian imperial ambitions; the development of the historical and archaeological arts in the context of archaizing in order to reinvent local traditions; and the socialization of monotheism and of democracy. Students will be evaluated on their discussion of the textual evidence as well as on reports in class and a final paper. This is the sole honors course treating the birth of the West. It expands on knowledge acquired in courses listed as prerequisites and in RL ST/CAMS/J ST 012; CAMS 044; ANTH/CAMS 133; CAMS/PHIL 200; HIST 100; HIST/J ST 102; and PHIL 200 and enriches the students experience in CAMS 400, CAMS 440, and CAMS 480; HIST 402; J ST 411; PHIL 437; PHIL 453, and PHIL 461. This course counts toward the major in Jewish Studies, History, Religious Studies and toward the minor in Jewish Studies and Religious Studies.

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 440Y** (US;IL) **The Orthodox Christian Tradition (3)** History, culture, and beliefs of the Eastern Orthodox religious tradition with special reference to Russia.

**The Orthodox Christian Tradition (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 461** (US;IL) (SOC 461) **Sociology of Religion (3)** Contemporary religion in the global perspectives: beliefs, structure, and function of major religious traditions, denominations, and cults.

**Sociology of Religion (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 461** (US;IL) (SOC 461) **Sociology of Religion (3)** Contemporary religion in the global perspectives: beliefs, structure, and function of major religious traditions, denominations, and cults.

**Sociology of Religion (3)**

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 471Y** (IL) (HIST 471Y) **Classical Islamic Civilization, 600-1258 (3)** Pre-Islamic Arabia; Muhammad; Arab conquest; Islamic beliefs and institutions; literary, artistic, and scientific achievements; relations with Europe; breakdown of unity.

**Classical Islamic Civilization, 600-1258 (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Humanities  
 Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 478** (J ST 478) Ethics After the Holocaust (3) Explores the philosophical effects of the Holocaust for thinking about the primary question: Is ethics possible?

**RL ST (J ST/PHIL) 478 Ethics After the Holocaust (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is an examination of ethical theories before the Holocaust and how those theories have failed, philosophically and empirically. Course topics will include the history of ethical theory, the nature and problem of evil, goodness and suffering, witnessing and testimony, and the promise of an ethics. This course provides students with philosophical approaches to the issues that emerge out of the events of the Holocaust. The course will help students expand their knowledge of the events of the Holocaust through a philosophical approach that does not merely expose them to what happened, but asks them to think about the implications of what happened: most specifically, how do we understand ethical life, if it cannot stop or confront evil? This course provides students with the philosophical approaches to the issues that emerge out of the events of the Holocaust. It will encourage them to think critically, write effectively and express their thoughts logically. Student evaluation will be based on weekly reaction papers, group presentations, and a final seminar paper. This course covers material in the history of philosophy, contemporary philosophy, and writings pertaining to the Holocaust in various forms (historical, literary documentary, and so forth). It provides links to other major areas in the history of philosophy, postmodernism, ethics, philosophy of religion, and Jewish history.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 483** (IL) Zen Buddhism (3) The development and current state of Zen Buddhist thought and practice.

**Zen Buddhism (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Other Cultures and Humanities  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**RL ST 495** Internship (1-18) Supervised off-campus, non-group instruction, including field experience, practica, or internships.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 499** (IL) Foreign Study--Religious Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Study--Religious Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RL ST 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Renal Medicine-Hy (REN)**

**REN 728** Hematology (3) Some of the areas studied will be: Renal Pathology and Congenital Disorders; Renal Physiology; Renal Function Testing; Glomerular Disease I and II; Urinary Tract Pathophysiology/Urinary Tract Infection; Urinalysis; Acid-Base; Pathology of the Prostate; Testicular/Penile Neoplasm; Salt and Water; Diuretics; Acute Renal Failure; Potassium; Calcium/Phosphorous; Chronic Renal Failure; and Inflammatory Disease of the Male Genital Tract.

### **Hematology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Reproductive Medcn-Hy (REP)**

**REP 730** Reproductive Medicine (4) Some of the areas studied will be: Menstrual Cycle; Sexually Transmitted Diseases; Hormonal Contraception; Non-hormonal Contraception; Amenorrhea and Galactorrhea; Pathology of Cervix, Vulva, and Vagina; Cytology; Ectopic Pregnancy; Normal Pregnancy; Cancer of the Cervix; Pathology of the Breast; Perinatal Pathology; Prenatal Genetics Screen; Pathology of the Ovary and Fallopian Tube; Menopause; High Risk Pregnancy; Trophoblastic Tumors; Carcinoma of the Breast; Pathology of the Uterus; and Ovarian Cancer.

### **Reproductive Medicine (4)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Rural Sociology (R SOC)

**R SOC 417** (CED 417) Power, Conflict, and Community Decision Making (3) Impact of institutions on human interdependence and behavior, the structure of power, and community decision making and public policy.

### **R SOC (CED) 417 Power, Conflict, and Community Decision Making (3)**

Community decision making and public choice is the result of collective action among individuals. The purpose of this course is to develop frameworks for analyzing conflict, power, and public choice. This course enables students to understand how culture and institutions affect the nature of human interdependence and behavior, shape patterns of influence and power, and impact community decision making and policy.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 420** (US;IL) (CED 420, WMNST 420) Women in Developing Countries (3) Analysis of women's work, experiences, and development policies and practices in Africa, Asia, and Latin America.

### **R SOC (WMNST/CEDEV) 420 Women in Developing Countries (3) (US;IL)**

The purpose of this course is to increase understanding of women's lives in third world countries at the time when women's movements, grassroots activism, and feminism are on the rise in the third world. The course examines third world women's challenges to Western definitions of feminism and traces the theoretical shifts and practical changes related to women's issues in African, Asia, and Latin America. Students participate in studying specific community and agricultural development projects. Topics include feminist critiques of development and post-colonialism, ecofeminism and environment, sexuality and reproduction, global restructuring, and grassroots community activism. Students will be evaluated based on class participation, two written critiques of readings, a final course project, a mid-term, and a final exam. This course will add diversity to both the rural sociology, community and economic development, and women's studies curricula. International, gender, ethnic, and racial issues are core components of the course. The course will be an elective for women's studies majors and minors and will serve graduate students in rural sociology, women's studies, and other fields.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 452** Rural Organization (3) Social organization and change in rural communities; use of sociological principles in analysis of rural problems and rural development.

### **R SOC (CEDEV) 452 Rural Organization (3)**

This course combines an introduction to the social theories of communities with real-life examples of applications to understanding community problems and concerns. The focus is on the special circumstances facing, small towns and rural communities, but the concepts are applicable in all communities, from urban neighborhoods to suburbs. Topics covered include local community in a global economy, power and decision-making, the role of governments and other social institutions, development of community and the importance of building social infrastructure as well as economic and physical infrastructure, multi community collaboration and building, sustainable communities. Those taking the class will gain experience in conducting a case study of a small Pennsylvania community, build skills in working in a team, and gain understanding of the complexity of factors that influence community (and your own) well-being. If your future career involves operating within a community setting, this course can increase your knowledge of that setting and how to function within it. And, even if you don't plan on working with communities in your job, you will be living in a community. This course can help you to understand the ways that you can contribute to improving your own quality of life by becoming involved in your community. Grades in this class are based on the community case study report, take home, mid-term and final exams, short team exercises, and class participation. Graduate students taking the course also are required to write reaction papers to three different topics during the semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 499** (IL) Foreign Study--Rural Sociology (1-12) Study in selected countries of rural social institutions and current rural sociological problems.

#### **Foreign Study--Rural Sociology (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 502** Use of Theory in Rural Sociology (3) Examine and evaluate metasociology of alternative theoretical systems applicable to rural society, with emphasis on American society.

#### **Use of Theory in Rural Sociology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 505** (CEDEV 505, AEE 505) Leadership Development (3) Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

#### **R SOC (CEDEV) 505 Leadership Development (3)**

Leadership is integral to professional roles of community and economic development practitioners. This course introduces students to the four basic elements of leadership personal, interpersonal, group/organization, and community. A deliberate blend of substantive, theoretical, and application perspectives permits students to understand and apply leadership theories and techniques to community and economic development situations. In this course students will have the opportunity to examine sociological theories of leadership such as exchange theory, attribution theory, group dynamics, community change theory, and formal organizations. Practical aspects of leadership covered include influence, authority, and power; group dynamics; collaborative leadership skills; mediation and dispute settlement; and, deliberation in community settings. The course is problem based and student-centered, meaning, that the specific content and process vary from year to year based on the needs and wants of the student cohort involved.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 508** Sociology of Agriculture (3) Sociological analysis of changes in the organization of agriculture and food systems in the United States and developing countries.

**Sociology of Agriculture (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 513** Research Methods in Rural Social Sciences (3) Scientific method in planning and conducting research.

**Research Methods in Rural Social Sciences (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 516** (CEDEV 516) Change in Rural Society (3) Social change in rural society, emphasizing prediction and control of the change process. Even years.

**R SOC (CEDEV) 516 Change in Rural Society (3)**

Rural America has experienced change throughout its history, but the most rapid have occurred in the past three decades. Forces of urbanization, industrialization, technological change and globalization of the economy drive change in rural America, and the effects of these forces differ across the United States. Some rural areas benefit from the changes that occur while others are devastated. Some rural people and places are able to adapt and view change as an opportunity, while others are unable to respond to the forces that threaten them. Individuals, families and communities have changed in response to these broad forces. This becomes manifest in new patterns of inequality, family life, educational attainment, migration, age and racial patterns, health and well-being, and local service availability. Questions examined in this course include: What are the theories that explain or describe the social change that has been affecting rural people and places? What industrial restructuring and economic change has occurred in rural areas, how has it affected rural areas, and what drives this restructuring? What other social change has taken place, and can we determine potential sources of that change? What are the options available to rural people and communities as they adapt to forces of change, and how much can they influence their own futures? Underlying each of these questions is the issue of whether the well-being of rural people, families, and communities has improved or is threatened by these changes, and which rural areas are most likely to benefit and which are threatened. Students will leave the class with a broad understanding of the forces affecting rural America, and how and why those forces influence some people and places differently. Grades are assigned in this class based on a term paper on a topic related to rural social change, reaction papers written about each set of reading assignments, serving as discussion leader, and class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 517** (CEDEV 517) International Rural Social Change (3) Implications of planned change for international rural societies, considering basic structural constraints, known institutional linkages, and potential synergetic consequences.

**R SOC (CEDEV) 517 International Rural Social Change (3)**

Three-quarters of the world's population live in developing countries where problems of hunger, malnutrition, underemployment, high morbidity and mortality, overurbanization, and inadequate housing, (to name just a few) often are severe. This seminar covers the sociology of economic change in developing countries. Through an extensive list of readings, a series of topical videos, and in-depth class discussions, seminar participants should come away with a firm grounding in the ways development has been defined, the social and economic problems facing developing countries today, the basic ways in which economic development has been approached theoretically and empirically, the implications

for developing countries of being embedded in a larger world economy, the influence of multinational corporations, the policies that developing countries have followed in fostering economic growth, the nature of foreign aid, the causes and consequences of Third World debt, the nature of the informal economy, rural development and land reform, world hunger and the Green Revolution, and other topics.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 522** Data Analysis in Rural Sociology (1) Analysis of research data in rural sociology using computer library programs.

#### **Data Analysis in Rural Sociology (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 525** Fertility, Population Change, and Development (3) Fertility and population growth in less-developed countries; theories of fertility change, agricultural development, and population policies.

#### **Fertility, Population Change, and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 530** Sociology and Demography of Poverty in the United States (3) An in-depth treatment of sociological and demographic dimensions of poverty in rural and urban areas of the United States.

#### **Sociology and Demography of Poverty in the United States (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 552** Theoretical Frameworks for Rural Community Research (3) Application of community theories to the study of communities in rural areas.

#### **R SOC 552 Theoretical Frameworks for Rural Community Research (3)**

Communities form the fabric of social life in rural areas. It is in these communities that individuals live and work, and experience the broader society and culture. It also is in these communities that individuals deal with the past and make decisions about their own futures. Knowing the theoretical underpinnings of communities in rural areas is crucial for understanding issues of social and economic well-being. This course examines sociological theories of community and how they relate to understanding the organization, structure, interactions and development of rural communities. Rural community theory also plays a role in understanding how community context influences individual and family well-being. In this course, students will gain an appreciation for the role of rural sociology in the study of community. They will read and evaluate theoretical essays and how the theories have been applied in empirical studies of rural communities. The goal is to increase student knowledge and understanding of the research process that links theory and hypothesis development as it relates to the study of community in rural areas. Students will enhance their skills and obtain experience in organizing and leading class discussions; reading, interpreting and integrating theoretical and empirical studies; writing a book review; and writing essays that integrate ideas from assigned materials with student evaluations of the materials. Students will be evaluated on class participation, written essays evaluating key topics, organizing and leading class discussion, and a written book review. Rural Sociology 452, or its equivalent, is a prerequisite for this class.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 555** Human Dimensions of Natural Resources (3) Identification of the interrelationships and influence of human behavior and natural resources.

### **Human Dimensions of Natural Resources (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 573** Methods of Survey Data Analysis (3) Use of multivariate procedures in the analysis of survey data in the rural social sciences.

### **Methods of Survey Data Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 597C** Qualitative Methods (3) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Qualitative Methods (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None

Diversity: None

Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides advanced standing graduate students from a research oriented curriculum the opportunity to receive experience/supervision in resident instruction in higher education.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**R SOC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Russian (RUS)

**RUS 400** (IL) Senior Seminar in Russian Culture (3) Senior seminar devoted to topics in Russian culture; conducted in Russian.

**RUS 400 Senior Seminar in Russian Culture (3)  
(IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

RUS 400 will be the senior seminar for Russian majors. Building on linguistic and cultural material covered in the second and third levels of study toward the Russian major, it will add depth and sophistication to the students' understanding of basic concepts in Russian culture and improve their ability to discuss and write about these concepts in Russian.

The materials for RUS 400 will be arranged chronologically and will cover the "big themes" of Russian culture: e.g., the legacy of Kievan Rus, the cultural/historical preconditions for the "Third Rome" theory, the rift between the people and the upper classes following Peter the Great, Westernizers versus Slavophiles, the Bolshevik Revolution, the Stalinist terror. Readings will be selected from a wide variety of genres and will reflect a diversity of linguistic styles: e.g., passages from

the ancient chronicles, folk legends, memoirs and autobiography, letters, historical and literary texts. Some films will be used.

Students will be evaluated on the basis of frequent quizzes and oral participation. In addition, each student will write a short research paper and present it in Russian to the class. These papers will help round out the presentation of central themes in Russian culture. Research papers might cover such topics as Andrey Rublev, religious sectarianism, peasant beliefs about nature, the biography of Lenin.

Russian 400 will be a required course for both the B.A. and B.S. in Russian. Students must complete RUS 204, 214, and 304 prior to RUS 400.

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 401** Advanced Russian A (3) Advanced Russian grammar, conversation, and composition.

**RUS 401 Advanced Russian A (3)**

RUS 401 is an advanced Russian language course that covers topics in grammar in the context of the spoken and written language. It is taught in Russian and serves as a complement to RUS 402. Emphasis will be placed on verbal aspect, reflexive and passive verbs, un-prefixed verbs of motion, relative pronouns, and participles. Classes will include group and individual oral presentations, analyses of written texts, and assignments using the internet to access recent oral and written materials in Russian that treat current events and illustrate particular linguistic usage. Students will also view one feature film.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 402** Advanced Russian B (3) Advanced Russian grammar, conversation, and composition.

**RUS 402 Advanced Russian B (3)**

RUS 402 is an advanced Russian language course that covers topics in grammar in the context of the spoken and written language. It is taught in Russian and functions as a complement to RUS 401. Emphasis will be placed on prefixed verbs of motion, use of the imperative, comparative and superlative forms, and complex and conditional sentences in Russian. Classes will include group and individual oral presentations, analyses of written texts, and assignments using the internet to access recent oral and written materials that treat current events and illustrate particular linguistic usage. Students will also watch one feature film during class time.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 403** Advanced Russian Conversation and Composition (3) A conversation and composition course that includes situational topics as well as complex academic discourse.

**RUS 403 Advanced Russian Conversation and Composition (3)  
(IL)**

The Russian 403 course is intended primarily to develop students' oral and composition skills in Russian. The main focus of the course will be on speaking and understanding spoken Russian and writing on a variety of themes. The students will engage in different oral activities on a number of topics from the everyday life of an average Russian person to more complex discussions of current events, culture, history, the arts, and politics. The students will be expected to do a good deal of talking in Russian both with classmates and with the instructor in class, and prepare oral and written assignments at home. The written exercises will enhance the students' ability to perform well on the class assignments. The course will include a practical review and practice of some of the most complex and troublesome aspects of Russian grammar. There will be a considerable emphasis on vocabulary, word-formation for vocabulary building, and communicative strategies in the course. One of the goals of the course is also to increase the students' understanding of Russian culture and the Russian way of life based on Russia's history and current reality.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:  
 Concurrent: RUS 400 RUS 401 RUS 402 RUS 405 RUS 412

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 404** Advanced Reading and Composition (3) Advanced Russian Reading and Composition.

**RUS 404 Advanced Reading and Composition (3)**

RUS 404 focuses on reading and writing in Russian. Some time is spent on reading strategies, methods of building a working Russian vocabulary, sentence structure, and word order. Reading materials are at the advanced level and for the most part treat the history of the Russian Revolution and Civil War, the Stalinist era and the Thaw. Literary selections complement the historical readings and include works of Blok, Akhmatova, Zoshchenko, Bulgakov and Solzhenitsyn.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 405** (IL) Seminar in Russian Literature (3-6 per semester/maximum of 6) Readings in classical Russian literature; Topics vary.

**RUS 405 Seminar in Russian Literature (3 per semester/maximum of 6) (IL)**

In no other culture has literature attained the centrality it enjoyed in nineteenth- and twentieth-century Russia. Political, social and historical constraints propelled Russian writers into figures of witness, prophecy and moral instruction. Yet far from being limited to the vast, dark novels of legend, Russian literature offers a great deal of variety, including much humor, lyricism and fantasy. Russian 405 is a senior-level seminar devoted to the in-depth study of selected texts of classical nineteenth- and twentieth-century Russian literature. It presupposes a solid reading knowledge of Russian. The choice of authors and texts will vary from one year to the next. Writers discussed on a regular basis will include such major figures as Alexander Pushkin, Mikhail Lermontov, Nikolai Gogol, Ivan Turgenev, Fyodor Dostoevsky, Lev Tolstoy, Anton Chekhov, as well as selected writers from the Soviet and post-Soviet period.

The thematic emphasis will vary from one year to the next. The focus may be on the oeuvre of a single writer, on the development of a particular genre (e.g., lyric poetry or the short story), on a particular time period (e.g., the so-called "Silver Age" at the beginning of the twentieth century), or a particular theme (e.g., the conflict between liberalism vs. radicalism, the "woman question," the role of religion, Russia vs. the West, Russian "Orientalism," the Communist Revolution and its discontents, etc.).

The literary texts will be read in Russian. They will be analyzed both in their socio-historical context and as aesthetically compelling manifestations of verbal art. Explorative analytical writing and class discussion will be essential means to explore the subject matter.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 406** (IL) Russian Film (3) Conversation and Composition based on classical Russian films.

**RUS 406 Russian Film (3) (IL)**

Taught in Russian, this course offers an overview of the development of the film industry in the USSR/Russia within its historical context: from the silent classics of the Soviet Golden Age, to the mass entertainment movies of Socialist Realism, the new-wave productions of the cultural thaw of the 60s, the popular genres of the "stagnating" 70s, the liberated films of the glasnost period, and the most recent movies reflecting Russia's difficult economic transition. Russian cinema will be discussed as an index of sociopolitical trends over the years, as well as a medium in its own right. Therefore, attention will be devoted to historical turning points that affected the cultural policies of the Soviet Union, and consequently the styles, themes, and quality of filmmaking. At the same time, the course will consider the film as text, and analyze the feelings it stirs, the moods it evokes, and the ideological message it conveys. To this end, the course will cover the basic elements and techniques of film language (shots, montage, mise en scene, etc.) and the process of visual

perception that affects the audience.

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 412 (IL) Russian Translation (3 per semester/maximum of 6)** Translation from Russian into English of complex texts from the humanities, social sciences, and technical fields.

**Russian Translation (3 per semester/maximum of 6)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 426 (IL) Dostoevsky (3)** Study of representative works by Dostoevsky in the original Russian.

**Dostoevsky (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 427 (IL) Tolstoy (3)** Study of representative works by Tolstoy in the original Russian.

**Tolstoy (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 460 (IL) Linguistic Analysis of Contemporary Russian (3)** Detailed study of the phonology, morphology, and syntax of Modern Standard Russian and the major dialects.

**Linguistic Analysis of Contemporary Russian (3)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or

small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 501** Readings in Russian Literature (3-6) No description.

### **Readings in Russian Literature (3-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 525** Pushkin (3) Pushkin's significance in Russian literature; his relation to other European literatures; Eugene Onegin and selected shorter works.

### **Pushkin (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual

basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching RUS 001, 002, or 003 under the supervision of a full-time faculty member.

### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**RUS 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **School Psychology (S PSY)**

**S PSY 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 500** Professional Issues in School Psychology (1-3) Orientation to the field through study of unique problems, current issues, ethical and legal matters, unique cases, and research projects.

**Professional Issues in School Psychology (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 503** Development Across the Life Span (3) This is a graduate level survey course on the scientific discipline of human development across the life span.

**S PSY 503 Development Across the Life Span (3)**

The purpose of this course is to give graduate students, especially in the professional practice areas of psychology, such as counseling psychology, school psychology, and clinical psychology and other developed practice areas (e. g., counselor education), an overview of the study of human development across the life span. This survey of the scientific discipline of human development will cover three major areas, with a cultural emphasis: theory, methodology, and research findings. A variety of influential development theories (non exhaustive), in conjunction with classic and contemporary research, will be examined with the goal of providing a framework for comparing and contrasting various theories, concepts, and supporting research as well as understanding their use in the professional practice and research endeavors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 510** Supervision of Pupil Service Personnel (1-10) Program supervision and professional leadership in university clinics and school systems.

**Supervision of Pupil Service Personnel (1-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 517** Social Aspects of Behavior in Education (3) A critical and detailed examination of social behavior in canons of classic and contemporary theoretical and empirical work.

**Social Aspects of Behavior in Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**S PSY 530** Psychoeducational Interventions (3) Development of empirically validated psychoeducational interventions for academic and behavioral problems experienced in school by children and adolescents.

**Psychoeducational Interventions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 535** School-Based Psychological Interventions for Children and Youth (3) Development of empirically supported psychological and psychoeducational interventions for behavioral and emotional concerns among school-aged children.

**S PSY 535 School-Based Psychological Interventions for Children and Youth (3)**

This course is an advanced graduate course that will be offered in the spring semester. Topics will include (a) psychological theories underpinning psychological interventions, (b) introduction to basic individual and group helping and communication skills, (c) criteria for empirically supported psychoeducational interventions, (d) issues related to individual characteristics and medical needs that potentially can impact educational progress, and (e) school-based individual and group crisis intervention skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 554** Psychological and Educational Evaluation of Exceptional Children (3) Administration and interpretation of individual tests other than the Stanford- Binet, WISC, WAIS.

**Psychological and Educational Evaluation of Exceptional Children (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 556** Psychological Assessment of Preschool and School-Aged Children (2) Study of cognitive/affective tests; use of systems--analytic, multivariate statistical, actuarial methods of data combination in decision-making processes.

**Psychological Assessment of Preschool and School-Aged Children (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 559** The Individual Psychological Examination (3) Demonstrations and practice in widely used ability and aptitude tests; psychological report writing.

**The Individual Psychological Examination (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 561** Consultation in Educational Settings (3) Prepares students to consult with teachers, administrators, parents, and other professionals about academic, behavioral, social-emotional, and programmatic issues.

**S PSY 561 Consultation in Educational Settings (3)**

This course will be an advanced graduate seminar which will be offered in the fall semester by the School Psychology program. Topics will include: (a) the history of consultation; (b) a review of the major consultation models (mental health, behavioral, instructional, organizational development); (c) research literature on consultation; (d) application of the consultation models in practice; (e) cross-cultural consultation; and (f) ethical and legal issues in consultation. Students completing this course will have a solid grounding in consultation theory and research as well as supervised experiences consulting with educators. Final grades will be based on a number of criteria including classroom participation, analyses of daily readings, a mid-semester examination, a final paper, written logs of consultation activities, regular attendance, and active participation in classroom discussions and activities. Although a mandatory course for advanced graduate students in School Psychology, the course will also be a useful addition to the training of other graduate students who will be consulting with parents or teachers around psycho-educational issues. To benefit from the course, students should have some prior training in assessment and intervention. Prior to working with educational professionals, students will participate in role-plays and simulations to hone their skills. Actual consultation sessions will be videotaped and students will also be expected to critically analyze the videotapes as part of the process of self-improvement and to demonstrate their ability to learn from their own mistakes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 575 Child and Adolescent Psychopathology (3)** This course will familiarize students with specific psychiatric disorders of childhood and adolescence encountered by mental health professionals in schools.

**Child and Adolescent Psychopathology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 595A Practicum in School Psychology (1-6)** Clinical experience with children under supervision in a variety of settings requiring service, including practice in synthesizing data and observations.

**Practicum in School Psychology (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 595B Internship in School Psychology (1-10)** Long-term placement in settings providing work for school psychologists with children, parents, teachers, administrators, and service agencies, under supervision.

**Internship in School Psychology (1-10)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 597** Special Topics (1-9) Formal courses given on a topical or special interest subject that may be offered infrequently; several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes, A, B, etc.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 597A** Professional Development of School Psychologists in Working with English Language Learners (3) This course is designated to educate school psychology graduate students on accommodations and adaptations for diverse learners, per Pennsylvania's guidelines.

**Professional Development of School Psychologists in Working with English Language Learners (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S PSY 843** (CN ED 843) Prevention Strategies and Programming (3) Addresses prevention program development, implementation, and evaluation, along with theoretical and empirical underpinnings, ethical, and multicultural issues related to prevention.

### **Prevention Strategies and Programming (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Science (SC)**

**SC 400** Consequences of Science (1) A series of lecture/discussions in which science faculty members show the social implications of their research specialty.

### **Consequences of Science (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 401** Basic Science and Disease (1) Clinical aspects of various disease and how basic scientific information contributes towards understanding and treating disease.

### **SC 401 Basic Science and Disease (1)**

The purpose of this course is to provide students with some general background on the symptoms, risk factors, prevention, and treatment of various diseases. Along with the clinical aspects of the diseases, we examine how basic scientific research studies contribute information towards helping to understand the mechanisms underlying disease development and control. This one-credit course is targeted to all students that have a general interest in health and science, and may include students in the following majors: premedicine, science, biology, chemistry, biochemistry and molecular biology, forensic science, biobehavioral health nursing, kinesiology and nutrition. Enrollment priority is given to students with fourth semester or above status.

Examples of topics discussed are: Hypertension, Osteoporosis, Infectious Diseases, Asthma, Chronic Obstructive Pulmonary Disease, Cancer, Diabetes, Sickle Cell Anemia/Anemia, Blood Disorders, Hypercoagulability, Coronary Artery Disease, Alcoholism/Alcohol Poisoning, HIV/AIDS, Tuberculosis, Irritable Bowel Syndrome, Hepatitis, Thyroid Disease, Congestive Heart Failure, Parkinson's Disease, and Arthritis

This course is structured as a seminar. Most lectures are powerpoint presentations by invited speakers, which usually will be local physicians sometimes paired with Penn State research faculty. The speakers introduce the disease topic by discussing the basic anatomy and physiology of the system or body part most affected by the disease. (e.g. lungs, heart, kidneys, etc). Once the foundation is established the pathophysiology is discussed. Risk factors and prevention are also highlighted. One important goal of each seminar is to indicate to students how advances in basic science research can impact the understanding and treatment of disease. Students are encouraged to ask questions after the lecture. The speaker(s) remain afterwards to allow students to ask more specific questions about the disease topic. On occasion, speaker physicians also talk about their medical school training and/or life as a practicing physician. The students that enroll in this course receive a letter grade based on attendance (students must attend 9 out of 10 classes), quizzes and a 2-3 page reaction paper on one of the disease topics. Random short-answer quizzes are sometimes administered at the end of a seminar, testing on information presented during the seminar. Also, reading assignments are sometimes given prior to a seminar, or information handout materials are provided during the seminar. If a student needs to miss class due to an evening exam they need to fill out an Excused Absence Form, which can be obtained from the instructor (no other activities are excusable except for athletic competitions for students in varsity sports).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 402** Science-Related Employment: Corporate Organization, Opportunities, and Expectations (1-3 per semester/maximum of 3) Present undergraduate and graduate students with information and skills necessary for success in science-related job positions available in industry.

**Science-Related Employment: Corporate Organization, Opportunities, and Expectations (1-3 per semester/maximum of 3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 476** Human Dimensions of Health Care (3) Field experience in five or more medical settings; complementary exposure to the scientific literature; weekly discussions.

**SC 476 Human Dimensions of Health Care (3)**

This course, delivered jointly by Penn State and the local medical community, is designed to provide field experience for students with plans for a future in the health professions. The course is structured around rotations through multiple no less than five medical settings, which may include Community Medicine, Dentistry, Emergency Room, Family Medicine, Hospice Care, Oncology, Optometry, Palliative Care, Pediatrics, Physical Therapy, Senior Services, Wound Care, and other specialties.

The first four weeks consist of an introduction and orientation to the goals each setting. The purpose of these sessions is to acquaint the students with the requirements of the course as well as expectations for the on-site rotations. During this time, the students become familiar with the health care issues associated with each setting through literature specific to particular medical settings. At the end of these sessions the students write a course plan, in which they review the major issues common to each setting, and project how they expect to gain and how they expect to contribute in each setting.

During the next nine weeks, the students rotate through the medical settings, spending two afternoons per week in rotation. Students are scheduled to assignments with one of the medical settings for the afternoon. At these times the students are under direct supervision of the setting's staff. Where feasible, students may also sit in on physicians' staff meetings, attend lectures, or receive other forms of special instruction provided by medical staff. All students will maintain a logbook of activities during the rotations.

Weekly meetings on campus are devoted to reports of experiences by each of the students, discussions based on the questions developed during the orientation period, and resolution of issues which may arise. In this way, students assigned to each rotation inform those students who will later enter that setting.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 494** Research Project Courses (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project Courses (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 494H** Research Project Courses (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project Courses (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**SC 495** Science Co-op Work Experience III (1-3) A supervised work experience where the student is employed in a scientific position. To be offered for SA/UN grading.

### **Science Co-op Work Experience III (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Science Education (SCIED)**

**SCIED 410** Using Technology to Enhance Science Teaching (3) This course explores contemporary practice and research associated with applications of technology to enhance science learning and teaching.

### **SCIED 410 Using Technology to Enhance Science Teaching (3)**

The primary emphasis of this course is to explore current research and practice associated with using technology tools to enhance the teaching and learning of science. Through participation in the course, students will have the opportunity to:

- \* investigate a variety of technology tools with specific applications in supporting student learning in science (e.g., web-based resources, simulations, tutorials, graphing software, concept mapping programs, hypermedia authoring tools, etc.) and document abilities to use these tools;
- \* incorporate technology tools into science instruction (e.g., making observations, designing and conducting investigations, interpreting and reporting results, etc.) in ways that enhance teaching and learning;
- \* evaluate technology tools within the context of their applications to supporting teaching and learning science;
- \* participate in electronic discussions of central considerations associated with enhancing science teaching with technology; and
- \* author a hypermedia tool that supports science teaching and learning (and incorporates a variety of media).

In addition, students will design and conduct an individualized project targeted at meeting these needs as science teachers and/or graduate students in science education.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 411 Teaching Secondary Science I (3)** Introduction to teaching secondary school science, including curriculum, learning theory, media, evaluation as they relate to student progress.

### **Teaching Secondary Science I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 412 Teaching Secondary Science II (3)** Implementation of science instruction using a variety of modern approaches.

### **SCIED 412 Teaching Secondary Science II (3)**

SCIED 412 is the third of three sequenced methods courses for secondary science teachers. In SCIED 412 prospective science teachers practice and develop skills in planning, presenting, and assessing effective science learning and teaching for students in middle and high school grades. The course incorporates theory and practice associated with science learning and teaching in school classroom settings. As in SCIED 410 and 411, emphasis will be on becoming a professional science teacher. Goals include: developing the knowledge, skills, and dispositions that encourage reflective practice, collaborative action, and lifelong inquiry into teaching and learning.

Students will develop an understanding of learning theory, and the approaches that diverse individuals take to construct knowledge; becoming competent in the use of science content and inquiry processes and the various materials that can help in the planning instruction relevant to learners' needs; developing skills in instructional, communication, management, and assessment strategies that contribute to planning meaningful science lessons for middle or high school level students, and will become competent in selecting and integrating appropriate technological tools into instruction.

Finally, students will become aware of major issues facing science education today and consider the implications of those issues for teaching. Additionally, the focus on technology initiated in SCIED 410 and continued in SCIED 411 will be extended in SCIED 412. Students will engage in teaching and learning science using appropriate state-of-the-art technology applications. A variety of software tools will be explored including, but not limited to, probeware, spreadsheets and graphing packages, on-line collaborative inquiry-based projects, and models and simulations. Students will apply their knowledge of technology tools acquired in SCIED 410 to classroom settings. Students will teach a technology-enhanced science lesson in a mentored environment, i.e., small group peer teaching, and strive to integrate technology in their practicum classroom.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:  
Concurrent: C I 412W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 455 Field Natural History for Teachers (3)** Ecologically oriented field study course to provide teachers with basic knowledge of natural science resources in school environments.

### **Field Natural History for Teachers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 457 Environmental Science Education (3)** Philosophy, techniques, and skills for teaching environmental science, including curriculum development, fieldwork, and the use of appropriate technologies.

### **SCIED 457 Environmental Science Education (3)**

This course provides an introduction to teaching environmental science to children. Although our emphasis is school-based instruction in the middle and secondary sciences, the course is also appropriate for grade K-6 teachers and teachers of other environmentally related subjects (e.g., social studies, agriculture), as well as educators who plan to work in nonformal educational settings such as nature centers and museums. The course builds students' knowledge in the philosophy, methods, and skills of environmental education; engages students in environmental curriculum analysis and development; and provides hands-on training in classroom-based and field-based environmental investigations. Training and practice with appropriate environmental technologies is included, including CBLs, GPS, and computer software.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2003  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCI 458 Teaching Science in the Elementary School (3)** Interpreting children's science experiences and guiding development of their scientific concepts; a briefing of science content material and its use.

### **SCI 458 Teaching Science in the Elementary School (3)**

SCI 458 is designed to support teacher candidates in developing their own reflective practice in science teaching for young learners. Candidates in this course engage in a series of experiences that move them from their own understanding of engagement in science, to understanding children's engagement in science, and finally towards methods of designing science instruction for young learners. Central to this work is a focus on reflective practice; expert teachers reflect on their own teaching practices. During this course, candidates learn to be critical of their own learning, instructional design, and teaching. Candidates use this to revise their practice as they grow as science teachers. The course activities, assignments, readings, and placement experiences offer multiple opportunities for candidates to learn essential knowledge and practices to support children's curiosity about the world.

Course assignments and in-class experiences are designed to help teacher candidates understand the importance of engaging their future students in a strongly integrated focus on science content and practice. This encompasses both how scientists work (the practice of doing science and building our knowledge of the world) and how children learn the skills and practices of doing science. Helping children understand the practices of science is of equal importance as helping them learn the content of science.

To start understanding ways of supporting children in learning to do science in age-appropriate ways, teacher candidates in this course contrast their understanding and experiences with those of children. Assignments are designed to help facilitate exploration of the links between understanding children's prior knowledge and beliefs, using knowledge of how people learn, and making pedagogical choices to move children towards specific content and practice goals. Candidates consider the role of differentiated instruction and methods of assessment in science teaching.

Finally, the course examines methods of adapting science curriculum using knowledge of children and specified learning goals. Teacher candidates bring together what they have learned about the practices of science, social constructivist instructional methods, and assessment to think critically about how to support elementary students learning science across time.

SCI 458 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: C I 495A OR C I 495B ; MTHED 420 SS ED 430W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCI 458 Teaching Science in the Elementary School (3)** Interpreting children's science experiences and guiding development of their scientific concepts; a briefing of science content material and its use.

### **SCI 458 Teaching Science in the Elementary School (3)**

SCI 458 is designed to support teacher candidates in developing their own reflective practice in science teaching for young learners. Candidates in this course engage in a series of experiences that move them from their own understanding of engagement in science, to understanding children's engagement in science, and finally towards methods of designing science instruction for young learners. Central to this work is a focus on reflective practice; expert teachers reflect on their own teaching practices. During this course, candidates learn to be critical of their own learning, instructional design, and teaching. Candidates use this to revise their practice as they grow as science teachers. The course activities, assignments,

readings, and placement experiences offer multiple opportunities for candidates to learn essential knowledge and practices to support children's curiosity about the world.

Course assignments and in-class experiences are designed to help teacher candidates understand the importance of engaging their future students in a strongly integrated focus on science content and practice. This encompasses both how scientists work (the practice of doing science and building our knowledge of the world) and how children learn the skills and practices of doing science. Helping children understand the practices of science is of equal importance as helping them learn the content of science.

To start understanding ways of supporting children in learning to do science in age-appropriate ways, teacher candidates in this course contrast their understanding and experiences with those of children. Assignments are designed to help facilitate exploration of the links between understanding children's prior knowledge and beliefs, using knowledge of how people learn, and making pedagogical choices to move children towards specific content and practice goals. Candidates consider the role of differentiated instruction and methods of assessment in science teaching.

Finally, the course examines methods of adapting science curriculum using knowledge of children and specified learning goals. Teacher candidates bring together what they have learned about the practices of science, social constructivist instructional methods, and assessment to think critically about how to support elementary students learning science across time.

SCIED 458 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: C I 495A OR C I 495B ; MTHED 420 SS ED 430W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 470** Selected Studies in Science Education (1-6) Intensive work on particular issues, trends, or developments in science education for elementary and secondary school teachers.

#### **Selected Studies in Science Education (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 497A** Astrobiology for Educators (2) This course will cover topics including: is life beyond Earth possible and the

nature of Science. Students will investigate the habitability of Earth, what is life, life in our solar system, life beyond our solar system and the best practices for teaching these concepts to grades 4-12.

### **Astrobiology for Educators (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 497F (ENGR 497F) Fundamentals of Science, Technology and Engineering (3)** A course focusing on physics content, engineering design principles, and elementary science education pedagogy.

### **Fundamentals of Science, Technology and Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 498 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 551 History, Philosophy, & Sociology of Science and Science Teaching (3)** Examination of the implications of history, philosophy, and sociology of science for science teaching.

### **SCIED 551 History, Philosophy, & Sociology of Science and Science Teaching (3)**

This course explores science and school science studies from a sociocultural perspective. Topics draw from scholarship in the sociology, philosophy, and discourse of science. Among the central topics for discussion will be the social context of disciplinary knowledge, problems of experimentation, ideological bias in research, feminist critiques of science, the discourse of school science, multicultural issues in science, and knowledge access issues. The focus will remain on curriculum, instruction, and learning throughout the course. The course goals include learning about the history, philosophy, and sociology (HPS) of science as related to science education, learning about educational research and scholarship, applying ideas from HPS to the field of science education research. Students are expected to examine and interpret contemporary research in science education and related fields.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 552 Science Teaching and Learning (3)** Exploration of the theoretical and empirical foundations of the teaching and learning of science.

### **SCIED 552 Science Teaching and Learning (3)**

This course is an exploration of the foundational empirical and theoretical research in the teaching and learning of science. The first part of the course includes a core of learning theory based in the literature of education and science education. In addition to this theoretical work students will read empirical studies based on different theoretical foundations allowing for the critical examination of the relationship between theory and empirical based on theory. The readings and discussions in this course will be centered on the questions of "Is there a science of education that allows us to make instructional decisions in science teaching based on research?" and "What is the theoretical basis of standards-based science education reforms such as inquiry-based science?" The goal of this course is to help students develop a core foundational knowledge in the science education literature as well as an articulated theoretical framework for teaching and learning they can use to develop their own research projects.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 556** The Supervision of Science Curriculum (3) Supervision of elementary and secondary science teachers as they develop K-12 programs in the public schools.

### **The Supervision of Science Curriculum (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 558** Research Problems in Science Teaching (3) Problems and research dealing with curriculum, materials, evaluation, and supervision of science teaching and learning.

### **Research Problems in Science Teaching (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 559** Analysis of Instruction in Elementary Science Education (3) Analysis of the history, issues, trends, and research in elementary science education.

### **Analysis of Instruction in Elementary Science Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 590** Colloquium (1-3) continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**SCIED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCIED 597B** Learning Sciences (3) Course acquaints graduate students with the theoretical frameworks, research methods, and current scholarly issues in the emerging domain of the Learning Sciences.

### Learning Sciences (3)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Science, Technology, and Society (S T S)

**S T S 407** (PHIL 407) Technology and Human Values (3) Interrelationships of twentieth-century technological change and human values. Emphasis on the social and ethical aspects of technological progress.

### Technology and Human Values (3)

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Social and Behavioral Sciences  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 408** (COMM 408) Cultural Foundations of Communications (3) Examination of oral, scribal, print, industrial and electronic cultures; analysis of impact of technology on communications and social structure.

### S T S (COMM) 408 Cultural Foundations of Communications (3)

**(BA) This course meets the Bachelor of Arts degree requirements.**

S T S (COMM) 408 traces the development of communications technologies and their impact on culture over the last 500 years. Students will examine how different tools for communicating changed the way people organized and made sense of their worlds. The course begins by looking at oral cultures and moves on to the scribal, print, industrial, electronic and post-industrial or postmodern cultures, studying the media developments that marked each of these eras. With each period and its corresponding technology students will examine how and why the new media altered not only the *form* of communication (the type of speech, form of writing and/or speed of information transfer), but also how such changes altered the *content* of knowledge (how people made sense of their lives and communities). Readings are drawn from a range of disciplinary perspectives on the issues, from history, sociology and anthropology, to philosophy, communication studies and cultural theory.

The historical and theoretical knowledge provided by the course will give students a solid foundation for coming to terms with media trends in present-day society and for thinking through their possible epistemological, political and cultural impacts.

The course is a communications elective for the Journalism and Telecommunications majors and the Media Studies minor.

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 416** (US;IL) (AF AM 416, WMNST 416) Race, Gender and Science (3) The class will focus on race and gender as

products of science, and how societal values shape scientific activity.

**S T S (AAA S/WMNST) 416 Race, Gender and Science (3)  
(US;IL)**

The course's objective is to provide a seminar for students to integrate feminist theory, social theory, and science studies through class discussions, essays and research. The role of science in defining, producing, applying and policing of gender and race in society will be explored through the work of feminists and traditional scholars working in a variety of disciplines from cultural studies to science studies. Students will be encouraged to develop a critical analysis of race and gender in science in order to understand the impact of gender and race on the production of scientific knowledge. This course is designed for students in the humanities, social sciences, science and technical fields. Readings will be taken from past and contemporary social theory (i.e. students will be reading original works not textbooks). Students will be expected to read, understand and synthesize 75-100 pages of reading per class and to discuss them in a seminar fashion in order to analyze, critique and evaluate various theories to develop their own understanding of the interrelationship of science, race and gender. In addition they will do two professional-style book reviews during the semester. At the end of the semester students will integrate theory with social, cultural and historical data that they collect through library research (with a minimum of 50 sources). Students will present the paper to the class in a conference style presentation that will conclude with a Q&A session.

General Education: None

Diversity: US;IL

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 420** (EM SC 420, SOC 420) Energy and Modern Society (3) Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

**Energy and Modern Society (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 1991

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 427W** (CED 427W) Society and Natural Resources (3) Analysis of the relationship between societal development and enhancement and natural resources.

**S T S (CED/SOC) 427W Society and Natural Resources (3)**

There is a common tendency to portray environmental and natural resource problems as biophysical in nature. The implication of this tendency is that such problems are best addressed by scientists and engineers who discover evidence of and devise new technologies to fix them. Another common tendency is to assume that people resist solutions to environmental and natural resource problems because of individually held anti-environmental attitudes. In contrast to these two perspectives, sociologists point out that environmental and natural resource problems often lie at the intersection of biophysical processes and social, political, economic, belief, value, and knowledge systems. The goals of this writing-intensive course are to introduce students to the complexity of environmental and natural resource problems and to teach them to think sociologically. In addition to reading assigned books and articles, students will participate in a simulation to negotiate a global environmental treaty, attend a field trip to learn about alternative energy strategies, and conduct research on a local environmental or natural resource issue. After taking this course, students should be better prepared to engage in debates with academics, politicians, and other citizens regarding the causes of and potential solutions to environmental and natural resource problems.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 427W** (CED 427W) Society and Natural Resources (3) Analysis of the relationship between societal development and enhancement and natural resources.

**S T S (CED/SOC) 427W Society and Natural Resources (3)**

There is a common tendency to portray environmental and natural resource problems as biophysical in nature. The implication of this tendency is that such problems are best addressed by scientists and engineers who discover evidence of and devise new technologies to fix them. Another common tendency is to assume that people resist solutions to

environmental and natural resource problems because of individually held anti-environmental attitudes. In contrast to these two perspectives, sociologists point out that environmental and natural resource problems often lie at the intersection of biophysical processes and social, political, economic, belief, value, and knowledge systems. The goals of this writing-intensive course are to introduce students to the complexity of environmental and natural resource problems and to teach them to think sociologically. In addition to reading assigned books and articles, students will participate in a simulation to negotiate a global environmental treaty, attend a field trip to learn about alternative energy strategies, and conduct research on a local environmental or natural resource issue. After taking this course, students should be better prepared to engage in debates with academics, politicians, and other citizens regarding the causes and potential solutions to environmental and natural resource problems.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 428 (IL) (HIST 428) The Darwinian Revolution (3)** The origins and implications of evolutionary theory.

**The Darwinian Revolution (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities and Social and Behavioral Sciences  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 430 (IL) (NUTR 430) Global Food Strategies: Problems and Prospects for Reducing World Hunger (3)** Technological, social, and political solutions to providing basic food needs; food resources, population, and the environment; current issues.

**S T S (NUTR) 430 Global Food Strategies: Problems and Prospects for Reducing World Hunger (3) (IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Global Food Strategies examines opportunities for the world's poor to improve their health, nutrition, and physical environment by focusing on their own cultural strengths and organization, reassessing the opportunities within their environment, evaluating the appropriateness of new and old technologies, and gaining a renewed respect for their own abilities. Measures of appropriateness used throughout the course are ecological sustainability and cultural sensitivity. Approximately one third of the course focuses on the historical basis of underdevelopment up to and including the post-modern era. Topics include economic colonization, the industrialization of agriculture, the impacts of globalization, trade priorities and debt loads on the poor, population and ecological issues; and a critique of the economics of scarcity. The second two thirds focuses on micro-strategies for poverty alleviation. Topics include culturally-appropriate people centered development women's empowerment needs including microlending (small loans), the prospects and rationales for biological agriculture vs. industrialized agriculture, successful models of health and population control, the impact of American consumerism, and ecological footprint analysis. The goals of the course are to 1) awaken the student's interest in hunger and poverty issues and the cultural dimensions of poverty, 2) acquaint the student with viable and sustainable strategies for hunger and poverty alleviation for the very poor, and 3) enable the student to understand enough about globalism that he/she can critically analyze and evaluate international affairs articles in national newspapers. The classes integrate lecture information with films that help with the visualization of poverty problems and prospects, readings, current events, and small group discussion around issues and case studies. Readings are drawn from development classics and from a wide range of recent literature on poverty and change. Evaluation includes student responses to three essay tests posed by the instructor over the semester, and journal keeping. The class project is designed to promote citizenship/leadership skills. Students will make a contract to perform a particular citizen action relating to hunger and poverty alleviation, which they will describe in an oral report and written format. Participation is evaluated.

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 432 (PHIL 432) Medical and Health Care Ethics (3)** Examines ethical, political, and social issues in the research, implementation, and practice of medicine, medical technologies, and healthcare.

**Medical and Health Care Ethics (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: Humanities and Social and Behavioral Sciences  
 Effective: Fall 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 433** (PHIL 433) Ethics in Science and Engineering (3) Ethical issues arising in the practice of science and engineering and their philosophical analysis.

**Ethics in Science and Engineering (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Social and Behavioral Sciences  
 Effective: Fall 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 435** (PHIL 435) The Interrelation of Science, Philosophy, and Religion (3) The historical and transformative interactions between science and Western philosophical and religious views of nature, humanity, and God.

**The Interrelation of Science, Philosophy, and Religion (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Social and Behavioral Sciences  
 Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 457** (US;IL) (HIST 457, WMNST 457) The History of Women in Science (3) Critical analysis of the role women, gender, and minorities have played in the natural sciences.

**The History of Women in Science (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities and Social and Behavioral Sciences  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 460** (PL SC 460) Science, Technology, and Public Policy (3) The all-pervasive importance of science and technology policy in modern societies and mechanisms and processes by which it is made.

**Science, Technology, and Public Policy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 470** Technology Assessment and Transfer (3) Nature of technology assessment and technology transfer in product design and development process from federal and university labs, and internationally.

**Technology Assessment and Transfer (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 500** Integrating Science and Technology Into Society (3) Interdisciplinary analysis of critical issues for science, technology, and society.

**Integrating Science and Technology Into Society (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1991  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**S T S 589** Ethics and Values in Science and Technology (3) Study interrelationships of 20th century technological change and human values with emphasis on social and ethical aspects of technological progress.

### **Ethics and Values in Science and Technology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Scient Princ Medicin (SPM)**

**SPM 711** Scientific Principles of Medicine (15) This course provides an introduction to the basic science principles that form a foundation for the study of clinical medicine.

### **Scientific Principles of Medicine (15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Seminar - Dickinson (SEM)**

**SEM 900** Advanced Corporate Tax Seminar (2-3) This seminar will cover two main topics: Taxation of Executive Compensation and Corporate Mergers & Acquisitions.

### **Advanced Corporate Tax Seminar (2-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 901** Advanced Evidence Seminar (2) An advanced investigation of topics in the law of evidence.

### **Advanced Evidence Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 903** History of International Law: Seminar (2) The general historical introduction and seminar presentations and projects are designed to accentuate problems and issues which enable students to better understand the foundations of the law of nations and encourage independent research skills.

### **SEM 903 History of International Law: Seminar (2)**

This seminar invites participants to choose between two basic projects, and within each project a virtually unlimited

choice of concentration. The first three sessions are devoted to lectures by the instructor setting out some basic background in the field. Each Seminar participant is required to prepare a written project or paper and present the same orally to the Seminar. The final submission should take into account observations and criticisms made of the presentation.

The course aims to offer instruction through the seminar method and independent research projects insight into the historical foundations and sources of the law of nations.

The general historical introduction and seminar presentations and projects are designed to accentuate problems and issues which enable students to better understand the foundations of the law of nations and to encourage independent research skills.

Accordingly, students of this seminar should:

- (1) develop a more profound understanding of alternative approaches to legal reasoning and of legal concepts, terms, and institutions within the framework of the history of international law;
- (2) enhance their skills of legal analysis
- (3) develop a greater awareness of concepts of legal science and legal system;
- (4) read in some depth on the contemporary relevant principal documents for their project and appropriate doctrinal writings.

At the end of the course students should:

- (1) have a sound grounding in the aspect of the history of the law of nations which they have chosen to investigate;
- (2) be more demanding and rigorous in formulating and evaluating ideas and propositions;?
- (3) have a sense of the virtues and limitations of historical comparison as a method of scientific inquiry in law through the analysis of relevant national legislation;
- (4) have a thorough command of the main principles and rules of the law of nations which they have investigated;
- (5) give evidence of an ability to understand the other side of an argument, and better appreciate the strengths of an opposing view;
- (6) develop a willingness to question, to probe, to seek further information, and to display initiative in expanding one's knowledge
- (7) develop a command of the library and internet resources available for historical legal research.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 905 EU and International Trade Law Seminar (3)** This seminar seeks to examine selected aspects of the Commercial Law of the European Union. It provides an introduction to the distinct methodology of EU law and the European Court of Justice, examines the principles of the internal market, and focuses on aspects which are particularly important for US lawyers from a practical or theoretical perspective. It covers, among others, the following topics: Introduction to the fundamentals of the EU Legal Order; the internal market; free movement of goods, customs duties, discriminatory companies; financial services; aspects of competition law; anti-competitive agreements and monopolies; enforcement of competition law; selected comparisons with WTO and NAFTA.

### **EU and International Trade Law Seminar (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 907 The Supreme Court in Comparative Perspective (3)** This course examines the contribution of the judiciary to political governance in comparative perspective. It focuses on the Supreme Court and the European Court of Justice, which is the highest court of the European Union. It also takes into account selectively judgements of other constitutional courts. It seeks to explore the function of judicial review in modern democracy through a study of judicial decisions in selected areas. It examines the relationship between the judiciary and the other organs of government and the role of courts in protecting the citizen. It focuses on the following areas: federalism, the protection of human rights, the principles of democracy, non-discrimination, equality, proportionality, legitimate expectations, and fair hearing; *Locus standi*, remedies for the protection of constitutional rights, and the liability of public bodies and state agencies.

### **The Supreme Court in Comparative Perspective (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 908 Comparative Law in Globalized World Seminar (3)** This seminar gives students experience in researching, drafting and orally presenting an in-depth comparative scholarly work product. Early in the seminar, in consultation with the professor, students identify and select a timely and important topic which will serve as the subject of their Seminar research paper. Each student's research and written drafts are subject to ongoing review and critique by the professor and student colleagues throughout the Semester. When completed, each research paper is presented orally to the Seminar at the end of the course. The comparative research and drafting exercises sensitize students to the civil law tradition and contemporary national and supranational legal system in Europe and around the world that have grown out of or have been substantially influenced by the civil law tradition. Students also develop client counseling skills.

### **Comparative Law in Globalized World Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 909 Conflict Resolution Theory Seminar (2)** This seminar is a capstone course for students interested in understanding the lifecycle and dynamics of conflict and conflict resolution, and the role played by dispute resolution systems in furnishing both resolution and an experience of justice. The course will examine relevant dispute system design principles and socio-psychological theories and research and apply them to the processes used to resolve civil disputes in the United States and other countries through general and specialized courts, administrative agencies, ADR providers, and other private organizations. Students will conduct original legal and (if possible) empirical research, using the principles theories and research studied in the seminar to critique or propose elements of dispute resolution processes and/or systems. Students who enroll should be familiar with dispute system law and procedure from prior coursework.

### **Conflict Resolution Theory Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 910 Cross-Border Legal Practice Seminar (2)** This seminar will focus on two different themes. It will explore what it means to be a lawyer in the United States in comparison with what it means to be a lawyer in other countries. Among other things, participants will discuss the lawyer's role in society and the type of conduct that is regulated. This course will also examine the cross-border practice regulation that has emerged in response to the increasingly common circumstance of lawyers who handle a matter in a country other than their own.

### **Cross-Border Legal Practice Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 911 Education Law Seminar (2)** This course covers the basic premises of compulsory education; issues concerning exclusion of students; school control of student behavior and curriculum; teacher employment problems; and issues of funding, minority rights, and school liability.

### **Education Law Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 912 Elder Law Seminar (2)** This course presents students with opportunities for advanced research and writing in elder law, allowing them to draw on their experiences in other classes, including the Elder Law Clinic and the Elder Law Workshop. Students are required to write a paper and to make a presentation in class.

### **Elder Law Seminar (2)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 913** European Union Law Seminar (3) This course examines basic principles of the Union legal system, such as free movement of goods, persons, services, and capital, the right of establishment, common commercial policy, and foreign policy. It also examines the organization and functions of the Union's institutions and contrasts the United States federal experience. The relationship between Union law and the legal systems of member states will be addressed along with the jurisdiction of the Court of Justice. The relevance of the Union experience to the evolution of other common markets in North and South America and Asia will also be addressed.

#### **European Union Law Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 914** Federal Regulatory and Legislative Practice Seminar (2) A seminar devoted to exploring the details of federal regulatory and legislative practice in Washington, D.C.

#### **Federal Regulatory and Legislative Practice Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 916** Class Actions Seminar (2) This seminar explores the class action device, tracing its historical origins from the earliest forms of aggregate litigation through various amendments to Rule 23 and passage of the Class Action Fairness Act. Although other non-class aggregation techniques are discussed, they are addressed only for comparative purposes. The unique nature of representative litigation and the special issues that arise during the course of a class action are the subject of discussion and student presentations during seminar sessions. Considerable discussion is devoted to the roles of the various "players" in a class action: the qualifications of the class representative, the qualifications and interest of class counsel, and the fiduciary role of the district judge.

#### **Class Actions Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 916** Class Actions Seminar (2) This seminar explores the class action device, tracing its historical origins from the earliest forms of aggregate litigation through various amendments to Rule 23 and passage of the Class Action Fairness Act. Although other non-class aggregation techniques are discussed, they are addressed only for comparative purposes. The unique nature of representative litigation and the special issues that arise during the course of a class action are the subject of discussion and student presentations during seminar sessions. Considerable discussion is devoted to the roles of the various "players" in a class action: the qualifications of the class representative, the qualifications and interest of class counsel, and the fiduciary role of the district judge.

#### **Class Actions Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 917** Gender and the Law Seminar (2) The role of gender in the development of modern law is considered in a variety of contexts. Among the topics are discrimination in pay and conditions of employment, psychological and sociological



criminal defenses, pornography, spousal abuse, reproductive rights, and issues of child custody, support, and property division.

### **Gender and the Law Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 922 International Protection of Human Rights Seminar (3)** This seminar provides an introduction to international human rights law and procedures. It examines what are "human rights" and explores the law of treaty interpretation, how human rights law is incorporated into domestic legal systems, and the role of international governmental organizations, international and regional courts, and non-governmental organizations in protecting human rights. Students also learn how to research international law and how to write legal analysis based on international law.

### **International Protection of Human Rights Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 923 International Refugee Law Seminar (2)** This course is intended to provide an introduction to the basic framework of international refugee law. It begins by laying out the historical political and philosophical background to the development of the concept of "refugee" in the twentieth century. It examines this legal framework within the context of the broader human rights system. The cardinal provisions of the principal international instruments establishing this framework--in particular the 1951 UN Convention Relating to the Status of Refugees and the 1967 Protocol thereto - are examined against the domestic legal regime establishing the substantive, procedural and evidentiary requirements for making a claim for asylum under U.S. law.

### **International Refugee Law Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 925 Jurisprudence Seminar (2)** This seminar investigates myriad theories about law. It is an aim of this offering to afford students a vehicle whereby they might test and place in perspective many of the theories of law gleaned from classroom work and personal experience.

### **Jurisprudence Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 926 Law and Individuals with Disabilities Seminar (2)** Major issues and concepts in law and social policy regarding individuals with handicaps are introduced. Topics include: income maintenance programs, special education, federal and state anti-discrimination laws, accessibility, special health issues, institutionalization and deinstitutionalization.

### **Law and Individuals with Disabilities Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 927 Law of Artistic Persons and Properties Seminar (2)** The objectives of this course include an examination of the

interface between law and the arts with an eye to both theoretical and practical implications and a striving to identify creative and serviceable solutions to the problems that have frustrated the growth and harvest of the creative effort. The investigation will be directed toward subject areas that reflect functional divisions within the arts; i.e., the visual arts, dance, music, the literary arts, and areas such as television and film. The course includes a mandatory field trip to New York City at the student's expense.

#### **Law of Artistic Persons and Properties Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 928** Law and Semiotics Seminar (3) Legal semiotics is the study of law focusing signs and symbols as well as the construction of meaning in law in legal discourse. Law's communicative structures are essential in this context. Moreover, recent large-scale economic, political and social developments in the Western hemisphere have increased the need to expand our knowledge about law, and semiotic studies sustain that need.

#### **Law and Semiotics Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 929** Law and Aging Policy Seminar (3) Examination of laws and public policies affecting older adults and families, including health and long-term care. This seminar will analyze demographic trends of aging world populations, including alternative public benefit and private retirement strategies affected by laws. Medicare, Medicaid, Social Security, protection of older adults, long-term care planning, and consumer protection laws will be introduced, with opportunities for students to select individual topics for in-depth research, writing and presentation in class. The seminar will also examine roles for specialists in elder law, whether in private practice or as public advocates.

#### **Law and Aging Policy Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 930** Law, Science, and Policy Seminar (2) This course will identify diverse areas in which advances in technology have posed challenges to society and law and will study select topics within those areas in order to ground the participants in the relevant legal, scientific, and ethical principles and jurisprudential and social theories. Subjects addressed include issues in biotechnology, such as cloning, transgenics, xenotransplantation, and pharmaceutical development; the ownership of biotechnological products; experimentation with humans and animals; human and animal rights concerns; environmental bioremediation; and non-lethal defense technologies.

#### **Law, Science, and Policy Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 931** Lawyering and Ethics for the Business Attorney Seminar (2) This seminar provides students with an opportunity to analyze and discuss ethical and legal issues relating to representation of business entities. Issues covered include (1) who is the client for the lawyer who represents a business entity; (2) what special rules govern confidentiality and information sharing in the representation of a business entity; (3) how should a lawyer respond to evidence of client fraud or other illegal activities; (4) what are the potential liabilities for furnishing legal advice or providing legal opinions for business transactions that are later found to have been fraudulent or illegal; (5) when is a business entity required or permitted to reimburse employees for legal expenses relating to their employment activities; and (6) what special obligations and responsibilities are imposed on "in-house" attorneys who are full-time employees of a business entity.

#### **Lawyering and Ethics for the Business Attorney Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 933** Protection of Individual Rights Under State Constitutions Seminar (2) With the perception that the federal judiciary is increasingly hostile to constitutional claims, individuals have turned to state constitutions as an independent source of rights in civil and criminal litigation. This course will explore the unique procedures and methods of state constitutional rights interpretation. In lieu of an examination, persons enrolled in the course will brief questions of state constitutional law in an arena where the United States Constitution fails to afford protection.

#### **Protection of Individual Rights Under State Constitutions Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 934** Race, Racism, and American Law Seminar (2) The purpose of this seminar is to facilitate discussion and understanding of the role law has played in both the subordination and promotion of the rights of people of color in America. Subjects for discussion will include race and the American criminal justice system, hate speech and the First Amendment, affirmative action policies, and the quest for effective schools.

#### **Race, Racism, and American Law Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 936** Law and Sexuality Seminar (2) This seminar explores the different ways in which the law regulates and accounts for sexuality in general and sexual orientation in particular. Topics to be covered will include rights to privacy and their impact on the ability of the state to regulate sexual conduct; rights to equal protection by lesbians and gay men; the military's "don't ask, don't tell" policy; rights to free speech and associations of lesbians and gay men (and of those who do not want to associate with them); same-sex marriage and adoption by lesbians and gay men; employment discrimination; and legal issues involving transgendered individuals.

#### **Law and Sexuality Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 937** Forensic Genetics Seminar (2) An examination of the history of and current issues in using genetic identification in the criminal law.

#### **Forensic Genetics Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 937** Forensic Genetics Seminar (2) An examination of the history of and current issues in using genetic identification in the criminal law.

#### **Forensic Genetics Seminar (2)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 938** The Supreme Court Seminar (2) The Supreme Court, including procedure and practice, principles of adjudication, and history, as well as the topics of the current term are studied. Students are required to present analyses of current cases as well as an analytical paper on approved topics of constitutional law.

### **The Supreme Court Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 939** Tax Policy Seminar (2) This course examines the fundamental issues in tax policy, focusing on trends and on current legislative proposals. Specific subjects include the underpinnings of the various tax systems, the tax legislative process, the use of tax structure and incentives to implement social and economic objectives, the legal methodology of controlling tax abuse, and similar subjects.

### **Tax Policy Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 941** The United Nations and International Law Seminar (2) The inexorable paces of globalization and interdependence have made the need for international cooperation more acute. The role of the United Nations in these processes has become both more relevant and controversial. Notwithstanding the critical voices that have questioned the relevance or usefulness of the world body from certain national perspectives and points of view, the United Nations, through its activities and programmes, continues to have a considerable impact on countries and societies around the world, in such areas as conflict prevention and resolution, control of population displacements, humanitarian action, and social and economic development. These considerations, among others, make a study of the United Nations and International law more important today than it has ever been.

### **The United Nations and International Law Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 943** International Justice Seminar (2) The seminar will address international trial investigative techniques, tribunal jurisdiction and procedure, and areas of international civil and criminal law that are most relevant to legal practice before international tribunals.

### **International Justice Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 945** Congressional Investigations Seminar (2) This seminar will examine the laws and procedures governing congressional investigations through a series of historically based case studies and student analytical presentations on approved areas of congressional investigations law and procedure.

### **Congressional Investigations Seminar (2)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 946** Policy Issues in Corporate Crime Seminar (2) This seminar focuses on the theoretical and policy justifications underlying the prosecution of white collar crime.

### **Policy Issues in Corporate Crime Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 947** International Financial Law Seminar (3) This seminar examines selected aspects of international financial, securities, and banking law. It will cover elements of financial law, including legal aspects of banking, securities, and money; the objectives of regulations and supervision; an overview of US regulation; and the public and private law of international monetary obligations. It examines aspects of international financial and securities regulation, including an examination of the financial crisis of 2008 and the regulatory reforms resulting from it; selected comparative aspects of regulation in the US and the EU through a detailed discussion of legislation and case law. The course also includes discussion on the economic and monetary union in the EU and the eurozone crisis and it will provide an overview of the law of the IMF and the international financial architecture.

### **International Financial Law Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 948** International Financial Law (3) This seminar examines selected aspects of international financial, securities, and banking law. It covers broadly four areas: First, it provides elements of financial law. Secondly, it examines aspects of international financial and securities regulation. Thirdly, it discusses economic and monetary union in the EU and the eurozone crisis. Finally, it provides an overview of the law of the IMF and the international financial architecture.

### **International Financial Law (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 967** Labor Law Seminar (2) This is an advanced seminar that assumes students will already have studied the National Labor Relations Act. It provides an opportunity for students to deepen their knowledge of labor law while also developing research, writing, analytical, and trial strategy skills.

### **Labor Law Seminar (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 968** International Uniform Enforcement of Human Rights Seminar (3) A study of the structure, value, and progress of the international Human Rights Law Project.

### **International Uniform Enforcement of Human Rights Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 969** Electronic Evidence Seminar (3) This seminar cover the case law, procedural rules, evidence rules, and rules of professional conduct implicated by the unique attributes of information created and/or stored electronically, as well as the filing and courtroom presentation of documents in electronic format. There are three components to the course. The first part concerns the discovery of ESI, and covers the nature, sources, and terminology of ESI; the different formats of ESI and the implications for preservation and production of ESI attributable to the different formats; the evolution of the rules and case law regarding discovery of ESI; and the obligations of counsel with respect of the preservation of ESI.

### **Electronic Evidence Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 970** Russian Law Seminar (2) This 2-credit seminar is concerned with the development of the law, legal system, and legal institutions of what is popularly known as Russia but also correctly and officially known as the Russian Federation within the boundaries presently occupied and, historically, within the boundaries of the Russian Empire. By "law" we mean formal legislation, customary rules, relevant international legal rules, legal doctrine, and anything else regarded by the Russian State or by Russian jurists as comprising part of the "law." For our purposes "legal institutions" encompasses all law enforcement agencies or any other agencies of the State or empowered by the state which are concerned with the law in any manner whatsoever, including educational institutions.

### **Russian Law Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 997** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 997A** Intellectual Property: Doctrine & Theory Seminar (3) The seminar will address recent topics in intellectual property law (IP): patent, trade mark and trade secret law. The seminar will address, IP's jurisprudential and economic underpinnings; the rights of creative professional and artists' and makers's rights; the question of property rights in the digital age, competing accounts of patent law and the dispute over open access IP regimes; and finally the doctrinal question of subject matter patentability in the context of DNA and genetically enhanced agricultural products. The seminar will work through the recent and important literature in IP; theoretical questions will be addressed in the context of IP doctrine, including recent landmark IP cases.

### **Intellectual Property: Doctrine & Theory Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SEM 997A** Intellectual Property: Doctrine & Theory Seminar (3) The seminar will address recent topics in intellectual property law (IP): patent, trade mark and trade secret law. The seminar will address, IP's jurisprudential and economic underpinnings; the rights of creative professional and artists' and makers's rights; the question of property rights in the digital age, competing accounts of patent law and the dispute over open access IP regimes; and finally the doctrinal question of subject matter patentability in the context of DNA and genetically enhanced agricultural products. The

seminar will work through the recent and important literature in IP; theoretical questions will be addressed in the context of IP doctrine, including recent landmark IP cases.

### **Intellectual Property: Doctrine & Theory Seminar (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Social Influenc Hlth (SIH)**

**SIH 711 Social Influences on Health (3)** This course introduces population based medicine and its influence on individuals and provides a framework for learning subsequent biomedical sciences.

### **Social Influences on Health (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Social Studies Education (SS ED)**

**SS ED 411 Teaching Secondary Social Studies I (3)** Methods for teaching social studies in secondary grades; nature of social studies, content and learning outcomes, instructional strategies and planning.

### **SS ED 411 Teaching Secondary Social Studies I (3)**

Teaching social studies in the secondary grades (7-12) with emphasis on content and methods for the major subjects (citizenship and government, economics, geography, and history). The principal goal is to provide prospective teachers with a better understanding of the nature, structure, and experience of social studies in the U.S., how to identify, select, instruct, and assess rigorous content and learning outcomes, and effective strategies for designing, planning, and implementing instruction. Additional topics may be included as determined by the section instructor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 412W Teaching Secondary Social Studies II (3)** Writing-intensive course focusing on study of the social studies teacher's role in planning instruction; strategies for teaching.

### **SS ED 412W Teaching Secondary Social Studies II (3)**

Advanced study and practice of teaching social studies in the secondary grades (7-12) with emphasis on content and methods for the major subject areas (citizenship and government, economics, geography, and history). The principal goal is to provide prospective teachers with intellectual preparation and relevant practice in selecting and applying rigorous content knowledge to higher-order thinking in the classroom and practical experience designing, planning, and implementing social studies instruction. Topics include the social studies teacher's role in planning and practicing instruction, strategies for implementing and assessing teaching in the social studies, and others as determined by the section instructor. As a writing course (W), SS ED 412W engages students in professional in-depth writing experiences that involve planning, process, development, teaching and learning social studies content, and other relevant writing that teachers are expected to perform.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2010  
 Prerequisite:

Concurrent: C I 412W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 430W Teaching Social Studies in the Elementary Grades (3)** Principles underlying use of social studies in the elementary school; practical demonstration of desirable methods.

### **SS ED 430W Teaching Social Studies in the Elementary Grades (3)**

Social studies transforms the social sciences and humanities to promote civic competence (National Council for the Social Studies, 2002). In this course, teacher candidates learn to coordinate and conceptualize the richness of anthropology, economics, geography, history, civics, and sociology for elementary classroom pedagogy. Candidates become familiar with various instructional strategies that support social studies. Candidates gain an understanding of the information, concepts, theories, analytical approaches, and different perspectives--including global and multicultural perspectives--that are important to teaching social studies. Candidates also learn how to assess social studies learning in a variety of ways.

This course stresses technology, content integration, social science competence, differentiated instruction, multicultural/global knowledge, teaching social historical inquiry, and constructing democratic learning communities. Teacher candidates learn how to apply the State Learning Frameworks and National Standards in their classroom instruction. At the conclusion of the course, candidates have a good understanding of elementary social studies and are able to develop and demonstrate powerful social studies curricula.

Being a "W" course, SS ED 430 incorporates both formal and informal writing into in-class and graded assignments to encourage teacher candidates to develop as critical thinkers and productive writers. This writing includes an essay describing one's own experiences as a social studies learner, reading responses, the creation of a unit of instruction, and several lesson plans that describe significant activities. These writing tasks are meant to professionalize the communication skills required to effectively teach social studies as well as to effectively communicate with parents, educators, and administrators.

SS ED 430W is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

Concurrent: C I 495A OR C I 495B ; MTHED 420 SCIED 458

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 430W Teaching Social Studies in the Elementary Grades (3)** Principles underlying use of social studies in the elementary school; practical demonstration of desirable methods.

### **SS ED 430W Teaching Social Studies in the Elementary Grades (3)**

Social studies transforms the social sciences and humanities to promote civic competence (National Council for the Social Studies, 2002). In this course, teacher candidates learn to coordinate and conceptualize the richness of anthropology, economics, geography, history, civics, and sociology for elementary classroom pedagogy. Candidates become familiar with various instructional strategies that support social studies. Candidates gain an understanding of the information, concepts, theories, analytical approaches, and different perspectives--including global and multicultural perspectives--that are important to teaching social studies. Candidates also learn how to assess social studies learning in a variety of ways.

This course stresses technology, content integration, social science competence, differentiated instruction, multicultural/global knowledge, teaching social historical inquiry, and constructing democratic learning communities. Teacher candidates learn how to apply the State Learning Frameworks and National Standards in their classroom instruction. At the conclusion of the course, candidates have a good understanding of elementary social studies and are able to develop and demonstrate powerful social studies curricula.

Being a "W" course, SS ED 430 incorporates both formal and informal writing into in-class and graded assignments to encourage teacher candidates to develop as critical thinkers and productive writers. This writing includes an essay describing one's own experiences as a social studies learner, reading responses, the creation of a unit of instruction, and several lesson plans that describe significant activities. These writing tasks are meant to professionalize the communication skills required to effectively teach social studies as well as to effectively communicate with parents, educators, and administrators.

SS ED 430W is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:  
 Concurrent: C I 495A OR C I 495B ; MTHED 420 SCIED 458

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 470** Issues in Social Studies Education (1-6) Concentration on particular issues, trends, and developments in the social studies.

#### **Issues in Social Studies Education (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 530** Instructional Practices in the Social Studies (3) Social studies innovations in the classroom, new programs, new materials, new methods, and evaluation.

#### **Instructional Practices in the Social Studies (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 532** Curriculum Models in Social Studies Education (3) Study of past and proposed curricula in elementary and

secondary social studies. Various means of judging curricula will be offered.

### **Curriculum Models in Social Studies Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 533** Research in the Teaching of Social Studies (3) Procedures and methods of research for the teaching of social studies, strategies of investigation, and review of research literature.

### **Research in the Teaching of Social Studies (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 590** Colloquium (1-3) Graduate seminar for new doctoral students in social studies education.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SS ED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Social Thought (SOCTH)**

**SOCTH 501** Seminar in Social Thought (3) Selected topics in the historical development of the tradition in social thought, and a discussion of contemporary issues and debates.

### **Seminar in Social Thought (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Socio-Ecolog Medicin (SOEM)**

**SOEM 711** Socio-Ecological Medicine (3) An introductory course encompassing topics such as public health, socio-ecological medicine, global health, health systems, medical anthropology, and culturally-sensitive medicine.

### **Socio-Ecological Medicine (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Sociology (SOC)**

**SOC 400W** Senior Research Seminar (3) Major concepts and principles of sociology through reading, data analysis, and writing. Capstone course for senior Sociology majors.

### **Senior Research Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 403** Advanced Social Psychology (3) Analysis of the major theoretical approaches and research findings of contemporary social psychology.

### **Advanced Social Psychology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 404** Social Influence and Small Groups (3) The study of social influence, leadership and status, and social cohesion and commitment processes in small groups.

### **Social Influence and Small Groups (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 405** Sociological Theory (3) Overview of the development of sociological theory; current issues and controversies.

### **Sociological Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**SOC 406** (CRIMJ 406, CRIM 406) Sociology of Deviance (3) Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group's normative expectations.

**SOC (CRIMJ/CRIM) 406 Sociology of Deviance (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the "Crime" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 408** Urban Ecology (3) Spatial and temporal aspects of urban structure; urban growth, neighborhoods, racial and ethnic groups, mental illness; cross-cultural perspectives.

**Urban Ecology (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 409** (US) (AF AM 409) Racial and Ethnic Inequality in America (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

**SOC (AAA S) 409 Racial and Ethnic Inequality in America (3)  
(US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course explores the impact of inequality and discrimination on individual and group identity for a wide range of social groups with special focus on racial and ethnic majorities and minorities. Using an extensive list of readings, writing assignments, small group activities, and journals (for personal reflection and scholarly critique) the students join the instructor in exploring the effects of inequality and discrimination. While emphasis is given to the inequality and discrimination experienced by local and national populations, a significant portion of the class will address issues rooted in international structures and institutions. Students are evaluated on quizzes, reaction papers, and analysis journals. AAA S/SOC 409 is not a required course in Sociology; it is, however, an optional 400-level course for all majors and minors that fulfills one of their upper-level course requirements. AAA S/SOC 409 is not required for the major or minor, but it is one of several optional courses from which they can choose to fulfill major and minor requirements.

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 409U** (US) (AF AM 409U) Racial and Ethnic Inequality in America (3) The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups.

**Racial and Ethnic Inequality in America (3)**

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 411 (US) (HD FS 416) Racial and Ethnic Diversity and the American Family (3)** This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States.

**SOC 411 (HD FS 416) Racial and Ethnic Diversity and the American Family (3)**

During the last several decades, the racial and ethnic composition of the U.S. population has changed dramatically. At end of the 20th century, non-Hispanic whites accounted for less than 75 percent of the U.S. population. While blacks remained the largest minority group, there were nearly as many Hispanics as blacks, and the number of Asians was increasing. Population projections indicate that by the middle of the 21st century, Hispanics will make up nearly one-fourth of the U.S. population. Blacks, Asians, and American Indians together will comprise an additional fourth of the population. The last several decades have also brought significant changes in family life in the United States, including declining rates of marriage, a rising age-at-marriage, an increase in cohabitation, and a dramatic rise in the proportion of births outside of marriage. While these trends in family life have been experienced by all racial and ethnic groups, there is substantial variation in family patterns by race and ethnicity. The course will build on other courses in social inequality and the family. The course does not overlap with any existing courses in the Department of Sociology or with courses offered in other relevant departments.

This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States. The student will read articles from major sociological journals and learn to extract major points and issues. He/she will learn to synthesize and critique various arguments on major issues in the field. The student will acquire skills in summarizing and evaluating arguments in essay form. He/she will also develop oral presentation skills. Final grades for the course will be based on class participation, a brief (approximately 5 pages) paper, a group presentation, a midterm examination (essay format) and a final examination (essay format). The course is not required for the Sociology minor or major. However, the course can count as one of the 400-level elective courses in Sociology for the Sociology minor, B.A. or B.S.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 412 (CRIMJ 412, CRIM 412) Crime, Social Control, and the Legal System (3)** Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

**Crime, Social Control, and the Legal System (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 413 (CRIM 413, CRIMJ 413) Advanced Criminological Theory (3)** This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories.

**SOC (CRIM/CRIMJ) 413 Advanced Criminological Theory (3)**

Advanced criminological theory is intended to extend and deepen students' knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/CRIM/SOC 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with a Deviance and Criminology specialization.

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 414** (CRIMJ 414, CRIM 414) Criminal Careers and the Organization of Crime (3) Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and life- styles; policy implications.

**Criminal Careers and the Organization of Crime (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 416** (US) (EDTHP 416) Sociology of Education (3) The theoretical, conceptual, and descriptive contributions of sociology to education.

**Sociology of Education (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 419** (US) Race and Public Policy (3) Seminar format course in which sociological theory and research are applied to current race policy issues.

**Race and Public Policy (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 420** (EM SC 420, S T S 420) Energy and Modern Society (3) Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

**Energy and Modern Society (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 422** World Population Diversity (3) Survey of world diversity in national population growth/composition; the impacts of demographic change on the economic/social life of nations/people.

**World Population Diversity (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 423** Social Demography (3) Social demographic perspectives on fertility, mortality, morbidity, migration, population density, demographic transitions, social mobility, family, the aged, and minorities.

**Social Demography (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 424 Social Change (3)** Critical review of classical and recent theories of social change, emphasizing the transformations occurring in the modern world.

**Social Change (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 425 Social Conflict (3)** An analysis of the variables affecting intergroup and international conflict and cooperation.

**Social Conflict (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 427W (CED 427W, S T S 427W) Society and Natural Resources (3)** Analysis of the relationships between societal development and enhancement and natural resources.

**SOC (CED/S T S) 427W Society and Natural Resources (3)**

There is a common tendency to portray environmental and natural resource problems as biophysical in nature. The implication of this tendency is that such problems are best addressed by scientists and engineers who discover evidence of and devise new technologies to fix them. Another common tendency is to assume that people resist solutions to environmental and natural resource problems because of individually held anti-environmental attitudes. In contrast to these two perspectives, sociologists point out that environmental and natural resource problems often lie at the intersection of biophysical processes and social, political, economic, belief, value, and knowledge systems. The goals of this writing-intensive course are to introduce students to the complexity of environmental and natural resource problems and to teach them to think sociologically. In addition to reading assigned books and articles, students will participate in a simulation to negotiate a global environmental treaty, attend a field trip to learn about alternative energy strategies, and conduct research on a local environmental or natural resource issue. After taking this course, students should be better prepared to engage in debates with academics, politicians, and other citizens regarding the causes and potential solutions to environmental and natural resource problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 428 Homelessness in America (3)** Survey of social science research on homelessness in the contemporary United States.

**Homelessness in America (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 428H Homelessness in America (3)** Survey of social science research on homelessness in the contemporary United States.

**Homelessness in America (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 429** Social Stratification (3) Structure and dynamics of class, caste, and status systems; class differentials and social mobility; current theoretical and methodological issues.

**Social Stratification (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 430** Family in Cross-Cultural Perspective (3) Sociological analysis of family systems in various cultures and subcultures.

**Family in Cross-Cultural Perspective (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 431** (HD FS 431) Family Disorganization: Stress Points in the Contemporary Family (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

**Family Disorganization: Stress Points in the Contemporary Family (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 1994

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 432** Social Movements (3) Why and how people mobilize to promote or retard social change. Factors predicting success or failure of social movements.

**Social Movements (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 435** (HD FS 434) Perspectives on Aging (3) An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

**Perspectives on Aging (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 440** (HD FS 440) Family Policy (3) An in-depth examination of family policy.

**SOC (HD FS) 440 Family Policy (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**



This course is designed to provide an in-depth examination of family policy. Students will identify and critically analyze major issues, controversies, and policies that affect families. Attention will be devoted to recognizing both intended and unintended consequences of family policies and understanding policy challenges and trade-offs. Students will gain an understanding of how policies are shaped by both facts and myths, as well as our values. Students will examine historical and current trends in family patterns (e.g., divorce, women's labor force participation, nonmarital births) to understand the implications they hold for individuals, families and society. Students will gain an awareness of the social, economic, historical, legal, and political contexts within which family policies exist and are proposed. Although the main focus is on U.S. family policy, some time will be devoted to learning about family policies in other countries. We will learn about several specific family policies in-depth (e.g., welfare), but a final goal is to help students develop a general way of looking at family policy that they can then use to understand any issue of family policy that unfolds throughout their lifetime. This course will foster thoughtful reflection and critical thinking, writing skills, research skills, and skills of synthesis, logic, and argument. Course goals will be accomplished through course readings, writing assignments, lectures, class discussions, debates and group projects. Mastery of course material and student evaluation are assessed in several ways. Students will take a midterm and final exam that cover lectures, class discussions, and assigned readings. Two papers are also required. The first paper is based on an analysis of newspaper articles dealing with family policy issues that students will collect and relate to course materials. The second paper is a literature-based analysis of a family policy in a society outside the United States. Class participation is also essential and its evaluation will be based on a combination of class attendance, contributions to class discussions, participation in group debates and projects, and an oral presentation of the final paper on a non-U.S. family policy.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 445 U.S. Immigration (3)** This class examines theories of U.S. immigration and immigrant adaptation, effects of immigration, and policy.

### **SOC 445 U.S. Immigration (3)**

The United States has long been known as a nation of immigrants. People have come for all sorts of reasons, including economic opportunity, political asylum, and religious freedom. Immigration continues to be a fundamental source of demographic and social change today. However, the nature of the changes brought about by immigration will depend on the pathways immigrants and their descendants take as they incorporate into American society. This course is designed to introduce students to theories of immigration, patterns of immigrant incorporation, immigration's impact on the U.S., and political debates about immigration issues.

Topic to be discussed include:

- Why do immigrants come to the U.S.?
- In what kinds of communities do immigrants live?
- What is the economic impact of immigration on U.S. society?
- What is the social impact of immigration?
- Are new immigrants assimilating?
- What are the problems with current immigration policies and what are the alternative approaches to reform?

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 446 Political Sociology (3)** Sociological analysis of types of political organization and their relations with other elements of social life.

### **Political Sociology (3)**

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Winter 1978

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 448 Environmental Sociology (3)** Examination of the relationship between the physical environment and society.

### **Environmental Sociology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 449 Environmental Movements (3)** Comparative exploration of environmental movements within the context of classical and new social movement theory.

**Environmental Movements (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 450 Justice and the Environment (3)** Considers notions of justice in relation to environmental philosophy, environmental movements, and general environmental concerns.

**Justice and the Environment (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 454 (US) The City in Postindustrial Society (3)** Postindustrial social organization in the United States and Europe; consequences for metropolitan social stratification, community power, and environmental quality.

**The City in Postindustrial Society (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 455 Work and Occupations (3)** Work and occupational life in modern society; work in the past, present, and future.

**Work and Occupations (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 456 (WMNST 456) Gender, Occupations, and Professions (3)** The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

**Gender, Occupations, and Professions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 457 (US;IL) (ANTH 457, J ST 457) Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3)** Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.

**SOC (ANTH/J ST) 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3)**

**(US;IL)**

This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State's Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research.

General Education: None

Diversity: US;IL

Bachelor of Arts: None

Effective: Summer 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 461 (US;IL) (RL ST 461) Sociology of Religion (3)** Contemporary religion in the global perspective: beliefs, structure, and function of major religious traditions, denominations, and cults.

**Sociology of Religion (3)**

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 461 (US;IL) (RL ST 461) Sociology of Religion (3)** Contemporary religion in the global perspective: beliefs, structure, and function of major religious traditions, denominations, and cults.

**Sociology of Religion (3)**

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 467 (CRIM 467, CRIMJ 467) Law and Society (3)** Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials.

**SOC (CRIMJ/CRIM) 467 Law and Society (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Law and society teaches students' knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIM/CRIMJ 113 and CRIM/CRIMJ 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the "Law" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

General Education: None

Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 468** Mood-Altering Substances in Society (3) Perspectives of cultures throughout the world toward mood-altering substances are reviewed in light of public policy, benefits, and problems.

### **Mood-Altering Substances in Society (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 469** Techniques in Small Group Facilitation (1-4 per semester/maximum of 12) This course is the training course for students working as facilitators with the World in Conversation Project.

### **SOC 469 Techniques in Small Group Facilitation (1-4 per semester/maximum of 12)**

SOC 469 is an advanced training course for students who have been selected to be facilitators for the World in Conversation Project. In this course, students draw on sociological theories and methods to learn how to sharpen their group facilitation skills in order to lead small group dialogues on race relations. The main objective is to learn how to create an ideologically neutral environment in which participants will think critically and speak candidly about their views and roles in race relations. All evaluations are accomplished through "live" observations of students actually facilitating dialogue. In order to be considered for a position as facilitator with the World in Conversation Project, a student must successfully complete SOC 119 (Race and Ethnic Relations) and SOC 300 (Preceptorship in Sociology).

There are different learning objectives for students who take SOC 469 the first time as compared to those returning for multiple semesters. The general objectives are as follows:

**Semester 1:** During the first semester, students develop advanced facilitation skills. In the context of work with the World in Conversation Project, this means that they acquire the tools they need to encourage critical thinking, to address complex racial and culture-related subjects and emotions, to lead "ideologically neutral" dialogue, and to more adeptly understand and implement the Socratic Method. At the core of their learning is study of the sociological dynamics of group process.

**Semester 2:** During the second semester, students develop their social and emotional intelligence as the foundation for implementing successful conversational interventions. The core of their learning involves integrating a more advanced understanding of their own personal cultural identity with more advanced facilitation techniques. In other words, in order to master small group facilitation and group process, students need to explore the nuances of their own personal racial and cultural identities and how these enter into their work as facilitators.

**Semester 3:** Students stay on for a third semester only if they can clearly articulate the advanced facilitation/observation/interpretation skills learned during the first two semesters in a way that allows them to assume the role of a peer mentor with new facilitators.

A student is only invited back for subsequent semesters of SOC 469 if they have successfully accomplished the learning objectives set forth for each semester.

The method of evaluation is standard for each semester that a student takes the class, and consists of a combined approach that includes: 1) live observations via an audio/video monitoring system and performance goal-setting with instructors and WCP staff (weekly), 2) self-evaluation and personal goal-setting through review of recorded small group dialogue sessions (three times per semester), and 3) personal meetings with course instructors (twice per semester).

For Your Information:

What is the WCP?

These are campus wide 90 minute, peer facilitated small groups where trained undergraduate students (former SOC 119 facilitators) help participants explore their personal stories, views, biases and roles in race relations using a version of the Socratic Method. These inquiry-based sessions are designed to discuss the true nature of race relations face to face in an ideologically neutral environment. The conversations are extremely popular with participants (85 percent rate them as valuable and worthwhile) and the number offered each year has grown from 140 to over 800 in just six years. Currently twenty facilitators work for the project, all Penn State undergraduate students.

The WCP Mission Statement:

The mission of the RRP is to create an ideologically neutral environment for dialogue where individuals can voice their true concerns about race relations and begin to address these concerns in a productive and meaningful way.

WCP Philosophy:

Our guiding assumption is that the articulation of one's viewpoint on an issue is the beginning of greater understanding and knowledge of that subject. And the experience of doing so with others in a group setting creates a kind of synergy that advances critical thinking as well as bridge building.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 469 Techniques in Small Group Facilitation (1-4 per semester/maximum of 12)** This course is the training course for students working as facilitators with the World in Conversation Project.

### **SOC 469 Techniques in Small Group Facilitation (1-4 per semester/maximum of 12)**

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There are different learning objectives for students who take SOC 469 the first time as compared to those returning for multiple semesters. The general objectives are as follows:

**Semester 1:** During the first semester, students develop advanced facilitation skills. In the context of work with the World in Conversation Project, this means that they acquire the tools they need to encourage critical thinking, to address complex racial and culture-related subjects and emotions, to lead "ideologically neutral" dialogue, and to more adeptly understand and implement the Socratic Method. At the core of their learning is study of the sociological dynamics of group process.

**Semester 2:** During the second semester, students develop their social and emotional intelligence as the foundation for implementing successful conversational interventions. The core of their learning involves integrating a more advanced understanding of their own personal cultural identity with more advanced facilitation techniques. In other words, in order to master small group facilitation and group process, students need to explore the nuances of their own personal racial and cultural identities and how these enter into their work as facilitators.

**Semester 3:** Students stay on for a third semester only if they can clearly articulate the advanced facilitation/observation/interpretation skills learned during the first two semesters in a way that allows them to assume the role of a peer mentor with new facilitators.

A student is only invited back for subsequent semesters of SOC 469 if they have successfully accomplished the learning objectives set forth for each semester.

The method of evaluation is standard for each semester that a student takes the class, and consists of a combined approach that includes: 1) live observations via an audio/video monitoring system and performance goal-setting with instructors and WCP staff (weekly), 2) self-evaluation and personal goal-setting through review of recorded small group dialogue sessions (three times per semester), and 3) personal meetings with course instructors (twice per semester).

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The WCP Mission Statement:

The mission of the RRP is to create an ideologically neutral environment for dialogue where individuals can voice their true concerns about race relations and begin to address these concerns in a productive and meaningful way.

WCP Philosophy:

Our guiding assumption is that the articulation of one's viewpoint on an issue is the beginning of greater understanding and knowledge of that subject. And the experience of doing so with others in a group setting creates a kind of synergy that advances critical thinking as well as bridge building.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 470** Intermediate Social Statistics (4) Descriptive and inferential statistics in social research: central tendency and variation, normal distribution, measures of association, confidence intervals, hypothesis testing.

#### **Intermediate Social Statistics (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 471** Qualitative Research Methods in Sociology (3) Theory, methods, and practice of qualitative data collection, including observation, participant observation, interviewing; supervised projects in natural settings.

#### **Qualitative Research Methods in Sociology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 481H** Senior Honors Seminar in Sociology (1) Supervised experience in planning and writing the honors thesis.

#### **Senior Honors Seminar in Sociology (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Spring 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 497A** (CRIM 497A) Communities and Crime (3) Students will critically assess theory and empirical research on the effects of neighborhood structure and social organization on crime.

**Communities and Crime (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 497A** (CRIM 497A) Communities and Crime (3) Students will critically assess theory and empirical research on the effects of neighborhood structure and social organization on crime.

**Communities and Crime (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 497B** Medical Sociology: Health, Disease, and Society (3) The emphasis in the course is on the social patterning of health and disease with a focus on variation by age, gender, race/ethnicity, disability status, socioeconomic status and neighborhood/community.

**Medical Sociology: Health, Disease, and Society (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Social and Behavioral Science  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 497H** Changing American Family (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Changing American Family (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 499** (IL) Foreign Study--Sociology (2-6) Study, in selected foreign countries, of groups, institutions, and social problems.

**Foreign Study--Sociology (2-6)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 500** Introduction to Graduate Study in Sociology (1) Required of all incoming graduate students in sociology.

**Introduction to Graduate Study in Sociology (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 501** Proseminar in Sociology (3 per semester/maximum of 6) An in-depth introduction to the major specialty areas of Sociology.

**Proseminar in Sociology (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 502** Theories of Society I (3) Review and analysis of trends and controversies in sociological theory from late eighteenth-century beginnings through the nineteenth century.

**Theories of Society I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 503** Theories of Society II (3) Review and analysis of trends and controversies in sociological theory in the twentieth century.

**Theories of Society II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**SOC 512 (CLJ 512) Criminological Theories (3)** Survey of theoretical and substantive issues in deviance and criminology, with emphasis on critical review of theories.

**SOC (CLJ) 512 Criminological Theories (3)**

This graduate course in Criminological Theories is designed to provide students with a broad understanding of the major theories that have animated the field of criminology since its inception. The course traces the development of criminological theories from the early 20th century to the present and provides students with a targeted exposure to empirical studies that have tested these theories. Major topics covered (and the approximate percentage of time devoted to each) are as follows:

Images of Crime and Criminals - 10%  
 The Chicago School Approach - 10%  
 Anomie and Strain Theories - 10%  
 Opportunity and Routine Activity Theories - 10%  
 Socialization and Learning Theories - 10%  
 Conflict Theory and the Social Construction Perspective - 10%  
 Criminal Organizations - 10%  
 Criminal Careers - 10%  
 Gendered Theories of Crime - 10%

This is a required course for both the M.A. and Ph.D. degrees in Crime, Law, and Justice and as such this course occupies a central position in the graduate curriculum. The course is offered once per year, usually during the Fall semester, and typically contains between 6 and 10 students.

Students are evaluated based on (1) the degree of preparation for class discussion; (2) a series of short written assignments (3-5 pages) covering each of the topic areas listed above; and (3) a longer term paper consisting of a theoretical analysis of critique, a critical review of the literature, or a research paper with a strong theoretical foundation. Grades are based on class participation and written work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 513 Sociological Research Methods (3)** Critical review of methodological issues; research designs; analysis and interpretation of findings.

**SPAN 513. Acquisition of Spanish as a Second Language (3)**

An in-depth analysis of current research carried out on the acquisition of Spanish as a second language. Focus will be on syntax, phonology, lexicon, discourse, and pragmatics. Specific topics covered include the following: null-subjects, clitics; movement and word-order, tense and aspect, mood, agreement features, grammaticalization, modality, negation, functional categories, tutored vs. untutored learners, UG vs. non-UG effects, the Noun Phrase Accessibility Hierarchy, markedness, cohesive devices, speech acts, metaphors, idioms, the lexicon and culture, the phonological systems, including suprasegmentals. In addition to developing an understanding of the current research on the acquisition of Spanish as a second language, students will learn how to read the research literature from a critical perspective and how to read empirical data presented in published research that might result in alternative interpretations from those espoused by authors of published work. This goal will be achieved in two ways: requiring students to submit via e-mail to the professor and other students in the seminar, two- to three-page critiques of assigned readings; oral presentations in class of readings selected by the student(s). Some of the critical reports and presentations will be carried out jointly and others will be done individually. Students will also learn how to design and implement empirical research on the acquisition of Spanish as well as how to write up the results of this research in a potentially publishable research report. Finally, they will have the opportunity to present their research findings to the Penn State applied linguistics community, in a mini in-house workshop at the end of the course. In preparation for this, time will be set aside near the end of the seminar for students to present and discuss their research with their colleagues in the course. Most of the readings for the course will be preselected by the professor; however, students will also be expected to carry out independent reading of publications not included in the course syllabus and present and critique what they read in the seminar.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 515 (CLJ 515) Research Methods in Criminology and Deviance (3)** Review of methodological issues; design and conduct of research; analysis and interpretation of findings; ethical and policy issues.

**Research Methods in Criminology and Deviance (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 518 (PL SC 518) Survey Methods I: Survey Design (3)** Research design for social, behavioral and health surveys.

**SOC (PL SC) 518 Survey Methods I: Survey Design (3)**

This course is intended to provide graduate students the background to both evaluate published research using survey methods, and -- when combined with additional training -- to design their own surveys to collect data for their own research. Students will learn the essentials of sampling, questionnaire design, and how surveys may be implemented in different modes: telephone, face to face interviews, mail or other self-administered modes, and the internet. The course will emphasize how decisions of research design have important implications for the validity, reliability, and quantity of data that will be analyzed to answer key questions in the social, behavioral and health sciences. Sample design: 2 weeks; Questionnaire design and item analysis: 2 weeks; Telephone Surveys: 2 weeks; Face to face surveys: 2 weeks; Self administered and mail surveys: 2 weeks; Internet Surveys: 2 weeks; Ethics and human subjects protection: 1 week.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 519 (PL SC 519) Survey Methods II: Analysis of Survey Data (3)** Intermediate course on the statistical analysis of survey data: topics include weighting, complex surveys, missing data, and contextual analysis.

**SOC (PL SC) 519 Survey Methods II: Analysis of Survey Data (3)**

This is an intermediate level course in quantitative analysis. It is intended for graduate students who have completed 1-2 semesters of graduate-level statistics (not general research methods) and who are interested in the application of social statistics to the unique aspects of data collected by way of surveys. Surveys have a combination of qualities that represent challenges to valid inference. These include cluster and stratified sampling, under-representation of some groups due to differential response rates, missing data due to item non-response, cross-sectional design, and coarse measurement. Quite often we use surveys to test theories that the original survey designer did not intend to address, raising issues of validity and reliability of measurement. At the same time, surveys offer a number of opportunities and, when combined with other surveys (pooled cross sections) or merged with contextual data, can address a wide range of theoretical puzzles in the social sciences. This course provides an introduction to techniques in applied statistics that have developed specifically to address the special features of survey data. Examples of such techniques are: use of design weights, post-stratification weights, merging surveys with other surveys or auxiliary data, missing data imputation, challenges of causal inference. The class will blend an understanding of the core statistical issues with an emphasis on acquiring an intuition for the theory underlying the statistical models rather than focusing on proofs and estimation. This will provide a foundation for frequent hands-on applications in this seminar and for enrollment in more advanced or more in-depth courses offered by the Statistics department and the various social science departments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 521 Family Demography (3)** Current family demographic research on nuptiality, divorce, household composition, female employment, migration, and fertility.

**Family Demography (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1985

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 522 Demography of the Life Course (3)** The theoretical bases, critical concepts, and methods of life course analysis

in the study of demographic transitions.

### **Demography of the Life Course (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 523** Internal and International Migration (3) Examination of theories, frameworks, and policies related to internal and international migration causes and consequences in developed and developing nations.

### **Internal and International Migration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 524** The Demography of Human Fertility (3) Overview of major issues and methodological approaches in the demographic study of human fertility in developing and developed countries.

### **SOC 524 The Demography of Human Fertility (3)**

This course provides a graduate-level overview of the study of human fertility, one of the three basic demographic processes (i.e., fertility, mortality, migration) emphasized in the field of demography. The first part of the course will focus on the timing and nature of historical and contemporary fertility declines. The major theories that have been set forth to explain why fertility declines occur will be studied, as will empirical evidence that bears on the applicability of the theories to fertility patterns in specific areas of the world. The second component of the course will focus on fertility patterns in the contemporary United States. Theoretical perspectives on the determinants of fertility in advanced industrial countries will be examined. Variation in fertility by race, ethnicity, and various social characteristics will be addressed. In addition, students will learn how to measure fertility with various types of data (e.g., surveys, vital statistics, censuses) and they will be exposed to a variety of research methodologies employed to assess the nature and determinants of fertility patterns. The class will be organized as a seminar. Major requirements are class participation, leadership of one or more class sessions, and completion of a class project. The class project can be an empirical research paper, a research proposal, or a literature review.

This course covers core content that is essential for demographic training. The course has been approved by the Dual-Title Graduate Degree Program in Demography as a core seminar on demographic structure and change; it can therefore be used by students in that program (in addition to students in Sociology) to fulfill the requirements for the degree.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 525** Immigration, Assimilation, and Inequality (3) Examine theories, research, and policies on the incorporation of immigrants and their descendants.

### **SOC 525 Immigration, Assimilation, and Inequality (3)**

Over the last several decades, the diversity of American society has increased substantially as a result of immigration from Latin America, Asia, and other world regions. This has raised numerous questions about the consequences of immigration and the long-term prospects of immigrants and their descendants. The major objective of this course is to provide the foundation for a sociological understanding of the process of assimilation (or incorporation), especially in relation to the structure of opportunities and the reproduction of inequality. This will be accomplished through a survey of contemporary theoretical perspectives, and both quantitative and qualitative studies that evaluate their merits. Although sociology has embraced the study of assimilation since its inception, we will also draw on other disciplines to explore various topics associated with educational attainment, economic mobility, social incorporation, political incorporation, family formation, and ethno-racial identification. Students will be evaluated on the basis of their engagement with weekly readings, as revealed by the quality of their participation in discussions and their written response to weekly essay questions. Students will also be required to write a paper on a topic of their choosing. This paper may be a research proposal, a literature review or a research study. The course will be offered every other year. It may serve as an elective in Sociology and the Dual-Title Graduate Degree Program in Demography as a core seminar on demographic processes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 526 (H P A 526) Health Disparities (3)** This course provides an overview of social factors that lead to demographic disparities in health.

**SOC (H P A) 526 Health Disparities (3)**

This course provides a broad exploration of U.S. health disparities. In particular, it examines several types of U.S. health disparities that emerge as a result of individuals' race/ethnicity, socioeconomic status, nativity status and gender. The course focuses on theoretical and methodological strategies for studying health disparities as well as empirical evidence supporting the existence of different health disparities and explanations for understanding and ameliorating them. Students will summarize and discuss weekly readings and apply course materials to understand the state of the field and to carry out an original research project on a particular health disparity that interests them. This course fulfills basic seminar requirements in the Sociology graduate curriculum and serves as a process course for the interdisciplinary Demography dual-title graduate curriculum.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 527 (AFR 527) Migration, Urbanization, and Policy in the Developing World (3)** This course examines the dynamics of migration and urbanization processes, as well as their policy implications, in non-industrialized regions of the world.

**Migration, Urbanization, and Policy in the Developing World (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 528 Homelessness in America (3)** Survey of social science research on homelessness in the contemporary United States.

**SOC 528 Homelessness in America (3)**

The major objective of Sociology 528 is to introduce students to the scholarly literature on homelessness. Although the course emphasizes work by sociologists, contributions from psychology, political science, geography, history, and other disciplines are covered as well. Through reading, lecture, and discussion, students examine what is known about the origins of homelessness, its dimensions, and its consequences. They are encouraged to evaluate critically the methods used to investigate the problem and the evidence generated by those methods. They are also expected to be active producers of knowledge, independently exploring some aspect of homelessness in greater detail than sharing their results in oral and written form. This combination of activities is designed to underscore the relevance of social science research to important policy issues. Once students complete Sociology 528, they should be well prepared to take part in the ongoing public debate over how best to respond to homelessness in the contemporary U.S.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 529 Seminar in Race and Ethnicity (3)** Reviews the status of U.S. racial and ethnic minority groups; analyzes factors influencing inequality and inter-group relations.

**SOC 529 Seminar in Race and Ethnicity (3)**

The seminar opens with a review of the status of central racial and ethnic minority groups in the United States: African Americans, Latinos, Asian Americans, American Indians. Educational and economic status are considered, along with such factors as family structure, geographical location, residential segregation, language, and involvement with the criminal

justice system. Institutional patterns that potentially contribute to observed statuses are reviewed.

Two groups of African Americans receive special attention: the urban "underclass" that sits at the bottom of the socioeconomic ladder and middle class blacks. Consideration of economic stratification by race and ethnicity includes analysis of wealth disparities and the differences in life chances they create. Structural and cultural explanations of economic outcomes are contrasted. Patterns of economic assimilation shown for recent immigrants are outlined, and the notion of "segmented assimilation" is introduced. Economic interdependence among minority groups receives attention. Extensive recent evidence about employment discrimination is reviewed.

The relevance of white Americans' racial attitudes to political opinions and policy outcomes receives attention in readings that focus on policy issues affecting both African Americans and American Indians. Classic and recent frameworks for understanding prejudice and discrimination are introduced. Patterns observed for African American targets are contrasted with those for Latinos and Asian Americans. Research on the outcomes of intergroup contact is reviewed, along with recent "contextual" studies that assess the influence of community characteristics on racial attitudes.

Racial/ethnic identity is put in the spotlight, with attention to African Americans but also American Indians, West Indian immigrants, Latinos, Asian Americans, multiracial groups, and white Americans. "Pan-ethnicity" is considered.

The seminar is designed to familiarize graduate students in sociology and related fields with central information about the evolving status of racial and ethnic minority groups in the U.S., and with theoretical perspectives developed in sociology and other social science disciplines to understand racial/ethnic prejudice, discrimination, and inequality.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 530** Sociology of Family (3) An in-depth introduction to the sociological study of the family.

### **SOC 530 Sociology of Family (3)**

This seminar will cover critical issues or current debates and issues regarding family policy in the United States. Examples of current family policy debates include welfare, class, gender, etc.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 531** (HD FS 531) Family Disorganization: Stress Points in the Contemporary Family (3) Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

### **Family Disorganization: Stress Points in the Contemporary Family (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 532** Global Health and Mortality (3) Major issues in international health from a demographic perspective; special attention to the Global South and to data quality.

### **SOC 532 Global Health and Mortality (3)**

This course provides a broad exploration of the principal health problems of the world's populations, focusing on the health situation in the developing world (also referred to as the "Global South" or the "Two-Thirds World"). In particular, it investigates questions of cross-national and sub-national inequalities in mortality and morbidity (i.e., illness). Specific inquiries into the role of infectious disease, chronic disease, war, and violence are at the center of course readings and analyses. Understanding the historical trends in and theoretical perspectives on health and mortality will help students link particular epidemiological and demographic phenomena to broader cultural questions. Students will complete data quality assessment and measurement exercises in service of the course aim of training students to produce original, relevant, and high-quality research on global population issues.

This course has an interdisciplinary focus. It considers research from demography, sociology, public health, epidemiology, and medical anthropology and builds an awareness of population processes, especially in relation to the analysis and

measurement of health dynamics from a population perspective. Research contributions require students to apply traditional demographic techniques to the global population phenomena of their choosing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 533** Sociology of Religion Seminar (3) A survey of the sociology of religion designed to help students conduct and critique social science research.

### **Sociology of Religion Seminar (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 534** (EDTHP 534, SOC 534) Childhood and Education in Sociological and International Comparative Perspective (3) The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in the process.

### **Childhood and Education in Sociological and International Comparative Perspective (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 535** Sociology of Aging (3) Current research and methodological issues in the sociological study of aging.

### **Sociology of Aging (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 537** (HD FS 537) Biosocial Perspectives on the Family (3) The implications of knowledge from behavioral endocrinology, behavior genetics, and evolutionary psychology for understanding family relationships and child development.

### **SOC (HD FS) 537 Biosocial Perspectives on the Family (3)**

Breakthroughs in the way biological variables are measured and modeled have generated new findings that greatly increase our understanding of the reciprocal influences between family relationships, child development, and biological factors. Specifically, advances in the study of hormones, genetics, evolution, pharmacology, and immunology have led to important advances in our knowledge of gender, becoming a parent, early child development, middle child, and adolescent development, parent-child relations, courtship and mate selection, quality of intimate relations, separation and divorce, incest, and dominance and family violence.

Students are required to keep a journal of researchable ideas during the first five weeks of class. The purpose is to give students practice in identifying research needs and opportunities. The journal should include 4-6 research problems, each developed in 2-3 typed pages. The majority of each entry should be a clear statement of what knowledge gains would be realized by conducting the study and why they are important. The remainder of the statement should include consideration of the data you would use, measures of major variables, and analytic strategies. Think of it as a brief portfolio of thesis, dissertation, or research publication ideas.

Entries on research projects in which you are already involved are not eligible for inclusion in the journal. On the last page of the journal, indicate which problem you would like to develop into a more detailed proposal during the remainder of the

semester and why. Turn in the journal during week 5. I will evaluate your entries and comment on your selection idea. The rest of the semester will be spent on developing one of the ideas to a full-blown proposal (about 20 pages). You should turn in as many drafts as needed to receive a good grade for this segment of the course. I expect you to turn in three or more before the end of the semester. We will meet about each draft and go over my comments. Proposal drafts should be spaced out over the semester.

The last week of the semester will be devoted to presentations of research proposals after which class members will offer comments and suggestions. Your grade will be based on the proposal draft you turn in the last week of the class. Twenty-one percent of the course grade is based on the research proposal.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 538 (EDTHP 538) Sociology of Education (3)** Provides students with an overview of dominant sociological theoretical perspectives on schools, schooling, and education in modern society.

### **SOC (EDTHP) 538 Sociology of Education (3)**

This graduate course in the Sociology of Education covers the major sociological theories and empirical research on the role of formal education in society. The object of the course is to have the student become conversant with the main lines of sociological research applied to education and social development at the individual, community, and societal levels. Since sociology of education has had considerable impact on educational policy over the past 50 years, a second goal of the course is to understand this relationship and avenues for future research and policy analysis from a sociological perspective. This course is a central topic in the general study of social stratification and hence in pursuit of the Ph.D. in the Educational Theory and Policy and the Sociology program. The format of the course is a didactic seminar with extensive written assignments as the usual form of evaluation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 544 Current Issues in Complex Organizations (3)** Critical survey of recent developments in sociological study of organizations and the theory of bureaucracy, including reciprocal effects on environments.

### **Current Issues in Complex Organizations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 546 Seminar in Political Sociology (3)** Analysis of issues and problems in political sociology. Topical emphasis varies.

### **Seminar in Political Sociology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 551 Social Stratification and Social Change (3)** Origin and development of stratification systems and inequality among and within societies; social mobility; change in stratification systems.

### **Social Stratification and Social Change (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 553** (CI ED 553, EDTHP 553, HI ED 553) Education Mobility in Comparative Perspective (3) Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, South America.

**SOC (CI ED, EDTHP, HI ED) 553 Educational Mobility in Comparative Perspective (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 557** (EDTHP 557, HI ED 557) Sociology of Higher Education (3) Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis.

**SOC (EDTHP, HI ED) 557 Sociology of Higher Education (3)**

Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 560** Urban Sociology (3) Examination of the structure and dynamics of North American cities and of residents' experiences in such settings.

**SOC 560 Urban Sociology (3)**

The major objective of Sociology 560 (formerly 597F) is to survey the field of urban sociology, providing graduate students with a solid grounding in the literature on North American cities. The course heavily emphasizes recent writings by sociologists. However, the historical development and continuity of the major questions that have guided urban research receive more than passing attention, as do the contributions of geographers, psychologists, and others outside the discipline. A broad range of theoretical perspectives, substantive topics, and methodological strategies are through reading, lecture, and discussion. Students are expected to be active, critical consumers of urban knowledge but also producers of it: they must independently formulate and address a research problem then share their results with their classmates. Once students complete Sociology 560, they should be ready to enroll in more specialized urban seminars and to teach urban sociology at the undergraduate level.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 573** Demographic Techniques (3) Models and measures of vital processes (fertility, mortality, migration) and their



effects on growth and age structure of human populations.

### **Demographic Techniques (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 574** Statistical Methods for Social Research (3) Basic concepts of statistics; linear regression; computer software; analysis of social surveys; causal inferences from nonexperimental data.

### **Statistical Methods for Social Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 575** Statistical Models for Nonexperimental Research (3) Causal models for quantitative and qualitative data; path analysis and structural equations; logistic regression; duration models.

### **Statistical Models for Nonexperimental Research (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 576** Applied Mathematical Demography (3) Survey of mathematical models used in the study of population: models of growth, survivorship, fertility, migration, stability, kinship, projection.

### **Applied Mathematical Demography (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 577** Techniques of Event History Modeling (3) Survival analysis theory and methods for discrete dependent variables.

### **Techniques of Event History Modeling (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 578** Multilevel Regression Models (3) Covers multilevel regression models for the analysis of nested or hierarchical data, including both contextual and longitudinal applications.

### **SOC 578 Multilevel Regression Models (3)**

This course is devoted to statistical models for regression analysis of multilevel data. Multilevel data arise when cases are sampled at two or more levels, with each lower level subsumed within the next higher, such as residents within neighborhoods within cities or individuals within families. Such data almost always violate the independence assumption of ordinary least squares regression, and in recent years a wealth of more appropriate techniques have become available. These methods bring the full flexibility of multiple regression analysis to the analysis of multilevel data, enabling scholars to address a broad range of research questions. This course thoroughly covers the basic multilevel regression model and also devotes considerable time to more advanced topics such as analysis of data with three or more levels, multilevel analysis of discrete dependent variables, and latent variables. Students will study examples in a broad range of

substantive domains, with special attention to the unique research questions to which these methods give access. This is a course in the application of statistics to social science research, not a theoretical statistics course. Therefore the course will not include derivations and proofs, but rather the mathematics covered will be in the service of defining statistical models that correspond to useful research questions. The emphasis will be on understanding how to use these methods to do good research and on learning to interpret the results they provide. Several class sessions will be held in computer laboratories in order to train students in the use of statistical software that implements these methods.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 579 (ANTH 579) Spatial Demography (3)** This graduate course will expose students to spatial analysis tools and analytical methods applied to demographic research.

### **SOC (ANTH) 579 Spatial Demography (3)**

The improved application of spatial data and methods to demographic research is a critical methodological challenge facing demographers today. This graduate seminar is designed to focus on substantive demographic research topics while exposing sociologists and demographers to challenges in, and opportunities for, using geographic information systems (GIS), spatial analysis, and spatial statistics in their own research. Substantive foci will include readings and discussions of spatial perspectives on topics such as racial/ethnic segregation, spatial mismatch/entrapment, poverty, crime/delinquency, migration, health inequalities, wellbeing, maternal and child health, environmental justice, and population and environment relations. Similarly, the seminar will highlight connections between spatial concepts and data availability (e.g., Modifiable Areal Unit Problem - MAUP; data privacy), other emerging methodological approaches to studying society (e.g., contextual modeling, multi-level modeling and the area of neighborhood effects) as well as the integration of different types of data (e.g. qualitative data and quantitative data). Throughout the course lectures and discussions will be complemented with lab sessions introducing spatial analysis methods and GIS and spatial analysis software. The lab sessions will include the use of among other software GeoDa, CrimeStat, R, and ArcGIS (including Geostatistical Analyst and Spatial Analyst extensions). These lab sessions will introduce many methodological and technical issues relevant to spatial analysis (e.g., error, data validation, data integration, cartography, exploratory spatial data analysis, spatial regression modeling, geographically weighted regression, point pattern analysis and geostatistics). Assignments for the courses include up to two writing assignments, up to four lab assignments, and a final project which will be presented as a short 15-minute presentation as well as submitted as a term paper. The writing assignments will include an annotated bibliography/brief literature review within a selected demographic theme area and a profile of a well-known demographer and their adoption of spatial thinking/perspectives/methods. The lab assignments will focus on building geospatial databases, basic spatial analysis, exploratory spatial data analysis, and spatial regression modeling. The courses will include other labs and assignments that will be completed for no grade; these are intended as mechanisms/opportunities for developing and enhancing familiarity with selected software, data resources, and analytic methods.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 584 (PSY 584) Attitude Formation and Change (3)** Theory and method in research on attitude formation and change with emphasis on critical analysis.

### **Attitude Formation and Change (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 590 Colloquium (1-3)** Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 591 (CLJ 591) Teaching Sociology/Crime, Law, and Justice (1)** Preparation for teaching sociology and/or crime, law, and justice at the college level.

**SOC (CLJ) 591 Teaching Sociology/Crime, Law, and Justice (1)**

The primary goal of this course is to prepare students to teach sociology/crime, law, and justice at the college level. This task is addressed through four sub-goals focusing on (1) developing an understanding of the student-teacher relationship, (2) understanding the structure of higher education as an institution, (3) introducing some of the basic issues in the presentation of sociology/crime, law, and justice as content, and (4) providing an introduction to alternative means of evaluating and improving one's own teaching.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2000

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 592 Writing for Publication in the Social Sciences (3)** Systematic, collective review of unpublished student manuscripts with an eye toward revision for publication.

**SOC 592 Writing for Publication in the Social Sciences (3)**

The overarching goal of the course is to prepare relatively advanced Ph.D. students to write effective journal articles, books, and grant proposals. The course emphasizes learning by doing. We begin by writing reviews of anonymous manuscripts that have been submitted to journals for possible publication. We ask four key questions about each article: What do we like about the manuscript (strengths)? What do we dislike (weaknesses)? What suggestions do we have - substantive and stylistic - for revising the manuscript? Is it published? Class discussion is organized around those questions. Then we use the same format and tools to critique unpublished student manuscripts. We discuss each manuscript with a view to answering the question of how the manuscript needs to be revised to make it publishable. Finally we read key articles on the differences between journal writing, book writing, and the writing of grant proposals. Again students are given hands-on experience by reviewing book prospectuses and grant proposals. The course is designed to be a core course in the Sociology Department's Professional Development Module for Ph.D. students. The specific goals of the course are: A publishable paper - or at least concrete suggestions for how to make a student manuscript publishable, or book precis competitive, grant proposal fundable. A better understanding of how the review process works - what happens after you submit your paper, precis, or research proposal; what to expect from the editor's decision letter. A better understanding of what editors and reviewers are looking for in a journal manuscript, book precis, or grant proposal, and a better understanding of how to respond to reviewers' criticisms when you are invited to resubmit a manuscript or grant proposal. Good reviewing skills - what a good review looks like, and how to go about writing one. An expansion of students' intellectual horizons through exposure to different substantive areas, methodologies, and styles of work. Students will be evaluated on the basis of their written reviews due each week. The course will be offered at least twice every three years. Course enrollment should be limited to 12, to enable full in-class discussion of each student's manuscript.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 595A (PL SC 595A) Survey Research Practicum (1-6 per semester/maximum of 6)** Practicum in Survey Research data collection or management.

**Survey Research Practicum (1-6 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 596 Individual Studies (1-9)** Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597A** Demography of Aging (3) This course focuses on the demographic aspects of health and aging and integrates social and biological approaches to population aging.

### **Demography of Aging (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597B** Social Movements (3) Overview of International research on social movements dynamics. Particular attention to Mobilization, Framing and Political Opportunity processes.

### **Social Movements (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597C** Causal Analysis (3) The concept of causality in the social sciences. Models for estimating causal effects in social research.

### **Causal Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597D** Social Networks (3) Social network research methods and perspectives that focus on sets of actors and the patterns of social ties among them.

### **Social Networks (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597E** (CLJ 597E) Sentencing and Corrections (3) The course takes a sociological and criminological view of sentencing

and corrections, through classic and contemporary theory and empirical research.

### **Sentencing and Corrections (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 597F** Advanced SEM Methods (3) This is an advanced course on measurement and modeling in the social sciences using modern structural equation models and methods.

### **Advanced SEM Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 601** Ph.D. Dissertation Full-Time (0) No description.

### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Students will teach introductory level courses as required by staffing and students' needs.

### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

### **Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Software Engineering (SWENG)**

**SWENG 400** Introduction to Software Engineering Studio (3) Provides an introduction to the principles of software engineering and includes complementary instruction in one programming language.

**Introduction to Software Engineering Studio (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1999  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 411** Software Engineering (3) Software engineering principles including life cycle, dependability, process modeling, project management, requires specification, design analysis, implementation, testing, and maintenance.

**SWENG 411 Software Engineering (3)**

This is an introductory course in software engineering, addressing the software development process, including aspects such as software requirements documentation, design specification, implementation, system integration, testing, and maintenance by individuals and teams. Topics include software process modeling, requirements elicitation and documentation, software architecture design and analysis, detailed design and programming, graphical user interface (GUI's) design and prototyping, software quality assessment, software testing, software maintenance and evolution management, personal and team-based development. In lab students gain practical experience by completing programming assignments and utilizing computer-aided software engineering (CASE) tools for their personal projects tailored to each stage of the software life cycle. A semester long team-based project is required that reinforces teamwork fundamentals and the concepts covered in lecture. The projects and assignments provide an opportunity for student teamwork, document writing, and oral presentations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:  
 Concurrent: SWENG 311

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 421** Software Architecture (3) The analysis and design of software systems using canonical design patterns.

**SWENG 421 Software Architecture (3)**

This course introduces the frequently-used software infrastructures in software development by experienced engineers. The formal UML notations are utilized to design software architecture and help communicate the design visually.

Students will learn the real practice of architectural styles, design patterns and design reuse. As to certain complex problems, alternative architectures will be proposed and their design trade offs will be evaluated. For instance, students compare two-tier with three-tier client/server architectures for distributed systems, and employ multi-process and

multi-thread concurrent architectures for high performance computation systems. Moreover, students learn to conduct high level quality analysis from the design artifacts. The quality evaluation will focus on a number of attributes, including reusability, extendibility and performance.

A great deal of effort is placed on the major categories of design types containing dozens of separate design patterns. Students first review the most fundamental design patterns. Afterwards, they apply creational patterns to effectively create objects, partitioning patterns to categorize objects, structural patterns to allocate objects, behavioral patterns to interface the communication between objects, and concurrent patterns to handle tasks simultaneously. These skills will enable students to extend their own knowledge after graduation by giving them the skills to learn new patterns on their own.

Finally, students will integrate their programs with native code applications to enlarge the application domains. To achieve best reusability, they also learn modular designs to develop component-based software. These help them meet today's software needs of cross applications and architectures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 431** Software Verification, Validation, and Testing (3) Introduction to methods of software verification, validation, and testing; mathematical foundations of testing, reliability models; statistical testing.

### **SWENG 431 Software Verification, Validation, and Testing (3)**

Provides a background necessary for verification, validation, and testing of software systems. Verification addresses the question: "are we building the product right?" In other words, does the product meet the engineering specifications? Validation addresses whether the right product is being built and if it meets the design requirements. The testing aspect of the course addresses many of the methods available to test software systems. The levels of testing explored are 1) unit level (each module is tested independently), 2) integration testing (where the modules are integrated together and tested as a complete system), and 3) acceptance testing (the testing requirements of the users). Following this, specific test methodologies are addressed. By the end of this course the student should also be able to develop an appropriate test plan.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 452W** Embedded Real Time Systems (3) The design and implementation of real time systems.

### **SWENG 452W Embedded Real Time Systems (3)**

Real time operating systems is the study of hardware/software systems in which timing constraints must be met for correctness. Real time systems are embedded in applications ranging from the antilock brakes in cars to the flight control systems for jetliners. Students are first introduced to the concept of systems with real time constraints by examining case studies. The unified modeling languages (UML) with real time extension is introduced allowing students to capture the constraints present in the systems in a variety of models allowing the problem to be described at several levels of abstraction. Tasks and messages are introduced as programming structures which can satisfy the constraints described by the UML models. With a basic understanding of real time systems and how to implement them, the focus of the course shifts away from these technical concerns towards understanding the documentation of the requirements using the Volere Requirements Specification template. All the writing assignments in the class will revolve around Volere in one way or another. Increasingly complex case studies will give the class the opportunity to explore more sophisticated inter-task communications mechanisms as well as common pitfalls present in RTOS applications. Students will learn how to verify the correctness of their applications in order to guarantee that the real time constraints can be met when the system is deployed. Discussion will turn to application programmer interfaces used by hardware vendors to port hardware into a RTOS. The class will end by designing and building a complex RTOS by a team of students using the techniques learned in the class. The project will outline the needs of the RTOS application in a project proposal using the Volere template. The proposal will be developed iteratively with the faculty member until its scope and definition are clear. This proposal will be developed into a complete requirement specification including a time-line and identification of development benchmarks. This system resulting from the development will be documented in the final report write-up.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 465 Web Services (3)** This course introduces the students to a contemporary computing paradigm called "service-oriented computing."

**SWENG 465 Web Services (3)**

This course focuses on a new computing paradigm called "service-oriented computing", which has been greatly impacting a wide array of software systems. It covers "service-oriented architecture." Students will not only gain an in-depth understanding of the concepts and technical issues underpinning Web services, but also gain hands-on experience of the development of software systems built upon Web services.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 480 Software Engineering Design (3)** Concepts of engineering ethics, economy, and project management, senior capstone project selection, and technical communication skills.

**SWENG 480 Software Engineering Design (3)**

This course prepares senior software engineering students for industrial engineering design and project management. It covers the engineering design process, project planning and evaluation, engineering ethics, and engineering economy. In addition, students select, specify, and start their capstone design project, which is completed, in the follow-up course, SWENG 481. Students are expected to carry out a group design project that is on par with industrial expectations. Upon completion of this course a student should have a solid understanding of the engineering design process, a clear capstone project description, should have completed some preliminary design work, and be adequately prepared to complete the project in SWENG 481.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 481 Software Engineering Project (3)** Capstone group design projects in software engineering.

**SWENG 481 Software Design Projects (3)**

In this course students complete their group senior design project started in SWENG 480. Design groups meet regularly with a faculty advisor to report progress and resolve technical issues. Oral and written progress reports are expected at selected times. The class culminates with a final technical defense of the project.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**



General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 497A** Special Topics: Software Integration (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics: Software Integration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 497B** Special Topics: Software Documentation (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics: Software Documentation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 497C** Special Topics: Domain Specific Languages (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

#### **Special Topics: Domain Specific Languages (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 500** Software Engineering Studio (3) The 500-level studio provides an opportunity for students to undertake a substantial software project.

### **Software Engineering Studio (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 505** Software Project Management (3) Analysis and construction of project plans for the development of complex software products; how to manage change and cost control.

### **Software Project Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 510** Secure Software Engineering (3) This course provides a foundation in software engineering techniques for developing secure software systems.

### **Secure Software Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 537** Software System Design (3) Best practices in the requirements, analysis, and design of large software systems including the Unified Modeling language and the Unified Process.

### **Software System Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 541** Advanced Database Design Concepts (3) Practical benefits of a Database Management System; three-stage process to create and implement a relational database to meet defined requirements.

### **Advanced Database Design Concepts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 545** Data Mining (3) Practical benefits of data mining will be presented; data warehousing, data cubes, and

underlying algorithms used by data mining software.

### **Data Mining (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 552 Bioinformatics (3)** Introduction to information processing problems in computational biology and a unified treatment of machine learning methods for solving these problems.

### **SWENG 552 Bioinformatics (3)**

The practical aspects of bioinformatics will be presented. There is an introduction into machine learning algorithms with emphasis on dynamic programming, gradient descent, Markov chain Monte-Carlo methods, evolutionary and genetic algorithms. Neural networks and hidden Markov models with application to DNA and RNA nucleotide sequencing, prediction of protein secondary structures, and gene finders illustrate the application of machine learning methodology. Time permitting, probabilistic models of evolution or phylogenetic trees will be covered.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 560 Web Based Systems (3)** Autonomous intelligent software agent mechanisms, Java's database connectivity, and the emerging architectures for the development of Web based information systems.

### **Web Based Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 568 Enterprise Integration (3)** Advances in design, development, and deployment of control and management software for enterprise and production information systems.

### **Enterprise Integration (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 569 Service Oriented Architecture (3)** The principles of service oriented architecture; modeling, design and implementation of services; mapping business processes to services.

### **SWENG 569 Service Oriented Architecture (3)**

Service-Oriented Architecture (SOA) is a design principle for guiding the design, development, deployment, and sustaining of flexible and agile IT solutions. SOA has become increasingly viable because of the widespread adoption of Web services technology that makes creating SOA practical and cost effective. SOA essentially makes IT agile, interoperable, and more responsive.

This course is structured to be appropriate for graduate students in software or systems engineering, or information science. Many of the topics covered in this course may be applied to a wide variety of research areas. Usually this course would cover the following topics: 1) Model, design, and implement SOA; 2) Create agile and reusable SOA; 3) Automate business processes by mapping to the architectural model; 4) Orchestrate services and execute processes with the Business Process Execution Language (BPEL); 5) Achieve interoperability within SOA using proven design patterns and/or best practices; and 6) Implement loosely coupled services using WSDL-first techniques.

Students will be evaluated on their understanding of the course material by completing one examination (20%), weekly assignments (40%), and an individual project with presentation (40%).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 580** Advanced Software Engineering (3) Description of tools and techniques in the software development lifecycle; Mitigation and managing time-to-market and quality of large software systems.

### **Advanced Software Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 581** Software Testing (3) This course provides a rigorous formal framework and practical information on this the testing of software throughout its life cycle.

### **SWENG 581 Software Testing (3)**

This course provides a rigorous formal framework and practical information on the testing of software throughout its life cycle. Emphasis will be placed on software testing activities throughout the software lifecycle, testing of object-oriented and non-object-oriented software, and on formal methodologies for software testing. Documentation of software testing activities will also be covered.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 582** Real-Time Software Design and Analysis (3) A holistic, systems-based approach to design and analysis of real-time systems; design and implementation of a small real-time system.

### **Real-Time Software Design and Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 584** Genetic Algorithms (3) Application of genetic algorithms to problems in engineering and science including combinatorial optimization, multi-criteria optimization, biology, chemistry, and neural networks.

### **Genetic Algorithms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 585** Pattern Oriented Design (3) This class examines well-known heuristics, principles and patterns in the design and construction of reusable frameworks, packages and components.

### **SWENG 585 Pattern Oriented Design (3)**

This course studies the heuristics, principles and patterns of object-oriented design in the construction of extendable frameworks, reusable packages and pluggable components. Topics covered include Riel's object-oriented design heuristics, Martin's principles of class and package design, the "Gang of Four" design pattern catalog, refactoring and

framework evolution.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 586** Requirements Engineering (3) Theory and applications of requirements elicitation, analysis, modeling, validation, testing, and writing for hardware and software systems.

### **SWENG 586 Requirements Engineering (3)**

This course is a thorough treatment of the theoretical and practical aspects of discovering, analyzing, modeling, validating, testing and writing requirements for systems of all kinds, with an intentional focus on software-intensive systems. The course will bring to bear a variety of formal methods, social models, and modern requirements writing tools (e.g., the UML) to be useful to the theorist and practicing engineer.

Students will be led through a series of weekly activities that culminate in the delivery of a complete software requirements specification project for a hardware/software system (first in draft, then in final form). The project is broken down into four subprojects, Requirements Elicitation, Requirements Analysis and Representation, Requirements Validation and Testing, and Final Requirements Documentation, each of which counts 25% toward the final grade.

The course can be used as an elective in the Master of Software Engineering (M SE) program and, it is a required course in the online Systems Engineering (M.Eng.) program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 587** Software Systems Architecture (3) Software systems architecture; architectural design principles/patterns; documentation/evaluation of software architectures; reuse of architectural assets through frameworks/software product lines.

### **SWENG 587 Software Systems Architecture (3)**

Architecture is an abstract view of a software system distinct from the details of how such a system is implemented. A robust architecture is key to developing software systems that meet quality expectations (such as performance, scalability, availability, maintainability, etc.) of their stakeholders. This course introduces basic concepts of software architecture, architectural design principles, and patterns. Students also learn how to document and evaluate software architectures, and reuse architectural assets through software product lines.

This course is structured to be appropriate for graduate students in software or systems engineering. Many of the topics covered in this course may be applied to a wide variety of research areas.

Students will be evaluated on their understanding of the course material by completing one examination (25%), weekly assignments (35%), and an individual project with presentation (40%).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 588** Program Understanding (3) Techniques for the analysis and visualization of large software systems to assess the quality of the design and architecture.

### **SWENG 588 Program Understanding (3)**

It is a general observation that software engineers learn about software design, programming languages, paradigms, patterns and tools, and are expected to produce high quality designs and code, often without ever having seen good examples. This approach is akin to teaching students the syntax of the English language and writing techniques and then expecting them to become expert writers without ever having read great literary works. The course in Program Understanding seeks to educate graduate software engineering students beyond their understanding of code syntax and best construction practices with analytical evaluation of "great works" of software code. This approach includes manual code reading, the use of visualization techniques, and automated approaches to assessment of design and code quality.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 594A** Masters Research Paper (3) Supervised student activities on research projects identified on an individual or small-group basis.

**Masters Research Paper (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SWENG 826** Applied Human-Computer Interaction (3) Evaluate and design interactive products that support how people

work and communicate from both a theoretical and practical perspective.

### **SWENG 826 Applied Human-Computer Interaction (3)**

This course introduces the student to the broad area of human-computer interaction. Emphasis is placed on applying theories and techniques to the evaluation and design of software-based products that are both useful and usable. Students will gain an understanding of these concepts primarily by analyzing existing interfaces and developing prototypes. Students will be exposed to the challenges of usability testing through review of published studies and by developing a usability study design.

#### Objectives:

The course objectives are for Information Science professionals and software engineers to:

1. Identify examples of positive and negative user experiences in both everyday life and the work environment
2. Gain an overview of HCI theories, principles, and guidelines
3. Learn how to design for usability
4. Learn how to incorporate usability design into the software development process
5. Use usability principles to evaluate and compare software-based products
6. Learn how to effectively test for usability

Performance will be evaluated through projects where students will apply what they have learned to design and evaluation problems.

It is anticipated that this course will be offered once every year with expected enrollment of 20 students per offering.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Soil Science (SOILS)**

**SOILS 401** Soil Composition and Physical Properties (3) Advanced study of mineralogical and physical properties of soils which affect soil-plant-water relationships.

### **Soil Composition and Physical Properties (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 402** Soil Nutrient Behavior and Management (3) Chemical and biological behavior of soil nutrients; management for plant availability and fate in the environment. Laboratory emphasizes soil testing and soil-plant relationships.

### **SOILS 402 Soil Nutrient Behavior and Management (3)**

Soil Nutrient Behavior and Management is a senior/graduate level course that covers the chemical and biological processes that determine the behavior of essential plant nutrients in soils. As this understanding of basic nutrient behavior is developed in the course, it is applied directly to explain the basis for management of nutrients for optimum plant availability. This same nutrient behavior is linked to the fate of nutrients either applied as sources of plant nutrition or through disposal of nutrient containing materials on soils, which is a major environmental issue. Management practices necessary to minimize environmental impacts from nutrients are also covered. From this background students will be able to understand nutrient behavior and management recommendations and adapt management to a variety of soil-plant systems and situations both for plant growth and environmental protection. Real world examples of developing and adapting management systems are used to illustrate this process. The laboratory exposes the student to common soil testing procedures, methods for studying soil nutrient-plant interactions, and examples of practical application of management practices in the field. Evaluation will be based on 3 exams, laboratory reports, homework assignments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 403** Soil Morphology Practicum (2 per semester/maximum of 4) Students develop field skills to describe soil morphology, classify soils, and make land use interpretations.

**SOILS 403 Soil Morphology Practicum (2 per semester/maximum of 4)**

SOILS 403 is an eight week course that provides students with the opportunity to: make detailed soil morphological descriptions and interpretations; evaluate soil properties and their suitability for different land uses; and observe various soils throughout the Northeastern U.S. SOILS 403 synthesizes techniques used to describe soil morphology and site characteristics, classify soils, and make land use interpretations. The field skills taught are highly applicable to those pursuing careers in fields of environmental studies, engineering, waste disposal, horticulture, landscape architecture, agricultural, forestry, consulting, and by those describing soils for research. Students also have the opportunity to try out for the Penn State Undergraduate Collegiate Soil Judging Team each fall.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 404** Urban Soils (3) This course introduces the student to natural and human-influenced soils.

**SOILS 404 Urban Soils (3)**

This course introduces the student to the management of soils in urban and suburban settings via comparisons in soil physical, chemical, and biological properties. The soil is also examined as the interface between the biotic and abiotic components of an urban site. Therefore, site management of soil during or following placement is examined in detail. Urban soil physical and chemical properties are discussed in terms of site stability. The interactions between stormwater management, erosion control, soil mechanics, and the soil's ability to support vegetation are examined in the context of sustaining urban environments. The soil design process is presented: site assessment, biophysical analysis, profile construction, specification formulations, and conformance testing and inspection protocols. Professional practical examples such as mine reclamation, brown field restoration, and landscape construction are presented to illustrate the process. The student completes a series of exercises to gain experience in soil examination, soil/land use interpretation, site assessment, soil erosion calculations and a group assignment that evaluates soil issues on a reclamation or construction project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 405 (GEOSC 405)** Hydropedology (3) Soil and water interactions across scales, integrated studies of landscape-soil-water relationships, fundamental processes of water flow and chemical transport.

**SOILS (GEOSC) 405 Hydropedology (3)**

Hydropedology is the study of the fluxes, storages, pathways, residence times, and spatio-temporal organization of water in the root and deep vadose zones, and their relations to climate, ecosystem, land use, and contaminant fate. The aim is to characterize integrated physical, chemical, and biological processes of soil-water interactions across scales (including chemicals and energy transported by water flow). This course embraces interdisciplinary and multiscale studies of interactive pedological and hydrological processes in the earth's surface and subsurface environments. The course will address the fundamental issues and practical applications of hydropedology (as a sister discipline of hydrogeology). This course emphasizes *in situ* soils that have distinct characteristics of pedogenic features, structures, layers, and soil-landscape relationships in the real world. Students will gain an in-depth understanding of soil and water interactions across scales from point observations to watershed phenomena, and will gain skills in predicting flow pathways and water fluxes in the landscape. This course promotes active learning, critical thinking, and hands-on skills. Course format will consist of two lectures and one laboratory/field exercise each week. The course will utilize a network of local watersheds with different land uses for demonstrations and class projects. Grading will be based on weekly lab/field exercise (20%), class research project (40%), homework (10%), one midterm exams (15%), and one final exam (15%). Since hydropedology is linked to a wide array of environmental, ecological, geological, agricultural, and natural resource issues of societal importance, SOILS (GEOSC) 405 will support interdisciplinary training of students in Soil Science as well as in other disciplines of the College of Agricultural Sciences, especially Agricultural and Biological Engineering, Agronomy, and Forest Resources. Students in the College of Earth and Mineral Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Program in Ecology also will find this course useful when undertaking research on the vadose zone, the hydrologic cycle, and the earth system.

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 412W** Soil Ecology (3) Introduction to soil organisms; includes interactions between organisms, their processes, and metabolism with a major focus on microorganisms.

### **Soil Ecology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 416** Soil Genesis, Classification, and Mapping (4) Lecture and laboratory course on the genesis of soils, their classification, mapping, and interpretation for land use.

### **SOILS 416 Soil Genesis and Classification (3)**

The study of soil genesis, classification, and mapping examines the evolution of soils, their organization into natural units, and their distribution throughout the world. Physical, chemical, and morphological soil characteristics are studied both in the field and classroom and then used to classify soils. These classification units are in turn used to study the processes that influence soil development. Students acquire a detailed knowledge of the technical terminology of soil genesis and develop observational and analysis skills needed to describe and/or interpret soil morphologies in the context of the landscape a profile is found in. Students learn to recognize and explain soil genetic pathways due to current or past soil forming periods (as affected by climate change for example). Students also evaluate the effect of soil genesis on land use and management decisions, learn how to map soils at multiple scales, and deliver soil mapping information.

The course is comprised of weekly lectures and a laboratory. Exercises in the field and laboratory are designed to further develop a student's ability to ascertain a natural soil's origin using the five soil forming factors. Field skills that will be refined over the course of the semester include profile description, site description, soil mapping, and measurement and characterization of soil physical and chemical properties.

Upon completion of SOILS 416, students will demonstrate: 1) deep understanding of fundamental soil processes that result in the genesis of soils around the world; 2) familiarity with soil analytical and testing protocols for common laboratory and field measurements used in studying the genesis of soils; 3) skills for interpreting soil profiles from the soil orders of the world; 4) accurate prediction of soil genesis pathways for a given landform; 5) the ability to interpret soil profile physical and chemical data, classify a soil according to US Soil Taxonomy, map soils to an order 1 level, and be able to apply soil profile information as gathered from the US Soil Survey program to make land use interpretations.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 418** (AGECO 418, AN SC 418) Nutrient Management in Agricultural Systems (3) Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices.

### **SOILS (AGECO/AN SC) 418 Nutrient Management in Agricultural Systems (3)**

Nutrient Management in Agricultural Systems is a senior level course that applies the fundamentals of animal and plant sciences to the concept of a nation-wide food animal system. The regional concentration and consolidation of animal production enterprises has resulted in important economic savings for consumers. But these changes have also had some detrimental impacts on the environment. For example, some nutrients such as calcium and phosphorus and certain trace elements are mined, while others such as nitrogen and potassium are derived from crop production systems. In all cases, the nutrients are transported to areas of livestock concentration. A small portion of the nutrients leave the farm in the form of animal products, while 60 to 70% of the nutrients are excreted and applied to nearby crop land. The environmental implications of the net influx of these nutrients to livestock producing communities have only recently been recognized. These concepts will provide the background around which regulations are written and sound nutrient management strategies are developed and implemented.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 419 (GEOSC 418) Soil Environmental Chemistry (3)** Introduction to chemical constituents and processes occurring in soils. Topics include mineral weathering, soil solution chemistry and adsorption of solutes.

### **SOILS 419 (GEOSC 418) Soil Environmental Chemistry (3)**

Upon completion of the course, the students will be able to identify the soil components and properties responsible for the chemical reactivity of soils and will know the fundamental chemical processes that occur in soils. The students will also be able to link theoretical concepts to real life environmental problems.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 420 Remediation of Contaminated Soils (3)** Basic principles and technical aspects of remediation of contaminated soils.

### **SOILS 420 Remediation of Contaminated Soils (3)**

Remediation of contaminated soils is an introduction to the basic principles and techniques of remediation. Upon completion of this course, students will be able to determine what type of remediation technology needs to be used in real-world conditions depending upon the chemical nature and extent of contamination and learn about protocols for soil sampling and leach testing. They will learn about regulatory background and many different types of wastes that will be encountered in contaminated soils. Students gain knowledge of various cationic and anionic species of metal contaminants and how best to fix these using chemical fixation and solidification technique, which is an established remediation technology. In addition, they will learn about other established technologies such as on-site and off-site incineration and innovative technologies such as bioremediation, phytoremediation, vacuum extraction, thermal desorption, soil washing, solvent extraction, ex-situ supercritical oxidation, in-situ vitrification etc. They will be able to determine which technology is cost-effective for a particular contaminated soil. Students are evaluated through written testing of their understanding of basic remediation concepts and an oral presentation about a novel remediation technology through literature search. Soils 420 has no laboratory component.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 422 Natural Resources Conservation and Community Sustainability (3)** Conservation, land-use, and community (soil, water, air, plants, animals, and humans) impacting quality of life and sense of place.

### **SOILS 422 Natural Resources Conservation and Community Sustainability (3)**

SOILS 422 provides the student with practical knowledge of community and natural resources conservation. The course covers symbiotic aspects of soil, water, air, plants, animals, and humans and their impact on the community. The course focuses on developing methods for the conservation and sustainable use of resources. This involves understanding the land ethic and developing a sense of place.

Conservation awareness has grown in recent years. Originally, erosion control was the sole reason for conservation planning. Eventually water conservation also became a concern addressed by planning. We have now moved into an era of ecosystem-based planning, where soil health, water and air quality, sustainable communities, and much more are considered in conservation planning. This planning involves both natural and human resources.

SOILS 422 covers understanding, designing, and developing best management practices (BMP's) for addressing resource conservation and maintaining sustainable farmland and communities. Calculating runoff and soil loss are researched and integrated into conservation planning as tools for establishing the need for BMP's.

Resources and technologies are covered, such as soil surveys, geographic information systems (GIS), global positioning systems (GPS), and ground penetrating radar (GPR). Networking and partnerships are also covered to give the student a practical knowledge of the critical nature of teamwork. Additionally, workings and interactions between federal, state, and local organizations and agencies are explored.

Land-use patterns, such as urban and suburban sprawl, mining, logging, and resource utilization are explored. Education is enhanced in the form of a community/sense of place project. This project utilizes classroom knowledge and incorporates student research into a practical plan for developing an appreciation and awareness for ones community.

Throughout the course the various aspects of soil, water, air, plants, animals and humans are woven together to emphasize the importance of all decisions on the ecosystem. After completing SOILS 422, the student will be equipped to make valuable and educated decisions to positively affect the community.

At the end of the course the student will be able to evaluate effects of human activities on the landscape; make sustainable land use decisions; determine the need for, and design best management practices; and develop a sense of place and describe individual roles and responsibilities in the community.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 450** Environmental Geographic Information Systems (3) Use of geographic information systems (GIS) and digital spatial databases to characterize landscapes for environmental assessment and management.

#### **Environmental Geographic Information Systems (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 489** Supervised Experience in College Teaching (1-3) Participate with instructors in teaching an undergraduate soil science course; assist with teaching and evaluation and with development of instructional materials.

#### **Supervised Experience in College Teaching (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 490** (AGRO 490) Colloquium (1) Continuing written and oral presentations developed by students in consultation with the course instructor.

#### **Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 494** Senior Thesis (1-6) Supervised data collection and analysis on a topic of interest to the student culminating in a formal thesis.

#### **Senior Thesis (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 494H** Senior Thesis (1-6) Supervised data collection and analysis on a topic of interest to the student culminating in a formal thesis.

#### **Senior Thesis (1-6)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 497** Special Topics (1-9) Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

#### **Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 502** Soils Properties and Functions (3) Introduction to soil science for graduate students including fundamentals of and applications to plant production and environmental sustainability.

#### **SOILS 502 Soils Properties and Functions (3)**

This course provides an introduction to soil science, emphasizing the three areas of biological, chemical and physical properties of soils. It is intended as an introductory course in soil science for graduate students whose work would benefit from background knowledge of soil science but who have not previously been exposed to the science of soils as an undergraduate.

As a graduate course, the pace of learning will be rapid, and the material covered will be quite comprehensive. The breadth of material is comparable to that covered in an undergraduate introduction to soil science, but with greater depth. The class will incorporate a substantial level of experiential components, including chemical analysis lab practice overview, some labs for gaining insight into physical properties, and field trips to help students gain an appreciation of how soils are influenced by, and also influence, the landscape in which they exist. Landscape visits with guided discussions, research proposal development and analysis, and selected soil management problem analysis provide students opportunities to synthesize classroom and textbook based material. Students will be evaluated based on quizzes, exams and written assignments.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 507** Soil Physics (3-4) Soil physical properties emphasizing water, heat, gas, and ion movement in unsaturated soils. Laboratory included with 4 credits.

### **Soil Physics (3-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 510** Geographic Information System Applications (3) Soil data bases, image processing, and geographic information systems will be used to model and understand land and water resources.

### **Geographic Information System Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 512** Environmental Soil Microbiology (3) Biology and ecology of microorganisms in terrestrial environments; microbiological and molecular analysis methods; microbial processes in carbon and nitrogen cycling.

### **SOILS 512 Environmental Soil Microbiology (3)**

Environmental Soil Microbiology (SOILS 512) examines the major groups of microorganisms and their processes and interactions in terrestrial systems, with an emphasis on carbon and nitrogen cycling. Students will obtain an overview of the biology, ecology, and functions of bacteria, archaea, and fungi in soils, rhizospheres, sediments, and organic wastes. This course is intended for students interested in spatial and temporal distribution and activities of microorganisms in the environment, as well as in appropriate methods for analyzing microbes in environmental samples. Course format will consist of two weekly lectures, each followed by a 25 -min discussion period. Class discussions will include exercises and reviews of recent literature on classical and molecular soil/environmental microbiology. Grading will be based on participation in class discussions (20%), two midterm exams (20 % each), one final take-home exam (20%), and a 10-page research proposal to be presented to the class in late April (20%). SOILS 512 will support interdisciplinary training of graduate students in Soil Science as well as in other disciplines of the College of Agricultural Sciences, especially Plant Pathology, Horticulture, Entomology, and Agricultural and Biological Engineering. Graduate students in the Intercollege Graduate Degree Program in Ecology (IGDPE), College of Earth and Mineral Sciences, Eberly College of Science, and College of Engineering also will find this course useful when undertaking research on systems involving microorganisms (e.g., biogeochemistry, plant or animal systems, or environmental engineering). Course will be offered every other spring semester with an anticipated enrollment of 20 students per class.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 513** Soil Environmental Chemistry (3) Chemical constituents and processes occurring in soils. Discussion of soil components, reactions at the solid-solution interface, and soil chemical processes.

### **Soil Environmental Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**SOILS 516** Soil Genesis (1 per semester, maximum of 4) Field trip to study the genesis, classification, and geomorphology of the major soils of the northeastern United States.

**Soil Genesis (1 per semester, maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 519** Nature of Soil Minerals (3) Constituent minerals of soils: modern methods for identification; relations to soil formation and agricultural practices.

**Nature of Soil Minerals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 571** Ecosystem Nutrient Cycles (3) Ecological theory and applications related to water, carbon, nitrogen, phosphorus, and cation cycling in managed and unmanaged terrestrial ecosystems.

**SOILS 571 Ecosystem Nutrient Cycles (3)**

This course is designed to benefit basic and applied environmental scientists that want to understand how nutrients cycle in terrestrial ecosystems. Students will develop knowledge of the biologically important nutrient cycles in terrestrial ecosystems, including linkages between nutrient cycling and energy (carbon) and water flow. The material covers the major theoretical advances in ecosystem ecology and applications of ecosystem theory to environmental management and problem solving. The water, carbon, nitrogen, phosphorus, and nutrient cation cycles will be covered. For each nutrient, inputs, outputs and internal cycling in plants and soils are discussed. Class time will include a mixture of lectures, discussions of primary literature and case studies, and group projects. Each student will write a paper on a topic related to their research that will be reviewed by student peers. Field and laboratory experiences will expose students to methods used by ecosystem ecologists. Students will complete the class with an understanding of: (1) classic and contemporary theories of nutrient cycling at the ecosystem scale, 2) variability in nutrient cycling among the major unmanaged and managed ecosystem types, 3) ecosystem responses to natural disturbance and human management, and 4) common and cutting-edge methods of ecosystem analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 590** Colloquium (1-3 per semester/maximum of 3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 590** Colloquium (1-3 per semester/maximum of 3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3 per semester/maximum of 3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 597D** Ecosystem Analytical Techniques (3) Advanced quantitative laboratory experimentation course that is designed to give students a deeper understanding of modern analytical instruments and the background theory and principles underlying ecosystem chemical measurements. Upon completion of the course, the students will be well versed in, and able to apply appropriate techniques used to measure the chemical condition of ecosystems such as atmospheric, soil and geologic, aquatic, plant, animal, and insect chemical constituents. Instrumental methods of analysis will include: spectroscopic, chromatographic, spectrometric, electrochemical, and thermal methods for ecosystem measurements.

#### **Ecosystem Analytical Techniques (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 597E** Ecosystem Lab Quality Control (3) This course gives an overview of the necessary actions to be taken to make sure that ecosystem analytical data of known quality objectives are obtained. The data quality objectives covered in the course include accuracy, bias, trueness, recovery, precision, sensitivity, instrument and method detection limits, decision limits, calibration lower range limits, homogeneity of variance and linearity tests, selectivity specificity, measureability, reliability, validity, timeliness and control charts. Implementing a quality control program is one of the requirements to be in compliance with the U.S. Environmental Protection Agency's Good Laboratory Practice Standards (GLPS).

#### **Ecosystem Lab Quality Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 597E** Ecosystem Lab Quality Control (3) This course gives an overview of the necessary actions to be taken to make sure that ecosystem analytical data of known quality objectives are obtained. The data quality objectives covered in the course include accuracy, bias, trueness, recovery, precision, sensitivity, instrument and method detection limits, decision limits, calibration lower range limits, homogeneity of variance and linearity tests, selectivity specificity, measureability, reliability, validity, timeliness and control charts. Implementing a quality control program is one of the requirements to be in compliance with the U.S. Environmental Protection Agency's Good Laboratory Practice Standards (GLPS).

#### **Ecosystem Lab Quality Control (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 600** THESIS RESEARCH (1-15) NO DESCRIPTION.

**THESIS RESEARCH (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 601** PH.D. DISSERTATION FULL-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION FULL-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 602** SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6) GRADUATE STUDENT INVOLVEMENT IN PREPARATION, PRESENTATION, AND EVALUATION OF COURSE MATERIALS FOR UNDERGRADUATE FORMAL COURSES.

**SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1-3 PER SEMESTER, MAXIMUM OF 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 610** Thesis Research Off-Campus (1-15) No description.

**Thesis Research Off-Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SOILS 611** PH.D. DISSERTATION PART-TIME (0) NO DESCRIPTION.

**PH.D. DISSERTATION PART-TIME (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Spanish (SPAN)**

**SPAN 410** Advanced Oral Expression and Communication (3) Emphasis on achieving practical command of spoken Spanish and the comprehension of native speech. Use of journalistic materials.



**Advanced Oral Expression and Communication (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Second or Beyond 12th Level Foreign Language  
 Effective: Fall 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 412** Translation (3) Techniques of oral and written translation from Spanish to English and vice versa, particularly for business, literature, and social work.

**Translation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 413** Interpretation (3) Introduction to the art of interpretation, with particular attention to the professions for which it is most commonly required.

**SPAN 413 Interpretation (3)**

Spanish 413 will provide students with demonstrations and exercises designed to develop the skills required in sight translation and in consecutive, simultaneous and summary interpretation. The course does not presume to provide the training needed for entrance into the profession; it is intended to give students sufficient understanding of the rigors and demands of the profession and to help them determine whether they have the interest and skills to pursue further training in this area. At the same time, it will provide students with a unique opportunity to improve their listening comprehension and fluency in the target language, whether English or Spanish.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 414** Spanish Phonology (3) Spanish phonetics and phonemics; systematic means of correcting pronunciation defects; other audio-lingual applications.

**Spanish Phonology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 415** Spanish Morphology and Syntax (3) The Spanish grammatical system; analysis of morphemic units and their organization into syntactic structures.

**Spanish Morphology and Syntax (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 418** The Evolution of Spanish (3) The emergence and development of the sounds and forms of Spanish.

**The Evolution of Spanish (3)**

General Education: None  
 Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 420** Spanish for Business and International Trade (3) Introduction to the Spanish of international business and to the social and cultural norms of negotiation in Spanish-speaking countries.

### **Spanish for Business and International Trade (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 439** Don Quijote (3) Thorough study of the masterpiece, including its sources, genesis, language, style, success, and influence.

### **Don Quijote (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 440** Teaching of Romance Languages (3) Theories of second language acquisition. Current classroom practices in the teaching of Romance languages.

### **Teaching of Romance Languages (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 472** The Contemporary Spanish American Novel (3) The regionalist and social novel since 1910, together with the social background.

### **The Contemporary Spanish American Novel (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 474** Many Mexicos (3) Overview of Mexican literature, culture and history from pre-colonial period to present.

### **Many Mexicos (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 476** Masterpieces of Spanish American Literature (3) Reading, analysis, and discussion of selected major works representative of Spanish American prose and poetry.

### **Masterpieces of Spanish American Literature (3)**

General Education: None

Diversity: None  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language and Other Cultures  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 490** Masterpieces of Spanish Prose (3) Reading, analysis, and discussion of selected masterpieces of Spanish novels, short stories, etc.

### **Masterpieces of Spanish Prose (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities and Second or Beyond 12th Level Foreign Language  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Humanities  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 497A** Painting and Theater in Early Modern Spain (3) Examine a number of plays and paintings to see how one influenced the other, how painters were seen and represented, and how the popular stage used painting and painters as principle characters to comment on art, society, politics, and social concerns.

**Painting and Theater in Early Modern Spain (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 497A** Painting and Theater in Early Modern Spain (3) Examine a number of plays and paintings to see how one influenced the other, how painters were seen and represented, and how the popular stage used painting and painters as principle characters to comment on art, society, politics, and social concerns.

**Painting and Theater in Early Modern Spain (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 497B** The Romance Languages (3) This course situates Spanish in the broader context of the Romance languages through the study of the origin and development of these languages and through systematic comparison of their linguistic features (especially at the phonological, morphological, and syntactic levels).

**The Romance Languages (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 497C** Mexico Noir (3) This class traces the development of a particular genre of crime fiction and film known as el genero negro or noir in Mexico and along the U.S/Mexican border.

**Mexico Noir (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 497D** Grammar Mistakes (3) The goal of this course is to help students build their awareness of how Spanish grammar works and identify where and how they tend to make mistakes, which in turn can improve their Spanish.

**Grammar Mistakes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Humanities  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 499** (IL) Foreign Study--Spanish (1-12) Contemporary Spanish life and civilization. Emphasis on post-Civil War period: literature, arts, and sociopolitical problems.

**Foreign Study--Spanish (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**SPAN 502** Theory and Techniques of Teaching Spanish (1-3) Audio-lingual orientation.

**Theory and Techniques of Teaching Spanish (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 507** Hispano-Romance Linguistics (3 per semester/maximum of 9) History, development, and linguistic description of Old Spanish and related Romance languages of the Iberian Peninsula.

**Hispano-Romance Linguistics (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 508** Generative Syntax (3) This course offers foundations of generative syntax. It addresses the advantage of a scientific model to explain human knowledge of language that also makes predictions about its representation in the mind.

**Generative Syntax (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 509** Functional Syntax (3) This course covers foundations of functional syntax. It addresses the advantages of a scientific approach to explain human knowledge of language that makes predictions about its representation in the mind.

**Functional Syntax (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 510** Spanish Descriptive Linguistics: Phonology (3) No description.

**Spanish Descriptive Linguistics: Phonology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 511** Spanish Transformational-Generative Linguistics (3) No description.

**Spanish Transformational-Generative Linguistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 513** Acquisition of Spanish as a Second Language (3) Analysis of research on the acquisition of syntax, phonology, lexicon, discourse.

**SPAN 513 Acquisition of Spanish as a Second Language (3)**

An in-depth analysis of current research carried out on the acquisition of Spanish as a second language. Focus will be on syntax, phonology, lexicon, discourse, and pragmatics. Specific topics covered include the following: null-subjects, clitics; movement and word order, tense and aspect, mood, agreement features, grammaticalization, modality, negation, functional categories, tutored vs. untutored learners, UG vs. non-UG effects, the Noun Phrase Accessibility Hierarchy, markedness, cohesive devices, speech acts, metaphors, idioms, the lexicon and culture, the phonological systems, including suprasegmentals.

In addition to developing an understanding of the current research on the acquisition of Spanish as a second language, students will learn how to read the research literature from a critical perspective and how to read empirical data presented in published research that might result in alternative interpretations from those espoused by authors of published work. This goal will be achieved in two ways: requiring students to submit via e-mail to the professor and other students in the seminar two- to three-page critiques of assigned readings; and oral presentations in class of readings selected by the student(s). Some of the critical reports and presentations will be carried out jointly, and others will be done individually.

Students will also learn how to design and implement empirical research on the acquisition of Spanish as well as how to write up the results of this research in a potentially publishable research report.

Finally, they will have the opportunity to present their research findings to the Penn State applied linguistics community, in a mini in-house workshop at the end of the course. In preparation for this, time will be set aside near the end of the seminar for students to present and discuss their research with their colleagues in the course.

Most of the readings for the course will be preselected by the professor; however, students will also be expected to carry out independent reading of publications not included in the course syllabus and present and critique what they read in the seminar.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 514** Hispanic Dialectology (3 per semester/maximum of 6) Early fragmentation among the peninsular dialects; their status today, Judeo- Spanish; descriptive analysis of modern Spanish American dialects.

**Hispanic Dialectology (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 516** Medieval Spanish Literature (3 per semester/maximum of 9) Topics vary: juglaria and clerecia, emergence of lyric and brief narrative; history and didacticism; origins of novel; balladry; fifteenth-century innovations.

**Medieval Spanish Literature (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 528** Seventeenth-Century Spanish Literature (3 per semester/maximum of 9) Prose and poetry of major authors: works and trends of the late Golden Age and Baroque period.

**Seventeenth-Century Spanish Literature (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 537** Golden Age Theatre (3 per semester/maximum of 6) Major works of Lope de Vega, Tirso de Molina, Calderon, and others.

**Golden Age Theatre (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 553** Writings of the "Generation of 1898" (3 per semester/maximum of 6) Novels, plays, short stories, essays, poetry of Valle-Inclan, Azorin, Benavente, Unamuno, Machado, Maeztu, and Baroja in the context of generation concept.

**Writings of the "Generation of 1898" (3 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 560** The Contemporary Novel in Spain (3 per semester, maximum of 9) The novel since 1941: Cela, Laforet, Zunzunegui, Suarez Carreno, Matute, and others.

**The Contemporary Novel in Spain (3 per semester, maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 566** Contemporary Spanish Poetry (3) Various currents in Spanish poetry from the generation of 1927: Lorca, Aleixandre, Salinas, Guillen, Alonso, Alberti, Hernandez, Otero, and others.

**Contemporary Spanish Poetry (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 568** Early Spanish American Literature (3 per semester/maximum of 9) Content varies; selected topics from colonial period, romanticism, and the nineteenth century before modernism.

**Early Spanish American Literature (3 per semester/maximum of 9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 574** The Spanish American Novel (3 per semester/maximum of 9) Content varies; selected works from the late nineteenth century through the contemporary period.

**The Spanish American Novel (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 587** Stylistic and Literary Criticism (3) Major theories of literary criticism applied to Hispanic literature.

**Stylistic and Literary Criticism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 588** Seminar in Hispanic Literature (3-12) Common and individual research in special problems in Spanish or Spanish American literature.

**Seminar in Hispanic Literature (3-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 589** (CMLIT 589, FR 589, GER 589) Technology in Foreign Language Education: An Overview (3) Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with APLNG 589)

**Technology in Foreign Language Education: An Overview (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1988



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 597A** Gender and Nation in Spanish American Literature (3) This course will explore the literary work of Spanish American women since the seventeenth century until the present in relationship to a sense of belonging, or not, to a particular region, or to a colonial or postcolonial community, or a nation.

**Gender and Nation in Spanish American Literature (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 597B** Mystics, Ascetics and Visionaries: Religious Writings in Imperial Spain (3) This course will focus on religious writers of Imperial Spain in the sixteenth and seventeenth centuries, including Saint John of the Cross, Fray Luis de Leon, Luisa de Carvajal y Mendoze, and Sait Theresa of Avila.

**Mystics, Ascetics and Visionaries: Religious Writings in Imperial Spain (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 603** Foreign Academic Experience (1-12) Foreign study and/or research constituting progress toward the degree at a foreign university.

**Foreign Academic Experience (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPAN 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Special Education (SPLED)**

**SPLED 400** Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management (4) Legal issues, learner characteristics, collaboration skills, assessment, and behavior management related to educating students with disability in inclusive settings.

### **SPLED 400 Teaching Exceptional Students in General Education Settings (4)**

This course is delivered via a model of blended instruction and addresses foundational skills (assessment and management) and knowledge (laws, etiologies, collaboration) for those working with students with special education needs in general education classrooms. Almost 30% of the content includes student understanding of the history and current relevance of special education law; roles and responsibilities of general education teachers in providing services to students with special education needs; characteristics and etiologies relevant to providing effective instruction to students with mild and severe disabilities; and developing and maintaining effective education teams. Roughly 35% of content is relevant to assessment in inclusive settings and is centered on sound instructional decision making as well as linking instruction to standards based curricula. Coverage includes understanding formative and summative assessment; creating and administering curriculum-based assessments in reading, mathematics, and writing; designing systems to collect behavioral data; interpreting a variety of norm-referenced test scores; using brief experimental analyses is adequate for a given purpose. Roughly 35% of content is relevant to applying principles of Applied Behavior Analysis (ABA) to managing and motivating learners with special needs placed in inclusive settings. Broad objectives include student acquisition of knowledge and skills related to ABA principles and interventions such as: identifying the nature (positive and negative) of consequences maintaining or decreasing specific behaviors; operationally defining behavior; establishing a classroom and school environment conducive to learning for all students; creating class-wide, school-wide; and individual motivation systems; intervening to decrease specific behavior; and using functional behavioral assessments (FBAs) and positive behavior supports.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 401** Motivating Exceptional Learners (4) Group and individual techniques to promote student task engagement and prosocial behavior.

### **Motivating Exceptional Learners (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 402** Human Rights: Historical and Current Issues in Special Education (3) Litigation, legislation, regulation, and advocacy issues impacting on educational and related services for individuals with academic and/or physical disabilities.

### **Human Rights: Historical and Current Issues in Special Education (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 403A** Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing (3) Evidence-based methods for design, delivery, and adaptation of instruction for elementary students with disabilities in reading, mathematics, and writing.

### **SPLED 403A Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing (3)**

This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in elementary, inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content on: designing direct and explicit instruction; self-regulated learning; assistive technology; adaptations and accommodation for learners with several disabilities; and the hierarchy of taxonomical units relative to instructional design. The remaining half of the course covers content relevant to a wide range of literacy concerns and includes: evidence based practices for instruction in early reading (e.g. decoding, phonemic awareness, phonic and structural analysis; and vocabulary); reading comprehension at primary and intermediate levels (e.g. test structure, content specific vocabulary, and narrative and expository reading in content domains); writing (e.g. handwriting, spelling grammar, and written expression); and mathematics (e.g. number sense and early numeracy, basic facts and operations, applied skills, problem solving, fractions, decimals, and percents).

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 403B** Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings (3) Evidence-based methods for designing, delivering, and adapting instruction for students with disabilities in inclusive secondary education settings.

### **SPLED 403B Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings (3)**

This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in secondary inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content on: designing direct and explicit instruction; self-regulated learning; assistive technology; adaptations and accommodation for learners with several disabilities; and the hierarchy of taxonomical units relative to instructional design. The remaining half of the course covers content relevant to a variety of procedures and approaches to help students with special education needs gain meaningful access to secondary curriculum content without watering it down or ignoring the instructional needs of students without disabilities. Broadly this content includes ways of planning and delivering instruction to help all students, including those with learning problems, understand and retain critical course content. Topics include using graphic organizers, options for presenting content, mnemonics; task specific learning strategies; cooperative groups and peer focused interventions; study guides and guided notes; advance organizers; text structures for narrative and expository text; single and multiple-approaches for reading comprehension; writing mechanics, prompts, and rubrics; narrative, informative, and persuasive writing; problem solving (including Polya's model); analogies; elaborative interrogation; and practice for problem solving.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLLED 404** Working with Families and Professionals in Special Education (3) Strategies for productive interactions between special educators and others such as colleagues, employers, parents, service providers, professionals, and students.

**Working with Families and Professionals in Special Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLLED 408** (EDPSY 408) Meeting Instructional Needs of English Language Learners with Special Needs (3) The course content and activities focus on instruction and assessment for English Language Learners with special needs.

**SPLLED (EDPSY) 408 Meeting Instructional Needs of English Language Learners with Special Needs (3)**

The purpose of this course is to bring together two bodies of research to prepare future teachers of learners with special needs who are also English language learners to be effective teachers. The course has been developed to fulfill requirements of Pennsylvania Department of Education and in recognition of the growing number of English Language Learners (ELL) in the general population and thus in special education settings. The course presents (1) theory and research on the instructional needs of English Language Learners (ELLs) and (2) the knowledge base on effective instruction for students with special needs and assists students to integrate the two. Major topic areas include principles and issues in second language acquisition; ELL characteristics including linguistic and cultural factors that affect second language acquisition; techniques and methods of research-based instruction for English Language Learners with special needs; lesson planning and instructional modifications for ELLs with special needs; and appropriate assessment practices for ELLs with special needs. A major objective of this course is for students to be able to develop or modify instructional plans that reflect evidence based practices for adapting for the needs of ELL learners with special needs. Evaluation will be based on a combination of methods including, tests and quizzes, analyses of videos and case studies and reports of observations and interviews.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLLED 409A** Fundamental Literacy Skills for Students with Special Needs (3) Effective reading curriculum and teaching methods to teach students with special needs.

**SPLLED 409A Fundamental Literacy Skills for Students with Special Needs (3)**

Effective classroom-based assessment, curriculum development, and instructional strategies for teaching reading to educate students with special needs will be described in this course. Students will learn how to assess, develop curriculum, and provide scientifically based best practice instruction in reading to K-12 students with special needs. Students will learn how to select reading skills necessary to scaffold and enhance students' present reading skills. Methods for using researched based assessment strategies and developing foundational reading skills within a classroom context, will be described.

This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLLED 409A extend knowledge of explicit instructional strategies in the context of reading. The content offered in this course complements 409B and 409C through the integration of researched based methods and sound instructional design within a curriculum to most effectively teach students with special needs.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:  
Concurrent: SPLLED 495G

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLLED 409B** Writing and Content Literacy for Students with Special Needs (3) Effective curriculum and materials for teaching writing and content literacy to students with special needs.

**SPLLED 409B Writing and Content Literacy for Students with Special Needs (3)**

Effective application of classroom-based measurement, curriculum development, and instructional strategies for teaching writing and content literacy to educate students with special needs will be described in this course. Students will learn how to use assessment to develop curriculum and provide scientifically based best practice instruction in writing

mechanics (handwriting, spelling, capitalization & punctuation) and written expression (pre-planning to revision) to K-12 students with special needs. Students will learn how to identify, select, and teach content text structure. Methods for using assessment to develop a reading comprehension curriculum within a content classroom context and teach K-12 students with special needs to read and comprehend narrative and expository text (such as text found in Math, Science, Social Studies, and other content textbooks) will be described. Methods for using assessment to develop curriculum and teach K-12 students with special needs to respond to content text and materials through writing will also be examined.

This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409B will have achieved mastery in basic reading theory, assessment, curriculum, and instructional methods. The content offered in this course adds to the existing course content by specifically addressing writing mechanics, written expression, and content reading, curriculum development, and instructional methods (including plans for generalization and maintenance) for students with special needs.

Written responses for assigned readings will be required for each topic area. Written evaluations and class assignments (including case studies) will be given to assess student learning throughout the course time period. Students' learning will be further evaluated through projects that demonstrate understandings of applying classroom-based measurement, curriculum development, and the instructional methods required to effectively teach writing and content learning to students with special needs. Student applied projects, in coordination with practicum placement, for writing instruction will include: (1) the collection of baseline writing data for a student with special needs, (2) development of a curriculum scope and sequence, (3) development of a research validated instructional intervention, (4) implementation of the intervention, (5) the collection of writing data throughout instruction and after instruction, and (6) development and implementation of an instructional plan for maintenance and generalization. To demonstrate understandings of teaching content reading and writing, students will prepare a presentation of an identified research-based content reading or writing instructional strategy or approach taught within a curriculum scope and sequence.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:  
 Concurrent: SPLED 495G

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 409C** Mathematics Instruction for Students with Special Needs (3) Research-based practices for teaching mathematics skills to students with special needs.

### **SPLED 409C Mathematics Instruction for Students with Special Needs (3)**

Research-based assessment, instruction, and intervention strategies for teaching mathematics skills to students with special needs will be described in this course. Students will identify (a) the risk factors associated with mathematics disabilities, (b) effective prevention and remediation models of mathematics disabilities, (c) characteristics of scientifically-based instruction in content-area skills (e.g., counting, addition, fractions, problem solving, geometry) for K-12 students with disabilities, and (d) how to effectively provide and assess the effects of such instruction while provided in general and special education classrooms. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409C will have achieved mastery in assessment, curriculum, and instructional methods. The content offered in this course adds to the existing course content by specifically addressing how to teach content-area skills for students with special needs.

Written responses for assigned readings will be required for the topic areas. Written evaluations and class assignments will be given to assess student learning throughout the course time period. Students' learning will be further evaluated through projects that demonstrate understanding of classroom-based assessment, curriculum development, and the instructional methods required to effectively teach content-area mathematics skills to students with special needs. Student applied projects, in coordination with practicum placement, for mathematics instruction will include: (1) the collection of baseline mathematics performance data for a student with special needs, (2) development of a curriculum scope and sequence, (3) development of a research validated instructional intervention, (4) implementation of the intervention, (5) on-going data collection throughout instruction and after instruction, and (6) development and implementation of an instructional plan for maintenance and generalization. To demonstrate understandings of teaching content area mathematics skills, students will prepare a presentation of a self- or instruction-selected research-based curriculum and instructional strategy or approach that meet "best practice" standards (e.g., those identified through previous meta-analysis).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:  
 Concurrent: SPLED 495G

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 411** Intervention for Students with Severe Disabilities (3) Assessment, teaching strategies, curricula, materials, and assistive techniques for use with individuals having severe disabilities (mental and physical).

### **Intervention for Students with Severe Disabilities (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:  
 Concurrent: a grade of C or better in SPLED 495E

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 412** Instruction for Students with Mild Disabilities (4) Appropriate teaching strategies, curriculum sequences, and materials selection and evaluation for children with mild special needs.

#### **Instruction for Students with Mild Disabilities (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:  
 Concurrent: a grade of C or better required in SPLED 454

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 415** Early Special Education (3-4) Includes early identification methods, assessment, curricula, parent involvement, and program evaluation for exceptional preschoolers in mainstreamed or segregated settings.

#### **Early Special Education (3-4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 418** Technologies for Persons with Disabilities (2) Sensory aids, communication systems, computer systems, expert systems, simulations, and other technologies for students who are academically or physically challenged.

#### **Technologies for Persons with Disabilities (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 419** Assistive Technology for General Education Teachers (2-3) Strategies to support use of assistive technologies by students with disabilities in general education classrooms.

#### **SPLED 419 Assistive Technology for General Education Teachers (2-3)**

This course will teach students the role of the general education teacher in supporting the use of assistive technology (AT) by students with disabilities in general education classrooms. Students will learn the role of the general education teacher in the AT process, including (as appropriate) how to identify student AT needs, obtain information on common AT applications and devices, make first-hand use of current AT solutions, and evaluate the use of AT to address specific student needs. Particular attention will be given to the use of AT to assist students with disabilities in reading, writing, math, communication, and the development of social skills. Students will learn the role and responsibilities of the general education teacher on the AT team, as well as issues of "scope of practice", and the roles and responsibilities of the other licensed professionals on the AT team. Students will also be provided with resources and strategies for making use of state and national information resources and services related to AT.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 425** Foundations of Special Education, Etiologies, Law, and Implications for Practice (4) An introduction to

exceptional individuals being served in special education programs across the life span.

#### **SPLED 425 Foundations of Special Education, Etiologies, Law, and Implications for Practice (4)**

This course is designed to provide an introduction to all exceptionalities included in special education programs as delineated by the most recent federal legislation guiding services for individuals with special needs. An important component of this course is the exploration of typical developmental stages and milestones used to monitor children's growth and progress over time. Fourteen (14) categories of disability are defined in relation to how states define who is eligible for a free appropriate public education under special education law. In addition, recent legislation is explored in relation to services provided, funding requirements, accommodations and classroom placement. The primary objective of this course to provide future educators with a solid foundation for their understanding disabilities, services, and legislation as they enter into the special education profession. Secondary objectives include preparing students to (a) address common misconceptions and myths associated with special education, (b) work with interdisciplinary teams in the formation of Individualized Education Program (IEP), and (c) promote the preparation of exceptional individuals to assume adult roles.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 430 Foundational Skills for Working with Students with Special Education Needs in General Education Classrooms (1)** Introduction to working with students with special education needs in the general education classroom, including history and legal foundation.

#### **SPLED 430 Foundational Skills for Working with Students with Special Education Needs in General Education Classrooms (1)**

This is the first course in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service general education teachers who are seeking content on the roles and responsibilities of the general education teacher in providing services to students with special needs. This course serves as an introduction and prerequisite to the subsequent courses in the series.

This course addresses foundational skills for working with students with special education needs in general education classrooms. Board course objectives include student understanding of the history and current relevance of special education law; roles and responsibilities of the general education teacher in providing services to students with special education needs; providing effective instruction to students with mild and severe disabilities; and developing and maintaining effective education teams.

Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVD's of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 course total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via-PicTel or some similar videoconferencing technology.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 431 Evidenced-Based Methods for Monitoring Student Progress and Making Instructional Decisions (2)** Evidence-based methods for assessing student progress and making data-based instructional decisions.

#### **SPLED 431 Evidence-Based Methods for Monitoring Student Progress and Making Instructional Decisions (2)**

This is the second course in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders, Communication Disorders, Developmental Delays, etc.) in general education classes. Students should complete this course after they have completed the first course in the series (Foundational Skills for Working with Students with Special Education Needs in General Education Classrooms) and prior to completion of the final course in the series (either Evidence-Based Practices for Inclusive Elementary Classrooms or Evidence-Based Practices for Inclusive Secondary Classrooms).

This course is based on a model of effective instruction that includes (a) deciding what to teach, (b) instructional design, and (c) assessing the effectiveness of instruction. A feedback loop is instruction more effective and more efficient. After

completing the class students should be able to: (a) give a rationale for the collection of data in classrooms; (b) describe the assessment process; (c) describe response to intervention and the general educator's role in the process; (d) summarize data using graphs and trendlines; (e) create and administer curriculum-based assessments in reading, mathematics, and writing; (f) design systems to collect behavioral data in classrooms; (g) interpret a variety of norm-referenced test scores; (h) use brief experiential analyses to identify effective academic interventions; (i) interpret norm-referenced test data; and (j) determine if the reliability/validity of an assessment is adequate for a given purpose.

Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via e-mail. Furthermore, at least once during the course, instructors will be available live via PicTel or some similar videoconference technology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 432** Evidence-Based Practices for Inclusive Behavior Management (2) Managing and motivating learners with special needs in general education settings based upon principles of Applied Behavior Analysis.

### **SPLED 432 Evidence-Based Practices for Inclusive Behavior Management (2)**

This is the third course in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders, Communication Disorders, Developmental Delays, etc.) in general education classes. Students should complete this course after they have completed the first and second courses in the series (Foundational Skills for Working with Students with Special Education Needs in General Education Classrooms and Evidence-Based Methods for Monitoring Student Progress and Making Instructional Decisions) and prior to completion of the final course in the series (either Evidence-Based Practices for Inclusive Elementary Classrooms or Evidence-Based Practices for Inclusive Secondary Classrooms).

The course addresses aspects of managing and motivating learners with special needs placed in general education settings based upon the principles of Applied Behavior Analysis (ABA). Broad course objectives include student acquisition of knowledge and skills related to ABA principles and interventions such as: identifying the nature (positive or negative) of consequences maintaining or decreasing specific behaviors; operationally defining behavior; establishing a classroom and school environment conducive to learning for all students; creating class-wide, school-wide, and individual motivation systems; and intervening to decrease specific behaviors.

Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment of quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via e-mail. Furthermore, at least once during the course, instructors will be available live via PicTel or some similar videoconferencing technology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 433** Effective and Explicit Instruction for Students with Learning Difficulties (2) Evidence-based methods for designing, delivering, and adapting academic instruction for students with mild, moderate, and severe learning difficulties.

### **SPLED 433 Effective and Explicit Instruction for Students with Learning Difficulties (2)**

This is the fourth course in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. This course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders, Communication Disorders, Developmental Delays, etc.) in general education classes. Students should complete this course after they have completed the first course in the series (Foundational Skills



for Working with Students with Special Education Needs in General Education Classrooms) and prior to completion of the final course in the series (either Evidence-Based Practices for Inclusive Elementary Classrooms or Evidence-Based Practices for Inclusive Secondary Classrooms).

The course addresses aspects of designing delivering and adapting instruction for students across the range of disability (i.e., mild, moderate, & severe).

Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the PicTel or some similar videoconferencing technology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 434A** Evidence-Based Practices for Inclusive Elementary Classrooms (2) Evidence-based methods to effectively serve special needs students in elementary general education settings, including reading, writing, and mathematics instruction.

### **SPLED 434A Evidence-Based Practices for Inclusive Elementary Classrooms (2)**

This course is one of two final class options in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders, Communication Disorders, Developmental Delays, etc.) in general education classes. Students should complete this course only after they have completed the first four courses in the series (Foundational Skills for Working with Students with Special Needs in General Education Classrooms, Evidence-Based Methods for Monitoring Student Progress and Making Instructional Decisions, Evidence-Based Practices for Inclusive Behavior Management, Evidence-Based Design and Delivery of Effective Instruction for Students with Learning Difficulties).

This course addresses aspects of providing reading, writing, and mathematics instruction to elementary school students with special needs in the general education classroom. Broad course objectives include student acquisition of knowledge and skills in reading (e.g., word recognition, fluency, reading comprehension, vocabulary); writing (e.g., spelling, grammar, handwriting) and written expression (e.g., narrative, informative, persuasive); and mathematics (e.g., computation and problem solving).

Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via e-mail. Furthermore, at least once during the course, instructors will be available live via PicTel or some similar videoconferencing technology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 434B** Evidence-Based Practices for Inclusive Secondary Classrooms (2) Evidence-based methods to effectively serve special needs students in secondary general education settings.

### **SPLED 434B Evidence-Based Practices for Inclusive Secondary Classrooms (2)**

This course is one of two final class options in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders, Communication Disorders, Developmental Delays, etc.) in general education classes. Students should complete this course only after they have completed the first four courses in the series (Foundational Skills for Working with Students with Special Needs in General Education Classrooms, Evidence-Based Methods for Monitoring Student Progress and Making Instructional Decisions, Evidence-Based Design and Delivery of

Effective Instruction for Students with Learning Difficulties).

The course addresses a variety of procedures and approaches to help students with special education needs gain meaningful access to the secondary curriculum content without watering it down or ignoring the instructional needs of students without disabilities. Broad course objectives include ways of planning and delivering instruction to help all students, including those with learning problems, understand and retain critical course content.

Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison response; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via e-mail. Furthermore, at least once during the course, instructors will be available live via PicTel or some similar videoconferencing technology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLD 444** Inclusive Education and Assessment (6) Knowledge and skills needed to educate students with special needs in urban schools.

#### **Inclusive Education and Assessment (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:  
Concurrent: URBED 395W

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLD 454** Assessment for Instruction (4) Orientation to evaluation of special students with emphasis on the creation, use, and interpretation of teacher-made assessment procedures.

#### **Assessment for Instruction (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:  
Concurrent: a grade of C or better in SPLD 412

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLD 460A** Fundamentals of Reading Instruction in Special Education (3) Topics include the interactive nature of reading, recent findings of the National Reading Panel, explicit instruction principles and reading assessments.

#### **SPLD 460A Fundamentals of Reading Instruction in Special Education (3)**

Fundamentals of Reading Instruction in Special Education (RISE 1), is the first course in an approved distance education certificate program. It is designed to provide teachers of students with special needs with evidenced-based procedures to teach a variety of reading skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLD 460B** Teaching and Assessing Reading Skills of Students with Special Needs (3) Topics include methods for assessing and teaching reading skills including fluency, word level decoding and comprehension.

#### **SPLD 460B Teaching and Assessing Reading Skills of Students with Special Needs (3)**

Teaching and Assessing Reading Skills of Students with Special Needs (RISE 2), is the second course in an approved distance education certificate program. It is designed to provide teachers of students with special needs with evidenced-based procedures to teach a variety of reading skills.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 460C** Specialized Reading Applications in Special Education (3) Topics include methods for assessing and teaching reading skills in vocational competence, functional reading, reading for students with sensory impairment.

### **SPLED 460C Specialized Reading Applications in Special Education (3)**

Specialized Reading Applications in Special Education is the third course in an approved distance education certificate program. It is designed to provide teachers of students with special needs with evidenced-based procedures to teach a variety of reading skills.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 461** Introduction to Autism Spectrum Disorders: Issues and Concerns (3) Overview of issues, characteristics, and evidenced-based assessment strategies, and approaches for individuals with autism/PDD.

### **SPLED 461 Introduction to Autism Spectrum Disorders: Issues and Concerns (3)**

This course will center on working with individuals having Autism Spectrum Disorders (ASD) and Pervasive Developmental Disorders (PDD) in educational and related settings. Topics include an overview of characteristics and diagnosis, ethical issues in treatment, assessment, the use of science in treatment approaches, working effectively with families, and strategies for successful inclusion of students with ASD/PDD in integrated settings. Course content will be delivered through DVD lectures, and required as well as supplemental readings. Evaluation procedures will include on line multiple-choice exams. The course will be changed to assess students through 6 (v.4) online multiple choice exams. Multiple choice format offers immediate feedback to students. To ensure assessment of applications skills, exams will include case studies in which students must apply skills to areas such as child assessment, data analysis, and strategies for working effectively with parents.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 462** Autism and Applied Behavior Analysis (3) This course addresses principles of applied behavior analysis and empiricism related to instruction and special issues affecting individuals with autism.

### **SPLED 462 Autism and Applied Behavior Analysis (3)**

This world campus course will include an overview of basic principles of applied behavior analysis (ABA) and elements of empiricism and ethics in educational settings. Course objectives will center on acquisition of content related to: a) principles of ABA instruction; b) ethical standards in education; c) best practice interventions for learning; d) strategies for diagnosing and programming for behavioral issues; e) special issues affecting individuals with ASD and their families. Course content will be delivered through DVD lectures, and required as well as supplemental readings. Evaluation procedures will include on line multiple-choice exams, and on line assignments.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 463** Communication and Social Competence (3) Overview of deficits and strategies in speech, language, and communication across the Autism Spectrum Disorder.

**SPLED 463 Communication and Social Competence (3)**

Communication and Social Competence is the third course in the 5 course (12 credit) series leading to the Professional Development Certificate in Autism. All information, activities, and assignments are through videotaped and web-based learning. Content includes an overview of the deficits in the area of speech, language, and communication across the Autism Spectrum Disorders (ASD). Basic information on the nature of these deficits is provided from both a psycholinguistic model as well as a behavioral model. In addition to information on deficits, the majority of the course content will provide practical information related to intervention.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 464** Assessment and Curriculum (3) Overview of screening, diagnosis, and identification of skills in developmental domains and curricula for individuals with autism.

**SPLED 464 Assessment and Curriculum (3)**

Assessment and Curricula is the fourth course in the 5 course (12 credit) series leading to the Professional Development Certificate in Autism. All information, activities, and assignments are through videotape and web-based learning. Content includes types of assessment and identification of skills in developmental domains. Practical strategies will be outlined.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 465** Asperger Syndrome (1) Characteristics, assessment, intervention, and curricula for individuals with Asperger syndrome. Emphasis will be given to social skill development.

**SPLED 465 Asperger Syndrome (1)**

Asperger is the fifth course in a five course (12-credit) series leading to the Professional Development Certificate in Autism. All information, activities, and assignments are through videotaped and web-based learning. Basic information on views of causes, assessment, treatments, and parent concerns for individuals with Asperger syndrome are included.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 495E** Experience with Exceptional Children (3) Supervised activities with exceptional children in a variety of possible settings, e.g., schools, institutions, day care centers, vocational settings.

**Experience with Exceptional Children (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

Concurrent: a grade of C or better in SPLED 411 SPLED 412

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 495F** Practicum in Special Education (15) Teaching experience with mildly/moderately disabled children in age appropriate settings, e.g., infant/preschools, schools, vocational/job sites.

**Practicum in Special Education (15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 495G** Experience with an Integrated Inclusion Classroom (4) Supervised teaching in integrated general classrooms with activities in assessment, diagnosis, and direct intervention with students in need or with disabilities.

**Experience with an Integrated Inclusion Classroom (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:  
Concurrent: a grade of C or better required in SPLED 409

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 500** Seminar in Special Education (1-9) Continuing series of professional seminars designed to provide a forum for discussion of current and classical research concerning exceptional children.

**Seminar in Special Education (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 501** Administration and Supervision of Educational Programs for Exceptional Children (2-3) Problems connected

with the instituting and organizing of classes for atypical children; the legal phases, finances, teaching personnel, pupil personnel, housing, equipment, courses of study, curriculum, etc.

### **Administration and Supervision of Educational Programs for Exceptional Children (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 502** Educating Individuals with Autism Spectrum Disorders (3) This seminar addresses evidence-based strategies related to individuals with ASD including characteristics, assessment, treatment approaches, and life-span programming.

### **SPLED 502 Educating Individuals with Autism Spectrum Disorders (3)**

This advanced seminar will address evidence-based strategies related to working with individuals diagnosed as having Autism Spectrum Disorders (ASD). Course objectives will include familiarity/competency in the following topical areas: a) cognitive, social, and behavior characteristics that affect learning; b) assessment strategies and instrumentation; c) treatment/intervention approaches; d) strategies to assess the validity of interventions according to evidence-based/empirical standards; and e) how to program across the lifespan of the individual with ASD. Course content will be delivered through lectures, discussions, peer presentations, and guest speakers. There are no prerequisites for the course.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 503A** Applied Behavior Analysis for Special Education: Basic Principles I (4) Topics include a history of applied behavior analysis; underlying assumptions; dimensions and characteristics of ABA; ethics; basic terminology and principles.

### **Applied Behavior Analysis for Special Education: Basic Principles I (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 503B** Applied Behavior Analysis for Special Education: Basic Principles II (4) Topics include functional assessment of behavior, ethics, methods to increase and decrease behavior, and generalization.

### **Applied Behavior Analysis for Special Education: Basic Principles II (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 503C** Applied Behavior Analysis for Special Education: Extended Applications I (4) Topics include assessment and intervention for challenging behavior, systems support, classroom applications of ABA, and review of ABA Certification Exam.

### **Applied Behavior Analysis for Special Education: Extended Applications I (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 503D** Applied Behavior Analysis for Special Education: Extended Applications II (3) In this course students learn additional techniques to promote meaningful behavior change using principles of behavior.

**Applied Behavior Analysis for Special Education: Extended Applications II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 505** Single-Case Research (3) Overview of research methods associated with collecting and evaluating repeated measures on single cases.

**SPLED 505 Single-Case Research (3)**

This is an advanced graduate course that introduces students to single-case research design and methodology. This course is designed to provide the student with all the necessary tools needed to formulate questions that require repeated measures observation and analysis, including the use of visual and statistical analytic methods. Intro-subject experimental designs are discussed with particular attention paid to repeated measures analysis of trends and level effect size changes, as well as supportive topics (e.g., observing and recording behavior, observer training and agreement, social validation).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 510** Problems in the Education of the Mentally Retarded (2-4) Study of existing curriculums, instructional practices, educational programs; experimentation in curriculum building and materials construction.

**Problems in the Education of the Mentally Retarded (2-4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 511** Ethical Considerations for Special Education Populations (3) Discussion of ethical and legal standards in special education.

**SPLED 511 Ethical Considerations for Special Education Populations (3)**

Ethical behavior is a key component of any human service enterprise. Before a special education teacher or behavior analyst can effectively work with a client or student, they must first establish an environment of trust. This trust is built through ethical behavior on the part of the practitioner. In this class students will learn about the governmental and professional disciplinary standards that regulate the field of behavior analysis in special education. Beyond the letter of the law, students will work through case studies where ethical dilemmas are presented in an effort to tease out the underpinnings of ethical behavior.

In this class students will work through five major content areas that are related to ethics in behavior analysis. As a foundation, Federal, State, and Local statutes that pertain to the practice of behavior analysis will be presented. Additionally, other key legal issues such as informed consent and privacy will be discussed. Next, students will learn about definitions of ethics along with the most common ethical dilemmas in the field. Relatedly, students will learn about the reporting of unethical behavior. After the more general treatment of ethics, the class will move on to more formal codes of ethical conduct, which include those promulgated by the Council for Exceptional Children and the Behavior Analyst Certification Board. The final third of the class is focused on ethics within practice and includes topics such as working and communicating with families in a responsible manner and strategies to support ethical behavior.

After completing this course students should be able to (a) describe ethical behavior, (b) discuss relevant governmental regulations regarding behavior analysis in schools, (c) discuss the disciplinary standards of the Behavior Analyst Certification Board, (d) discuss the ethical standards of the Council for Exceptional Children, and (e) identify effective communication skills with clients and students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Summer 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 515** Infants and Toddlers with Special Needs (3) Comparison of typical and atypical development of infants and toddlers; applicable instructional strategies in education.

### **Infants and Toddlers with Special Needs (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 516** Assessment in Early Educational Intervention (2-3) Describes and illustrates models, methods, and materials for assessing infants and preschoolers with developmental delays and disabilities.

### **Assessment in Early Educational Intervention (2-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 530** Problems in the Education of the Learning Disabled (2-4) Review of the research and theoretical implications in the educational and behavioral management of learning disabled children.

### **Problems in the Education of the Learning Disabled (2-4)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 540** Orientation to PhD Study in Special Education (3) Information and skills needed for successful completion of Ph.D. study in Special Education for those targeting academic careers.

### **SPLED 540 Orientation to PhD Study in Special Education (3)**

Offered every fall semester, this course is for students new to Ph.D. study in Special Education to prepare them for Candidacy and initiation of a line of research. Students take the course during their first semester in the Program. Based upon special offerings and typical numbers of new Ph.D. students in Special Education the anticipated enrollment will be 5-7 students. The course is intended to provide students frequent feedback on development of basic search skills and skills related to conducting a systematic review of professional literature, a skill that is prerequisite to development of a research agenda. At this point in their development, students are not expected to be able to formulate experimental research questions or use the IRB. They are still at a point at which they need to develop their skills reading and synthesizing current literature as a foundation for future experimental efforts (development of hypotheses, experimental designs, and IRB approvals are all covered in later courses). Students will receive feedback from the instructor and from peers as well as provide it to peers thereby developing their own feedback and editing skills (students actually receive feedback on their feedback). Towards the end, they need to be able to recognize varying forms of literature reviews (differing purposes and methods) and developing a means for conducting their own reviews in a systematic, replicable manner. They need to work on technical writing skills and on organization and using APA style. To accomplish this requires a lot of discussion and analysis of work in separate stages of development of a review.

Generally the content includes basic information and skills needed for successful completion of Ph.D. study including: Campus resources, pitfalls, technical writing skills, setting a research agenda (research to practice issues) and conducting systematic reviews of professional literature. While this may not sound like much, it is important to note that this is a highly individualized course with an emphasis on skill development. Therefore, as a result of participation students will: (1) become acclimated to PSU information resources, (2) identify ways to keep on track during PhD study, (3) identify local support networks, (4) locate 3 systematic reviews of the professional literature and identify key features, (5) identify 3 key issues in research to practice in Special Education, (6) complete electronic searches for references on a topic assigned by the course instructor, (7) write an 18-22 page, systematic review (which will include introduction, methods, results, and discussion/implications sections), of the literature on a topic assigned by the instructor and based upon search results, (8) practice formulating "good" (i.e., answerable) research questions, (9) distinguish between plagiarism and appropriate citation of other works, (10) refine technical writing skills (including using APA style), (11) develop feedback/editing skills in the area of technical writing, and (12) prepare an oral presentation of their results complete with visuals. Methods of



evaluation are primarily subjective and will include both peer and instructor assessments. Peer feedback during the development of the systematic review will not carry weight toward a final grade although the instructor will provide feedback to peers on their feedback to each student. The instructor's feedback will largely be individual and in writing and orally in private meetings with each student as the review is conducted in steps (e.g. introduction, results, etc.). Instructor's feedback will include areas related to technical writing in Special Education such as correct APA format, organization, substantiating claims, analysis and synthesis skills, and providing solid rationale for the effort.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 550** Professional Seminar in Special Education (2) Professional competencies and ethical issues related to obtaining and retaining positions in higher education.

**SPLED 550 Professional Seminar in Special Education (2)**

SPLED 550, Professional Seminar in Special Education is a required course for all doctoral candidates in the Special Education Program. The purpose of the seminar is to discuss and further develop professional competencies needed to obtain and retain positions in higher education as well as discuss issues related to professional ethics. Topics will include university teaching, applying and interviewing for a job, conference presenting, developing inservice programs and other expectations of higher education not covered in other coursework. In addition, ethical issues related to conducting research and working with students, staff and colleagues will be covered.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 570** Problems in the Education of the Emotionally Disturbed (2-4) Current issues, methods, and problems associated with the education of the emotionally/behaviorally disturbed.

**Problems in the Education of the Emotionally Disturbed (2-4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

Concurrent: SPLED 305 SPLED 401

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 573** Introduction to Research in Special Education (3) A seminar to review and design research in special education.

**SPLED 573 Introduction to Research in Special Education (3)**

The research literature provides professionals in the field with an array of valuable information. Unfortunately, this literature is, for various reasons, under-utilized by classroom teachers. The ultimate purpose of this class is to help teachers find solutions in the literature to everyday classroom problems. In line with this purpose, teachers will learn how to (a) find information in the literature, (b) evaluate the technical adequacy of the information, and (c) apply the information in their setting.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 575** Grant-Proposal Development in Special Education (3) Designed to facilitate development of grants and proposal writing techniques for submission and funding by student researchers.

**Grant-Proposal Development in Special Education (3)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 594** Reserach Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Reserach Topics (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 595** Internship (1-12) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

**Internship (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 595A** Practicum (1-6) Supervised clinical experience on campus in University-managed diagnostic and remedial settings.

**Practicum (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 595B** Field Experiences in Off-Campus Laboratories (1-10) Supervised off-campus field experiences in selected laboratory settings with exceptional children.

**Field Experiences in Off-Campus Laboratories (1-10)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 595C** Internship in Special Education Supervision (1-6) Internship in day/residential school setting under supervision of field supervisor and University faculty.

**Internship in Special Education Supervision (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 595D** Internship in Special Education (2-10) Internship to take place in schools or educational situations where student is not regularly employed, under supervision of graduate faculty.

**Internship in Special Education (2-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 597A** Long Evidence-based Practices for Helping Adolescents with Learning Problems Succeed in Secondary General Education Classrooms (3) Course provides information about teaching content enhancement routines and strategies for middle and senior students.

**Long Evidence-based Practices for Helping Adolescents with Learning Problems Succeed in Secondary General Education Classrooms (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Experience in structuring and teaching a college course supervised by a graduate faculty member.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPLED 867** Practicum in Applied Behavior Analysis (2-4 per semester/maximum of 10) Supervised experience in applied settings implementing behavior management techniques.

**Practicum in Applied Behavior Analysis (2-4 per semester/maximum of 10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

Concurrent: SPLED 503A SPLED 503B SPLED 503C SPLED 503D

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Special Grad Pmgr (SPEC)

**SPEC 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPEC 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPEC 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPEC 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SPEC 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Statistics (STAT)

**STAT 401** Experimental Methods (3) Random variables; probability density functions; estimation; statistical tests, t-tests; correlation; simple linear regression; one-way analysis of variance; randomized blocks.

**Experimental Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 402** Statistical Analysis II (3) Two-sample problems, single and multifactor ANOVA, simple and multiple regression, categorical data.

**Statistical Analysis II (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 414 (MATH 414)** Introduction to Probability Theory (3) Probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Students may take only one course from STAT(MATH) 414 and 418.

**Introduction to Probability Theory (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 415 (MATH 415) Introduction to Mathematical Statistics (3)** A theoretical treatment of statistical inference, including sufficiency, estimation, testing, regression, analysis of variance, and chi-square tests.

### **Introduction to Mathematical Statistics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 416 (MATH 416) Stochastic Modeling (3)** Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.

### **Stochastic Modeling (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 418 (MATH 418) Introduction to Probability and Stochastic Processes for Engineering (3)** Introduction to probability axioms, combinatorics, random variables, limit laws, and stochastic processes. Students may take only one course from MATH(STAT) 414 and 418 for credit.

### **STAT (MATH) 418 Introduction to Probability and Stochastic Processing for Engineering (3)**

This course gives an introduction to probability and random processes. The topics are not covered as deeply as in a semester-long course in probability only or in a semester-long course in stochastic processes only. It is intended as a service course primarily for engineering students, though no engineering background is required or assumed. The topics covered include probability axioms, conditional probability, and combinatorics; discrete random variables; random variables with continuous distributions; jointly distributed random variables and random vectors; sums of random variables and moment generating functions; and stochastic processes, including Poisson, Brownian motion, and Gaussian processes.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 440 Computational Statistics (3)** Topics related to computing in statistics, including numerical linear algebra, optimization, simulation, numerical integration, and bootstrapping.

### **STAT 440 Computational Statistics (3)**

This course introduces many important ideas in statistical computing. Students are expected to possess knowledge of mathematical statistics at the level of STAT 415 and matrices at the level of MATH 220. Students will learn the statistical computing environment called R and use R to implement many of the theoretical computing topics, which include numerical linear algebra, optimization, numerical and Monte Carlo integration, random number generation and simulation, and bootstrapping. Other statistical and mathematical software may be treated briefly, including symbolic mathematics environments like Mathematica and Maple.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 460** Intermediate Applied Statistics (3) Review of hypothesis testing, goodness-of-fit tests, regression, correlation analysis, completely randomized designs, randomized complete block designs, latin squares.

### **Intermediate Applied Statistics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 461** Analysis of Variance (3) Analysis of variance for single and multifactor designs; response surface methodology.

### **Analysis of Variance (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 462** Applied Regression Analysis (3) Introduction to linear and multiple regression; correlation; choice of models, stepwise regression, nonlinear regression.

### **Applied Regression Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 463** Applied Time Series Analysis (3) Identification of models for empirical data collected over time; use of models in forecasting.

### **STAT 463 Applied Time Series Analysis (3)**

This course covers many major topics in time series analysis. Students will learn some theory behind various time series models and apply this theory to multiple examples. An introduction to time series and exploratory data analysis will be followed by a lengthy study of several important models, including autoregressive, moving average, autoregressive moving average (ARMA), autoregression integrated moving average (ARIMA), and seasonal models. For each model methods for parameter estimation, forecasting, and model diagnostics will be covered. Additional topics will include spectral techniques for periodic time series, including power spectra and the Fourier transform, and one or more miscellaneous topics chosen by the instructor, such as forecasting methods, transfer function models, multivariate time series methods, Kalman filtering, and signal extraction and forecasting. The use of statistical software will be a central component of this course, as will the proper interpretation of computer output. Students enrolling for this course are assumed to have taken a semester-long course on regression.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 464** Applied Nonparametric Statistics (3) Tests based on nominal and ordinal data for both related and independent samples. Chi-square tests, correlation.

### **Applied Nonparametric Statistics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 466** Survey Sampling (3) Introduction to design and analysis of sample surveys, including questionnaire design, data collection, sampling methods, and ratio and regression estimation.

### **STAT 466 Survey Sampling (3)**

This course covers classical sampling design and analysis methods useful for research and management in many fields. Topics include design of questionnaires; methods of data collection, sample-survey designs including simple random sampling, stratified sampling, cluster sampling, and systematic sampling ratio, regression, and difference estimation; two-stage cluster sampling; population size estimation; methods for dealing with nonresponse; and possibly other topics at the discretion of the instructor. Statistical software will be used to apply many of the techniques covered by this course.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 470W** Problem Solving and Communication in Applied Statistics (3) Provide problem solving and communication skills through development of writing ability, interaction with peers and the SCC, and oral presentations.

### **Problem Solving and Communication in Applied Statistics (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2000

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 480** Introduction to SAS (1) Introduction to SAS with emphasis on reading, manipulating and summarizing data.

### **STAT 480 Introduction to SAS (1)**

STAT 480 addresses the fundamentals of the SAS programming language. It addresses the programming environment and major aspects of the Base SAS software, including reading in, manipulating, and transforming data. It also addresses techniques for reshaping and restructuring data files, merging and concatenating data sets, creating summaries and subsets of data sets, formatting and printing data, as well as using some of the basic statistical procedures.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 481** Intermediate SAS for Data Management (1) Intermediate SAS for data management.

### **STAT 481 Intermediate SAS for Data Management (1)**

STAT 481 builds on the skills and tools learned in STAT 480 to provide intermediate level ability to use the Statistical Analysis System (SAS). It covers additional capability and major uses of the program, such as error checking, report generation, date and time processing, random number generation, and production of presentation quality output for graphs and tables. Other possible topics include advanced merging, PROC SQL, importing and exporting data sets, SAS GRAPH, and the Output Delivery System.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 482** Advanced Topics in SAS (1) Advanced statistical procedures in SAS, including ANOVA, GLM, CORR, REG,



MANOVA, FACTOR, DISCRIM, LOGISTIC, MIXED, GRAPH, EXPORT, and SQL. Credit can not be received for both STAT 482 and STAT 480/481/483.

### **STAT 482 Advanced Topics in SAS (1)**

STAT 482 builds on the skills and tools learned in STAT 480 and STAT 481 to provide advanced programming ability to use the Statistical Analysis System (SAS). It provides a survey of the major statistical analysis procedures, such as the TTEST, GLM, REG, MANOVA, FACTOR, DISCRIM, LOGISTIC, and MIXED procedures. Other topics include using the TABULATE procedure to create reports, generating random numbers, exporting data from SAS data sets, using the SAS/Graph module to produce presentation quality graphs, using the SQL procedure to query and combine data tables, and using macros to write more efficient SAS programs. Credit can not be received for both STAT 482 and STAT 480/481/483.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 483 Statistical Analysis System Programming (3)** Introduction, intermediate, and advanced (3) topics in SAS. Credit can not be received for both STAT 483 and STAT 480/481/482.

### **STAT 483 Statistical Analysis System Programming (3)**

The three-credit STAT 483 course is a combination of the three one-credit courses STAT 480, STAT 481, and STAT 482. In STAT 480, students are introduced to the SAS windowing system, basic SAS programming statements, and descriptive reporting procedures, such as the FORMAT, PRINT, REPORT, MEANS, and FREQ procedures. In STAT 481, the focus is primarily on extending the programming skills of the students, as they learn how to read messy data into SAS data sets, how to combine SAS data sets in various ways, how to use SAS character functions, how to read and process date and time variables, how to use arrays and do loops to write more efficient programs, and how to use the Output Delivery System to create SAS output in a variety of formats. STAT 482 provides a survey of the major statistical analysis procedures, such as the TTEST, GLM, REG, MANOVA, FACTOR, DISCRIM, LOGISTIC, and MIXED procedures. Other STAT 482 topics include using the TABULATE procedure to create reports, generating random numbers, exporting data from SAS data sets, using the SAS/Graph module to produce presentation quality graphs, using the SQL procedure to query and combine data tables, and using macros to write more efficient SAS programs. Credit can not be received for both STAT 483 and STAT 480/481/482.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2009

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 494 Research Project (1-12)** Supervised student activities on research projects identified on an individual or small group basis.

### **Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 494H Research Project (1-12)** Supervised student activities on research projects identified on an individual or small group basis.

### **Research Project (1-12)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 495 Internship (1-18)** Supervised off-campus, nongroup instruction including field experiences, practica, or internships.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 497C** Topics in Stat Computing with R (1) Topics: I) Basic background on R II) Manipulating data I III) Finding help IV) Simple univariate data V) importing data VI) Documenting your work VI) Manipulating data II VII) Repetitive tasks - loops and the apply() family(IX) Bidual data X) Basic analyses (as much as possible we'll work with real data.)

**Topics in Stat Computing with R (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 497C** Topics in Stat Computing with R (1) Topics: I) Basic background on R II) Manipulating data I III) Finding help IV) Simple univariate data V) importing data VI) Documenting your work VI) Manipulating data II VII) Repetitive tasks - loops and the apply() family(IX) Bidual data X) Basic analyses (as much as possible we'll work with real data.)

**Topics in Stat Computing with R (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 500** Applied Statistics (3) Descriptive statistics, hypothesis testing, power, estimation, confidence intervals, regression, one- and 2-way ANOVA, Chi-square tests, diagnostics.

**Applied Statistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 501** Regression Methods (3) Analysis of research data through simple and multiple regression and correlation; polynomial models; indicator variables; step-wise, piece-wise, and logistic regression.

**Regression Methods (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 502** Analysis of Variance and Design of Experiments (3) Analysis of variance and design concepts; factorial, nested, and unbalanced data; ANCOVA; blocked, Latin square, split-plot, repeated measures designs.

**Analysis of Variance and Design of Experiments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 503** Design of Experiments (3) Design principles; optimality; confounding in split-plot, repeated measures, fractional factorial, response surface, and balanced/partially balanced incomplete block designs.

**Design of Experiments (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 504** Analysis of Discrete Data (3) Models for frequency arrays; goodness-of-fit tests; two-, three-, and higher- way tables; latent and logistic models.

**Analysis of Discrete Data (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 505** Applied Multivariate Statistical Analysis (3) Analysis of multivariate data; T2-tests; partial correlation; discrimination; MANOVA; cluster analysis; regression; growth curves; factor analysis; principal components; canonical correlations.

**Applied Multivariate Statistical Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 506** Sampling Theory and Methods (3) Theory and application of sampling from finite populations.

### **Sampling Theory and Methods (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 507** Epidemiologic Research Methods (3) Research and quantitative methods for analysis of epidemiologic observational studies. Non-randomized, intervention studies for human health, and disease treatment.

### **STAT 507 Epidemiologic Research Methods (3)**

This 3-credit course develops research and quantitative methods related to the design and analysis of epidemiological (mostly observational) studies. Such studies assess the health and disease status of one or more human populations or identify factors associated with health and disease status. To a lesser degree, the course also covers non-randomized, intervention (experimental) studies that may be designed and analyzed with epidemiological methods. This course is a second-level course and complements Biostat Methods, STAT 509, which is focused on clinical (experimental) trials. Together, these two courses provide students with a complete review of research methods for the design and analysis for common studies related to human health, disease, and treatment. Prerequisite are Intro Biostats (STAT 250 or equivalent) and Principles of Epidemiology (H P A/BB H 440 or equivalent) or permission of the instructor. To be taught in the Spring Semester each year.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 509** Design and Analysis of Clinical Trials (3) An introduction to the design and statistical analysis of randomized and observational studies in biomedical research.

### **STAT 509 Design and Analysis of Clinical Trials (3)**

The objective of the course is to introduce students to the various design and statistical analysis issues in biomedical research. This is intended as a survey course covering a wide variety of topics in clinical trials, bioequivalence trials, toxicological experiments, and epidemiological studies. Many of these topics do not appear in other statistics courses, although a few topics are covered in greater depth in more advanced statistics courses. Computations are performed via the SAS statistical software package. Evaluation methods include four to five homework assignments, an in-class mid-semester examination and an in-class final examination.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 510** Applied Time Series Analysis (3) Identification of models for empirical data collected over time. Use of models in forecasting.

### **Applied Time Series Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 511** Regression Analysis and Modeling (3) Multiple regression methodology using matrix notation; linear, polynomial, and nonlinear models; indicator variables; AOV models; piece-wise regression, autocorrelation; residual

analyses.

### **Regression Analysis and Modeling (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 512** Design and Analysis of Experiments (3) AOV, unbalanced, nested factors; CRD, RCBD, Latin squares, split-plot, and repeated measures; incomplete block, fractional factorial, response surface designs; confounding.

### **Design and Analysis of Experiments (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1984  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 513** Theory of Statistics I (3) Probability models, random variables, expectation, generating functions, distribution theory, limit theorems, parametric families, exponential families, sampling distributions.

### **Theory of Statistics I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 514** Theory of Statistics II (3) Sufficiency, completeness, likelihood, estimation, testing, decision theory, Bayesian inference, sequential procedures, multivariate distributions and inference, nonparametric inference.

### **Theory of Statistics II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1986  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 515** Stochastic Processes and Monte Carlo Methods (3) Conditional probability and expectation, Markov chains, Poisson processes, Continuous-time Markov chains, Monte Carlo methods, Markov chain Monte Carlo.

### **STAT 515 Stochastic Processes and Monte Carlo Methods (3)**

This course provides an introduction to stochastic processes and Monte Carlo methods. The course covers topics usually covered in a standard introductory course on stochastic processes, including Markov chains of various kinds. It also covers modern Monte Carlo and Markov chain Monte Carlo methods. Simulation and computing are emphasized throughout the course.

The course is divided into two parts: the first part (roughly 8 weeks) provides an introduction to stochastic processes, while the latter (roughly 7 weeks) focuses on Monte Carlo methods, including Markov chain Monte Carlo. The first part of the course begins with a review of elementary conditional probability and expectation before covering basic discrete-time Markov chain theory and Poisson processes. The course then provides students with an overview of continuous-time Markov chains and birth-death processes. The second part of the course covers Monte Carlo methods. Starting with basic random variate generation, the course covers classical Monte Carlo methods such as accept-reject and importance sampling before discussing Markov chain Monte Carlo (MCMC) methods, which includes the Metropolis-Hastings and Gibbs sampling algorithms, and Markov chain theory for discrete-time continuous-space Markov chains.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 517** (MATH 517) Probability Theory (3) Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

**Probability Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2000  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 518** (MATH 518) Probability Theory (3) Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

**Probability Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 519** (MATH 519) Topics in Stochastic Processes (3) Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.

**Topics in Stochastic Processes (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1984  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 524** Ecometrics (3) Stochastic models and statistical methods in ecological problems; population dynamics, spatial patterns in populations of one, two, or more species.

**Ecometrics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 525** Survival Analysis I (3) Location estimation, 2- and K- sample problems, matched pairs, tests for association and covariance analysis when the data are censored.

**Survival Analysis I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1992  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 540** Statistical Computing (3) Computational foundations of statistics; algorithms for linear and nonlinear models, discrete algorithms in statistics, graphics, missing data, Monte Carlo techniques.

**Statistical Computing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Fall 1983

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 544** Categorical Data Analysis I (3) Two-way tables; generalized linear models; logistic and conditional logistic models; loglinear models; fitting strategies; model selection; residual analysis.

### **Categorical Data Analysis I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 1992

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 548** Statistical Distribution Theory (3) Analytical study of nonnormal models and methods in reliability theory, survival analysis, records evaluation, scale/scale-free analysis, and directional statistics.

### **Statistical Distribution Theory (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1984

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 551** Linear Models I (3) A coordinate-free treatment of the theory of univariate linear models, including multiple regression and analysis of variance models.

### **Linear Models I (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 552** Linear Models II (3) Treatment of other normal models, including generalized linear, repeated measures, random effects, mixed, correlation, and some multivariate models.

### **Linear Models II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 553** Asymptotic Tools (3) A rigorous but non-measure-theoretic introduction to statistical large-sample theory for Ph.D. students.

### **STAT 553 Asymptotic Tools (3)**

STAT 553 covers most standard statistical asymptotics theory but does not require any knowledge of measure theory (it does not define convergence with probability one, for example). It covers convergence of random variables in both the univariate and multivariate settings, Slutsky's theorem(s) and the delta method, the Lindeberg-Feller central limit theorem, power and sample size, likelihood-based estimation and testing, and U-statistics. Although there is no measure theory in the course, it is a mathematically rigorous course and major results are proved. Many common applications of the theory in mathematical statistics are discussed, and most assignments require the use of a computer.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 557 (IST 557) Data Mining I (3)** This course introduces data mining and statistical/machine learning, and their applications in information retrieval, database management, and image analysis.

### **STAT (IST) 557 Data Mining I (3)**

With rapid advances in information technology, we have witnessed an explosive growth in our capabilities to generate and collect data in the last decade. In the business world, very large databases on commercial transactions have been generated by retailers. Huge amount of scientific data have been generated in various fields as well. For instance, the human genome database project has collected gigabytes of data on the human genetic code. The World Wide Web provides another example with billions of web pages consisting of textual and multimedia information that are used by millions of people. How to analyze huge bodies of data so that they can be understood and used efficiently remains a challenging problem. Data mining addresses this problem by providing techniques and software to automate the analysis and exploration of large complex data sets. Research on data mining have been pursued by researchers in a wide variety of fields, including statistics, machine learning, database management and data visualization.

This course on data mining will cover methodology, major software tools and applications in this field. By introducing principal ideas in statistical learning, the course will help students to understand conceptual underpinnings of methods in data mining. Considerable amount of effort will also be put on computational aspects of algorithm implementation. To make an algorithm efficient for handling very large scale data sets, issues such as algorithm scalability need to be carefully analyzed. Data mining techniques developed in fields other than statistics, e.g., support vector machine in machine learning will be introduced as well.

Students will be required to work on projects to practice applying existing software and to a certain extent, developing their own algorithms. Classes will be provided in three forms: lecture, case study, and project discussion. In case study, students will be lead through practical problems addressed by data mining techniques. The aim is to provide a detailed view on how to convert real problems into models so that algorithms can be applied appropriately and how to solve possible computational issues. Project discussion will enable students to share and compare ideas with each other and to receive specific guidance from the instructors.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 558 (IST 558) Data Mining II (3)** Advanced data mining techniques: temporal pattern mining, network mining, boosting, discriminative models, generative models, data warehouse, and choosing mining algorithms.

### **STAT (IST) 558 Data Mining II (3)**

This course is the second course in a two-course sequence on data mining. It emphasizes advanced concepts and techniques for data mining and their application to large-scale data warehouse. Building on the statistical foundations and underpinnings of data mining introduced in Data Mining I , this course covers advanced topics on data mining; mining association rules from large-scale data warehouse, hierarchical clustering, mining patterns from temporal data, semi-supervised learning, active learning and boosting. In addition, to computational aspects of algorithm implementation, the course will also cover architecture and implementation of data warehouse, data preprocessing (including data cleansing), and the choice of mining algorithms for applications. In addition to discriminative models such as CRF and SVM models, the course will also introduce generative models such as Bayesian Net and LDA.

A term project will be developed by each student to apply an advanced data mining algorithm to a multi-dimensional data set. Classes will include lectures, paper discussions, and project presentations. Paper discussions will allow students to discuss state-of-the-art literature related to data mining. Project presentations will enable students to share and compare project ideas with each other and to receive feedback from the instructor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 561 Statistical Inference I (3)** Classical optimal hypothesis test and confidence regions, Bayesian inference, Bayesian computation, large sample relationship between Bayesian and classical procedures.

### **Statistical Inference I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None



Effective: Spring 2003

Prerequisite:

Concurrent: STAT 517

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 562** Statistical Inference II (3) Basic limit theorems; asymptotically efficient estimators and tests; local asymptotic analysis; estimating equations and generalized linear models.

### **Statistical Inference II (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2003

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 565** Multivariate Analysis (3) Theoretical treatment of methods for analyzing multivariate data, including Hotelling's T<sub>2</sub>, MANOVA, discrimination, principal components, and canonical analysis.

### **Multivariate Analysis (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 580** Statistical Consulting Practicum I (2) General principles of statistical consulting and statistical consulting experience. Preparation of reports, presentations, and communication aspects of consulting are discussed.

### **Statistical Consulting Practicum I (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2005

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 581** Statistical Consulting Practicum II (1 per semester/maximum of 2) Statistical consulting experience including client meetings, development of recommendation reports, and discussion of consulting solutions.

### **STAT 581 Statistical Consulting Practicum II (1 per semester/maximum of 2)**

This course serves as a continuation of STAT 580, which provides actual practical experience as a statistical consultant. In STAT 581, each student will hold a consulting session biweekly (by appointment) with a researcher to discuss the statistical design, analysis and computation aspects required for the client's project. Written reports are required for each project and reviewed for appropriateness and accuracy by a supervising faculty member. In addition, a weekly seminar is utilized to discuss selected projects and non-standard applications of statistical methodology. This course will be offered in the spring and summer, with an anticipated enrollment of 15-20 students per semester.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2004

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 597A** Mixture Models (3) Mixture models.

#### **Mixture Models (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 597A** Mixture Models (3) Mixture models.

#### **Mixture Models (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 897A** Introduction to Applied Statistics (3) Description statistics, hypothesis testing, power estimation, confidence, intervals, regression, one- and two-way ANOVA, chi-square tests, diagnostics.term.

**Introduction to Applied Statistics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 897D** Applied Data Mining and Statistical Learning (3) Data Mining tools are exploring data with regression, PCA, discriminate analysis, cluster analysis, classification and regression trees (CART).

**Applied Data Mining and Statistical Learning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STAT 897D** Applied Data Mining and Statistical Learning (3) Data Mining tools are exploring data with regression, PCA, discriminate analysis, cluster analysis, classification and regression trees (CART).

**Applied Data Mining and Statistical Learning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Structl Basis-Med Pr (SBMP)**

**SBMP 715** Structural Basis of Medical Practice (13) This integrated course will provide gross structure, organization, and function of human body with labs devoted to dissection of human body; clinical and radiological correlation.

### **Structural Basis of Medical Practice (13)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Study Abroad (ABLAW)**

**ABLAW 900** Study Abroad (1-17) Law student attending international study abroad program.

### **Study Abroad (1-17)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Study Abroad (STABO)**

**STABO 999** (IL) Study Abroad (1-12) See summer program brochure for description.

### **Study Abroad (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABO 999A** (IL) Consumer Arbitration - McGill PRG (1) Examines the U.S. Canadian, and European law on the use of arbitration in the context of consumer disputes. Recent High Court cases from the implicated jurisdictions are considered.

### **Consumer Arbitration - McGill PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABO 999B** (IL) UNCITRAL Model Law on ICA - McGill PRG (1) Addresses the basic principles of the international governance of arbitration, arbitral awards, and arbitral proceedings through the uniform law established by the UN Commission on International Trade Law (UNCITRAL).

### **UNCITRAL Model Law on ICA - McGill PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABO 999C** (IL) NAFTA Arbitration - McGill PRG (1) A transborder arbitration system, like ICSID, that applies to the mixed (commercial and political) disputes of international trade in the North American context. The considerations focus primarily upon NAFTA Chapter 11 arbitral proceedings.

**NAFTA Arbitration - McGill PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABO 999D** (IL) ICC Arbitration - McGill PRG (1) Examines the structure and practices of a major provider of arbitration services. The International Chamber of Commerce, headquartered in Paris, France, administers more than 600 arbitrators yearly. It plays a significant role in transborder arbitral practice.

**ICC Arbitration - McGill PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABO 999E** (IL) U.S. Law of Arbitration - McGill PRG (1) Addresses the basic issues and rules of arbitration law (including international commercial arbitration [ICA]) as articulated in U.S. law and the rulings of the U.S. Supreme Court.

**U.S. Law of Arbitration - McGill PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABO 999F** (IL) ICSID Arbitration - McGill PRG (1) A study of the World Bank arbitration process. The latter is designed to address the issue of sovereignty in the context of transborder commercial and investment disputes. ICSID was established in 1965 under the Washington Convention. It has become a key arbitration system with the proliferation of Bilateral Investment Treaties (BITs). BITs give foreign investors the right to make claims against a host State.

**ICSID Arbitration - McGill PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Study Abroad (STABR)

**STABR 997** Special Topics (1-12) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**STABR 999** (IL) Study Abroad (1-12) See summer program brochure for description.

**Study Abroad (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABR 999A** (IL) Separation of Powers - Florence PRG (1) This course will examine the federal doctrine of Separation of Powers, as applied in opinions of the United States Supreme Court. Subjects, covered will include appointment and removal of federal officers, unconstitutional delegation of legislative powers, the legislative veto, standing to sue, and proper attributes of the judicial power. The assigned readings will include brief excerpts from The Federalist and from Tocqueville's Democracy in America. Throughout the course, comparisons will be made to the treatment of similar issues in foreign countries, particularly the countries of the European Union.

**Separation of Powers - Florence PRG (1)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABR 999B** (IL) Comparative Law in a Globalized World - Transnational Perspectives - Florence PRG (2.5) This course addresses selected topics that are important for U.S. lawyers in transnational practice. It introduces students to the civil law tradition and contemporary national and supranational legal systems in Europe and around the world that have grown out of or have been substantially influenced by the civil law tradition.

**Comparative Law in a Globalized World - Transnational Perspectives - Florence PRG (2.5)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABR 999C** (IL) International and Comparative Family Law - Florence PRG (2.5) This course will present an overview of the family law systems in the United States and European countries with emphasis on Italy. The course will also focus on transnational family law problems involving recognition of foreign decrees, transnational custody battles, international adoptions etc. The course will combine theoretical and practical approaches. No prior knowledge of family law is required, and the course is not intended to be a substitute for an in depth U.S. family law course.

**International and Comparative Family Law - Florence PRG (2.5)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABR 999D** (IL) International Arbitration - Florence PRG (2.5) Because international arbitration has become a common method for resolving transnational business disputes, an understanding of arbitration enhances a lawyer's ability to work in international contexts. This course will facilitate understanding this important area of law.

**International Arbitration - Florence PRG (2.5)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**STABR 999E** (IL) Transnational Litigation and Civil Procedure - Florence PRG (2.5) This course explores the problems that most frequently arise in litigation involving foreign parties or business transactions. It initially focuses on judicial jurisdiction and related questions of forum non conveniens, validity and enforceability of forum selection clauses, antisuit- injunctions and international lis pendens. It then concentrates on the intricacies of serving process in transnational cases, and provisional remedies (injunctions, attachment and equivalent remedies) in litigation involving foreign parties or activities. The discovery process in transnational disputes and recognition and enforcement of foreign judgments are also addressed.

### **Transnational Litigation and Civil Procedure - Florence PRG (2.5)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Summer Practicum (SP)**

**SP 714** Summer Practicum (1) The Penn State College of Medicine's summer practicum gives students the opportunity to gain direct experience in the care of patients in conducting biomedical research. The course is offered during the summer session between the first and second year of medical school.

### **Summer Practicum (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Supply Chain Mgmt (SCM)**

**SCM 400** Transport Planning (3) Advanced study of transport systems in supply chain networks.

### **Transport Planning (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 404** Demand Fulfillment (3) Analysis of demand fulfillment and the role of distribution operations management in the supply chain.

### **SCM 404 Demand Fulfillment (3)**

This course introduces the student to how customer demand is managed and how subsequent orders are filled in both business-to-business and business-to-consumer markets. Topics focus on the demand fulfillment process, which encompasses flows of goods, information, and funds from the moment a business receives an order from a customer until all requirements for the order are satisfied in full. These topics include:

- \*role of demand management and distribution operations in the supply chain
- \*transportation management
- \*distribution center processes
- \*inventory control and order management elements
- \*facility costing and productivity analysis
- \*strategic demand management and distribution operations issues in the supply chain.

Both theoretical and quantitative perspectives will be offered on these topics. Additionally, each topic will be addressed from strategic and financial perspectives. After completing this course, students will have the knowledge, skills, and abilities to:

- \*Explain the role of demand management in the supply chain

- \*Explain the role of distribution operations in demand management
- \*Determine the strategic and financial impacts of demand management and distribution operations management
- \*Articulate the role of information systems in demand management and distribution operations management
- \*Use quantitative techniques to analyze supply chain processes
- \*Describe related system software.

This is one of three prescribed foundation courses for the Supply Chain and Information Systems major for which SCM 301 Supply Chain Management is a prerequisite. This course also satisfies the prerequisite for SCM 421 Supply Chain Modeling and Analysis. Student evaluations are based on individual and group homework assignments and computer-lab exercises, as well as on at least three written examinations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 405 Manufacturing and Services Strategies (3)** Investigates manufacturing and services strategies in supply chain networks.

### **SCM 405 Manufacturing and Services Strategies (3)**

This course examines manufacturing and services strategies, with special emphasis given to quality management concepts, methods, and issues. After completing this course, students will have the knowledge, skills, and abilities to:

- Explain the role of manufacturing or services operations from the boundary-spanning perspective of supply chain management and how supply chain management can be used as a strategic competitive advantage
- Articulate how the various components of a manufacturing strategy are integrated, particularly with respect to the use of information technologies for supply chains
- Effectively apply operational and quality tools useful in implementing manufacturing strategies.

Individual and team assignments form the basis for evaluation. Evaluation methods include a combination of class participation, exams, "hands-on" exercises, case studies, and written assignments. This is one of three prescribed foundation courses in the Supply Chain and Information Systems major for which B A 302 "Supply Chains" is a prerequisite. The course is also an important prerequisite for the capstone course in the major, SC&IS 450 "Supply Chain Leadership."

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 406 Strategic Procurement (3)** Analysis of strategic procurement in the supply chain.

### **SCM 406 Strategic Procurement (3)**

SCM 406 provides an in-depth analysis of the procurement process and supplier management, with strong emphasis placed on managing a supplier base for both products and services. Elements examined include the strategic role of procurement in supply chains, the identification and evaluation of requirements, the strategic make-versus-buy decision, how to identify, evaluate, and select potential suppliers and conduct a post-purchase evaluation; and the impact of information technology on strategic procurement. Both theoretical and quantitative perspectives will be offered. In addition, the topics will be addressed from strategic, financial, and global perspectives. In light of these perspectives, the course objectives are to develop a comprehensive understanding of:

- (1) the supplier selection and evaluation process
- (2) the relationship between product design and the supplier base
- (3) the types of relationships that exist between buyers and sellers
- (4) the impact of information technology on strategic purchasing and supply management.

Students will also develop skills in using quantitative tools to select and evaluate suppliers. This is the third of three prescribed foundation courses in the Supply Chain and Information Systems major.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2011



Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 416** Warehousing and Terminal Management (3) Administration of warehouse and terminal functions in logistics systems, with analysis of customer service, forecasting, inventory, investment, design, and operation. Not available to baccalaureate business students in Smeal.

### **Warehousing and Terminal Management (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 421** Supply Chain Analytics (3) Models and Methodologies for supply chain analysis.

### **SCM 421 Supply Chain Analytics (3)**

This course provides a spreadsheet-based, example-driven approach to learn about important supply chain models, problems, and solution methodologies. The objectives of this course are:

- (1) to develop valuable modeling skills that students can appreciate and use effectively in their careers
- (2) reinforce and enrich your understanding of supply chain theories, principles, and concepts studied previously in foundation courses.

Student evaluation is based on:

- (1) individual and team group performance on problem-based exercises
- (2) individual performance on examinations
- (3) class participation.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 435** International Logistics (3) Design and operation of global supply chain networks. Not available to baccalaureate business students in Smeal.

### **SCM 435 International Logistics (3)**

SCM 435 develops an understanding of concepts, methods, and issues for design and management of global supply chain networks. Special emphasis is given to import and export processes. This is an elective course for majors and minors in Business Logistics and a required course for majors in Business Logistics and International Business.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 445** Operations Planning and Control (3) Aggregate production planning procedures, disaggregation methods in hierarchical production planning, master production scheduling, material requirements planning, lot-sizing, and capacity planning. Not available to baccalaureate business students in Smeal.

### **Operations Planning and Control (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 450W** Strategic Design and Management of Supply Chains (3) Strategic design and management of supply chains.

**SCM 450W Strategic Design and Management of Supply Chains (3)**

This course is about the strategic design and effective operation of supply chains. It will help prepare you for supply chain management positions in manufacturing, distributing, and other service firms including providers of logistics services. The course focuses on the definition, as well as the application, of a single logic that guides the management of all the supply chain activities. Information decision support systems, primarily computer-based, provide the foundation for this logic. Because the determination of inventory locations and the control of inventory levels play a key role in this logic, we spend considerable time on these subjects. The last section of the course covers ways to lead and organize people to manage cross-firm and cross-functional relationships effectively. After completing this course, students should have the knowledge, skills, and abilities to:

- Articulate the process perspective and the total systems view of supply chain management, the impact of systems thinking on firm performance, and the nature of relationships supply chain networks.
- Quantify the effect of strategic initiatives such as postponement and risk pooling on the financial performance of the firm, as well as on supply chain performance.
- Use and apply selected quantitative tools useful in implementing supply chain strategies.
- Explain the complex nature of human interaction needed to successfully introduce supply chain concepts in the firm. This is the prescribed capstone course for the Supply Chain and Information Systems major. It builds upon the fundamental supply chain knowledge, skills, and abilities developed in foundation and intermediate courses. Students must complete SCM 421 before taking this course.

SCM 450W is a writing-intensive course. In addition to written assignments encompassing case studies, hands-on exercises, and examinations, student evaluations include oral presentations and class participation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 455** Logistics Systems Analysis and Design (3) Customer service, inventory management, transportation, warehousing, purchasing, international logistics, site location planning and analysis, and total cost analysis.

**Logistics Systems Analysis and Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 456** Supply Chain Risk Analysis (3) Business processes are modeled as a network of queues using discrete-event simulation and analyzed model outcomes using statistical methods.

**SCM 456 Simulation Models of Business Processes (3)**

Students will learn to build models using commercial-grade simulation software. The course objective is to teach the methods and best practice of conducting simulation experiments, but this can only be realized within the context of a fully functional modeling tool. [Our traditional choice is ARENA, from Systems Modeling Corp., but other products are feasible.] Students learn to build models of processes typical in business operations, trace their step by step function, measure performance of the system, and predict the impact of proposed changes in the system. Simulation is a long-standing method in management science that has broad applicability.

Students will complete two examinations, regular homework assignments, and an applied project. The concepts in this course build upon one another. Early homework assignments and in-class lab exercises permit the instructor to insure mastery of the principles of the course. Students work in pairs to collect and analyze data about a real system as the basis for their final project.

SCM 456 is one of three courses (MS&IS 427, 455, or SCM 456) that students can select to complete requirements for the Management Science and Information Systems major and it is an optional course in the Operation and Information Systems Management curriculum.

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 460** Purchasing and Materials Management (3) Purchasing policies, procedures, order specifications and agreements, supplier selection, and the role of purchasing in production planning and inventory management. Not available to baccalaureate business students in Smeal.

### **Purchasing and Materials Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 465** Electronic Business Management (3) A problem-based exploration of the various electronic business tools and technologies required to efficiently manage a supply chain. Not available to baccalaureate business students in Smeal.

### **Electronic Business Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 496A** Electronic Business Management (3) A problem-based exploration of the various electronic business tools and technologies required to efficiently manage a supply chain.

**Electronic Business Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 496B** Supply Chain Management (1-6) Supply chain management concepts, principles, and methodologies.

**Supply Chain Management (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 530** Supply Chain Analysis (3) Methods and tools to support supply chain decision making with emphasis on forecasting, inventory analysis, and demand planning.

**Supply Chain Analysis (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 540** Transportation in Supply Chains (2) Strategies and processes for design and implementation of transportation service links in supply chain networks.

**Transportation in Supply Chains (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 546** Strategic Procurement (2) Development of procurement and supply management strategies to support synchronized supply chains.

**Strategic Procurement (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 556** Manufacturing Strategy (2) Development of service-sensitive manufacturing strategies to support synchronized supply chains.

**Manufacturing Strategy (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 566** Demand Fulfillment (2) Demand fulfillment strategies, operations, and methods in supply chain networks.

**Demand Fulfillment (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 570** Supply Chain Modeling (2) Explore current modeling methods and software for design, analysis, execution and integration of supply chains.

**Supply Chain Modeling (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 576** Logistics and Supply Chain Leadership (2) Current issues and best practices for selected supply chain leadership topics.

**Logistics and Supply Chain Leadership (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or

small-group basis.

### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 597A** Special Topics (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 597B** Six Sigma Blackbelt for MBA Students (2) A focused overview highlighting principles of six sigma methodology including implementation of proven principles and techniques for business performance.

### **Six Sigma Blackbelt for MBA Students (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 800** Supply Chain Management (4) Introduction to the strategic framework, issues, and methods for integrating supply and demand management within and across companies.

### **SCM 800 Supply Chain Management (4)**

SCM 800 provides an enhanced understanding of key principles, concepts, and methodologies for effective supply chain management. Supply chain management is the integration of core business processes from the end user through original suppliers that provides products, services and information that add value for customers. The systems viewpoint and a process orientation are explored at the firm level and from the perspective of inter-firm collaboration among participants in supply chains. Case studies explore supply chain management and its critical role in business. The course provides opportunities to investigate important topics such as the bullwhip effect, the key approaches to planning and managing inventory across supply chains, the creation of value through alignment and realignment of supply chain capabilities, and

the key supply chain performance metrics.

After completing this course, students should have the knowledge, skills, and abilities to:

- a. Articulate the essential principles and concepts of the supply chain approach
- b. Understand the potential role of supply chains in creating value and in sustaining competitive positions of firms
- c. Explain the impact of the bullwhip effect on supply chain performance
- d. Understand the underlying causes of the bullwhip effect and articulate the principal approaches to ameliorating its impacts on supply chain performance
- e. Articulate differences in the principal approaches to managing inventories across supply chains
- f. Articulate the principal benefits and challenges associated with collaborative approaches to supply chain management
- g. Understand the principal metrics used to manage supply chain performance

The evaluation of students is based on small group case study submissions, short paper and problem assignments, on-line discussion postings, and peer reviews.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 810** Transportation and Distribution (4) Role of transportation and distribution operations in matching supply with demand; principles of transport industry analysis and competitive positioning.

#### **SCM 810 Transportation and Distribution (4)**

The course is set against a background of microeconomic theory and in a framework of supply chain management. Course design is directed toward graduate students with relatively little or no previous academic work in transport management and economics. Subject coverage includes both conceptual and applied material, such as the principles of industry analysis and competitive positioning; theory and practice of transport demand, costing, pricing, and revenue and demand management in distribution settings.

After completing this course, students should have the knowledge, skills, and abilities to:

- a. Perform an industry analysis and assess a firm's competitive positioning in its industry
- b. Explain the principal categories of cost in a transport/distribution operation and how those cost categories behave with changes in the level of activity
- c. Perform a basic activity-based costing analysis for a transport/distribution operation
- d. Articulate the principal characteristics of transport demand
- e. Understand the measure of price elasticity of demand and to use this measure to quantify the revenue impact of price changes
- f. Articulate principal distribution strategies
- g. Calculate a cost-based price and a differential price
- h. Explain the principles and primary applications of revenue and demand management

The evaluation of students is based on small team case study submissions, individual short paper and problem assignments, on-line discussion postings, and peer reviews.

This course is a prescribed course for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM). The course is the second course in the first year of study, building on foundation knowledge developed in the first course but with a focus on the deliver portion of the supply chain.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 815** Product Realization: Development, Manufacturing, and the Supply Chain (4) Integration of product development, production, and supply chain processes required to launch products from design concept to steady state manufacturing.

#### **Product Realization: Development, Manufacturing, and the Supply Chain (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 820 Strategic Procurement (4)** Strategic planning for the source/buy process, including developing and managing supplier relationships, global issues, and e-procurement.

#### **SCM 820 Strategic Procurement (4)**

The course provides a special emphasis on the development and management of strategic sourcing relationships and promotes an understanding of the strategic role of supply management in effective supply/demand/value chain operations. Students learn through the application of course materials to relevant supply management case problems and scenarios. Collaboration in case preparation is required. Online discussions, "what if scenarios," and contemporary problems enhance the learning experience.

After completing this course, students should have the knowledge, skills, and abilities to:

- a. Understand the strategic role of supply management in effective supply/demand/value chain management.
- b. Understand the potential impact of supply management on the competitive success and profitability of business organizations.
- c. Articulate supply management best practices and understand the circumstances under which they work or do not work as well.
- d. Understand key issues and approaches in relation to strategic supply management, including: supply relationship management, supply segmentation, and the outsourcing decision.
- e. Plan and execute negotiation strategies.
- f. Explain developments and technologies in e-Business and e-Procurement and their implications for supply chain management. View and examine future trends in both e-Business and e-Procurement.
- g. Understand basic issues related to global sourcing.
- h. Articulate the challenges and opportunities for supply management in the future.

The evaluation of students is based on small group case study submissions, individual case study submissions, a small group negotiation exercise, on-line discussion postings, and peer reviews.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 830 Supply Chain Analysis (2)** Methods and tools to support supply chain decision making with emphasis on forecasting, inventory analysis, and demand planning.

#### **SCM 830 Supply Chain Analysis (2)**

Students in SCM 830 will manage competing firms in an action-learning simulation. In this simulation, students must make marketing, production, distribution, and procurement decisions for their firm. Students will develop analytic models to help support their decisions. Students will learn techniques for demand forecasting and inventory planning and build decision support tools to help make these decisions.

After completing this course, students should have the knowledge, skills, and abilities to:

- a. Understand the interaction between supply chain operations and pricing and marketing efforts
- b. Articulate the importance to firm performance of coordinated interaction among multiple functional areas associated with the supply chain
- c. Use time series models and appropriate qualitative adjustments for demand planning
- d. Use demand forecasts to make inventory decisions
- e. Apply commercial spreadsheet software to develop forecasts and to make inventory decisions

Evaluation of students is largely based on student performance in the simulation, supporting models developed and justifications given for their decisions. Short written assignments and quizzes may also be used for assessment.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 840 Supply Chain Project Management (4)** The fundamentals and tools of managing supply chain projects, with special emphasis given to related information technology projects.

#### **SCM 840 Supply Chain Project Management (3)**

This course explores the principles, concepts, and tools of managing supply chain projects, including project activity that requires a commitment of resources and people to an often strategically important undertaking that is not repetitive and short term. Special emphasis is given to IT related projects in supply chains.



After completing this course, students should have the knowledge, skills, and abilities to:

- a. Articulate the critical project management elements and the sequence of these elements in bringing a project to fruition and success.
- b. Charter and organize a cross-supply-chain project teams capable of achieving project success.
- c. Use and apply the essential project management tools such as CPM, PERT, and Project to complete supply chain projects.
- d. Determine project risks, costs, and advantageous alternative project paths.

Evaluation methods include a combination of written assignments and case studies, exercises, projects, and on-line discussion postings.

This course is a prescribed course for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM). The course is taken in the second year of study, building on supply chain management knowledge developed in three foundation courses taken in the first year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 850** Supply Chain Design and Strategy (4) Design and management of supply chain networks, emphasizing the alignment of supply chain networks with corporate competitive strategy.

#### **SCM 850 Supply Chain Design and Strategy (4)**

The focus of this course is the strategic design of supply chain networks. Supply chain design decisions have extraordinary impact on the cost and service value attributes of a product or service over its lifetime. The influence of supply chain design on a firm's profitability and competitive positioning is one reason why competition today extends beyond firm versus firm to supply chain versus supply chain. Supply chain design decisions are among the most financially influential and long lasting business decisions and yet, supply chain designs should not be static. Ever increasing customer requirements, expanding product lines and customer segments, decreasing product life cycles, and competitive pressures enabled by a growing range of flexible supply chain design constantly force supply chain executives to evaluate and modify their current supply chain networks and the role of the supply chain in their firm's overall strategy.

This course provides an examination of (1) the role of supply chain network design within the context of the firm's competitive strategy, (2) alternative supply chain designs and the factors that influence network design decisions, (3) a framework for the network design process, and (4) the principal models and techniques used for the design of supply chain networks.

After completing this course, students should have the knowledge, skills, and abilities to:

1. Explain the importance of achieving strategic fit between a firm's competitive strategy and the design of the firm's supply chain network.
2. Describe the basic decision making framework for achieving strategic fit.
3. Identify the key questions in network design for supply chains
4. Identify the principal supply chain network design alternatives
5. Enumerate the principal factors influencing choices among alternative supply chain designs
6. Present a framework for the supply chain network design process
7. Examine the principal models and techniques used for making network design decisions
8. Consider the influence of demand and supply uncertainties on network design choices

Evaluation of students is based on individual and team case study submissions, a culminating simulation exercise, on-line discussion postings, and peer reviews.

This course is prescribed for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM) and its taken in the second year of study, building on the supply chain knowledge, skills and abilities developed in previous foundation courses.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 860** Supply Chain Transformation and Innovation (4) Strategic supply chain transformation and innovation with emphasis on (re)configuration of key capabilities to achieve competitive advantages.

#### **SCM 860 Supply Chain Transformation and Innovation (4)**

This course focuses on strategic supply chain transformation, innovation, and organizational change. The course examines current issues and best practices with respect to supply chain strategy; value creation through design and

redesign of supply chain capabilities; transformational outsourcing; supply chain role in new product design, development, and market introduction; technology adoption; and change management. Supply chain transformation initiatives offer firms great potential for improving profitability and competitive positioning, both within the market and within the supply chain. Because sustainable competitive advantage is not found in one set of supply chain capabilities, strategic transformations must constantly assemble and reassemble the key capabilities that give the firm and its supply chain successive temporary advantages. This assembling or redesigning of capabilities chains should be an on-going process as the most significant value producing capabilities in any given industry change over time. The ability to consistently assemble the set of capabilities that produce competitive advantages is what some refer to as the ultimate core capability.

After completing this course, students should have the knowledge, skills, and abilities to:

1. Articulate the meaning of competitive strategy in the context of transformation of supply chain capabilities chains.
2. Understand value creation through transformation of supply chain capabilities over time.
3. Identify the supply chain structure that is appropriate for various business situations
4. Examine the development of essential elements of rapid response supply chain capabilities
5. Understand the conditions under which functional activities, such as, manufacturing, product design, and new concept development, are amenable to outsourcing
6. Assess operational and strategic challenges of vertical integration and outsourcing and in particular, highlight the nature of the strategic tension created by supplier decisions to integrate vertically into capabilities previously performed by critical customers
7. Articulate the role of supply chain transformation in support of new product development
8. Identify ways to organize and lead change in organizations

The evaluation of students is based on individual and team case study submissions, short paper and problem assignments, on-line discussion postings, and peer reviews.

This prescribed course in the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM) is the capstone course taken in the second year of study that integrates previous topics.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 894** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

#### **Research Topics (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 896** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

#### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 897** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

#### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SCM 898** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

### Special Topics (1-9)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Supply Chain and Information Systems (SC&IS)

**SC&IS 505** Management Information Systems Research (1-3) Research problems and issues in supply chain and information systems.

### SC&IS 505 Management Information Systems Research (3)

This is a Ph.D. level course designed to familiarize students with information systems theories and research methodologies. Special emphasis is given to the design science paradigm and, specifically, to process and data modeling of information systems problems using techniques like UML, XML, and Petri-nets. In addition, workflow systems as an application of process modeling will be studied. After completing this course, students will have the knowledge, skills, and abilities to discuss and critically reflect on:

- a) Information system research paradigms
- b) Information system modeling techniques
- c) Coordination theory
- d) Workflow models, management and architectures
- e) Information systems in supply chains

This is a prescribed research foundation course. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Fall semester for 5-10 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 510** Introduction to Supply Chain and Information Systems (3) Introduction to the strategic framework, issues, and methods for integrating supply and demand management within and across companies.

### SC&IS 510 Introduction to Supply Chains and Information Systems (3)

This course introduces the strategic framework, the managerial issues, and the methodologies for integrating supply and demand management within and across companies. Both theoretical and quantitative perspectives will be offered on these topics. Additionally, each topic will be addressed from strategic, financial, and research perspectives. After completing this course, students will have the knowledge, skills, and abilities to discuss and critically reflect on:

- a) supply chain theories, methodologies, trends, best practices, and research issues
- b) core supply chain processes
- c) strategic and financial impacts of supply chain management
- d) role of information systems

This is the first of four prescribed foundation courses. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Fall semester with resident enrollment limits set at 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 516** (I E 516) Applied Stochastic Processes (3) Study of stochastic processes and their applications to engineering and supply chain and information systems.

**SC&IS (I E) 516 Applied Stochastic Processes (3)**

This course covers the mathematical fundamentals and tools for analyzing stochastic systems evolving over time, including concepts and techniques related to Poisson Processes, renewal processes, and discrete and continuous time Markov chains. Students will also learn to build probabilistic intuition and insights when thinking about random processes. Additionally, students will learn to apply the essential techniques of stochastic processes to real world problems in the supply chain and information systems area.

This is a prescribed research foundation course for Ph.D. students in SC&IS. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Spring semester to approximately 5-10 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 519 (I E 519) Dynamic Programming (3)** Theory and application of dynamic programming; Markov decision processes with emphasis on applications in engineering systems, supply chain and information systems.

**SC&IS (I E) 519 Dynamic Programming (3)**

This course presents the basic theory and applications of dynamic programming. The focus of the course will be on the theory of Markov decision processes (MDP), which provides an analytical tool to optimally control the behavior of a Markov Chain. The students will learn fundamental MDP models, computational methods and applications in supply chain and information systems, including production and inventory control, quality control, logistics, scheduling, queueing network, and economic problems.

Student evaluations are based on class participation, individual and group assignments, and projects. This course will be offered during Spring semester for approximately 5-10 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 520 Principles of SC&IS I (3)** Initial course on principles of supply chain and information systems with special emphasis on potential research topics.

**SC&IS 520 Principles of SC&IS I (3)**

This is the first of two courses covering principles, research problems and issues in supply chain and information systems. The course familiarizes students with a wide range of appropriate research topics and prepares them to initiate doctoral level research in these areas. Topics include: logistics network design, transportation and distribution, management production and inventory management, supply chain integration and coordination, workflow systems, and process and data modeling of information systems.

Evaluation methods include homework assignments, research paper(s), presentations, and class participation and discussion.

Offered in the fall semester only. SC&IS 510 is a prerequisite.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 525 Supply Chain Optimization (3)** Introduction to theory and practice of optimization methods and models for analyzing and improving the performance of supply chain environments.

**SC&IS 525 Supply Chain Optimization (3)**

This course introduces students to the optimization methods and models that are applicable to managing supply chains and provides a quantitative foundation for research in supply chain management. The primary objective is to investigate

the theory and practice of optimization methods, especially as they apply to managing large, interconnected supply chains. The investigation includes mathematical programming techniques, modeling approaches, and optimization languages.

This is a required course for Ph.D. students in SC&IS and an element of a set of methodological courses designed to provide a framework for analytical study of supply chain management. The course may also serve graduate students in related fields of study. Student evaluations are based on individual and group assignments or projects and examinations. This course will be offered during Spring semester to approximately 5019 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 530** Principles of SC&IS II (3) Sequel on principles of supply chain and information systems with special emphasis on potential research topics.

### **SC&IS 530 Principles of SC&IS II (3)**

This sequel to SC&IS 520 is directed at first and second year Ph.D. students in the SC&IS program. Other graduate students are welcome to attend with instructor's permission. The objectives are to (1) study supply chain and information system principles, (2) expose students to a wide range of appropriate research topics, and (3) prepare students to conduct doctoral level research in these areas. Topics include planning, integration, and coordination; value and impact of information; game theory models, auctions, and behavioral issues.

Evaluation methods include homework assignments, research paper(s), presentations, and class participation and discussion.

This is the second part of a two-course sequence covering research problems and issues in supply chain and information systems. Offered in the spring term only. SC&IS 510 is a prerequisite.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 535** Statistical Research Methods for Supply Chain and Information Systems (3) Current statistical research methods for modeling and analysis of supply chain and information systems.

### **SC&IS 535 Statistical Research Methods for Supply Chain and Information Systems (3)**

This is a Ph.D. level course that requires in-depth study of statistical research methods for observational analysis and modeling of supply chain and information systems. Special emphasis is given to five methods of statistical inference:

- a) Estimation
- b) Comparison of K-groups
- c) Forecasting
- d) Data mining
- e) Decision-making under uncertainty

Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Fall semester for approximately 5-10 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 540** Transportation and Distribution Management (3) Transportation and distribution systems in supply chains. Emphasis on role of system cost, price, service elements in total order management.

### **SC&IS 540 Transportation and Distribution Management (3)**

This course focuses on the role of transport and distribution systems in new supply chain business models, with special emphasis given to total order management. Transportation system topics cover economic conditions, managerial

strategies, governmental policies, and other phenomena, which affect the demand for and supply of transport and distribution services. Course design is directed toward graduate students with relatively little or no previous academic work in transport management and economics. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during the Fall semester with resident enrollment limits set at approximately 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 545 Supply Chain Systems Simulation (3)** Application of computer simulation to analysis and design of supply chain and information systems design; simulation experiments in SC&IS research.

### **SC&IS 545 Supply Chain Systems Simulation (3)**

This course will provide an introduction to Monte Carlo and discrete-event simulation. Material will be aimed at the students who need to use simulation as a research tool at a sophisticated level. Although the focus of the course is the application of simulation to the analysis and design of supply chain and information decision systems, the material in this course will be appropriate for a much broader range of applications. Some time will be spend constructing simulation models of real-world systems, but the bulk of the course will be devoted to the statistical analysis required for correctly specifying input processes and interpreting the output of simulation models.

This is an elective course for graduate students in SC&IS, which may also serve graduate students in related fields of study. Student evaluations are based on a series of classroom assignments. This course will be offered during Spring semester to approximately 5-10 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 546 Procurement and Supply Management (3)** Analysis, planning, and management of domestic and international procurement and supply activities.

### **SC&IS 546 Procurement and Supply Management (3)**

SC&IS 546 provides an overview of procurement and supply management in the context of domestic and global supply-chain networks. Special emphasis is given to strategic sourcing relationships, supply management "best practices," and E-perspectives on supply management. The course uses problem-based learning and emphasizes the case method. The goal is to learn through the application of course materials to relevant supply management case problems and scenarios. Collaboration in case preparation is required. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during the Fall semester with resident enrollment limits set at 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 560 Seminar in Transport Economics and Policy (3 per semester/maximum of 6)** Comparative analysis of theoretical and empirical studies in transport cost, demand, pricing, and policy problems.

### **SC&IS 560 Seminar in Transport Economics and Policy (3-6)**

This course is designed for Ph.D. students interested in intensive study of transportation economics and policy research and current issues. Student evaluations are based on class participation, individual and group assignments, and written exams. This course will be offered during the Spring semester with resident enrollment limits set at approximately 20 students.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 565** Supply Chain Strategy (3) Strategies, issues and best practices in technology adoption, change management, financial/capability assessments, critical aspects of relationship management in supply-chain networks.

### **SC&IS 565 Supply Chain Strategy (3)**

The course focuses on the strategic design and the effective operation of supply chains. It specifically seeks to integrate topics foundation course and to engage students in the critical analysis and in probing discussions of specific supply chain leadership issues. Special emphasis is given to supply chain technology adoption, change management, shareholder value assessment, capability assessment, relationship management, and performance metrics.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 570** (I E 570) Supply Chain Engineering (3) Use of operations research models and methods for solving problems in supply chain systems.

### **SC&IS (I E) 570 Supply Chain Engineering (3)**

The course provides state-of-the-art mathematical models, concepts and solution methods important in the design, control, operation and management of global supply chains. It provides an understanding of how companies plan, source, make and deliver their products to create/or maintain a global competitive advantage. It emphasizes the application of operations research models and methods to optimize the various components of an integrated supply chain. The course is appropriate for graduate students interested in working in the supply chain area in industry as well as those planning to pursue research in supply chain optimization.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 570** (I E 570) Supply Chain Engineering (3) Use of operations research models and methods for solving problems in supply chain systems.

### **SC&IS (I E) 570 Supply Chain Engineering (3)**

The course provides state-of-the-art mathematical models, concepts and solution methods important in the design, control, operation and management of global supply chains. It provides an understanding of how companies plan, source, make and deliver their products to create/or maintain a global competitive advantage. It emphasizes the application of operations research models and methods to optimize the various components of an integrated supply chain. The course is appropriate for graduate students interested in working in the supply chain area in industry as well as those planning to pursue research in supply chain optimization.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Future: Spring 2014

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 590** Colloquium (1-3) Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 597P** Supply Chain Practicum (2) Course designed to expose students to supply chain research in the context of industry.

**Supply Chain Practicum (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**SC&IS 597P** Supply Chain Practicum (2) Course designed to expose students to supply chain research in the context of industry.

**Supply Chain Practicum (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 599** (IL) Foreign Studies (1-2 per semester/maximum of 4) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-2 per semester/maximum of 4)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 601** Thesis Preparation No description.

**Thesis Preparation**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 610** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SC&IS 611** Thesis Preparation No description.

**Thesis Preparation**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Surgery-Hy (SURG)**

**SURG 700** Surgical Core Clerkship (15) Fundamental surgical course for medical students designed to provide basic surgical information and clinical exposure.

**Surgical Core Clerkship (15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 710** General Surgery Acting Internship (5) Four week General Surgery Acting Internship.

**General Surgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 711** Cardiothoracic Surgery Acting Internship (5) Acting Internship in Adult Cardiothoracic Surgery.

**Cardiothoracic Surgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 712** Surgical Endocrinology Elective (5) An in-depth experience involving the medical and surgical management of endocrinological disorders.

**Surgical Endocrinology Elective (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 713** Vascular Surgery Acting Internship (5) An opportunity for in-depth experience in vascular surgery.

**Vascular Surgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**SURG 714** Transplant Surgery Acting Internship (5) An in-depth experience in the preoperative evaluation, intra-operative procedures, and postoperative management of kidney, liver, and pancreas transplant patients.

**Transplant Surgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 720** Plastic Surgery Acting Internship (5) Preceptorship with an active plastic surgical service at The Milton S. Hershey Medical Center or an affiliated hospital.

**Plastic Surgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 722** Hand Surgery Acting Internship (5) Surgical Acting Internship experience in Hand Surgery.

**Hand Surgery Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 740** Urology Acting Internship (5) In-depth experience in evaluation and management of urologic problems.

**Urology Acting Internship (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 741** Intensive Respiratory Care -- Anesthesia (5) Students are taught to assess and manage acute respiratory insufficiency.

**Intensive Respiratory Care -- Anesthesia (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 745 (PED 745)** Pediatric Cardiothoracic Surgery Elective (5) This fourth-year elective provides an introduction to the operative repair and peri-operative management of simple and complex congenital heart disease.

**SURG (PED) 745 Pediatric Cardiothoracic Surgery Elective (5)**

This elective in pediatric cardiothoracic surgery is offered to fourth-year medical students with an interest in congenital heart disease. It is principally targeted at students who plan a career in pediatrics, surgery, or pediatric or adult cardiology. The course is offered year-round on a monthly basis, with enrollment limited to 1-2 students per rotation. Students will work exclusively with attending surgeons in the clinical environment, and will participate in the comprehensive surgical management of infants, children, and adults with congenital heart disease. Clinical exposure will be provided to the initial surgical consultation, the judgment and rationale for operative versus non-operative

management, the preoperative family counseling meeting and informed consent process, and the formulation of the operative plan. In the operating room, students will second-assist with pediatric heart surgery and will gain first-hand appreciation of the anatomic defects and their surgical repair. Postoperatively, students will participate in clinical rounds on pediatric heart surgery patients, and will follow the patients to discharge. The elective will emphasize the multi-disciplinary approach to the management of congenital heart disease, with collaborative exposure to pediatric cardiology, pediatric critical care, cardiac anesthesia, and cardiology for adults with congenital heart disease. Didactic lectures, case presentations, and reviews will be provided to students as an introduction to the major heart defects. Students will gain skill in the interpretation of echocardiograms, and will have the opportunity to view, in real-time, intraoperative transesophageal echo images, and correlate those images to the live, beating heart. Students will also gain skill in interpretation of cardiac MRI and CT angiography. The course is offered as an elective for students seeking an advanced introduction to surgery for congenital heart defects. The course is not intended as an acting-internship; thus, there is no in-house call, and limited night or weekend clinical requirements. A pre-test and a post-test will be administered.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 770 Otolaryngology Acting Internship (5)** A clinical experience devoted to disorders of the ears, nose, throat, and head and neck.

#### **Otolaryngology Acting Internship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 771 Otolaryngology - Head and Neck Surgery Elective for Third Year Medical Students (2.5)** This course provides exposure to basic concepts for diagnosis and management of ear, nose and throat problems in children and adults.

#### **SURG 771 Otolaryngology - Head and Neck Surgery Elective for Third Year Medical Students (2.5)**

This course is designed to introduce third year medical students to the basics of evaluation and management of patients with ear, nose, throat and neck problems. Students on this elective will serve as an integral part of the Otolaryngology - Head & Neck Surgery team. This rotation should serve to enhance the head and neck history and examination skills of the student. Student will be expected to personally evaluate patients in the clinic, as well as possibly through the emergency room and inpatient consultation service. Management of these patients will be discussed with resident and attending faculty in formulating a treatment plan. Operative experience will be directed mostly towards routine ear, nose, throat, and neck surgeries. More intense head and neck cases may be utilized as opportunities for head and neck anatomy experiences for all students. For those expressing an interest in otolaryngology - head and neck surgery as a potential career, operative experience can be tailored for the exposure necessary to demonstrate the breadth of otolaryngology - head and neck surgery. Daily conferences and lectures will serve as formal didactics, in addition to the teaching opportunities provided in outpatient clinics and inpatient rounds.

The goals of this elective rotation are to enhance head and neck skills and to reinforce for students the otolaryngologic pathology they are likely to see in their clinical practice, regardless of specialty.

Evaluation methods will include subjective evaluation of students' funds of knowledge and patient care skills by the attending otolaryngology - head and neck surgery faculty. This course will be offered throughout the entire academic year.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 780 Pediatric Surgery Acting Internship (5)** Exposure to the surgical crises of the pediatric patient and their treatment.

#### **Pediatric Surgery Acting Internship (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 796** Surgery Individual Studies (5) Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

### **Surgery Individual Studies (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 796A** Surgery Individual Studies for 3rd Year Medical Students (2.5) Surgery Individual Studies for 3rd Year Medical Students.

### **Surgery Individual Studies for 3rd Year Medical Students (2.5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SURG 797** Surgery Special Topics (5) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Surgery Special Topics (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Systems Engineering (SYSEN)**

**SYSEN 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 497A** Wireless Positioning (3) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Wireless Positioning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 505** Technical Project Management (3) Analysis and construction of project plans for the development of complex

engineering products taken from a variety of problem domains.

### **Technical Project Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2003

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 507 Systems Thinking (3)** The theory and practice of systems thinking. General systems theory; system dynamics, emergent properties, structure, feedback and leverage.

### **SYSEN 507 Systems Thinking (3)**

This course provides students with the tools to understand and describe complex systems and to identify emergent properties, feedback mechanisms, and their effects. Students will understand the difference between systematic and systemic approaches, the pitfalls of reductionism, and the necessity for holistic system understanding and description. They will apply these ideas through a variety of approaches and methodologies including Causal Loop Diagrams, Stock and Flow Diagrams and Rich Pictures.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 509 Biostatistics (3)** Multivariate Statistical methodology arising in the health care and biological sciences.

### **SYSEN 509 Biostatistics (3)**

The rationale behind Multivariable Statistical methodology arising in the health care and biological sciences will be examined. The use and interpretation of the output of a statistical software package for implementation of the methodology will be emphasized. Topics will include Multiple Regression, Covariance analysis, Principal Components, Contingency Tables and Survival Analysis.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 510 Engineering Analysis I (3)** The course includes applications of advanced engineering mathematics; the study of systems are described by ordinary/partial differential equations and methods of solutions.

### **Engineering Analysis I (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 520 Systems Engineering (3)** Fundamentals of Systems Engineering with focus on System methodology, design, and management; includes life cycle analysis, human factors, maintainability, serviceability/reliability.

### **Systems Engineering (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 522** Systems Verification Validation & Testing (3) The theory and practice of verification, validation and testing of engineering systems.

**Systems Verification Validation & Testing (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 530** Systems Optimization (3) Theory/practice of linear programming will be developed including determination of optimum mix of products, levels of staffing, blending, network analysis, multi-period planning.

**Systems Optimization (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 531** Probability Models and Simulation (3) Provides background in modeling problems containing random components that must be accounted for in a reasonable solution.

**Probability Models and Simulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 533** Deterministic Models and Simulation (3) Provides a background in simulation and the modeling of problems that contain differential equations as part of the system.

**Deterministic Models and Simulation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 536** Decision and Risk Analysis in Engineering (3) Analysis of engineering decisions under uncertainty; problem identification, formulation, judgment, resolution; mitigation, risk analysis, quantification and management.

**SYSEN 536 Decision and Risk Analysis in Engineering (3)**

This course examines the analysis of decisions under uncertainty within the context of engineering and technology. It focuses on understanding and improving the decision-making process of individuals and groups in technical organizations. Emphasis is placed on evaluation methods; identification, modeling, and problem resolution; consequences/outcomes of the action taken; risk analysis and quantification.

**Objectives**

1. To appreciate the theoretical foundations of decision sciences within the context of engineering data and problems.
2. To be able to explain and evaluate alternative perspectives of the decision making process.
3. To be able to identify sources of decision failure in individuals and organizations.
4. To gain an understanding of decision technologies in the context of engineering decision making.

Performance will be evaluated through a mid-semester written examination, homework (case studies) assignments, class participation, and a semester group project with an in-class presentation.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 540** Intelligent System Applications (3) Mathematical foundations of intelligent control and systems; linear quadratic self-tuning regulation and model reference adaptive control.

### **Intelligent System Applications (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 550** Creativity and Problem Solving I (3) Foundations of individual problem solving, including creativity, cognitive style and level, problem solving processes and techniques, the paradox of structure.

### **SYSEN 550 Creativity and Problem Solving I (3)**

Problem solving is a fundamental human activity that is critically important to all disciplines. The primary objective of this course is to help students become better and more effective problem solvers through a basic, yet rigorous, understanding of the cognitive processes involved in problem solving and individual creative behavior. To meet this objective, selected elements of cognitive psychology are examined, along with general and domain-specific models of the problem solving process, a variety of problem solving techniques, and illustrative examples and case studies related to these topics in a variety of contexts (including science, engineering, and management). In addition, students will explore their personal preferences for problem solving strategies and the ways these preferences can impact both personal and professional life. Here, the objective is to provide students with an assessment of their strengths and weakness in the domain of problem solving, as well as a basis of understanding and appreciating the diverse problem solving abilities and styles of others.

With its focus on effective problem solving at the individual level, this course is appropriate for students in all disciplines and areas of study. It also serves as the foundation for additional courses in problem solving, which may build upon the theoretical elements presented here (e.g., group problem solving) or serve as in-depth application studies in specific topical areas (e.g., invention). Students' performance in this course will be evaluated through written examinations and homework assignments, as well as class participation. This course will be offered at least once during each academic year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 552** Creativity and Problem Solving II (3) Theory and practical applications of group problem solving, including cognitive gap, coping behavior, agents of change, and managing cognitive diversity.

### **SYSEN 552 Creativity and Problem Solving II (3)**

This course builds on an understanding of the individual problem solver to address the dynamics of group problem solving, with a particular focus on the domains of science, engineering, and technical management. At the core of the course material is cognitive gap, i.e., differences in cognitive characteristics that may exist between problem solvers (both individuals and groups) and/or between problem solvers and the problems they solve. Students will explore the impact different cognitive profiles on problem solving from multiple perspectives, including group efficiency, personal communication, and the quality of group outcomes. Strategies and tactics for improving the problem solving performance of groups of all sizes will be learned and applied using real-world examples and case studies. Upon completing this course, students will have a fundamental, rigorous understanding of cognitive diversity within groups and how it can be leveraged to make problem solving more effective. Skills learned will include: analyzing the cognitive resources of a problem solving group; breaking down complex problems based on cognitive variables; and matching cognitive resources appropriately with required skills.

With its focus on effective problem solving at the group level, this course is appropriate for students in all disciplines and areas of study. It also serves as the foundation for additional courses in problem solving, which may build upon the theoretical elements presented here (e.g., problem solving leadership) or serve as in-depth application studies in specific topical areas (e.g., invention). Students' performance in this course will be evaluated through written examinations and homework assignments, as well as class participation. This course will be offered at least once each academic year.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details



check the specific course syllabus.

**SYSEN 554 Problem Solving Leadership (3)** Models, processes, and techniques for solving complex problems, managing problem solving diversity, and facilitating change through problem solving in socio-technical systems.

### **SYSEN 554 Problem Solving Leadership (3)**

As the problems faced by professionals become more complex, expertise in the domain of the problem must be supplemented with knowledge about the problem solver and the problem solving process. This course builds on an understanding of the individual problem solver and problem solving groups (and the individual's role within them) to focus on the facilitation of complex problem solving within socio-technical systems, including the role of the problem solving leader within problem solving groups.

Students will learn and implement strategies for characterizing and coordinating the problem solving preferences and abilities of individuals and groups based on problem constraints and the solutions desired. Other topics and skill sets covered will include: systems models of leadership; practical leadership as problem solving; processes and techniques for characterizing complex needs, generating and assessing potential solutions, and evaluating problem solving outcomes; frameworks for modeling and coordinating problem solving diversity among people, problems, and products; and the modeling and facilitation of socio-technical change through problem solving.

This course is appropriate for students in all disciplines and areas of study, although it is particularly relevant for students in engineering, science, and/or management. Students' performance in this course will be evaluated through written examinations, homework assignments, and a class project that extends over the semester.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 555 Invention and Creative Design (3)** This course focuses on the creative design process which leads to the development of new products, processes, and systems (i.e. invention).

### **Invention and Creative Design (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 590 Colloquium (1-3)** Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 594 Research Topics (1-15)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 594A Masters Research Paper (3)** Supervised student activities on research projects identified on an individual or small-group basis.

### **Masters Research Paper (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 594A** Masters Research Paper (3) Supervised student activities on research projects identified on an individual or small-group basis.

### **Masters Research Paper (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 596A** Modeling Relationships of Engineering Design Behavior, Problem Solving, and Data of Engineers (3) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

### **Modeling Relationships of Engineering Design Behavior, Problem Solving, and Data of Engineers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**SYSEN 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1999

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Taxation (TAX)**

**TAX 949** Basic Federal Income Taxation (3) This course examines the basic substantive provisions of the federal income tax law. Included are the following general topics: gross income, exclusions, deductions, depreciation, basis, tax accounting, and other provisions affecting situations encountered by attorneys in general practice.

### **Basic Federal Income Taxation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 950** Advanced Federal Income Taxation (3) This course is designed to continue the examination of the basic substantive provisions for the federal income tax law begun in Basic Federal Income Taxation, including the following general topics: income splitting and assignment, realization and recognition of gain and loss, capital transactions, the investment credit, and other taxable entities.

### **Advanced Federal Income Taxation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 951** Comparative International Tax Law (3) This course treats the unique problems of Home country taxation of the foreign income and operations of resident persons and enterprises and Host country taxation of foreign persons and enterprises. Topics include the treatment of cross-border business and investment; sales, financing and e-commerce; the source of income; worldwide and territorial taxation; methods for the elimination of double taxation including foreign tax credits, exemption, and treaties; controlled foreign corporations; tax avoidance; and value added taxes. While stressing the law of the United States and the European Union, this course broadly examines the tax law of both developed and emerging economies to gain a better understanding of the impact of taxation internationally.

### **Comparative International Tax Law (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 960** Employee Benefits Law (2-3) This course introduces students to the law governing employer-provided benefit programs. It will begin with a look at the early development of welfare and pension plans offered through the workplace. The course will examine closely the landmark Employee Retirement Income Security Act of 1974 ("ERISA) and its subsequent amendments. Among topics to be covered will be defined benefit and defined contribution pension programs. This will include a survey of rules relating to pension taxation, vesting, funding, alienability, guaranty, and fiduciary duties. With respect to health insurance, the course will look at issues affecting both employee and retiree health programs, including collectively bargained ones. The course will also discuss the subjects of age discrimination in employee benefit programs as well as ERISA preemption.

### **Employee Benefits Law (2-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 980** Partnership Taxation (2) This course examines the income tax consequences of the formation, operation, and liquidation of a partnership, the classification of an entity as a partnership, distributions by a partnership, and sales of partnership interests.

### **Partnership Taxation (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 988** State and Local Taxation (2) Beginning with historical and constitutional aspects, students will analyze in detail recent developments in state and local taxation and their impact on client representation. Attention will be concentrated on corporate, sales and use and other business taxes, death duties, and property taxes and exemptions.

### **State and Local Taxation (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 991** Corporate Tax (3) This course focuses primarily on income tax problems unique to corporations and the income tax problems arising from the shareholder-corporate relationship.

### **Corporate Tax (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 992** International Tax (2) This course addresses U.S. taxation of the foreign income and operations of U.S. persons and enterprises.

### **International Tax (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 994** Tax Aspects of Mergers and Acquisitions (2) This course approaches corporate tax issues through the prism of the Federal income tax treatment of taxable and tax free mergers and acquisitions (M&A).

### **Tax Aspects of Mergers and Acquisitions (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 997** Special Topics (1-9) Special topics in Tax Law field.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TAX 997A** Taxation of Executive Compensation and Benefits (2) This class will focus on the tax and ERISA aspects associated with executive compensation and nonqualified deferred compensation, including a variety of executive perquisites, equity programs and fringe benefits. The course will address the applicable income tax reporting and withholding rules for employer-provided meals, lodging, transportation and other miscellaneous section 132 fringe benefits. In this course students will also learn about the tax doctrines of constructive receipt and economic benefit, as well as the requirements found in section 409A and section 83. Also covered will be the special tax rules for employees of tax exempt entities under section 457(b) and section 457(f).

### **Taxation of Executive Compensation and Benefits (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

## Theatre (THEA)

**THEA 400** Advanced Theatre Projects (1-6 per semester) Individual and group-directed study of in-depth projects involving reading, discussion, performance, and critical analysis by faculty.

### Advanced Theatre Projects (1-6 per semester)

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 401Y (IL)** Theatre History I: Ancient to 1700 (3) Survey of drama and theatre from primitive rites through the Renaissance.

### Theatre History I: Ancient to 1700 (3)

General Education: None  
Diversity: IL  
Bachelor of Arts: Arts  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 402** Theatre History II: From 1700 to Present (3) Survey of European drama and theatre from the eighteenth century through the modern period.

### THEA 402 Theatre History II: From 1700 to Present (3)

A survey of drama and theatre from the seventeenth century through the modern period. The course is a sequential second half of the history of world theatre. Beginning with the post-Shakespearean era, students study major theatre movements in play writing, acting, theatre architecture and design. Some eras include the English Restoration and Georgian periods, the French Neoclassical period, German Romanticism, and the rise of the Beijing Opera. In addition, emerging post-colonial theatres of Africa and Asia will be explored. For each major era or movement, a play by one of the acknowledged masters of the form will be read and discussed in class. Students will write brief responses to their assigned readings, as well as experience a variety of assessment techniques.

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 405 (US)** Theatre History: American Theatre (3) Survey of American drama and theatre from the colonial period to the present.

### Theatre History: American Theatre (3)

General Education: None  
Diversity: US  
Bachelor of Arts: Arts  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 407 (US)** (WMNST 407) Women and Theatre (3) A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background.

### THEA (WMNST) 407 Women and Theatre (3) (US)

**(BA)** This course meets the Bachelor of Arts degree requirements.

Theatre 407 approaches the study of theatre/performance as a valuable site for the exploration of race, class, and gender as social constructs. The focus will be on 20th century developments of women and theater. Feminist theory and theatrical practice will be a focus of the course and will reflect conflicts and differences present within feminism.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Arts  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 408 (US)** History of American Musical Theatre (3) A survey of the history of American musical theatre presented in a social, cultural, and aesthetic perspective.

### **History of American Musical Theatre (3)**

General Education: None  
 Diversity: US  
 Bachelor of Arts: Arts  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 410** Play Analysis (3) Advanced skills in textual analysis of plays and screenplays.

### **Play Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 412 (US;IL)** (AF AM 412) African American Theatre (3) Exploration of the development of African American theatre from its roots in Africa through the diaspora, to the present time.

### **THEA (AAA S) 412 African American Theatre (3) (US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In this course, we will explore the development of African American theatre from its roots in Africa and Europe, through the diaspora, to the present time. We will learn something of the rich diversity of African American people and their contribution to the world's creative mainstream. We will become acquainted with both historical and contemporary artists who created and continue to create this unique American art form. The goals of the course are:

- 1) to develop familiarity with African American theatre and the socio-historic context in which it was created
- 2) to develop an understanding of the relationship of African American theatre to mainstream American theatre
- 3) to acquire an appreciation of the schools, styles, and techniques of African American theatre

We will do this by reading and engaging plays in the context of the period in which they were created, viewing films of plays, and attending relevant productions where possible.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Arts  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 420** Scene Study I (3 per semester/maximum of 9) Advanced monologue and scene study techniques. Principal focus on realism.

### **THEA 420 Scene Study I (3 per semester/maximum of 9)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

THEA 420 Advanced Scene Study is a course in which students are allowed to explore and deepen their understanding of the art and craft of acting. The course is repeatable for credit and taught by a variety of instructors. This allows students to experience the processes of different pedagogical methodologies. Regardless of the instructor, the shared emphases include: scene work in a variety of styles (from classical verse plays to cutting edge contemporary material) tailored to the needs of the individual student; movement toward increased technical proficiency; deepening awareness that "acting is living truthfully under imaginary circumstances," however similar or different those circumstances may be to the actor's personal life; and, growing self-sufficiency through self-directed scenes and individual rehearsal discipline. The

environment of the classroom/rehearsal space is both safe and critical, as students begin to accept that risk is integral to successful acting. The student is also engaged in giving constructive criticism to their peers, learning to be honest, detailed, and nurturing in the process. This critical process requires students to give unconditional support to their peers, support that is geared toward mutual improvement and emotional/physical safety.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 423 Musical Theatre Performance III (2)** Studio training in the unique performance skills, repertoire and business of professional musical theatre.

**THEA 423 Musical Theatre Performance III (2)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

In depth preparation and performance of scenes from the works of Sondheim and Webber. Also, exploration of the adjustments needed to perform successfully in non-traditional performance venues.

The third in a musical theatre performance studio sequence, THEA 423 applies performance technique and methodology studied in previous studio classes to the works of contemporary composers, particularly Stephen Sondheim and Andrew Lloyd Weber. The course also explores the adjustment to performance needed when working in non-traditional stage spaces such as ballrooms, cruise ships, and industrials.

THEA 423 is a continuation of Musical Theatre Performance II. These studios represent the core of the musical theatre training program. Grading will be based on the quality of the musical theatre student's studio work, report, and demonstrated respect for the professional studio environment.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 424 Musical Theatre Performance IV (2)** Studio training in the unique performance skills, repertoire and business of professional musical theatre.

**THEA 424 Musical Theatre Performance IV (2)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This studio is designed for senior musical theatre majors to hone their skills in acting, singing, and dancing in the last semester of their college career. The majority of the class will be the preparation of the Senior New York Showcase where each student will have the opportunity to perform for an invited audience of agents, alumni, and special guests. Students are responsible for all research and preparation of showcase material. Showcase material will be coached in class, but the main body of preparation relies on the students themselves, utilizing skills and techniques learned throughout their studio training.

Grading will be based on attendance, preparation, and attitude. These are all critical factors for entering the profession and for successfully completing this course. Deadlines and appointments must be kept. Students must do adequate outside preparation.

THEA 424 is a continuation of Musical Theatre Performance III. These studios represent the core of the musical theatre training program.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 425A B.F.A. Acting Studio II (2) Scene Study**

**THEA 425A B.F.A. Acting Studio II (2)**

THEA 425A is a laboratory or practicum course requiring active student presentation of work in progress for critiques by

the instructor and input from peers. Working in pairs, students will be assigned a five-minute scene from modern American realism. Students must read the play from which the assigned scene is taken, do the necessary historical/analytical homework, develop a character biography and a scene score, and present the result of their work in the initial on-the-feet working sessions for faculty critique and peer input. Taking away responses from each working session, the students are expected to rehearse outside of class to address any issues raised in the previous working session and to ready the scene for the next viewing.

In THEA 425A, the instructor will serve, not as a director, but as an acting coach, asking probing questions and using his or her own energy to exhort, guide, and discipline the students. It is expected that faculty intervention will decrease and student self-reliance will increase with each passing studio.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:  
 Concurrent: THEA 425C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 425C B.F.A. Voice/Speech Studio II (2)** Advanced voice and speech training for BFA Musical Theatre students.

### **THEA 425C B.F.A. Voice/Speech Studio II (2)**

In THEA 425C, B.F.A. Musical Theatre students will continue to develop and expand their vocal instrument. Basics of vocal production will be repeated and developed with a greater focus on the individual actor's application of his/her voice in the performance of various texts.

The first ten weeks will recall the basics of the past two semesters of voice/speech work and continue to expand the actors' capabilities. Extended work in the area of breath support and release, resonance and vocal range, and speech/articulation will all be explored with appropriate texts.

In the last five weeks of the semester, work will focus on text in the performance setting. A short program of text performances will be devised and presented in the last week of class.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:  
 Concurrent: THEA 425A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 426 Children's Theatre (3)** Theories and practice of theatre for children.

### **Children's Theatre (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2001  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 427A B.F.A. Acting Studio III (2)** Continuation of THEA 425A

### **THEA 427A B.F.A. Acting Studio III (2)**

THEA 427A is an extension of THEA 425A, a laboratory or practicum course requiring active student presentation of work in progress for critiques by the instructor and input from peers. Working in pairs, students will be assigned a five-minute scene from modern American realism. Students must read the play from which the assigned scene is taken, do the necessary historical/analytical homework, develop a character biography and a scene score, and present the result of their work in the initial "on-the-feet" working sessions for faculty critique and peer input. Taking away responses from each working session, the students are expected to rehearse outside of class to address any issues raised in the previous working session and to ready the scene for the next viewing.

In THEA 427A, the instructor will serve, not as a director, but as an acting coach, asking probing questions and using his or her own energy to exhort, guide, and discipline the students. It is expected that faculty intervention will decrease and student self-reliance will increase with each passing studio.

General Education: None  
 Diversity: None



Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:  
 Concurrent: THEA 427C

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 427C B.F.A. Voice/Speech Studio III (2) Stage Dialect Studies**

**THEA 427C B.F.A. Voice/Speech Studio IV (2)**

THEA 427C focuses on the acquisition of stage dialects and accents. For each dialect the student becomes aware of the resonance, phonetic, inflection, and rhythm changes necessary to perform dramatic text with an accent or dialect. Vocal agility, phonetic recall and the ability to integrate the altered vocal behavior to the demands of acting are the primary goals. Each dialect unit will have an introductory instruction, a review session, and a presentation of a reading of a dialect monologue. The final project will be the performance of two dialect monologues.

Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall, and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:  
 Concurrent: THEA 427A

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 429 Theatre Performance Practicum (1-3 per semester) Supervised experience in rehearsal and performance of significant roles.**

**Theatre Performance Practicum (1-3 per semester)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 434 Introduction to Directing (3) Introduction to principles and procedures of play direction.**

**Introduction to Directing (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 436 Directorial Processes (3) Preparing a play for production including the scoring of the script, developing ground plan, casting, and staging projects in American realism.**

**Directorial Processes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 1991  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 437 Artistic Staff for Production (1-6) To provide students with experience in choreography, dramaturgy, combat, staging, voice/speech, musical direction, assisting in direction, for major productions.**

**Artistic Staff for Production (1-6)**

General Education: None  
 Diversity: None

Bachelor of Arts: Arts  
 Effective: Summer 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 440** Principles of Playwriting (3 per semester/maximum of 6) Structure, dramatic effect, characterization, and dialogue; the writing, reading, and criticism of original one-act plays.

**THEA 440 Principles of Playwriting (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

THEA 440 is a course in which students are allowed to explore, deepen, and exercise their understanding of the craft of playwriting. This course is repeatable and taught by one instructor. This course utilizes diverse critical commentary, craft-based texts, and plays that elaborate and illustrate the core writing techniques of structure, dramatic effect, characterization, and dialogue. The writing requirement of the class concentrates on the construction of several ten-minute plays, which are shared in the class as works-in-progress. The students engage with giving and getting constructive criticism inside a safe and nurturing space, and the students work towards articulating and exercising the technical aspects of writing in a clear, concise, and effective manner.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 447** Make-Up Design for Production (1-6) Materials, research, preparation, design, execution of make-up for major University Theatre productions.

**Make-Up Design for Production (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1989  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 450** Advanced Topics in Scene Design (3 per semester/maximum of 6) Design emphasis on a variety of production techniques, genre, and styles.

**THEA 450 Advanced Topics in Scene Design (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course will build upon the basic design process introduced in THEA 250. Students will explore design solutions for shows requiring multiple locals. Students will also be introduced to shows reflecting a variety of dramatic styles and will explore effective design solutions within stylistic constraints. In addition to previously introduced graphic skills, emphasis will be placed on graphic techniques involved in the production of scenery, including design drafting, prop drawings, and paint elevations.

As this course may be repeated, there will be a rotation of topics to ensure that students receive different content each semester. Topics within the rotation may include:

Design for Shakespeare, unit settings  
 Design for Musicals, practical and stylistic concerns  
 Design for Opera  
 Design for shows requiring simultaneous local  
 Poetic or fragmented realism  
 Design for contemporary episodic scripts  
 Epic theatre design

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 451** Drafting, Drawing, and Painting for the Theatre (1) Drafting, freehand drawing including perspective methods

and property development, rendering techniques, and painters' elevations.

### **Drafting, Drawing, and Painting for the Theatre (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 453** Advanced Scene Painting (1 per semester, maximum of 12) Practicum study in painting techniques currently in professional use. Exploration of tools, available paints, and texturing materials.

### **Advanced Scene Painting (1 per semester, maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 1991  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 454** Period Research for the Theatre (3) History of decor, styles, and movements in art and architecture.

### **Period Research for the Theatre (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 456** Scenic Projects for Production (1 per semester, maximum of 6) Special projects for production; painting, properties, design assistance.

### **Scenic Projects for Production (1 per semester, maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 457** Scene Design for Production (1 per semester/maximum of 6) Design and execution of production projects.

### **Scene Design for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 458** Digital Imaging for the Theatre (1) Introduction to imaging software and its application in theatrical design and production.

### **THEA 458 Digital Imaging for the Theatre (1)**

This course will provide students with an introduction to digital imaging software and explore the use of this software in the theatrical design and production process. An introduction to Photoshop or similar programs will make up the first part of the course. As part of the introduction to software, course time will be devoted to image acquisition using techniques such as Web based research, scanning, and use of the digital camera. The remainder of the course will focus on applying imaging software to the process of evolving and presenting designs for scenery, costumes, and lighting. Design presentation will include output of images for applications such as projection, Web pages, and both large and small-scale printing.

Students will execute a number of projects that will be turned in digitally to the instructor. Each project will have a

specific objective and the grade will be outlined in a comment sheet.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 459 Theatre Portfolio & Business Practices (2)** Life as a professional theatre designer. Contracts, taxes, record-keeping, resumes, portfolios, interviewing, job hunting, and legal considerations.

**THEA 459 Theatre Portfolio & Business Practices (2)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

This course is designed to prepare the student of design for life as a professional theatre designer. There are many challenges to working in the business of design, arising primarily from the fact that most theatre designers are self-employed. It's not enough to be a talented designer; one must also be a savvy business person. Contracts, taxes, recordkeeping, resumes, portfolios, interviewing, job hunting, and legal considerations will all be addressed, as they relate to life as a freelance designer. Special attention will be paid to the assembly of a professional portfolio, which is the centerpiece of any designers' work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 460 Advanced Topics in Costume Design (3 per semester/maximum of 6)** Developing and executing a design concept in a variety of the performing arts.

**THEA 460 Advanced Topics in Costume Design (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

THEA 460 places emphasis on the use of text analysis and extensive historical research to make artistic choices as a costume designer in a production of a classical play, opera, or dance. Plays of this sort are of a size and scope not often found in contemporary material, which places exceptional demands on a designer. This course investigates the manner in which the theatrical imagination can be liberated to fulfill the particular requirements of classic theatre, opera, and dance.

The course will require several large-scale projects that reinforce the costume design process in a variety of the performing arts. Each area of work within a project is separately graded. These projects will contain written segment components such as a design statement or character analysis, an oral presentation or explanation of the designer's choices and process, and (where applicable) a demonstration of the fully realized costume renderings.

The student is expected to master the process that takes a costume designer from reading a script (or listening to a piece of music) to the creation of a design concept to the visual presentation of renderings from which clothing can be constructed. Particular emphasis is placed on developing the oral presentation skills necessary to communication with the director and other theatre artists.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 461 Advanced Topics in Costume Construction and Technology (3 per semester/maximum of 6)** A specialized course in advanced costume construction techniques and theatrical costume technologies.

**THEA 461 Advanced Topics in Costume Construction and Technology (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

THEA 461 addresses the skills and techniques of theatrical costume construction necessary for the undergraduate student to understand and master in preparation for work within a professional costume setting. Emphasis is placed upon the creation of an historic silhouette as illustrated by a theatrical costume rendering for both men and women, with an eye to theatrical execution. Focus is placed on the production of clothing, as well as the creation of theatrical properties and accessories for the historic figure.

The course will require several large-scale projects that reinforce the costume construction process in a variety of historic eras. Each area of work within a project is separately graded. These projects will contain supporting research and examine the understanding and identification of construction and accessory techniques as manifested in the costume rendering.

A student's approach to problem solving, personal process, communication skills, and successful time management will also be addressed.

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2006  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 464** History of Fashion (3) Survey of dress from Egyptian period to contemporary fashion.

**History of Fashion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 465** History of Fashion II (3) Survey of dress from 1800 to contemporary fashion.

**THEA 465 History of Fashion II (3)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

The course is the second part of the history of fashion that is an elective for graduate theatre students, is required for the B.F.A. Costume Design emphasis, and is an elective for the undergraduate theatre minor. The goal of the course is to identify and examine movements and trends in clothing and fashion from 1800 to the present. Each period is studied by using primary sources, slide presentations, and actual garments to illustrate the relationship between clothing and broad social, historical and artistic developments. Emphasis will be placed on plays that serve as particularly good examples of a period or style of fashion covered in the course.

Grading will be based on periodic quizzes covering topics from class lectures, slide presentations, and textbook readings. There will be one oral presentation, a written comprehensive final exam, and assigned graphic presentations or "redrawings" of clothing pieces.

To complete these "redrawings" the student will find a primary source or a photographic reproduction of a primary source and "redraw" the garment. For example, a student may find a painting, a sculpture, or photo of a garment (usually on a figure) that represents the period being discussed in class. The student would then "redraw" or copy that image, not trace, for the purposes of identifying the clothing pieces that are shown in the original. The "redrawings" are graded not on the student's ability to draw but rather on the content, detail, and thoroughness of the pencil sketch.

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 466** Costume Construction for Production (1 per semester/maximum of 6) Execution of production projects in construction and shop management.

**Costume Construction for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 467** Costume Design for Production (1 per semester/maximum of 6) Design and execution of production design projects.

**Costume Design for Production (1 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 470** Advanced Topics in Lighting Design (3 per semester/maximum of 6) Advanced Topics in Lighting Design will rotate through opera, dance, non-traditional spaces, architecture, advanced technology, and color theory.

**THEA 470 Advanced Topics in Lighting Design (3 per semester/maximum of 6)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Advanced Topics in Lighting Design will utilize a rotating curriculum and may be taken twice for credit. Topics will include lighting design for opera, dance, non-traditional spaces, architecture, advanced technology, and color theory. Students will also learn to write and critique their own work, as well as the work of others, and to speak knowledgeably about design topics. There will also be some flexibility to allow students to pursue individual interests and group-directed projects.

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 471** Stagelighting Design II (3) Advanced training through lectures and laboratory experience with color, shape, and form as it relates to the specifics of illumination.

**Stagelighting Design II (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 472** Lighting Technology (3) An introduction to the basics of electricity, dimmer protocols, lightboard programming, lighting paperwork, and master electrician & assistant lighting design practices.

**THEA 472 Lighting Technology (3)**

THEA 472 is an introduction to the basics of electricity, dimmer protocols, lightboard programming, lighting paperwork, and master electrician & assistant lighting design practices. This course will help prepare theatre designers to understand the inner workings of all of the equipment, working practices and safety requirements that are involved with the business of lighting design. This course will also provide students with many of the skills needed to get their foot in the door and get started in the business.

Special attention will be paid to safety, stressing the need for safe working practices and environments over the need to get the show up no matter what.

Students will learn how all of the advanced technology that is being introduced to the world of lighting functions and how these new technologies are all integrated into a functional system.

Students will serve as master electricians and/or as assistant lighting designers as part of the hands-on production aspect of the class, with ample time devoted to process discussions and post-show critiques of the work. Small-group problem solving and system troubleshooting will be discussed in depth and applied to real production situations.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 477** Lighting Design for Production (1 per semester/maximum of 6) Design and execution of design projects.

**Lighting Design for Production (1 per semester/maximum of 6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 480** Advanced Topics in Technical Direction for the Theatre (3 per semester/maximum of 6) Advanced study of the methods, materials, equipment, facilities, concepts and processes associated with Technical Direction for the Theatre.

**THEA 480 Advanced Topics in Technical Direction for the Theatre (3 per semester/maximum of 6)**

This course will build on the foundations established in THEA 280. Students will be engaged in studying advanced topics through discussions and explorations of current theatre technology, communication and the management systems used to control the processes associated with modern technical direction. Examples of topics include project management, current trends in drafting, advanced technical packages, and structural design for the stage. This course is repeatable and topics will vary.

Students will participate in class discussions, hands-on exploration of equipment, investigate current practices through observation and research, and will complete projects associated with the topics studied.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 480B** Technical Production IV (3) Discussion of problems of the technical director: personnel management, time management, scheduling, budgeting, purchasing, and the technical drawing of production.

**Technical Production IV (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Spring 1995  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 481** Stage and Production Management (3) Production planning, scheduling, assignment of personnel, rehearsal procedures, and budgeting.

**Stage and Production Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 1983  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 482** Technical Production - Rigging (3) In-depth exploration of current rigging techniques used in entertainment.

**Technical Production - Rigging (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 484** Sound Recording Techniques (3) Multi-track audio recording and post production techniques.

**THEA 484 Sound Recording Techniques (3)**

THEA 484 will provide fundamental skills in recording an audio production.

The first four weeks will cover basics of current recording equipment, basic microphone theory and placement according

to principles of sound propagation within performance spaces.

The second four weeks will expand on the principles of the first four weeks, considering the problems of recording in a variety of different locations and specific techniques for recording particular instruments.

The final seven weeks will focus on work within a recording studio. Students will need to configure a mixer with a multi-rack digital recorder and create a mastered CD with all appropriate post processing (EQ, compression, reverberation, etc.).

Students will work on teams for various recording projects, with one student serving as producer for each, so that they gain a comprehensive knowledge of the various duties involved in setting up and operating recording equipment.

Team projects will make up the majority of the grading for the class. Periodic quizzes will be administered in order to check the progress of the students and ensure their comprehension of the material. Each student will complete a final project in lieu of a final exam. During the production of this project, they will also be expected to serve in ancillary roles for their classmates' projects. Their participation in these other projects will be considered in the grading of their final project.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 485** Sound for Theatre Production (3 per semester/maximum of 6) Aesthetics of live and recorded sound; recording and editing techniques for the stage.

**Sound for Theatre Production (3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 486** Stage Management for Production (1-9) Stage manager for University Theatre production.

**Stage Management for Production (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 487** Technical Projects for Production (1 per semester/maximum of 6) Execution of practical production projects.

**Technical Projects for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 489** Theatre Production Practicum (1 per semester) Supervised experience in production techniques. For theatre majors only.

**Theatre Production Practicum (1 per semester)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Summer 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**THEA 494H** Research Projects - Honors (1-12 per semester/maximum of 12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Projects - Honors (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 495** Internship Practicum (1-6 per semester/maximum of 12) Professional field experience in theatre performance, production, and management assignments.

**Internship Practicum (1-6 per semester/maximum of 12)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 496** Independent Studies (1-18) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 496H** Independent Studies - Honors (1-18) Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies - Honors (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497A** Acting/Camera (3) This course will introduce the student to the basics of acting in TV and film productions for single-camera techniques.

**Acting/Camera (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497A** Acting/Camera (3) This course will introduce the student to the basics of acting in TV and film productions for single-camera techniques.

**Acting/Camera (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497B** Advanced Acting Studio for Musical Theatre (3) Acting Studio for advanced Musical Theatre students.

**Advanced Acting Studio for Musical Theatre (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497C** Acting for the Camera (3) Camera acting workshop for advanced actors.

**Acting for the Camera (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497D** Professional Preparation (3) Professional preparation for the theatre business.

**Professional Preparation (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497E** Dramatic Literature for BAs (3) This course is being offered to give students caught in the BA transition the opportunity to fulfill a requirement for dramatic literature.

**Dramatic Literature for BAs (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497J** Comedy Writing Workshop (3) A writing workshop in the comedy genre.

**Comedy Writing Workshop (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: Arts  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 497K** Writer's Room (3) Workshop for students writing the script for the School of Theatre/College of Communications sitcom.

**Writer's Room (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Arts  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 499** (IL) Foreign Studies--Theatre Arts (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies--Theatre Arts (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 500** Theatre Research: Sources and Procedure (3) Source materials and techniques as applied to theatre research; the form and content of theses and monographs.

**Theatre Research: Sources and Procedure (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 502** Creative Collaboration (3) Theory and process of creative collaboration between the theatre artistic and production staffs.

**Creative Collaboration (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1993  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 505** Masterpieces in Production I (3) Dramatic structure, theatrical validity, production viability of great plays from Greek to eighteenth-century. Drama as blueprint for production.

**Masterpieces in Production I (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 506** Masterpieces in Production II (3) Dramatic structure, theatrical validity, production viability of masterworks of theatre. Drama as the blueprint for production. Offered in London, England.

**THEA 506 Masterpieces in Production II (3)**

This course functions as a component of the core sequence on text analysis and dramatic literature required of all graduate students in the School of Theatre. As the course is offered only in London, England, it also functions as a core component of the international field studies program. While in residence at University Park, the focus of the course will be on literature and theory. Graduate students will then take up residence in London, England, where they will experience and analyze plays in production, focusing on production techniques and application of theory in the real world of the theatre.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2004  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 507** Masterpieces in Production III (3) Dramatic structure, theatrical validity, production viability of major American plays from Tyler to the present. Drama as blueprint for production.

**Masterpieces in Production III (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 508** Experiential Analysis of Italian Design Styles (3) Applications of Historical and Cultural Perspectives in Dramatic Production. Offered in Italy.

**Experiential Analysis of Italian Design Styles (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 509** Experiential Analysis of Eastern European Styles (3) Applications of Historical and Cultural Perspectives in Dramatic Production. Offered in Prague and Budapest.

**Experiential Analysis of Eastern European Styles (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 510** Experiential Analysis of Period Style (3) Applications of Visual/Spatial History in Dramatic Production. Offered in London, England.

**THEA 510 Experiential Analysis of Period Style (3)**

This course is taught in tandem with the second course of the core sequence on text analysis and dramatic literature required of all graduate students in the School of Theatre. As the course is offered only in London, England, it also functions as a core component of the international field studies program. Prior to taking up residence in England, students will explore films and dramatic texts set in periods ranging from the middle ages to the present day. Discussion will focus on the historic context for each dramatic work. Topics covered will include background information on historical events, an introduction to the visual world of each period, and the social/cultural ideology reflected in the period design.

While in England, students will participate in tours of museums and historical sites. Class discussion will focus on establishing connections between the social/cultural content previously presented and the tactile, spatial experiences gained through seeing actual sites and artifacts from each period.

The primary objective of the course will be to enhance the practical and intuitive understanding of period dramatic action in theatre students of all disciplines by guiding them through actual experience of period artifacts and spaces.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2004

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 524** Acting V (2) Advanced scene study and class projects; development of individual student repertoires.

### **Acting V (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 526** Acting for the Camera (2) Development of techniques and skills necessary for media performance: commercials, soap operas, television drama, etc.

### **Acting for the Camera (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 529** Performance Monograph (1-2 per semester, maximum of 4) The development and presentation of M.F.A. monographs in acting, design/ production, or directing.

### **Performance Monograph (1-2 per semester, maximum of 4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 530** (THEA 222) Rehearsal Methods for the Director (3) Theory and practice in approaches, procedures, and techniques in mounting a play.

### **Rehearsal Methods for the Director (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1985  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 531** Directorial Styles and Approaches (2) Seminar in advanced theory and directorial practice. Designed for the advanced student of directing.

### **Directorial Styles and Approaches (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 532** Directing Seminar (2) Career orientation: resume preparation, interviewing, unions, survey of directorial opportunities, and review of major contemporary directors and practices.

**Directing Seminar (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 537** Artistic Staff for Performance in Production (1 per semester/maximum of 6) Practical experience in choreography, dramaturgy, combat, special staging, voice/speech work, musical direction, or assisting in stage direction for university theatre productions.

**Artistic Staff for Performance in Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 539** Projects in Directing (1-2) Approved directing projects for the M.F.A. directing student.

**Projects in Directing (1-2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1990  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 543** Projects in Playwriting (1-9) Preparation of the script for revision during and following production of the student's original play.

**Projects in Playwriting (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 550** Scenic Design III (3 per semester/maximum of 9) Advanced design, concentration on conceptualization, visual communication skills, portfolio production.

**Scenic Design III (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 551** Scenic Design IV (1-6) Advanced projects in scenic design.

**Scenic Design IV (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**THEA 552** Scene Design III (3) Design and project execution of plays and industrial installations.

**Scene Design III (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 553** Scene Design IV (3) Design of plays for proper theatre and mass media.

**Scene Design IV (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 559** Portfolio Presentation (1 per semester, maximum of 2) Current practice in portfolio development and presentation to client and employer.

**Portfolio Presentation (1 per semester, maximum of 2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 560** Costume Design III (3 per semester/maximum of 9) Advanced costume design with emphasis on total production concept.

**Costume Design III (3 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 562** Costume Design: Rendering Techniques (3) Exploration and development of various rendering techniques with application to costume design.

**Costume Design: Rendering Techniques (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 568A** Costume Design for Related Performance Arts (3) Exploration and development of costume design with application to the other arts (opera/dance/film).

**Costume Design for Related Performance Arts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**THEA 568B** Costume Design: Production Concepts (3) Exploration and development of costume design for specific production concepts.

**Costume Design: Production Concepts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 569** Costume Construction: Crafts (3) Exploration and development of various crafts techniques with application to costume construction (i.e. masks, jewelry, armor, millinery, footwear, wigs).

**Costume Construction: Crafts (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 570** Stage Lighting Design III (3) Advanced techniques in the art of theatrical lighting design.

**Stage Lighting Design III (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 571** Stage Lighting Design IV (3) Course addresses individual problems in the stage lighting design process concentrating on the development of skills necessary for professional examination.

**Stage Lighting Design IV (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 580A** Technical Production VII (3) Mechanical design for the theater; calculation for and specification of, DC motors and controls, sprockets, chain drives, gearboxes, gearing, shafts for the movement of scenery.

**Technical Production VII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 580B** Technical production VIII (3) Planning of the theater shop; emphasis on space design, renovation, upgrade, planning, outfitting, and safety; selection of tools and tool support systems.

**Technical production VIII (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1994  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 585** Theatre Planning (3) Processes and problems in planning and designing theatres: performance, audience, and technical requirements.

**Theatre Planning (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Winter 1978

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 589** Design/Production Monograph (1-4) The development and presentation of M.F.A. monographs in design/production.

**Design/Production Monograph (1-4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 595** Internship (1-3) Professional field experience in theatre performance, production, and management assignments.

**Internship (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 597A** Internship Journal Report (3) Individual time with instructor to complete and review internship journal.

**Internship Journal Report (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 597C** Singing (1) Vocal singing technique and familiarization of vocal music.

**Singing (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Teaching of theatre and film classes under senior faculty supervision.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 811** International Studio Intensive (1-9) The course enhances the ability of the actor to meet the voice and speech demands for the performance of Shakespeare.

**THEA 811 International Studio Intensive (1-9 per semester)**

The objective of the course is two-fold. The first part of the class deals with the vocal skills necessary for successful acting of the Shakespearean play. The actors work on a series of rigorous voice and speech exercises, and master an intense and complete warm-up that prepares them to deal with the text. The second portion of the course deals with the play-script itself and examines the relationship between the voice and the text. Working with sonnets and monologues,

the student is introduced to scansion, imagery, alliteration, and other text related skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 811A** International Production Studio Intensive (1 per semester/maximum of 9) Intensive studio application of processes and procedures within specific theatre disciplines as influenced by the work of international professionals.

**International Production Studio Intensive (1 per semester/maximum of 9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 820A** Acting I (4) Exercises, monologue, and scene study. Principal focus on realism.

**THEA 820A Acting I (3 per semester)**

THEA 820A is a laboratory or practicum course requiring active student presentation of assigned acting projects. Outside preparation and homework are required for all sessions. Working in pairs, each student will participate in improvisational scenes on a daily basis. In addition, each actor will be required to independently prepare and present various acting exercises, scenarios, and finally, a comprehensive play and character analysis for a scripted scene from contemporary realism (that will be performed with an acting partner the following semester). Critiques of each actor's work will be given on a daily basis and the student will be expected to rehearse outside of class to address any issues raised and to have them remedied for the next viewing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 820B** Movement for Actors I (2) Techniques and skills in physical expression, awareness, control, and stage movement.

**THEA 820B Movement for Actors I (2 per semester)**

A fundamental movement class designed to strengthen, prepare, and align the body for maximum freedom of expression. Emphasis is on concentration, flexibility, balance, coordination, relaxation and sensitivity to the impulses stimulated from outer and inner resources. Techniques may include but are not limited to time tested modalities such as Yoga, Alexander, Tai Chi, Pilates, Feldenkrais, and Modern Dance. Included in the course are units on nutrition, time management, and the proper care and maintenance of the physical instrument. Students will be evaluated according to their acquisition of skills and professional attitude.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 820C** Voice and Speech I (2) Vocal techniques for the actor: articulation, voice control, support, and projection.

**THEA 820C Voice and Speech I (2)**

THEA 820C is the first in a sequence of voice and speech courses for the actor. This first semester installment will focus on awareness and conditioning activities related to breath, posture, resonance and articulation. Prose and poetry readings will be used for application activities. Students will experience activities that will heighten their physical awareness of vocalizing. Most activities will involve a re-learning of how they speak, bringing to their conscious awareness the processes of voice/speech which were initially learned through early childhood nurturing. Class events will include awareness of breath patterns and the means to release inhibitive behaviors related to spinal posture, head and neck alignment, and

musculature along the breath/vocal tract. Students will also gain awareness of how breath relates to their expressive/emotional system.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 821A** Acting II (3) A continuation of THEA 520A.

### **THEA 821A Acting II (3)**

The foundational work of the first semester continues with its application to scripted material, primarily drawn from contemporary drama. The actor's skills in contact, communication, and inventiveness are further developed, along with personalizing the given circumstances of the dramatic text. The concept of "character" is introduced and students will begin the exploration of bringing truthful behavior to viewpoints different than their own. Each student will be paired with an acting partner and perform three scenes during the semester. A written, comprehensive script and character analysis will be required for each scene. Critiques of each actor's work will be given on a daily basis and the student will be expected to rehearse outside of class to address any issues raised and to have them remedied for the next viewing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 821B** Movement for Actors II (2) A continuation of THEA 520B.

### **THEA 821B Movement for Actors II (2)**

Through the study and discipline of learning precise corporeal skills, the actors gain confidence and clarity of expression. This clarity is applied toward the creation of mimetic illusions, mask-work, tableaux, and various animal and effort shaping studies aimed at developing characters for the stage. Characters may range from the fantastic to the most real. Improvisation and specific exercises are developed to encourage bold physical choices and the liberation of the creative imagination. Actors work in individual, team, and ensemble situations to apply techniques toward meaningful rendition of ideas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 821C** Voice and Speech II (2) A continuation of THEA 520C.

### **THEA 821C Voice and Speech II (2)**

THEA 821C is the second in a sequence of voice and speech courses for the actor. This second semester installment will continue the focus of voice/speech training addressed in THEA 820: focus on awareness and conditioning activities related to breath, posture, resonance and articulation. Prose and poetry readings will be used for application activities. Students will experience activities that will heighten their physical awareness of vocalizing. Most activities will involve a re-learning of how they speak, bringing to their conscious awareness the processes of voice/speech which were initially learned through early childhood nurturing. Class events will include awareness of breath patterns and the means to release inhibitive behaviors related to spinal posture, head and neck alignment, and musculature along the breath/vocal tract. Students will also gain awareness of how breath relates to their expressive/emotional system.

Class activities will also include physical awareness of the consonant and vowel sounds and their phonetic transcriptions. Each event will strive to improve actors' intelligibility and increase musicality of speech. Through application assignments with word lists, sentences, poetry and prose, students will increase language sensitivity.

This semester will also address voice quality issues directly and how they relate to the above. Specific events will focus on vibratory awareness in primary resonators and how to apply this awareness in all vocal life. Issues of vocal health, projection and emotional demands will be addressed.

Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 822A** Acting III (3) This course will focus on the research and development of skills necessary to perform the plays of Shakespeare and his contemporaries.

### **THEA 822A Acting III (3)**

THEA 822A is designed to take the skills acquired in the movement, voice and acting studios in the first year of the graduate actor training program and apply them to the lush words, passionate images, and intense emotion required by the elevated texts of playwrights such as Shakespeare. The process requires the reduction of modern vocal and physical parasites and their replacement by a higher standard of speech and a classically open, expressive body. Truthful behavior in action is still the goal - the challenge is to embrace Shakespeare's truths.

In the weeks devoted to scene study, the actors must learn to be comfortable with classical works, to confront any predisposition about style, and see that their vocal and physical instruments need to be strengthened in order to fully play classical characters.

Because THEA 822A is a laboratory performance course, one in which students must be sharing what they are learning or performing on a daily basis, on-going assessment takes place through faculty feedback in working sessions, through faculty and peer critique of work presented, through an oral evaluation at mid-semester in conference with the graduate acting faculty, and through an extensive written evaluation and formal conference with the head of the School and the head of the acting program at semester's end. Other faculty will observe midterm and end of semester presentations to offer insights. Students thus receive assessment on many occasions in the course of the semester.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 822B** Movement for Actors III (2) Advanced techniques and skills in physical expression.

### **THEA 822B Movement for Actors III (2)**

Building upon the character work of the previous semester, actors delve into the specific demands of farcical comedy and the development of European clown characters. Comic devices, timing, exaggeration, and invention are studied and applied to specific texts dealing with farcical movement demands. Clown characters are devised and guided toward specific invention work aimed at developing skills needed for a wide variety of comic situations. Building upon the previous work, an ensemble improvisation piece is developed to enable actors to apply techniques to an invented world with many different and demanding situations. Linking to the classical work in the acting studio, the actors will finish with a unit dealing with comic and dramatic physical demands and pitfalls inherent in working within the world of Shakespeare's plays.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 822C** Voice and Speech III (2) Advanced voice and speech training for the actor: articulation, resonance, and vocal technique related to verse and heightened language drama.

### **THEA 822C Voice and Speech III (2)**

THEA 822C is the third in a sequence of voice and speech courses for the actor. This third semester installment will focus on review of speech and voice techniques and application of those techniques in the performance of Shakespearean drama text and other heightened language plays. Scansion of poetic meter, syntax, lexicon resources, and sound patterns will be the primary informative elements of vocal performance. Students will be assigned sonnets, monologues and scenes as vehicles for application in the studio.

Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 823A** Acting IV (3) Students prepare audition material for their New York Showcase for theatrical agents.

### **THEA 823A Acting IV (3)**

The objective of the course is the selection, rehearsal, and performance of audition material for the New York Showcase for theatrical agents. Students begin the semester by bringing large amounts of potential audition material into a peer review format where their fellow students and the instructor, evaluate the monologues and scenes and give specific feedback on its suitability. During the course of the semester, the students decide on a core of eight monologues and four scenes from which the final Showcase will be crafted. The monologues are performed for the class and the School of Theatre faculty.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 823B** Movement for Actors IV (2) Fundamentals of unarmed and armed stage combat with emphasis on enactment of safe and effective stage fights.

### **THEA 823B Movement for Actors IV (2)**

Actors learn the basics of unarmed and armed stage combat techniques. Applying the standardized and time-tested safety measures derived from the Society of American Fight Directors, each actor must master kicks, slaps, punches, grabs, holds, rolls, and all other unarmed techniques. They must also learn how to wield a quarterstaff, rapier and dagger, and broadsword with confidence: safely and effectively enacting various styles of stage combat choreography. Designed to train specific techniques while raising kinetic awareness, the course also introduces the historical background for each weapon style.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 823C** Voice and Speech IV (2) A study of stage dialects.

### **THEA 823C Voice and Speech IV (2)**

THEA 823C is the fourth in a sequence of voice and speech courses for the actor. This fourth semester installment will apply the articulation, phonetics and resonance skills addressed in prerequisite classes toward the acquisition of stage dialects and accents. For each dialect the student becomes aware of the resonance, phonetic transcription, inflection, and rhythmic changes necessary to perform dramatic text with an accent or dialect. Vocal agility, phonetic recall and the ability to integrate the altered vocal behavior to the demands of acting are the primary goals. Each dialect unit will have an introductory instruction, a review session, and a presentation of a reading of a dialect monologue. The final project will be the performance of two dialect monologues.

Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 824** Acting for the Camera (6) This course introduces the actor to the skills necessary for successful performance in television, film, video and commercial venues.

**Acting for the Camera (6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 825A** Acting Professionally/NYC Showcase (3) Development of audition repertoire; study of business topics; development, rehearsal and performance of NYC showcase.

**THEA 825A Acting Professionally/NYC Showcase (3)**

THEA 825A is a capstone course that brings closure to the actors' studio training and prepares them for entrance into the competitive world of the entertainment industry. The first half of the semester the students will locate, edit and present audition material for weekly critique. The students will also become aware of business practices related to the acting profession such as union membership, contracts, working with agents/casting directors, etc. During the second eight weeks the students will rehearse and eventually perform an audition showcase in NYC for talent agents and casting directors. Students will receive daily criticism of their work by faculty and peers and will be graded upon the applied aspects of the course, in audition tour of professional regional theatres and the NYC showcase performance.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 825C** Professional Repertory Performance (3) Rehearsal and performance of theatre productions at Penn State featuring third year MFA actors and professional guest artists.

**THEA 825C Professional Repertory Performance (3)**

The professional performance experience is the equivalent of a masters degree thesis. It is the culminating event for three years of full-time study, rehearsal, and performance. The season is chosen to demonstrate the acting skills of each student in the third year of the M.F.A. program. These plays are chosen to be the first professional experience for the acting students as they work alongside professional guest artists.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 830** Interdisciplinary Theatrical Design Studio (3-6 per semester/maximum of 36) Advanced analysis, graphic, and presentation techniques for evolving and communicating design for the stage.

**Interdisciplinary Theatrical Design Studio (3-6 per semester/maximum of 36)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 857** Scenic Design for Production (1 per semester/maximum of 6) Design and execution of production design projects.

**Scenic Design for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 861** Costume Design and Construction (1-6 per semester/maximum of 18) Advanced special projects for the graduate designer and costumer.

**Costume Design and Construction (1-6 per semester/maximum of 18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 863** Costume Construction: Draping (3) Exploration and development of various draping techniques with application to costume construction.

**Costume Construction: Draping (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 865** Costume Construction: Period Reconstruction (3) Exploration and development of reproduction techniques relating to period clothing, and their application to costume construction.

**Costume Construction: Period Reconstruction (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 866** Costume Construction for Production (1 per semester/maximum of 6) Execution of production in construction and shop management.

**Costume Construction for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 867** Costume Design for Production (1 per semester/maximum of 6) Design and execution of production design projects.

**Costume Design for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 877** Lighting Design for Production (1 per semester/maximum of 6) Design and execution of production design projects.

**Lighting Design for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None



Bachelor of Arts: None  
Effective: Spring 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**THEA 887** Technical Projects for Production (1 per semester/maximum of 6) Execution of assigned technical projects for theatre production.

**Technical Projects for Production (1 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2010

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Training and Development (TRDEV)

**TRDEV 418** Instructional Methods in Training and Development (3) Emphasis on teaching techniques and learning principles used by trainers and supervisors in business, health care, and government.

**Instructional Methods in Training and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 421** Presentation Skills for New Trainers (3) The effective use of platform skills for training, including the use of voice, audio-visual aids, group facilitation, and personal presence.

**Presentation Skills for New Trainers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 431** Basic Technology Skills in Training (3) Introduces basic training technology skills: electronic communications, word processing, spreadsheets, databases; provides skills to create and maintain electronic presentations and programs.

**Basic Technology Skills in Training (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1999  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 432** Video Production in Training (3) Introduces learners to the equipment, design, and production of video instruction for the workplace.

**TRDEV 432 Video Production in Training (3)**

Trainers convey messages through a broad range of communication media. This course is concerned with the planning, preparation, design, development, and evaluation of video as a training medium. With VCR's commonly available in home, education, and corporate environments delivery of video materials is easy and effective.

The primary goal of this course is to demonstrate competency in applying design theory to evaluate and develop video training modules. This will involve knowledge of adult learning theory and the process of communication through video. Course competencies include storyboarding, scripting, and editing.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 460** Foundations in Training and Development (3) Roles in training and development, relationships between training and development and other organizational structures, and the principles of training design.

### **Foundations in Training and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 465** Performance Analysis (3) This course involves the systematic analysis of employee performance in organizations to identify performance problems, diagnose causes, and specify solutions.

### **TRDEV 465 Performance Analysis (3)**

A fundamental goal of training and development is to improve employee performance. An important first step in achieving this goal is the analysis of employee performance at the organization, process, and job-performer levels. This course involves the in-depth study of concepts, principles, and strategies for analyzing performance at these three levels to identify performance problems, diagnose causes of performance, problems, and specify appropriate training and development solutions.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 470** Human Resource Development Tools and Techniques (3) Examination of contemporary strategies, tools, and techniques for designing human resource functions to promote employee learning and performance within organizations.

### **TRDEV 470 Human Resource Development Tools and Techniques (3)**

The course provides an overview of the human resources function in organizations and examines the role of human resource development (HRD) and human resource management in relation to performing key tasks in the human resources function. Students investigate contemporary perspectives of HRD as a transformational function responsible for adding value and delivering results within organizations. The investigation includes the study of four contemporary HRD roles (strategic partner, administrative expert, employee champion, and change agent) and tools and techniques used by professionals in each of these HRD roles to facilitate employee learning and performance.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 475** Career and Succession Management (3) This course involves the study of a systematic approach for integrating career planning and succession planning programs in organizations.

### **TRDEV 475 Career and Succession Management (3)**

Examination of a systemic approach for integrating career planning and succession planning programs in organizations. This course examines this approach to career and succession planning through the study of career management concepts including core competency development, individual development plans, and performance management as well as new perspectives on career structures, such as the protean/boundaryless career, free-agent/contingent worker, and job sculpting.

General Education: None  
Diversity: None

Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 497 Special Topics (1-9)** Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 505 Project Management in Training and Development (3)** Introduces skills for managing complex training and development projects, such as developing timelines, creating budgets, and allocating resources.

### **TRDEV 505 Project Management in Training and Development (3)**

In today's fast-paced workplace, training and development professionals must effectively manage complex projects. This course is designed to enhance students' skills in managing a TRDEV project:

- a) Conceptualizing the project's scope
- b) Creating and monitoring a realistic timeline for management and completion of the project
- c) Identifying and allocating necessary resources and personnel
- d) Creating and monitoring a realistic project budget
- e) Creating and managing a TRDEV project team

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2006  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 507 Program Evaluation (3)** Evaluation of educational and other human services programs; preparation and presentation of the evaluation proposal.

### **Program Evaluation (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 518 Systematic Instructional Design in Training (3)** Study of theory and practice of systematic instructional design. Application of instructional design principles to training problems in local organizations.

### **Systematic Instructional Design in Training (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 520 Learning Styles and Learning Theory in Training (3)** Adult learning theory and its application to training and development.

### **Learning Styles and Learning Theory in Training (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 531** Technology in Training (3) Applications of various new instructional technologies to training problems.

### **Technology in Training (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 532** Web-Based Training (3) Introduction to the design and development of websites for computer-based instruction in the workplace.

### **TRDEV 532 Web-Based Training (3)**

Computer-Based Training (CBT), Computer-Assisted Instruction (CAI), Computer-Based Education (CBE), Interactive Multimedia (IMM), and Web-Based Training (WBT) are all terms used to describe the delivery of learning materials via computer. The recent rapid increase in these types of programs can be partially attributed to the development of software authoring tools. These allow developers to create computer-based programs through easy-to-learn Graphical User Interfaces (GUIs) without requiring extensive knowledge of programming and programming languages.

Most recently, the World Wide Web (WWW) has offered a way of distributing training materials through a broader electronic network. Thus, Web-Based Training, or WBT, is becoming increasingly important as a tool for Trainers. Its "language" is primarily HTML.

The primary goal of this course is for you, the student, to demonstrate competency in applying design theory while using Web tools to develop a WWW-based module.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 533** Distance Learning for Trainers (3) This course will explore a variety of instructional technologies which have direct applications in training adult learners at a distance.

### **Distance Learning for Trainers (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2002

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 565** Implementing Training and Development Programs (3) The critical analysis of theories, strategies, and techniques for planning and implementing TRDEV programs to enhance employee learning and performance.

### **TRDEV 565 Implementing Training and Development Programs (3)**

A fundamental goal of training and development is to promote employee learning performance. This course involves the critical analysis of theories, strategies, and techniques for planning and implementing TRDEV programs to support the accomplishment of that goal.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2006

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 583** Issues in Training (3) An issue seminar addressing topics such as an unprepared work force, diversity, recession, and issues generated by the class.

**Issues in Training (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2002  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 587** Master's Paper (1-6) The development of an original master's project (paper, production, or practicum) supervised and judged by an appropriate faculty committee.

**Master's Paper (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1986

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 588** Research Designs Applied in Training (3) Planning experimental, observation, survey and qualitative research designs for training setting needs such as needs assessments and evaluations.

**Research Designs Applied in Training (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1995  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 596** Individual Studies (1-9) Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1988

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRDEV 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Trans Clinical Medic (TCM)

**TCM 706** Transition to Clinical Medicine (2) Introductory course that teaches the basic skills and knowledge a student needs to enter the clinical training years.

### Transition to Clinical Medicine (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Traveling Schl Prog (C I C)

**C I C 597** Special Topics (1-15) Formal courses taken on a special interest subject which will be offered on a C I C institution by C I C traveling scholars; several different topics may be taken each semester.

### Special Topics (1-15)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**C I C 598** Special Topics (1-15) Formal courses taken on a special interest subject which will be offered on a C I C institution by C I C traveling scholars; several different topics may be taken each semester.

### Special Topics (1-15)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Trial Team (TRTEM)

**TRTEM 995A** AAJ Trial Team (2) See Handbook for description.

### AAJ Trial Team (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRTEM 995B** BLSA Trial Moot Court Team (2) See Handbook for description.

### BLSA Trial Moot Court Team (2)

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRTEM 995C** Gourley Trial Competition Team (2) See Handbook for description.

**Gourley Trial Competition Team (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRTEM 995D** National Trial Moot Court Team (2) See Handbook for description.

**National Trial Moot Court Team (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRTEM 995E** Miscellaneous Trial Moot Court Teams (2) See Handbook for description.

**Miscellaneous Trial Moot Court Teams (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TRTEM 997** BLSA Mock Trial Team (2) BLSA Mock Trial Team.

**BLSA Mock Trial Team (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Turfgrass (TURF)**

**TURF 425** Turfgrass Cultural Systems (3) A study of turfgrass maintenance practices and how their interrelationships can be utilized to develop meangement systems.

**TURF 425 Turfgrass Cultural Systems (3)**

TURF 425 is offered to students that are in their final year of the turfgrass science major. They are expected to use the information provided in the course and previously learned agronomic principles and concepts, to develop management and problem solving skills. More in depth information pertaining to various management systems are presented which expands upon prerequisite course content Students am expected to be able to integrate different turfgrass maintenance practices into sound management strategies that lead to the production of high quality turfgrass areas. The management compromise between aesthetic quality and Functionality is stressed and students are challenged to recognize those cultural practices that influence the balance between the two, There are three 100 point exams during the semester. The majority of the content in each exam will come from the information provided since the previous one. Several unannounced quizzes will be given throughout the semester (usually 12 to 13 with only the 10 best counting toward the grade). A soil testing exercise is also included whereby the student is expected to take an appropriate sample from a site of their choosing submit it to the soil testing tab, interpret the soil test results, and make a written recommendation based upon the results. The course will help the student better understand how the maintenance practices and pest control programs learned in other courses inter-relate in the overall management scheme for a given turfgrass site. It will also prepare them for TURF 436 (Case Studies) where they will be expected to work in teams in problem solving situations. The facilities provided in ASI building, associated greenhouses, and the turfgrass field research plots as well as the campus grounds provide ample support for the effective delivery of the course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 434 Turfgrass Edaphology (3)** Characterization of soil physical properties for the establishment and maintenance of sports turf; includes root-zone construction.

### **TURF 434 Turfgrass Edaphology (3)**

TURF 434 is offered to students that are entering their final year of the turfgrass science major. This course builds on introductory turfgrass and soil courses. In this course you will learn to interpret soil physical results using the United States Golf Associated specifications for greens construction. You will learn how to evaluate and manipulate the physical properties of a soil in order to provide a quality turfgrass stand under varying conditions. You will use new information as well as physical and quantitative tools provided to aid in soil management decisions. You will defend your decisions to other students in group-exercises conducted on a computer bulletin board. You will also submit your decision making process and defend your decisions in writing, in the form of business proposals. This class has a series of labs, some of which run over several weeks. You will use class material and the physical and quantitative tools learned in the labs to inform your decision-making processes. Your grade will be based on exams, lab reports, and practicums. The practicums and the labs are interrelated. The practicums, which are mini-case studies of actual turfgrass situations and problems, require you to apply techniques and information learned in the physical lab periods. The practicums are graded on initial draft, final draft, and your critique of other student's solution to a problem. TURF 434 is an advanced course in soil physical properties.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 435 Turfgrass Nutrition (4)** Study of turfgrass nutrition and growth; emphasizing constructed and mineral soil fertility, nutrient uptake and function, and fertilizer use efficiency.

### **TURF 435 Turfgrass Nutrition (4)**

Turfgrass Nutrition is a study in the nutrition and growth of turfgrass plants. Upon completion of this course, students will be able to distinguish the function and requirements of nutrients in the turfgrasses; describe how soil physical and soil chemical properties/conditions affect nutrient availability; select soil amendments to remedy soil chemical limitations; identify the best fertilizers and application methods to satisfy site-specific nutritional requirements; prepare nutrient management plans by appraising edaphic and environmental conditions and current cultural management and use; and will have discovered how best to sample soil, tissue, and water; submit samples, choose appropriate specialty tests, and interpret reports. TURF 435 compliments Turfgrass Edaphology, by examining soil chemical (rather than physical) properties as turfgrass growth parameters and addressing ameliorative measures in concept and operation. Students are introduced to the many classes of specialty fertilizers used in turfgrass management and their specific attributes are revealed through laboratory and field exercises. Students are evaluated through written testing of plant growth and nutrition concepts, interpretation of soil analysis, recommendations of fertilizer type and rate, and nutrient fate and management. TURF 435 has a substantial laboratory component.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 436W Case Studies in Turfgrass Management (3)** Case study and discussion considering integrated management of selected turfgrass sites; emphasis on problem analysis, principle application, and decision making.

### **TURF 436W Case Studies in Turfgrass Management (3)**

Case Studies in Turfgrass Management is a three credit, writing intensive course for students in the final year of the Turfgrass Science major. The goal of this 'capstone' course is to provide students with an understanding of processes involved in solving turfgrass and soil problems at the managerial level. Using several real-life scenarios provided by the instructor, students will learn to gather facts associated with a problem, analyze the problem, formulate a set of options for solving the problem, implement a plan of action, and evaluate the results of the action. Once these processes are assimilated, students will form teams and select challenging turf and soil problems, analyze them, formulate options for solving the problems, select the most feasible solutions, and evaluate outcomes. Teams will submit reports and develop presentations for class. Teams will also be charged with questioning presenting teams and evaluating team members.



Students will be evaluated through exams, reports, presentations, and class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 436W** Case Studies in Turfgrass Management (3) Case study and discussion considering integrated management of selected turfgrass sites; emphasis on problem analysis, principle application, and decision making.

#### **TURF 436W Case Studies in Turfgrass Management (3)**

Case Studies in Turfgrass Management is a three credit, writing intensive course for students in the final year of the Turfgrass Science major. The goal of this 'capstone' course is to provide students with an understanding of processes involved in solving turfgrass and soil problems at the managerial level. Using several real-life scenarios provided by the instructor, students will learn to gather facts associated with a problem, analyze the problem, formulate a set of options for solving the problem, implement a plan of action, and evaluate the results of the action. Once these processes are assimilated, students will form teams and select challenging turf and soil problems, analyze them, formulate options for solving the problems, select the most feasible solutions, and evaluate outcomes. Teams will submit reports and develop presentations for class. Teams will also be charged with questioning presenting teams and evaluating team members. Students will be evaluated through exams, reports, presentations, and class participation.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2014 Future: Spring 2014  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 489** Supervised Experience in College Teaching (1-3) Participate with instructors in teaching and undergraduate turfgrass course. Assist with teaching an evaluation and with development of instructional materials.

#### **Supervised Experience in College Teaching (1-3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 490** Colloquium (1) Oral presentations developed by students in consultation with the course instructor.

#### **Colloquium (1)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

#### **Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 496** Independent Studies (1-18) Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 850** Turfgrass Physiology (3) Lectures, reading assignments, and problems designed to develop student competency in plant physiology as it relates to turfgrass management strategies.

**TURF 850 Turfgrass Physiology (3)**

The emphasis of this course will be on the applied aspects of turfgrass physiology; however, in order for these to be useful in an applied manner, the science behind them must be fully understood so they may be properly implemented. This course is designed to provide turfgrass managers the background knowledge of physiological principles and concepts in order for them to make informed decisions as they implement new technologies in their cultural systems. Basic topics include the physiology of the germination process, seedling development, photosynthesis, respiration, transpiration, seedhead development, and the physiological implications of the use of bio-stimulants, growth regulators, phytohormones, and antioxidants on turfgrass quality. Other topics that will be discussed include; carbohydrate metabolism and utilization, dormancy, and hardening.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 852** Turfgrass Health Management (3) Lectures and exercises designed to develop student competency in solving turfgrass pest problems, as well as disease resistance in turfgrass.

**Turfgrass Health Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**TURF 853** (PPATH 853) Interpreting Turfgrass Science Literature (3) Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results.

**TURF (PPATH) 853 Interpreting Turfgrass Science Literature (3)**

This course will provide an introduction to literature search in turfgrass management, identification of most pertinent peer-reviewed journals for each area of interest/specialty in turfgrass management, and utilization of other resources such as technical journals, trade journals, online and resident educational material resources, extension bulletins/circulars from various institutions/organizations that addresses various topics on turfgrass management. This course will prepare the students for analyzing research questions or rationale formulated by an investigator, for understanding how the study was devised to address the objectives adequately and the results were obtained and presented in the publication, and for identifying the take-home message in the publication. Emphasis will be made on the criteria used for data collection, the significance of methods employed in statistical analyses of the data, and presentation of results in the publications to effectively convey the information to readers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Underser Med&Dom Hlt (UMDH)**

**UMDH 700** Underserved Medicine and Domestic Health (5) Students will apply critical thinking and clinical reasoning to

improve patient outcomes within the framework of underserved medicine.

### **Underserved Medicine and Domestic Health (5)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Urban & Reg Plan-CI (UR PL)**

**UR PL 595** Planning Internship (1-6) Internship with a planning agency, under supervision of a graduate faculty member.

### **Planning Internship (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1987  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**UR PL 596** Individual Studies (1-9) Creative projects, including nonthesis reseach, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**UR PL 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Veterinary Science (V SC)**

**V SC 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### **Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1995

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**V SC 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None

Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**V SC 611** Ph.D. Dissertation Part-Time (0) No description.

### **Ph.D. Dissertation Part-Time (0)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Veterinary and Biomedical Sciences (VB SC)**

**VB SC 402W** (ENT 402W) Biology of Animal Parasites (3) An introduction to animal parasitology. Emphasis placed on host/parasite interactions, parasites of zoonotic importance, control programs and taxonomy.

### **VB SC 402W Biology of Animal Parasites (3)**

This course provides students an opportunity to obtain an introduction to the field of animal parasitology. Material presented emphasizes life cycle patterns of animal parasites, host-parasite interactions and pathology, disease patterns and zoonotic potential of parasites to human disease, economic importance of parasitic diseases, taxonomy and parasite control programs. Information presented in this course will be useful to students interested in pursuing a career in veterinary medicine or careers dealing with animal care and management. Evaluation of student performance is achieved by 6 quizzes, three examinations and 3 writing assignments. The course is offered each spring semester with an enrollment of 15 to 25 students.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2010  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 405** Laboratory Animal Science (3) Principles involved in maintaining laboratory animals. Emphasis is on management, preventive medicine, and surgical considerations used in laboratory animal colonies.

### **VB SC 405 Laboratory Animal Science (3)**

This course in Laboratory Animal Science introduces students to the biology and characteristics of a variety of laboratory animal species, explores the care and use of animals in various research environments and examines ethical/legal issues pertaining to the use of animals in research and teaching. The laboratory section reinforces topics discussed in lecture and provides an opportunity for students to learn basic animal handling techniques in a safe and professionally supervised environment. Students work with live laboratory animals including mice, rats, hamsters, guinea pigs, and rabbits. They learn handling techniques, administration techniques (such as by injection), and sample collection techniques (such as blood collection). They also learn surgical principles and perform a surgical procedure using aseptic technique.

The Laboratory Animal Science course appeals to and benefits several general groups of students. Those who plan to pursue careers involving animal research such as in academia or industry receive a broad foundation in the field of laboratory animal science as well as an introduction to techniques commonly employed when handling animals. Those pursuing careers involving veterinary medicine or veterinary technology receive training and the opportunity to develop clinical/technical skills focused on a unique group of species. Students that are undecided in their career choice find that the field of laboratory animal science holds many opportunities for those with animal knowledge, handling skills and an understanding of the societal issues surrounding the use of animals in research.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 407 Dairy Herd Health Programs (2)** A discussion of health programs for dairy herds to assist in the control of infectious and metabolic diseases of dairy animals.

**VB SC 407 Dairy Herd Health Programs (2)**

Dairy Herd Health Programs provides students interested in dairy farm management and/or herd health medicine the opportunity to integrate basic knowledge of dairy cattle diseases into a comprehensive and practical herd health program. Herd health management is discussed as it relates to infectious disease control including mastitis and calf diseases, reproductive management, metabolic disease control and parasite control. A text book is not required. Readings are provided via ANGEL and students are strongly encouraged to read current scientific and lay press literature in the appropriate subject areas.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 409 Wildlife Diseases (3)** An introduction to wildlife diseases emphasizing their impact on wildlife, domestic animals and humans in today's world.

**Wildlife Diseases (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 418 Bacterial Pathogenesis (2)** Study of molecular interactions between bacterial pathogens and their hosts.

**Bacterial Pathogenesis (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 420 General Animal Pathology (3)** Nature and mechanisms of the disease process including degenerations, growth disturbances, inflammation, host-parasite relationships and neoplasia.

**VB SC 420 General Animal Pathology (3)**

The objectives of this course are to help the student develop an understanding of the concepts and general principles of disease processes in vertebrate species, attain skills required to observe and describe tissue changes in animals and develop critical thinking skills required for problem solving. In addition to text materials, photographs and photomicrographs of a variety of tissue lesions will be presented and discussed to emphasize concepts of disease processes as described in the course. Specific subjects that will be presented include cellular injury and necrosis, inflammation, blood coagulation, hemodynamic disorders, diseases of immunity, cell growth and adaptation and neoplasia. This course utilizes knowledge previously attained from courses in physiology, chemistry, immunology and biochemistry.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 421 (BIOL 421) Comparative Anatomy of Vertebrates (4)** The comparative anatomy of representative vertebrate animals, discussed from a descriptive and an evolutionary viewpoint.

**VB SC (BIOL) 421 Comparative Anatomy of Vertebrates (4)**

Upon completion of this course, students will understand the fundamentals of vertebrate anatomy and be able to employ comparisons between phylogenetically distinct vertebrate species to illustrate evolutionary adaptations and the

relationship between structure and function. Unique adaptations such as those of ruminants and birds will be explored in addition to the more common fish, amphibians and mono-gastric mammals typically used to illustrate these principles. Laboratory activities utilizing specimens representative of higher and lower vertebrate species will emphasize structure identification and functional adaptations. Students will be evaluated by means of laboratory examinations which will focus on structure identification. Attendance in laboratory is mandatory and laboratory exercises to be completed at each laboratory period will be graded. Students that miss laboratory session due to an excused absence should arrange a make up assignment with the instructor.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 423W Pathology of Nutritional and Metabolic Diseases (3)** Overview of nutritional and metabolic diseases of animals integrating concepts from biochemical and physiologic aberrations to clinical applications.

### **VB SC 423W Pathology of Nutritional and Metabolic Diseases (3)**

Nutrition plays a critical role in health, disease and convalescence of man and animals. Understanding the role of nutrition in disease pathogenesis, recovery and prevention requires an integration of biochemical and physiologic sciences and clinical practice. The intent of this course is to help the student integrate their knowledge from various basic science disciplines to real-world clinical issues related to the role of nutrition in disease pathogenesis, management and prevention across various animal species. Common nutrition and metabolic disease of production and companion animals will be used to demonstrate various principles of disease pathogenesis from a biochemical to whole animal basis. Deficiency and toxicity diseases of all essential nutrients will be addressed. In addition, a secondary role of nutrition in disease susceptibility and recovery mediated through immunologic and physiologic processes will be highlighted. In completing the course, students will have an understanding of comparative gastrointestinal anatomy and how this influences essential nutrients required and unique nutritional disease conditions. Additionally, students will gain appreciation for clinical management of nutritional diseases from diagnosis to prevention. Course format will be lectures and case-based discussions. With the integrative approach to course content, students are required to have previous courses in biology, biochemistry and nutrition. The course can meet requirements for writing across the curriculum and satisfies 400-level course requirements for Animal Bioscience and Animal Science majors. Prerequisites for the course include B M B 211 or B M B 401, and AN SC 301 or equivalent nutrition course.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 425 (AN SC 425) Principles of Avian Diseases (3)** Principles of pathogenesis and control of diseases in poultry and other avian populations. Case material used where appropriate.

### **VB SC (AN SC) 425 Principles of Avian Diseases (3)**

This course discusses the major diseases of domestic poultry, with etiology, prevention, and treatment reviewed on each disease. Since many of these diseases also affect wild birds and pet birds these are also reviewed. Lastly, avian disease with zoonotic (human public health) potential are also discussed in the course. This course is required by those seeking a poultry minor.

Previous coursework in pathogenic microbiology is beneficial.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2009  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 430 Principles of Toxicology (3)** Introduction to the biomedical aspects of toxicology with emphasis on the mechanisms and fate of chemical interaction with biological systems.

### **Principles of Toxicology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 431** (E R M 431) Environmental Toxicology (3) Effects of pollutants on animal health at the chemical, physical, and cellular level.

### **VB SC (E R M) 431 Environmental Toxicology (3)**

This ecotoxicology course is designed to provide a mechanistic understanding of how chemicals released into the environment affect individuals and populations. General concepts of fate and transport of chemicals in the environment, including sources and emission of pollutants, is a major focus of this course. In addition, the principals underlying the study of adverse health effects, toxicology, will be described. The experimental means used to assess toxicity and the regulation of chemical releases by governmental agencies will be included. Many of these concepts will be reinforced through the use of a case study approach where a pertinent, timely, environmental issue is incorporated into the ongoing lectures.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 432** (B M B 432, MICRB 432) Advanced Immunology: Signaling in the Immune System (3) The study of signaling pathways that regulate the immune response.

### **Advanced Immunology: Signaling in the Immune System (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 433** (B M B 433) Molecular and Cellular Toxicology (3) In-depth coverage of processes by which drugs/chemicals interact with biological systems and the experimental approaches used to study these interactions.

### **Molecular and Cellular Toxicology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 435** (B M B 435, MICRB 435) Viral Pathogenesis (2) A study of the molecular, immunological, and pathological aspects of viral diseases as well as laboratory methods of diagnosis.

### **Viral Pathogenesis (2)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 444** Epidemiology of Infectious Diseases (3) An introduction to epidemiology of infectious diseases with emphasis on understanding epidemiologic concepts for identifying, preventing and controlling infectious diseases.

### **Epidemiology of Infectious Diseases (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 445** Molecular Epidemiology of Infectious Diseases (3) A discussion and practicum of the molecular laboratory techniques used to study molecular epidemiology of infectious diseases.

### **Molecular Epidemiology of Infectious Diseases (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 448W** Current Topics in Immunology (3) Study of current approaches and questions driving research in immunology and infectious diseases.

### **Current Topics in Immunology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 451** Immunotoxicology of Drugs and Chemicals (3) An in depth discussion of the effect of xenobiotics and drugs on host immune mechanisms.

### **VB SC 451 Immunotoxicology of Drugs and Chemicals (3)**

Maintaining good health is a priority for most of us, and a key element in staying healthy is a properly functioning immune system. However, we are constantly exposed to a barrage of chemicals in the environment both natural and man-made. Some of the key questions asked included: 1) do environmental chemicals affect the generation of immunity?, 2) is our environment to blame for bad health? , and 3) can natural compounds cause immunotoxicity? These questions and more will be addressed in Immunotoxicology. This course will focus primarily on the effects of chemicals in the environment but will also cover the impact of other factors such as therapeutics, recreational drugs, and dietary factors on the immune system. Immunomodulatory mechanisms will be examined at systemic, cellular and molecular levels. Discussions will include theory, principles, and methodology and key issues in immunotoxicity, host immune mechanisms, and tumorigenesis. Key issues in regulatory immunotoxicology will be discussed to make students prepared for jobs in Federal Regulatory Agencies. Grading for undergraduates will include midterm and finals, and class participation; while graduate students will be required to also write a short, immunotoxicologically-related research proposal. Our intent is to provide a bridge between the two sciences and the undergraduate majors of Immunology and Toxicology, with an introduction to the basic mechanisms by which environmental, occupational, and therapeutic agents may interfere with immunologic systems. Immunotoxicology is offered every fall semester and is designed for undergraduate students from toxicology, immunology, and forensic science majors.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2012

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 494H** Honors Thesis (1-6 per semester/maximum of 6) Independent study directed by a faculty supervisor that culminates in the production of a Veterinary and Biomedical Sciences honors thesis.

### **Honors Thesis (1-6 per semester/maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.



**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 511** (BMMB 511, IBIOS 511) Molecular Immunology (2) The study of molecular and biochemical events that influence immune responses and define current questions in immunology.

**Molecular Immunology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 514** (NUTR 514) Prostaglandins and Leukotrienes (3) Biochemical, physiological, and nutritional aspects of arachidonic acid and related essential fatty acid metabolism. Structure-activity relationships of prostaglandins, prostacyclins, thromboxanes, and leukotrienes.

**VB SC (NUTRN) 514 Prostaglandins and Leukotrienes (3)**

Lipid mediators are formed in all eukaryotic cells during the course of normal metabolism; however, their biogenesis is closely linked to stimulation or treatment of cells by pathogens, cytokines, and chemokines, and environmental pollutants. In this course, we will examine the mechanisms by which endogenous fatty acid molecules are formed and how they alter gene expression in a given target cell. Of particular interest are prostaglandins and leukotrienes that are potent eicosanoid lipid mediators derived from fatty acids, including the membrane derived arachidonic acid and dietary fatty acids such as eicosapentaenoic acid and docosahexaenoic acid. We will examine their biological functions in homeostasis and inflammation. In addition, the effects of clinically relevant nonsteroidal anti-inflammatory drugs, the newer generation coxibs, and leukotriene modifiers will be studied. Through these studies, we hope to gain important insights into the mechanisms of inflammatory responses, pain, and fever. The course will rely on current literature with lectures and group discussions. Students will be required to present a review of a current journal article and lead a discussion of that paper. Students are evaluated by mid-term written exam (30% of the final grade), presentations (30% of the final grade), and a final written exam (40% of the final grade).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 515** (BMMB 515) Macrophage Biology (2) The role of macrophages at the interface between innate and adaptive immunity.

**VB SC (BMMB) 515 Macrophage Biology (2)**

The overall purpose of this course will be to provide second and third-year graduate students, the opportunity to study current concepts of macrophage biology. The course will be offered in the fall semester every other year. The class will meet once a week for two hours to review and discuss 3-4 papers on a chosen topic. For each class, the instructor will be responsible for choosing papers that reflect the most recent advances in the area of research to be covered and for providing background information on the topic. The students will be responsible for reading the papers prior to class and leading and/or participating in a critical discussion of the papers assigned for that week. This course will provide students

with a detailed understanding of macrophage biology as well as a forum for developing skills in critical evaluation and discussion of current research. The materials covered in this course will build on information presented in MICRB 410 (Principles of Immunology), VB SC/B M B/MICRB 432 (Advances in Immunology: Signaling in the Immune System) and is designed to complement VB SC/BMMB/IBIOS 511 (Molecular Immunology).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 518 (BMMB 518) T Cell Recognition and Development (2)** An in-depth analysis of the mechanisms of T cell recognition, activation and development, and the acquired immune response.

### **VB SC (BMMB) 518 T Cell Recognition and Development (2)**

The goals of the course are to provide second and third-year graduate students, and in-depth analysis of T cell recognition and development. The course will be offered in the spring semester every other year.. The class will meet once a week for two hours to review and discuss 3-4 papers on a chosen topic. For each class, the instructor will be responsible for choosing papers that reflect the most recent advances in the area of research to be covered and for providing background information on the topic. The students will be responsible for reading the papers prior to class and leading and/or participating in a critical discussion of the papers assigned for that week. This course will provide students with a detailed understanding of T cell recognition and development as well as a forum for developing skills in critical evaluation and discussion of current research. The materials covered in this course will build on information presented in MICRB 410 (Principles of Immunology), and VB SC/B M B/MICRB 432 (Advances in Immunology: Signaling in the Immune System) and is designed to complement VB SC/BMMB/IBIOS 511 (Molecular Immunology).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 520 Pathobiology (3)** The course deals with the mechanism of disease. Topics are: homeostasis, vascular injury, inflammation, neoplasia, genetic disorders, and biochemical toxicology.

### **VB SC 520 Pathobiology (3)**

Upon completion of VB SC 520, Pathobiology, students will have an understanding of disease processes with emphasis on changes at both the tissue and systemic levels. During the first portion of the course, the student will have the opportunity to examine the role of infectious agents, inflammation, genetics, metabolism and neoplasia in the disease process. Students will integrate their knowledge of general microbiology, cell biology, histology and biochemistry in understanding these processes. The student will understand how differing disease phenotypes can be caused by different underlying etiologies in an organism.

During the second portion of the course the student will gain knowledge concerning disease processes of different organ systems building on the general principles learned in the first portion. Topics are organized and presented in a format that covers the basics of normal anatomy and histology progressing to an analysis of the abnormalities associated with various disease states arising from multiple etiologies. While the human model will be discussed most extensively, there are numerous applications to other mammalian species. The student will learn considerable medical terminology and clinical concepts.

The course has been modeled after introductory pathobiology courses currently taught at major medical schools. It should be of interest to graduate and undergraduate students in life sciences who wish to become familiar with the various underlying mechanisms, including molecular mechanisms, which give rise to the disease phenotype. The course is an excellent preparation for students wishing to pursue advanced study in medicine or veterinary science.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2009  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 530 (IBIOS 530) Regulation of Gene Expression by Xenobiotics (3)** The mechanisms by which foreign chemicals alter gene expression and the techniques used to examine this effect are examined.

### **VB SC (IBIOS) 530 Regulation of Gene Expression by Xenobiotics (3)**

The goals of the present course are to enhance the students' ability to read, design, implement and discuss studies focusing on how chemicals regulate gene expression. Through the use of current research articles, the students will understand the principles of experimental design. They will learn critical reading skills as well as enhance their own research and problem solving abilities. In addition, an emphasis will be placed on presentation clarity and ability to defend scientific inquiry from peers. Thus students will develop critical communication skills. The grade is determined by presentations (60%) and one oral assignments (40%). Each student will give several presentations during the semester (depending on the number of students enrolled), each based on a current journal article. All students are expected to read the article and participate in in-class discussions. The oral assignment consists of a series of discussion questions, which the student will answer in writing and "defend" in an informal oral presentation. In addition to being a required course in the Molecular Toxicology graduate program (IBIOS), Regulation of Gene Expression by Xenobiotics will complement several life science graduate programs. This course builds upon Molecular and Cellular Toxicology and requires a good understanding of biochemistry and molecular biology.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 532** (IBIOS 532) Developmental and Reproductive Toxicology (3) Effects of environmental chemicals, nutrients and drugs on embryo/fetal development and maternal/paternal toxicity.

### **Developmental and Reproductive Toxicology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 534** Current Topics in Cancer Research (3) A discussion of current cancer research literature with the focus on primary research literature.

### **VB SC 534 Current Topics in Cancer Research (3)**

Students enrolled in Current Topics in Cancer Research will acquire knowledge of focused areas in cancer research including basic biology of cancer cells, genes and signaling pathways that control cancer cell growth and metastasis, molecular methods for analysis of human and animal cancers, specific animal models of cancer and molecular approaches to cancer therapy. Emphasis will be placed on critical reading of primary literature, identification of strengths and weaknesses of methods, approach and conclusions of specific studies and implications of the research for future studies and understanding of cancer and therapy. This course will provide a solid foundation and companion for other specialized courses in a diverse group of graduate degree programs as well as the critical thinking and analysis required for completion of a doctoral program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2011  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

#### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2008

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 600** Thesis Research (1-15) No description.

#### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 601** Ph.D. Dissertation Full-Time (0) No description.

#### **Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**VB SC 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Experience in preparing and conducting lectures/laboratories and assembling materials for laboratories.

#### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Wildlife and Fisheries Science (W F S)**

**W F S 406** Ornithology Laboratory (1) Laboratory and field identification of Pennsylvania birds, avian ecology and behavior, field survey techniques.

#### **W F S 406 Ornithology Lab (1)**

Laboratory and field identification of Pennsylvania birds. Students will learn to identify Pennsylvania birds by sight and sound and to apply this knowledge in the field. They will be able to describe the distribution and abundance of selected species within the state, develop a basic understanding of taxonomy and life history traits for selected families, and develop an appreciation for birds. Most classes are conducted outdoors. This course is the lab component of W F S 407 Ornithology.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 407** Ornithology (3) Introduction to the biology, ecology, adaptations, and conservation of birds.

### **Ornithology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 408** Mammalogy (3) Identification, systematics, characteristics, adaptations, ecology, behavior, natural history and conservation, and socio-economic aspects of mammals.

### **Mammalogy (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 409** Mammalogy Laboratory (1) Laboratory and field identification of mammals, ecology and behavior of mammals, field survey techniques.

### **W F S 409 Mammalogy Laboratory (1)**

Laboratory and field identification of mammals. Students will learn taxonomy and identification of many North American mammals. Students will also study the natural history, distribution, and identification of sign (e.g., tracks, scat, dens) of many Pennsylvanian mammals. Most classes are taught indoors. However, students will attend outdoor labs during the semester to observe mammals and their sign in the field. This course is the lab component of W F S 408 (Mammalogy).

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 410** General Fishery Science (3) Introduction to the study, management, and uses of fish populations; methods of investigation, culture, and harvest of fishes.

### **General Fishery Science (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 422** Ecology of Fishes (3) Role of fishes in aquatic communities and general ecosystems. Environmental factors influencing fish as individuals, populations, and communities.

### **Ecology of Fishes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 430** (FOR 430) Conservation Biology (3) The application of biological principles to issues in the conservation of biodiversity.

### **Conservation Biology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 435** (E R M 435) Limnology (3) Biogeochemistry and natural history of freshwater ecosystems.

### **W F S (E R M) 435 Limnology (3)**

This course will define and describe major principles (physical, chemical, biological, and ecological) that govern the structure and function of freshwater ecosystems (ponds, lakes, and rivers). Current scientific literature will be critically reviewed and discussed in relation to comparative philosophy, methodology, and case studies that cover a range of topics in limnology. The objectives of E R M (W F S) 435 are to familiarize students with the major physical properties, chemical cycles, taxonomic groups of organisms, and ecological interactions that define and describe the natural function of aquatic ecosystems. The course will use case studies to illustrate and examine pertinent issues (e.g., excessive material loading, introduction to exotic species, habitat fragmentation, and climate change) that can alter the structure and function of aquatic ecosystems. Knowledge of these basic ecosystem principles will be applied towards formulating real-life resolutions to the issues identified in class, in order to better manage aquatic resources (methods to reduce material loads, transport controls of exotic species, habitat restoration, and reduction of global gases). This course will be useful to both undergraduate and graduate students seeking degrees in Environmental Resource Management, Wildlife and Fisheries Science, Ecology, and other related subjects. At the undergraduate level, the course will serve as a 400-level selection in both the Environmental Resource Management and Wildlife and Fisheries Science degree programs. At the graduate level, the course will compliment several Wildlife and Fisheries courses that form the compliment of that degree program. Moreover, the course can satisfy the course requirement for ecosystems ecology in the inter-college Ecology graduate program and serve as a breadth course in Water Resources for graduate students in the Watershed Stewardship program.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 436** (E R M 436) Limnological Methods (3) Application of current methodologies to evaluate the biological, chemical, and physical characteristics of aquatic ecosystems.

### **W F S (E R M) 436 Limnological Methods (3)**

Limnological Methods will instruct students to apply state of the art analytical measurements in order to gain an understanding of how and why ecosystems support specific biodiversity and biogeochemical cycles. The course will help students define key ecological elements (e.g., ecosystem metabolism, resource limitation, predator-prey relations) in both qualitative and quantitative terms, thereby making them tangible, tractable, and readily understandable. The course will use an instructional rubric to integrate conceptual, analytical, and communicative exercises in order to instruct students about how to evaluate variation in natural ecosystems.

This course provides experiential training in the scientific process (rubric), so students can learn by doing, thereby internalizing their knowledge. Course content is organized into three 5-week sections, each of which will emphasize one component of the biogeochemical cycle (physical, chemical, biological). In each section, students will carry out a focused group study designed to evaluate how a pertinent environmental perturbation can affect that component of the aquatic biogeochemical cycle. The course content in each five-week block will have students: 1) review the experimental design and hypothesis, 2) implement the experimental design in the field or laboratory, 3 and 4) process and analyze samples in the laboratory, and 5) make statistical and graphical evaluations of the experimental results relative to their hypothesis (in class) and present these findings in written form. Knowledge of these basic ecosystem principles will be applied towards formulating real-life solutions to the issues identified in class, in order to better manage aquatic ecosystems.

This course will be useful to undergraduate students seeking degrees in Environmental Resource Management and Wildlife and Fisheries Science, as well as graduate students pursuing degrees in Ecology, Forest Science, Wildlife and Fisheries Science, Watershed Stewardship, and other related subjects. At the undergraduate level, the course will serve as a 400-level elective in Environmental Resource Management degree program, Wildlife and Fisheries Science degree program, and the inter-college Marine Science option. At the graduate level, the course will complement several Forest Science and Wildlife and Fisheries courses. Moreover, the course can also satisfy the requirements for the ecosystems ecology focus in the inter-college Ecology graduate program. Grades will be based on three research papers, and a final laboratory practical.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 440** Natural Resources Public Relations (3) The course prepares students to integrate public relations concepts with principles of natural resources management at the community level.

**W F S 440 Natural Resources Public Relations (3)**

This course will bring together the elements of previous courses in speech, writing, resource management, and policy to enable the student to present concepts and ideas to the public about management options. The course introduces the student to techniques used in conducting public relations activities as natural resources professional or as a representative of a natural resources agency or NGO. The course will emphasize current topics of sustainability, stewardship, ecosystem management, and conservation, all of which involve integration of ecological, economic and institutional concerns with a strong focus on effectively communicating with citizens at a local community level.

Professional presentations will be a major component of the class. Teams will develop a series of photographs to accompany a news feature; write a popular article; edit their peers' work; design and build a public display on a resource issue; research a current natural resources topic; develop a presentation and present their team's work to the class for evaluation.

They will learn how to develop media contacts, the aspects of hiring, supervision and interviewing for positions, work with both the electronic and print media, write a news release on a controversial topic, which will be evaluated by a professional in the field. A number of guest lecturers will be used to discuss current concerns and relate practitioner's experiences in the field. The class will focus on individual skills and team oriented projects. Students will be evaluated by their peers, professionals, and through a written mid-term and an oral final.

The course is based on a distinctive sub-discipline in natural resources management, which focuses on "information and education", typically one of five main divisions of a natural resources agency or organization. The central theme of the class is to bring to bear many of the concepts and ideas from a variety of previous classes to focus on the importance of public relations to the resource management field.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 446** Wildlife and Fisheries Population Dynamics (3) Concepts and estimation of mammalian, avian, and fish populations; processes of mortality, natality, growth, and regulation.

**Wildlife and Fisheries Population Dynamics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 447W** Wildlife Management (3) Management of renewable wildlife resources by applying ecological concepts, habitat evaluation, and decision-making; writing and editing reports are emphasized.

**Wildlife Management (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 450 (E R M 450)** Wetland Conservation (3) Wetland types, classification, functions and values; hydrology, soils, and plants; introduction to wetland identification and delineation; wetland regulations.

**W F S (E R M) 450 Wetland Conservation (3)**

Wetlands are unique ecosystems, differing in many ways from both terrestrial and aquatic environments. They provide recognized values and functions to society, although these values and functions remain difficult to quantify. The study of wetlands is interdisciplinary, requiring background knowledge in science, management and policy disciplines. This course will explore the variety of wetland types and functions, and emphasize the diverse hydrological, biological, chemical, and physical interactions that occur within wetlands. Because wetlands are recognized as valuable assets in the landscape, issues surrounding wetland management and regulation have taken on increased importance; we will address these issues as well. Topics will also include the restoration of degraded wetlands and wetland creation, along with the construction of wetlands for pollution abatement.

Students will become familiar with different wetland types and how they are classified, and will develop skills in understanding the interactions between wetland hydrology, hydric soils and hydrophytic vegetation. They will also develop an understanding of important national and state policies and regulations pertaining to wetlands and their protection and delineation. Classroom assessment will be based on three cumulative exams, homework assignments, and a final project.

The course will fulfill 3 credits of electives or technical selections in the Wildlife and Fisheries Science major. Other students university-wide may be interested in the course, and the intention is to develop a course that is accessible to a wide variety of traditional and non-traditional students. For proper instruction, a technology classroom with computer projection equipment will be required.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 452** Ichthyology (2) Study of the structure, taxonomy, systematics, and natural history of freshwater and marine fishes.

### **Ichthyology (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 453** Ichthyology Laboratory (2) Identification of fishes, major fish families, use of keys.

### **Ichthyology Laboratory (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 454** Field Ichthyology (2) Introduction to collection and field identification of the fishes of Pennsylvania.

### **W F S 454 Field Ichthyology (2)**

This course is designed familiarize students with collection, observation, and field identification of Pennsylvania's fish fauna. Students are taught how to collect, preserve, catalog, curate, and observe fishes. Additionally, they are taught how to gather pertinent in situ behavioral and distributional information on fishes and how to manage, record, and store field data. With the increasing emphasis on biodiversity and environmental monitoring, students need to be able to collect, manage, and store data as well as secure the chain of custody.

This course is offered annually at the end of spring semester at the Tom Ridge Environmental Center in Erie, PA. Classes begin Sunday night at 1800 and extend until 1700 on Friday. After the three-hour introductory class, students meet each day at the Tom Ridge Environmental Center at 0700. Field collections/observations begin promptly, and end about 1700. Students reassemble in the laboratory at 1830 for a two-hour discussion of the day's activities. On one day, a series of night collections is made that extends until midnight. Students are responsible for their motel and food expenses during the week. All transportation to and from the collection sites is provided.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:



**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 460 Wildlife Behavior (3)** Scholarly discussion and critique of history, concepts, and application of wildlife behavioral concepts to conservation issues.

**W F S 460 Wildlife Conservation Behavior (3)**

The course will give an in-depth coverage of concepts related to an understanding of wildlife behavior. Particular focus will be given to a discussion, critique, and development of these concepts and their application to contemporary issues in conservation and natural resource management of wildlife because there is a general lack of understanding of behavior by conservationists and natural resource managers.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 462 Amphibians and Reptiles (3)** Critique of global evolution and conservation of amphibians and reptiles, focusing on Northeastern U.S. natural history and ecology.

**W F S 462 Amphibians and Reptiles (3)**

This course explores the evolution, ecology, and conservation of amphibians and reptiles. This course is open to all students with some background in biology. The objectives of this course are for students to 1) describe the evolution, anatomy, reproduction, and physiology of amphibians and reptiles, 2) place contemporary research in the context of the natural history traits and behavioral ecology of herps, and 3) critically evaluate the application of these concepts to natural resource management for salamander, frog, turtle, lizard, and snake species and populations. Evaluation methods include minute papers and exams.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 463W Fishery Management (3)** Management of sport and commercial fisheries, including biological, political, social, and economic factors; regulations and other management techniques.

**W F S 463W Fishery Management (3)**

This course will introduce students to the management of recreational and commercial fisheries. The course emphasizes fishery management as a goal-oriented process that adapts over time to changes in fish populations and societal goals. Students will learn to recognize and understand that ecological, economic, political, and social forces shape this management process. Major methods of fisheries management involving people, population, and habitat management will be surveyed. Case studies highlighting the application of these management strategies to current fishery management are explored. Writing reports and management plans is emphasized.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 495 Wildlife/Fisheries Internship (1-6)** Supervised field experience related to the student's major.

**Wildlife/Fisheries Internship (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 496 Independent Studies (1-18)** Creative projects, including research and design, which are supervised on an

individual basis and which fall outside the scope of formal courses.

### **Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 497A** Ornithology Lab Practicum (1) This one-credit lab practicum must be scheduled concurrently with W F S 406, Ornithology Lab.

### **Ornithology Lab Practicum (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 497A** Ornithology Lab Practicum (1) This one-credit lab practicum must be scheduled concurrently with W F S 406, Ornithology Lab.

### **Ornithology Lab Practicum (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 497B** Mammalogy Lab Practicum (1) This one-credit lab practicum must be scheduled concurrently with W F S 409, Mammalogy Lab.

### **Mammalogy Lab Practicum (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 499** (IL) Foreign Studies (1-12 per semester/maximum of 12) Courses offered in foreign countries by individual or group instruction.

### **Foreign Studies (1-12 per semester/maximum of 12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**W F S 499A** (IL) Namibia Study Tour (1) During the 14-day tour, which takes place June 6-22, students will learn about (a) the vast skies of the Southern Hemisphere, (b) the Namib Desert and Skeleton Coast, (c) the Benguela Current and other upwelling ecosystems, (d) continental drift and landscape ecology, (e) the lore of the Bushmen, and (f) the contrasts of government and private management of wildlife resources. These examples will in turn be related through a series of lectures to the presumed origin of the Cosmos, history of the Earth, origins of mankind, and genetic bottlenecks. The study tour price is 4,000 USD/student and includes all in-country travel, lodging and meals, entry fees, and vehicle and driver. Prices exclude airfare to and from Namibia, accidental, life, health and personal property insurance (required), personal purchases, and alcoholic drinks. Lodging will be two persons per room, unless single rooms are requested at additional cost. A 50% non-refundable deposit is required.

#### **Namibia Study Tour (1)**

General Education: None

Diversity: IL

Bachelor of Arts: None

Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 500** Professionalism in Natural Resources (3) Scholarly discussion and critique of skills important to professionalism of students in natural resources, wood products, and related science-based disciplines.

#### **W F S 500 Professionalism in Natural Resources (3)**

The course will give an in-depth coverage of issues and skills pertinent to the professionalism of graduate students in natural resources, wood products, or related science-based disciplines. Particular focus will be given to a discussion, critique, and development of communication skills (oral and written). In addition, a spectrum of pertinent topics and issues relevant to graduate students will be discussed in depth, ranging from the philosophy and land-grant institutions and to those important to the academic success of graduate students and their success in future careers. This course will be offered in fall semester each year.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 525** Communications in Natural Resources (3) Communications of research results through manuscripts for peer reviewed journals, presentations at professional meetings, and articles for the general public.

#### **W F S 525 Communications in Natural Resources (3)**

This course focuses on development of communication skills for dissemination of scientific information from research. The major part of the course is devoted to methods for the planning, organizing, and writing of manuscripts suitable for submittal to peer-reviewed journals in the natural resource area. The course briefly reviews the design and delivery of effective presentations to professional audiences. Fundamentals for writing popular science articles are likewise addressed. An underlying objective is to help students become critical readers, listeners, and observers. Weekly assignments are designed to help students improve writing skills and to illustrate methods for developing major sections of a typical research paper. An original paper suitable for submission is required as a final product. Techniques for developing effective slide presentations are reviewed and students must design and deliver a slide presentation based on their journal article. Approaches for writing articles for lay audiences are presented by speakers with journalism backgrounds, and students are required to prepare an article suitable for publication in a newspaper or a popular periodical. Grading is based 50% on the final manuscript, 10% on slide presentation, 10% on popular article, and 30% on weekly assignments.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 530** Conservation Ecology (3) Discussion of the application of ecological principles to conservation and management of biological diversity, landscapes, and ecosystems.

#### **W F S 530 Conservation Ecology (3)**

Application of emerging ecological concepts and principles for the conservation of wildlife biodiversity (non-domesticated

plants and animals) in natural and human-induced landscapes and ecosystems. Particular focus will be given to forested and agricultural environments. Current concepts will be critically reviewed and assessed in relation to published case studies in the scientific literature dealing with a broad range of topics, such as ecosystem management, biodiversity conservation, and landscape phenomena (e.g., edges, corridors, metapopulations). This course will be offered in spring semester of odd years. Student evaluation will be based on individual participation, small-group presentations, and written papers.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 536** Freshwater Field Ecology (3) Organisms and physical/chemical factors that affect them in the aquatic environment; basic water chemistry; identification of aquatic organisms.

### **Freshwater Field Ecology (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 542** Systematics (3) Principles and methods of classification, phylogeny, and speciation; taxonomic techniques; analysis of species; causal interpretation of animal diversity.

### **Systematics (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 551** Wildlife Biometrics and Population Analysis (3) Application of biometrics and mathematics to concepts and problems in wildlife ecology with emphasis on population analysis.

### **Wildlife Biometrics and Population Analysis (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 552** Systematics and Evolution of Fishes (3) Detailed study of the systematics, evolution, identification, and natural history of fishes.

### **Systematics and Evolution of Fishes (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 560** Population Estimation and Modeling (4) Application of statistical models to estimating population parameters to test ecological theories.

### **W F S 560 Population Estimation and Modeling (4)**

The purpose of this course is to impart a working knowledge of statistical methods for estimating fish and wildlife populations. Primary emphasis will be on methods of estimating population size, survival rates, and birth rates as they relate to testing hypotheses about population dynamics. Most of the course will focus on mark-recapture models for both

open and closed populations, but other methods such as distance sampling and removal models that do not require marked animals will be studied.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 590** (FOR 590) Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

### **Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1989

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 597A** Applied Spatial Ecology (3) Compilation and analysis of spatial data for making sound resource management and conservation decisions.

### **Applied Spatial Ecology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 597B** Quantitative Methods in Ecology (3) Course will provide practical experience to develop skills and an understanding of quantitative methods for the analysis interpretation, and presentation of ecological data.

### **Quantitative Methods in Ecology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details

check the specific course syllabus.

**W F S 597B** Quantitative Methods in Ecology (3) Course will provide practical experience to develop skills and an understanding of quantitative methods for the analysis interpretation, and presentation of ecological data.

**Quantitative Methods in Ecology (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in wildlife courses.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W F S 611** Ph.D. Dissertation Part-Time (0) No Description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Women's Studies (WMNST)

**WMNST 400** (US;IL) Debates in Contemporary Feminism (3) Consideration of feminist theories of women's experience in transforming understanding, reconceptualizing old problems, raising new ones, and expanding traditional disciplines.

### **WMNST 400 Feminist Theory (3) (US;IL)**

This course focuses on theoretical analyses of gender as major components of contemporary thought. It is designed to help students develop knowledge of critical texts to better analyze women's issues and comprehend the realities of women's lives, past and present. The course will relate analyses of gender to analyses of race, class, religion, ethnicity, national origin, and sexual orientation. The course addresses theoretical issues rooted in an analysis of gender, critiques theories that do not attend to such issues, and investigates the premises and implications of feminist theory. The course will continue to have a prerequisite of WMNST 301: Introduction to Feminist Thought. For the Women's Studies major, WMNST 400 will fall under the heading of Additional Courses, where students will have a choice of this course or WMNST 401: Feminist Perspectives on Research and Teaching. These are our two most general courses at the 400-level. It may also be used to fulfill a US;IL requirement.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 401** Doing Feminism: Theory and Practice (3) Advanced analysis of feminist theory and the nature of its integration (sometimes uneasily) within feminist movements and practices.

### **WMNST 401 Feminist Perspectives on Research and Teaching (3)**

The course explores current themes organizing debates and discussions within feminist discussions of teaching and research. Students will become familiar with various research perspectives that feminist researchers use including interviews, ethnography, and action research. The course will examine debates within feminist research and teaching including power, difference, and race. Key themes will include questions around the politics of representation, the relationship of research to colonialism, the authority of the researcher, researcher-researched relations, and power/knowledge relations in research, classrooms, and knowledge production broadly defined. The aim is not to identify a feminist orthodoxy but rather: 1) to identify and understand the varieties of feminism existing today; 2) to become knowledgeable about a range of themes currently emerging in feminist debates on teaching and research; and 3) to arrive at an appreciation of the transformative effect upon teaching and research these new paradigms, debates, and themes have meant across a range of disciplinary boundaries.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 407** (US) (THEA 407) Women and Theatre (3) A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background.

### **WMNST (THEA) 407 Women and Theatre (3) (US)**

THEA/WMNST 407 approaches the study of theatre/performance as a valuable site for the exploration of race, class, and gender as social constructs. The focus will be on 20th century developments of women and theater. Feminist theory and theatrical practice will be a focus of the course and will reflect conflicts and differences present within feminism.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 412** (EDTHP 412) Education and the Status of Women (3) An examination of the relationship of education to the status of women in American society.

**Education and the Status of Women (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 416 (US;IL) (AF AM 416, S T S 416) Race, Gender and Science (3)** The class will focus on race and gender as products of science, and how societal values shape scientific activity.

**WMNST (S T S/AAA S) 416 Race, Gender and Science (3)  
(US;IL)**

The course's objective is to provide a seminar for students to integrate feminist theory, social theory, and science studies through class discussions, essays and research. The role of science in defining, producing, applying and policing of gender and race in society will be explored through the work of feminists and traditional scholars working in a variety of disciplines from cultural studies to science studies. Students will be encouraged to develop a critical analysis of race and gender in science in order to understand the impact of gender and race on the production of scientific knowledge. This course is designed for students in the humanities, social sciences, science and technical fields. Readings will be taken from past and contemporary social theory (i.e. students will be reading original works not textbooks). Students will be expected to read, understand and synthesize 75-100 pages of reading per class and to discuss them in a seminar fashion in order to analyze, critique and evaluate various theories to develop their own understanding of the interrelationship of science, race and gender. In addition they will do two professional-style book reviews during the semester. At the end of the semester students will integrate theory with social, cultural and historical data that they collect through library research (with a minimum of 50 sources). Students will present the paper to the class in a conference style presentation that will conclude with a Q&A session.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 420 (US;IL) (CED 420, R SOC 420) Women in Developing Countries (3)** Analysis of women's work, experiences, and development policies and practices in Africa, Asia, and Latin America.

**WMNST (CEDEV, R SOC) 420 Women in Developing Countries (3)  
(US;IL)**

The purpose of this course is to increase understanding of women's lives in third world countries at the time when women's movements, grassroots activism, and feminism are on the rise in the third world. The course examines third world women's challenges to Western definitions of feminism and traces the theoretical shifts and practical changes related to women's issues in African, Asia, and Latin America. Students participate in studying specific community and agricultural development projects. Topics include feminist critiques of development and post-colonialism, ecofeminism and environment, sexuality and reproduction, global restructuring, and grassroots community activism. Students will be evaluated based on class participation, two written critiques of readings, a final course project, a mid-term, and a final exam. This course will add diversity to both the rural sociology, community and economic development, and women's studies curricula. International, gender, ethnic, and racial issues are core components of the course. The course will be an elective for Women's Studies majors and minors and will serve graduate students in rural sociology, women's studies, and other fields.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Fall 2009

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 421 (IL) (HIST 421) The History of European Women (3)** European women's lives from the Middle Ages to the present.

**The History of European Women (3)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2013



Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 423 (US) (CRIMJ 423, CRIM 423) Sexual and Domestic Violence (3)** Legal, sociological, and psychological perspectives of sexual and domestic violence.

**WMNST (CRIMJ/CRIM) 423 Sexual and Domestic Violence (3)  
(US)**

This course investigates violence against women, specifically domestic, sexual, and relationship violence. Students will examine some of the legal, sociological, and psychological perspectives about sexual, domestic, and relationship violence as well as the social and cultural roots of violence against women. Students will also gain an understanding of the experiences of victims of domestic and sexual violence as well as the issues presented by perpetrators. Students will be evaluated based on performance on exams, and two research papers. CRIMJ/CRIM/WMNST 423 is a supporting course in both the WMNST major and minor as well as a supporting course in the CLJ major. It may also be used to satisfy a GI requirement.

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 424 (US) (KINES 424) Women and Sport (3)** An interdisciplinary approach to contemporary issues related to women and sport from historical, physiological, psychological, and sociological perspectives.

**Women and Sport (3)**

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 426Y (US;IL) (GEOG 426Y) Gender Geographies (3)** Description and explanation of the links between gender relations and spatial structures; gender and work, social services, and neighborhood activism.

**WMNST (GEOG) 426Y Gender and Geography (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Until the 1970s women remained invisible in the analyses of social space: human geography was indeed just that--(hu)man. Recently, feminist geography began to challenge the implicit masculinity of the subject of geography; this course will examine the evolution of the feminist challenge. The course addresses gendered geographies across multiple scales, such as the body, home, public space, community, nation and globe. Students explore each of these through readings and will produce a series of essays throughout the semester. As a point of entry to discussion of place, space and gender, this course explores the diverse ways in which feminists have seen space as central both to masculine power and to feminist resistance. In particular we will explore arguments from interdisciplinary paradigms, stemming from cultural, post colonial, subaltern, sexuality, gender studies and critical race theory, all of which have influenced current debates across the field of geography.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 426Y (US;IL) (GEOG 426Y) Gender Geographies (3)** Description and explanation of the links between gender relations and spatial structures; gender and work, social services, and neighborhood activism.

**WMNST (GEOG) 426Y Gender and Geography (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

Until the 1970s women remained invisible in the analyses of social space: human geography was indeed just that--(hu)man. Recently, feminist geography began to challenge the implicit masculinity of the subject of geography; this course will examine the evolution of the feminist challenge. The course addresses gendered geographies across multiple scales, such as the body, home, public space, community, nation and globe. Students explore each of these through readings and will produce a series of essays throughout the semester. As a point of entry to discussion of place, space and gender, this course explores the diverse ways in which feminists have seen space as central both to masculine power and to feminist resistance. In particular we will explore arguments from interdisciplinary paradigms, stemming from cultural, post colonial, subaltern, sexuality, gender studies and critical race theory, all of which have influenced current debates across the field of geography.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2013 Future: Fall 2013

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 428 (US;IL) (PL SC 428) Gender and Politics (3)** Gender in politics in the United States and around the world; major areas of women and politics research.

**WMNST (PL SC) 428 Gender and Politics (3)  
(US;IL)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course is designed as an overview to the field of women and politics. It examines the role that women play in politics in the United States and around the world. Students will begin by examining how women are socialized differently from men and how that socialization effects women's political attitudes and participation. Then students will focus on women in different political offices and how their behavior compares to that of their male counterparts. Students will then analyze the women's movement in the United States. Finally, students will turn to different theories of the ideal position of women and men in politics and use those theories to explore the issue of pornography. Students will be evaluated on a final exam, short essays ( 4 3-5 page essays), class participation, and a research paper (15 pages). This is an advanced course with 6 credits prerequisite in Women's Studies or Political Science. This course fulfills the American Politics and Comparative Politics distribution as well as the advanced course requirement for the Political Science major. It is an elective for a Women's Studies major. It also fulfills an United States Cultures and International Cultures requirement.

General Education: None

Diversity: US;IL

Bachelor of Arts: Social and Behavioral Science

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 430 (US) (AM ST 430) Women in American Society (3)** A historical study of women's roles and experiences in the United States.

**Women in American Society (3)**

General Education: None

Diversity: US

Bachelor of Arts: None

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 438 (PHIL 438) Feminist Philosophy (3)** Examines the central currents of feminist philosophy, selected problems and concepts regarding difference, gender and sex, identity, and political culture.

**Feminist Philosophy (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 452 (US) (BB H 452, NURS 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

**Women's Health Issues (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 452 (US) (BB H 452, NURS 452) Women's Health Issues (3)** Exploration of major health issues concerning women today, with an emphasis on social, cultural, and medical influences.

**Women's Health Issues (3)**

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 453 (US) (CRIMJ 453, CRIM 453) Women and the Criminal Justice System (3)** This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system.

**WMNST (CRIMJ/CRIM) 453 Women and the Criminal Justice System (3) (US)**

The course will examine the role of women in the criminal justice system and look at the issues related to women as offenders, victims of crime, and as professionals in the system. Students will gain an understanding of the issues concerning women in the criminal justice system, examine how societal arrangements affect women as offenders, victims, and criminal justice professionals, and better understand the overlooked problems faced by women in the criminal justice system. Students will be evaluated on the basis of exams, presentations, and papers. CRIMJ/CRIM/WMNST 453 is a supporting course for both WMNST and CLJ majors, as well as the WMNST minor. This course may also be used to satisfy a US requirement.

General Education: None  
Diversity: US  
Bachelor of Arts: None  
Effective: Spring 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 455 (US) (CAS 455) Gender Roles in Communication (3)** Explores the literature on gender research in the discipline of human communication.

**WMNST (CAS) 455 Gender Roles in Communication (3) (US)**

This 400-level course is a theory and application course which also satisfies an intercultural requirement. CAS/WMNST 455 strives to ensure that students understand female and male differences and similarities in communication patterns, perceptions of the opposite sex, and expectations and stereotypes regarding the opposite sex. Many researchers find that gender communication is "cross cultural," i.e., that women and men come from two different cultures, and therefore misunderstanding of each others' intent and expectations may frequently occur. This course examines how distinctions in meaning and interpersonal dynamics may create these two differing cultures, and promotes understanding and possibilities for adaptation. It also investigates when and if changing communication styles is desirable, and in which settings. A goal of the course is to help students to solve puzzles toward understanding those we work with and relate to, as well as to apply their knowledge to their own lives and contexts. The course content and format reflects these goals. CAS/WMNST 455 begins with theoretical information, later applying it to situations of interest to most -- relationships, language use differences (verbal and nonverbal), media messages, and workplace issues. Lecture incorporates considerable discussion and exploration of gender issues and most topics are followed by activities, which illustrate how theories work in real life. This course is useful for any students seeking an intercultural course. It is recommended to Communication Arts and Sciences and Women's Studies majors and minors due to emphasis on communication theory and gender issues. Business, Counseling, Psychology, Sociology, Education and any Social Science majors may fulfill a US requirement through 455. Exams are geared toward testing ability to apply theory to life. Other evaluation methods encompass short reaction papers, a book review, application paper, and team research papers and presentations. These assignments and all class exercises focus on application of theory and course content to students' lives.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 456** (SOC 456) Gender, Occupations, and Professions (3) The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

**Gender, Occupations, and Professions (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: Social and Behavioral Science  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 457** (US;IL) (HIST 457, S T S 457) The History of Women in Science (3) Critical analysis of the roles women, gender, and minorities have played in the natural sciences.

**The History of Women in Science (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: Humanities  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 458** (GS) (BB H 458) Critical Issues in Reproduction (3) Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

**Critical Issues in Reproduction (3)**

General Education: GS  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 458** (GS) (BB H 458) Critical Issues in Reproduction (3) Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

**Critical Issues in Reproduction (3)**

General Education: GS  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Future: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 462** (US) (ENGL 462) Reading Black, Reading Feminist (3) Female identity and its construction in textual representations of gender, class, color, and cultural difference in English-language literatures.

**WMNST (ENGL) 462 Reading Black, Reading Feminist (3)  
 (US)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL/WMNST 462 provides two important learning opportunities for undergraduate students. The first is to examine the construction of female identity in the textual representations of gender, class, color, and cultural differences by black American women. The second is to identify, explore, and analyze the major issues concerning the discovery and development of a black feminist literary tradition. Authors under consideration will vary from class to class, but may include writers such as Hortense Spillers, Harriet Jacobs, Harriet Wilson, E. Genovese, Hazel Carby, Francis Harper, J. Fauset, Nella Larsen, Zora Neale Hurston, Gwendolyn Brooks, Margaret Walker, Nikki Giovanni, Sonia Sanchez, Maya

Angelou, Lorraine Hansberry, Adrienne Kennedy, E. Brown-Guillory, Toni Morrison, S. A. Williams, Alice Walker, Paula Marshall, and Octavia Butler. The course will focus on the complex relationship of slavery and post-slavery black experience to the literary imagination of African American women, and of issues of gender in black identity in America. Topics covered will vary, but will include issues of the legacy of slavery, the development of black feminist thought, nineteenth-century conceptions of black womanhood, women's roles in the Harlem Renaissance, representations of black womanhood by male writers, and self-representation by female writers, women "Black Power" poets, black female playwrights, neo-slave narratives, the aesthetics of contemporary black feminism, and post-modernism and the challenge to understandings of canonicity posed by black women's writing, and the like. This class will prepare students for advanced courses in African American and feminist literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms. Students will be evaluated by class participation, a group oral presentation, small group problem solving exercises, three out-of-class essays (of 5-8 pages each), and an in-class final examination consisting of essays and short answers. In addition to satisfying requirements for students emphasizing in African American literature within the English major, this course will be important in the offerings of African/African American Studies, American Studies, Women's Studies, and History. The course may be used as English major elective credit or as credit towards the English minor. The course can be used to complete the major and minor in Women's Studies Arts and Humanities area and it also satisfies the Women of Color (WOC) sub-requirement.

General Education: None  
 Diversity: US  
 Bachelor of Arts: Humanities  
 Effective: Summer 2005  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 464 (US) (BE SC 464) Feminine/Masculine (3)** Study of sex role learning; investigating feminine/masculine labeling; implications for contemporary society.

**WMNST (BE SC) 464 Feminine and Masculine (3)  
 (US)**

This course provides a critical examination of the concepts of masculinity and femininity through a consideration of how these have shifted and changed historically and cross-culturally. It considers a variety of theories of gender difference. It investigates how gender is socially constructed and practiced. Thus, it examines how gender is enacted in interpersonal relationships and defined, reinforced, and challenged through processes of socialization as well as through the various institutional spheres of social life. The course addresses the diversity of masculinities and femininities within a single society. Thus, attention is given to race and class-based differences as well as to trans-genderism and homosexuality.

General Education: None  
 Diversity: US  
 Bachelor of Arts: None  
 Effective: Spring 2008  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 466 (US;IL) (HIST 466) Lesbian and Gay History (3)** Critical exploration of the history of sexuality, focusing especially on the emergence of modern lesbian and gay identities.

**WMNST (HIST) 466 Lesbian and Gay History (3)  
 (US;IL)**

This course will explore the relationships in different cultures and historical periods between the dominant culture and homosexuals, whom the culture deemed, at different times, sinful, deviant, criminal or, more recently, a minority community. Students will confront the very nature of difference, and how it has been played out in European and American history. The course will challenge students to deal with how societies define difference itself; how they isolate or punish deviants; and how the creation of the "homosexual" helped establish not simply difference but "normalcy" in a highly sexualized modern culture. Finally, the course will explore notions of identity itself, focusing on the creation of a modern gay and lesbian identity and its impact on broader questions of gender, community, civil rights, and political discourse in the United States.

An example of evaluation methods would be: course presented in a seminar format with grades based on class participation, brief analytical papers, and a longer research or historiographic paper.

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Spring 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 471 (US) (PSYCH 479) The Psychology of Gender (3)** Theories and research on gender differences and gender roles. Emphasis on women's and men's current positions in society.

**WMNST (PSY) 471 The Psychology of Gender (3)  
(US)****(BA) This course meets the Bachelor of Arts degree requirements.**

This course examines how psychologists have addressed questions relating to gender in past and present-day research. Our goal is to understand what "gender" is, and how and when gender matters in our evaluations of ourselves and in our interactions with others. The course focuses on four themes:

- (1) When does gender matter? Gender as a system of power relations, as an aspect of personality, as a cue;
- (2) Diversity within gender categories;
- (3) Thinking critically about language and the power of naming;
- (4) Connections between psychological research and social change.

Successful completions of the course will:

- (1) give students an understanding of the major concepts, theories, and methodological issues in past and current psychological research on gender
- (2) enable students to think critically about psychology's study of gender and its implications for social policy and social change
- (3) enable students to relate their history of experience of gender to the academic literature on the topic
- (4) give students an understanding of the importance and complexity of investigating gender in the context of other dimensions of social identity, such as racial ethnicity

Course grade is based on performance on quizzes/exams (30%), homework assignments (30%), a collaborative research project (35%), and class participation (5%). This course covers the psychology of gender in greater depth than does any other undergraduate PSY course, and provides a psychological perspective on topics covered in a variety of Women's Studies courses. It complements other PSY courses that cover related topics in social and personality psychology. The course can be counted as one of the required 400-level courses for the Psychology major and for the Women's Studies major.

General Education: None

Diversity: US

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2007

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 472 (LER 472) Work-Life Practices and Policies (3)** Explore the causes and consequences of conflicts between work, family, and other life commitments, and how these may be resolved.

**WMNST (L I R) 472 Work-Life Practices and Policies (3)****(BA) This course meets the Bachelor of Arts degree requirements.**

The interdisciplinary field of work-family and work-life developed as a result of middle-class women's entry into the labor force, a movement that generated conflict between family and paid work commitments. Overall, the course addresses the reasons the field developed, relevant theoretical perspectives regarding the issues, and related problems as well as proposed solutions at both the public and private sector levels. The overarching objectives of the course are to expand students' understanding of conflicts between work and family commitments, and how these might be resolved through private and public sector initiatives. Specifically, the course concerns how individuals, families, and organizations interact to help hinder the achievement of balance between work and life commitments, and relevant effects on those involved. The changing demographics of the family, laws and trends around working time, father and mother time with children, the expanded need for elder care, work-life programs such as flextime, concierge services, paid parental leave, part-time careers, paid time-off banks, and the role of unions, corporations and government legislation are covered. The course attempts to link the likely future needs of students to broader trends in society and how balance could be achieved at the level of individuals, families, other stakeholders in the community, and for society as well. Fields of research relevant to the course include labor studies, women's studies, Industrial/Organizational psychology, the sociology of work and of family, and child development.

General Education: None

Diversity: None

Bachelor of Arts: Social and Behavioral Science

Effective: Spring 2008

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 489 (ENGL 489) British Women Writers (3)** A study of selected British women writers.

**WMNST (ENGL) 489 British Women Writers (3)**

This course provides the opportunity to study writing by British Women from a historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will address the question of the role gender plays in the selection of literary forms and the development of character, theme, symbols, and rhetorical strategies. It will also explore what particular dimensions British women writers

have brought to the British literary tradition.

Students will be active learners through keeping reading journals, presenting background reports on the history of women in England, participating in small-group discussions about the texts, and writing 2 shorter essays and one longer research essay for the class. This course focuses on an area of British literature, which more traditionally structured courses tend to obscure. The course will be attractive to students from a variety of programs, including English majors, Women's Studies minors, and Interdisciplinary Humanities students.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 490 (US;IL) (ENGL 490) Women Writers and Their Worlds (3)** American and British literature written from the perspective of women.

**WMNST (ENGL) 490 Women Writers and Their Worlds (3)  
(US;IL)**

**(BA) This course meets the Bachelor of Arts degree requirements.**

ENGL/WMNST 490 covers particular aspects of American and British literature written from the perspective of women. The course stresses the diversity of women's authorial worlds, both through time and/or space. The readings and specific focus vary from semester to semester. ENGL/WMNST 490 seeks to make students aware of the extensive body of literature written by women, but, unlike ENGL 194, which is a survey course of women's literature, ENGL/WMNST 490 can be a more intensive course, focusing on selected themes and topics of particular concern to women as reflected in the poetry and fiction of twentieth-century American and British women writers. The class can also be taught in relationship to earlier periods, dealing, for instance, with English women novelists from 1775-1865. In such a class, readings would include fiction by Fanny Burney, Mary Wolstonecraft, Ann Radcliffe, Jane Austen, Mary Shelly, Emily Bronte, Elizabeth Gaskell, and George Eliot. The course would then place each novel in its historical, social, intellectual, and literary context, and explore the various ways in which some of England's best writers transformed their female experience of the world into fiction that extended the range and influenced the development of the novel. Regardless of the particular focus, all sections of the course pose the following questions throughout: Do women use the same myths, archetypes, and literary conventions as male writers? Or do they sometimes have to modify the myths, archetypes, and literary conventions originated by their male precursors in order to adapt them to female experience? Is there such a thing as a distinctively female imagination, with a symbolic language of its own? Is there such a thing as a chain of literary influence linking women writers to each other? What are the strategies for coping with the anxieties of authorship? What is the interaction between gender and genre? In what ways are creativity and procreativity modes of defying prevailing ideologies? Does a woman's psychological development have an effect on the plots a woman novelist conceives? How does women's literature reflect the realities of women's lives? As a course in women's literature, ENGL/WMNST 490 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women's literature in the context of men's literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. The course not only prepares students for taking up literary and cultural analysis in English classes, but also in any other class that engages in the verbal and written analysis of complex written texts, and in other classes in Women's Studies or in other Penn State departments that address the social, cultural, or ethical issues of gender. The course may be used as English Major elective credit or as credit towards the English Minor; it may also be used in the Women's Studies major and minor.

General Education: None  
Diversity: US;IL  
Bachelor of Arts: Humanities  
Effective: Summer 2005  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 491 (AM ST 476, ENGL 492) American Women Writers (3)** A study of selected American women writers.

**American Women Writers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2008  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 492W** Current Feminist Issues (3) Critical analysis of major contemporary feminist research and writing in the arts, humanities, social and natural sciences.

**WMNST 492W Current Feminist Issues**

This course is the capstone course for the Women's Studies major. We keep the course small (15-20 students) and offer it every spring. It is constructed to provide you the opportunity to apply the knowledge and skills you have developed in Women's Studies to some of the major topics being addressed in current academic feminist discourse. The first goal of the course is for each student to become familiar with the major arguments and evidence regarding some of the current major topics in feminism. The second goal is for each student to learn more about the multidisciplinary perspectives of women's studies. The third goal of the course is for each student to develop and demonstrate her skill at carrying out feminist scholarship.

There are two core elements of the course. The first is class discussion of readings addressing some of the major current feminist issues. Each year a new set of these topics is put together by the instructor, drawing upon the suggestions of other Women's Studies faculty and majors. The second core element of the course is each individual student doing a term paper. Work on these papers will take place both publicly and privately, so that everyone in the course will learn something about how feminist projects are constructed in the various disciplines represented by the students' choices of topics for their papers.

Because this is a W course, 2/3 of your grade will be based on writing assignments. Throughout the course, you will write short (2 page) papers on the readings that we will be discussing in our seminars. You will also write a term paper and some preliminary assignments related to it, including a topic justification paper, an annotated bibliography accompanied by a text description of the major themes identified in the bibliography, a class presentation on your paper topic, and the final 10-15 page paper. The other third of your grade will be based on your participation in seminar discussions.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 494** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1994

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 494H** Research Project (1-12) Supervised student activities on research projects identified on an individual or small-group basis.

**Research Project (1-12)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2007

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 495** Internship (1-18) Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Internship (1-18)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 1998  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside scope of formal courses.

**Independent Studies (1-18)**

General Education: None



Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1983

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 496A** Intro to Queer Study (1-6) Discuss the primary texts of queer theory.

**Intro to Queer Study (1-6)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1984

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 499** (IL) Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
 Diversity: IL  
 Bachelor of Arts: None  
 Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 501** Feminist Perspectives on Research and Teaching Across the Disciplines (3) Feminist approaches to methodological issues in research and teaching in the social sciences, humanities, and natural sciences.

**WMNST 501 Feminist Perspectives on Research and Teaching Across the Disciplines (3)**

In this seminar, we will explore feminist approaches to research and teaching in different fields in the humanities, the social sciences, and the natural sciences. Students will take an active part in identifying and evaluating feminist approaches to theory and in analyzing how a feminist approach to research reshapes and redirects the ways that research has traditionally preceded and the results obtained in different disciplines. Our aim is not to identify a feminist orthodoxy with which to replace a masculinist or patriarchal orthodoxy, but rather to identify and understand the varieties of feminism existing today; to delineate differences between feminist and traditional paradigms, in terms of the ways research is designed and carried out within those disciplines; and to arrive at an appreciation of the transformative effect upon teaching and research of the new paradigms forged by feminist scholars in a variety of disciplines.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 502** Global Perspectives on Feminism (3) Exploration of feminist issues in a global perspective, including debates in history, ethics, and political feminism.

**Global Perspectives on Feminism (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 507** Feminist Theory (3) Development of feminist theory and its relationship to history in terms of critique of family, sexuality, and gender stratification.

**Feminist Theory (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2002

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 516** (HIST 516) US Women's and Gender History (3) A critical analysis of gender and theories of gender in selected American historical contexts.

**US Women's and Gender History (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2012

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 520** Gender and Nationalism (3) Impact of Western nationalism and colonialism on the organization of gender roles from the 18th century to the present.

**Gender and Nationalism (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 536** Gender and Science (3) Studies the foundations of feminist science studies as applied to biocultural practices of gender, biology, and reproductive technologies.

**Gender and Science (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 537** (AFR 537) Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship (3) A course about discourses of sexuality and gender in studies of Islam in Africa, with South Africa as a case study.

**Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 538** (PHIL 538) Feminist Philosophy Seminar (3) Critically examines feminist approaches to ethics, epistemology, philosophy of science, metaphysics, social/political philosophy, and the history of philosophy.

**WMNST (PHIL) 538 Feminist Philosophy Seminar (3)**

This course aims to give students an understanding of the philosophical concepts and problems of feminist philosophy. The course will focus on major topics, such as the history of philosophy, ethics, social/political philosophy, epistemology

and philosophy of science, and metaphysics, and figures within 20th century feminist philosophy with the concurrent goal of brining them to bear on contemporary issues involving gender's relationship to race, sexuality, class, disability, nationality and age. This course builds upon PHIL 438 Feminist Philosophy and counts towards the requirements of the dual title degree in Philosophy and Women's Studies. Evaluation methods include preparation for and participation in class meetings, two short discussion papers, and a final term paper. The course will be offered at least once every four semesters with an enrollment goal of 20. Specific course content will vary with instructor.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2005

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 541** (ADTED 541) Women and Minorities in Adult Education (3) Seminar on women and minority adults as learners and leaders in various contexts of adult education.

### **Women and Minorities in Adult Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 594** Research Topics (1-15) Supervised student activities on research projects identified on an individual or small-group basis.

### **Research Topics (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 595** Internship (1-18) Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

### **Internship (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1998

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

### **Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1987

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently.

### **Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Spring 1992

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 597A** Gender and Environment (3) This course focuses on gender and the environment from a global perspective.

**Gender and Environment (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 597A** Gender and Environment (3) This course focuses on gender and the environment from a global perspective.

**Gender and Environment (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Spring 2014 Ending: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 597B (ENGL 597B)** Gen(d)ering the Climate Change Crisis: Feminist Narratives of Environment, Ecology, and Epistemology (3) This is a course about the facts and the fictions of climate change, and about feminist critique.

**Gen(d)ering the Climate Change Crisis: Feminist Narratives of Environment, Ecology, and Epistemology (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WMNST 602** Supervised Experience in College Teaching (1-3 per semester, maximum of 6) Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**Supervised Experience in College Teaching (1-3 per semester, maximum of 6)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## Wood Products (W P)

**W P 400** Properties of Wood (2) Chemical Structure and Mechanical Properties of Wood Composites.

**W P 400 Properties of Wood (2)**

The Properties of Wood is an introductory course for students in the Wood Products Business and Marketing Option and as an elective course for non-wood products majors in the Wood Products Marketing minor. The course is designed for students to develop an understanding of the molecular structure of wood and the macroscopic mechanical properties of wood. Students will develop the skills necessary to analyze and explain the behavior of wood during processing and utilization. The concepts and skills developed by the students in this course will be integrated into the wood products business case studies developed in advanced wood products business and marketing courses. Students will be evaluated by using weekly quizzes with descriptive and essay questions and a final exam. The course will be required for students in the Wood Products Business and Marketing option. Students electing the Wood Products Processing and Manufacturing option will be restricted from registering for this course.

General Education: None

Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2003 Ending: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 411** Wood-Environmental Relationships (4) Material composition and structure; basic and derived physical properties; moisture movement in wood; methods and techniques of drying wood.

#### **Wood-Environmental Relationships (4)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001 Ending: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 412** Wood in Structures (3) Behavior and design of solid, laminated, and plywood wood beams, trusses, columns, and foundations. Wood construction details.

#### **Wood in Structures (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 413** The Chemistry of Wood (3) Chemical composition, reactions, and properties in relation to products and the uses of wood.

#### **The Chemistry of Wood (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1997 Ending: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 416** Wood Industries Management Development (3) Managerial concepts and issues important to forest products organizations will help prepare students to assume management-level positions.

#### **W P 416 Wood Industries Management Development (3)**

This course will introduce students to managerial concepts and issues important to wood products manufacturers. The design of the course is to help students think more critically about problems and issues that are directly related to efficiency and effectiveness within the wood-based industry, with an emphasis on utilizing human capital to increase competitive advantage. The overall goal of the course is to prepare students to assume management-level positions within wood-based businesses. Course content will be designed to meet the unique production environments our graduates will face. For example, managing an hourly workforce that is under-motivated with insufficient skills, in an environment that is often unpleasant and physically challenging. The course will include case studies from relevant industrial settings and will expose students to current managerial issues (i.e., via field trips to mills and guest lecturers from industry). Students will give oral presentations based on assigned readings from a best selling managerial book and will also be asked to complete numerous in-class and out-of-class exercises (e.g., learning styles inventory, conflict style assessment, to-do lists, resume, etc.).

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 417** Wood Products Manufacturing Systems and Processes (4) Description of systems and processes used in the manufacture of wood products.

#### **Wood Products Manufacturing Systems and Processes (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 418** Chemical Processing of Wood (4) Principles and practices of basic operations in converting wood and wood waste into useful chemicals and modified cellulose products.

#### **Chemical Processing of Wood (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 423** Deterioration and Protection of Wood Products (2) Timber and wood deterioration from fungi, insects, fire; treatment of wood products for protection.

#### **Deterioration and Protection of Wood Products (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 1996 Ending: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 437W** Wood Industries Marketing Management (4) Examination of major international wood products market segments in terms of products, distribution, industry structure, and strategic management issues.

#### **Wood Industries Marketing Management (4)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1997 Ending: Fall 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 438** Business Concepts for Wood Manufacturing (4) The course will cover manufacturing strategies and related financial measures in a wood production environment.

#### **W P 438 Business Concepts for Wood Manufacturing (4)**

This course will introduce students to the challenges inherent in attempting to profitably manufacture quality products with wood as a raw material. This will lay the groundwork for student understanding that positive margins and profitability are not a given for all wood producers. Students will receive an overview of the operations function and how it should synergize with other business functions such as R&D and marketing. The remainder of the course will be dedicated to exposing students to (1) managerial finance and accounting topics pertinent to using wood as a raw materials in a manufacturing environment and (2) modern manufacturing strategies relevant to the wood products industry. The overall goal of the course is to give students a set of skills that will allow them to make informed economic decisions for a wood manufacturing organization. Knowledge of such topics as continuous process improvement from a business strategy standpoint should provide a framework for making decisions (using the managerial finance subject matter) that will improve the economic competitiveness of their employers. The course will include case studies from relevant industrial settings and will expose students to current managerial issues through field trips to mills and guest lecturers from industry. Students will also give an oral presentation based on assigned readings from a manufacturing-management text.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 460** Wood Products Industrial Environmental Control (3) Wood products industrial environmental control technologies and strategies for pollution abatement.

**Wood Products Industrial Environmental Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 490** Wood Products Colloquium (1) Presentations and discussions of solutions to problems within the forest products industry.

**Wood Products Colloquium (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993 Ending: Fall 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 495** Wood Products Internship (1-6) Supervised field experience related to the student's major.

**Wood Products Internship (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 499 (IL)** Foreign Studies (1-12) Courses offered in foreign countries by individual or group instruction.

**Foreign Studies (1-12)**

General Education: None  
Diversity: IL  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 511** Physical Properties of Wood and Fibers (3) Theories of moisture, diffusion, permeability, and heat transport; ultrastructure and thermal properties of wood and fibers.

**Physical Properties of Wood and Fibers (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 513** Wood Chemistry (3) Treatment of the chemical components of wood, their distribution and reactions.

**Wood Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 513** Wood Chemistry (3) Treatment of the chemical components of wood, their distribution and reactions.

**Wood Chemistry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2014 Future: Spring 2014

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 515** Wood Composite Processing Parameters (3) Wood composite manufacture in theory and practice including various synthesis parameters in relation to physical and mechanical properties.

**Wood Composite Processing Parameters (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 530** Case Studies in Forest Products (3) Manufacturing, marketing, and management issue analysis from a global perspective in the forest products industries.

**Case Studies in Forest Products (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 531** Mechanical Behavior of Wood (3) Time-dependent properties, theory of failure, rheologic properties, and theory of the mechanical behavior of wood and structural composites.

**Mechanical Behavior of Wood (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



**W P 532** Theory of Adhesion (3) Theory of adhesion as it pertains to bonding of wood, paper-based laminates, fibers, and bonding of wood to dissimilar materials.

**Theory of Adhesion (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 537** International Wood Products Marketing and Trade (3) Strategic analysis, environmental scanning, international trade policy implications, determinants of competitive strategy for firms, industries, and nations.

**International Wood Products Marketing and Trade (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 560** Wood Products Industrial Environmental Control (3) Legislation, impacts, and management of air, water, and solid waste pollution in the wood products industry.

**Wood Products Industrial Environmental Control (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 590** Colloquium (1-3) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Colloquium (1-3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1993

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 597** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 600** Thesis Research (1-15) No description.

### **Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) Provides an opportunity for supervised and graded teaching experience in forest products courses.

### **Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**W P 610** Thesis Research Off Campus (1-15) No description.

### **Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

## **Workforce Education and Development (WF ED)**

**WF ED 402** Supervision of Vocational Education (3) For administrators, supervisors, and teachers responsible for improvement of instruction through supervision or for students preparing for supervisory work.

### **Supervision of Vocational Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 405** Project Management for Professionals (3) Covers the essential concepts and skills needed to make effective contributions on projects, on time and within budget.

### **WF ED 405 Project Management for Professionals (3)**

Professionals in the workplace carry out many different projects every day ranging from somewhat small tasks, e.g., planning events and designing courses, to big projects, e.g., launching an enterprise wide system. Project Management for Professionals is a practical "hands-on" course designed for mid-career adult students and covers the essential concepts and skills needed to make effective contributions and have an impact on the successful accomplishment of projects on time and within budget. Project management principles and techniques are presented with an emphasis on how they are applied to real world workforce development projects. Topics include the project management life cycle and process; techniques for planning, scheduling, budgeting, and controlling project performance; project manager responsibilities and skills; project team development and effectiveness; project communication; and organization structures.

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 410 Leadership Competencies for Professionals (3)** Designed to teach contemporary professional leadership competencies for workforce professionals who do not currently have supervisory responsibilities.

### **WF ED 410 Leadership Competencies for Professionals (3)**

Leadership Competencies for Professionals is a course designed primarily for adult learners who demonstrate high leadership potential and who may not have significant supervisory and managerial responsibilities. Its purpose is to ensure that all students develop an adequate understanding of the contemporary professional leadership competencies that are needed to function effectively in today's global business environment. These competencies include: collaboration / multi-disciplinary team-building, leadership in diversely distributed team environments, interpersonal communication in the workplace, conflict resolution / human performance management, project management, problem-solving / creative thinking / ethical decision making, and contemporary and emerging technology usage. Students will be assessed and evaluated through quizzes, instructor and peer observation, self-assessments and reflection, and team projects and presentations.

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Summer 2011

Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 413 Vocational Education for Special-Needs Learners (3)** Introduction to program modifications, supplementary services, and resources required for special-needs learners in vocational and practical arts education programs.

### **Vocational Education for Special-Needs Learners (3)**

General Education: None

Diversity: None

Bachelor of Arts: None

Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 424 (CN ED 424) Facilitating Career Development (3)** This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work.

### **WF ED (CN ED) 424 Facilitating Career Development (3)**

This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work. This course addresses the following 12 Career Development Facilitator (CDF) competencies: 1) helping skills, 2) labor market information and resources, 3) assessment, 4) diverse populations, 5) ethical and legal issues, 6) career development models, 7) employability skills, 8) training clients and peers, 9) program management/implementation, 10) promotion and public relations, 11) technology, and 12) consultation.

These 12 competencies are identified by the National Career Development Association (NCDA) for those who (will) deliver career development programs and services in a variety of settings. Potential job titles of CDFs include career group facilitator, job search trainer, career resource center coordinator, career coach, career development case manager, intake interviewer, occupational and labor market information resource person, human resource career development coordinator, employment/placement specialist, and workforce development staff.

With certain years of work experience in career development, students who complete this course are eligible to apply for the Global Career Development Facilitator (GCDF) certification through the Center for Credentialing & Education (CCE), which is affiliated with the National Board for Certified Counselors (NBCC). A GCDF is a person who works in any career development setting or who incorporates career development information or skills in their work with students, adults, clients, employees, or the public. As of January 2011, about 18,000 individuals acquired the GCDF certification world-wide including Bulgaria, Canada, China, Germany, Japan, Romania, Turkey, South Korea, and New Zealand.

The goal of the GCDF credential was to provide standards, training specifications, and credentialing for diverse career development practitioners. This GCDF credential differentiates two levels of career practice, which are 1) career counseling and 2) career facilitation that does not require a counseling degree. This differentiation reflected the reality where many individuals who are currently providing career assistance are not professional counselors.

This course is taught by a nationally and internationally trained CDF Instructor (CDFI) who is certified by the NCDA. In addition, the CDF curriculum is updated every three years by the Career Development Leadership Alliance (CDLA) under the supervision of the NCDA CDF Advisory Council in order to keep up with recent changes in the field.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2012  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 441** Conceptual and Legal Bases for Cooperative Vocational Education (2) History, conceptual and legal bases for a cooperative vocational education program.

### **Conceptual and Legal Bases for Cooperative Vocational Education (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 442** Operating Cooperative Vocational Education Programs (2) Student and training station selection, training plan and related subject development, records and reporting systems, school-industry coordination.

### **Operating Cooperative Vocational Education Programs (2)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 445** Vocational Guidance (3) Problems and possibilities of vocational guidance; the field of guidance and guidance literature; methods of field work; school guidance techniques.

### **Vocational Guidance (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 450** (US;IL) Cultural Diversity in the Workplace (3) Provides opportunities for students to explore different cultures and mores that are changing the dynamics of the workplace.

### **Cultural Diversity in the Workplace (3)**

General Education: None  
 Diversity: US;IL  
 Bachelor of Arts: None  
 Effective: Fall 2006

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 451** Lean-Sigma for Professionals (3) The course focuses on essential lean and six sigma concepts to improve processes in any industry.

### **Lean-Sigma for Professionals (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 471** Training in Industry and Business (3) Appraisal of training functions and development of competencies in work analysis, design, development, delivery, and evaluation of training.

**Training in Industry and Business (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2001  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 495** Internship (1-6) Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

**Internship (1-6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 495A** Cooperative Education Practicum (2) Validation of competencies learned in prerequisite courses during interaction with professional staff while functioning under the supervision of a certified cooperative coordinator.

**Cooperative Education Practicum (2)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 495C** Student Teaching (10) Supervised observation and practice teaching in approved vocational industrial schools/health occupations education settings.

**Student Teaching (10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 495D** Instructional Internship in Industrial Training (5) Supervised internship in industrial training. Interns will be expected to perform instructional duties in industrial environments.

**Instructional Internship in Industrial Training (5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 496** Independent Studies (1-18) Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Independent Studies (1-18)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 497** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 498** Special Topics (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 498A** Occupational Safety and Health for Workplace Professionals (3) This five-day, 3-credit course can help you acquire the knowledge and skills you need to support a workplace free of occupational safety and health hazards. The curriculum meets requirements for OSHA-30 General Industry Safety and CPR and AED Training, as well as the safety elements of the approved program evaluation (PA 339 review) facilitated by the Pennsylvania Department of Education. Topics to be covered include: OSHA standards and inspections; worker rights and employer responsibilities; management of safety and health; hazard communication; industrial hygiene and blood-borne pathogens; ergonomics.

**Occupational Safety and Health for Workplace Professionals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013 Ending: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 508** Workforce Education Management (3) Introduction to theories and concepts of managing workforce education programs in the public and private sector.

**Workforce Education Management (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 518** Curriculum and Instructional Leadership for Workforce Education (3) Study of topics related to curriculum and instructional leadership in workforce education in the public and private sectors.

**Curriculum and Instructional Leadership for Workforce Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 528** Fiscal and Facilities Management for Vocational Administrators (3) Sources of revenue, budget preparation, purchasing, and the management of physical facilities in vocational education.

**Fiscal and Facilities Management for Vocational Administrators (3)**

General Education: None  
Diversity: None

Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 538** Administering Personnel Services in Vocational Education (3) Planning and implementing staff development activities, student guidance services, admissions, student organizations, and placement.

### **Administering Personnel Services in Vocational Education (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 540** Data Analysis in Workforce Education and Development (3) Provides opportunities to acquire and practice skills in descriptive and inferential statistics.

### **Data Analysis in Workforce Education and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 542** Social and Economic Foundations of Workforce Education and Development (3) Review of labor force, demographic and economic concepts, measures, and models.

### **Social and Economic Foundations of Workforce Education and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 543** Evaluation of Investments in Workforce Education and Development (3) Use of labor supply models to evaluate investments in workforce education and development.

### **Evaluation of Investments in Workforce Education and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2011

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 544** Analysis of Policies for Workforce Education and Development (3) Explores models and methods for analyzing policies for workforce education.

### **Analysis of Policies for Workforce Education and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 545** Economic and Demographic Modeling of Policies for Workforce Education and Development (3) Use of economic and demographic models to plan and evaluate workforce education and development.

### **Economic and Demographic Modeling of Policies for Workforce Education and Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 546** Work Based Education (3) Discussion of legislation and educational requirements for education based at the worksite including cooperative education, youth apprenticeship, and apprenticeship programs.

### **Work Based Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 550** Research in Workforce Education (3) Research techniques in workforce education.

### **Research in Workforce Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 560** Historical and Philosophical Foundations of Workforce Education (3) An investigation of historical, philosophical, and professional foundations of workforce education.

### **Historical and Philosophical Foundations of Workforce Education (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 572** Organization Development For Industrial Trainers (3) An introduction to major concepts, skills and techniques required by industrial trainers to support and facilitate organization change.

### **Organization Development For Industrial Trainers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 573** Needs Assessment for Industrial Trainers (3) Acquire skills to identify training and development needs, distinguish problems with management versus training solutions, develop and evaluate training solutions.

### **Needs Assessment for Industrial Trainers (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 574** Strategic Planning For Education For Work (3) Study of human capital as a component of education, industrial and business training strategic planning at economy, and organizational levels.

### **Strategic Planning For Education For Work (3)**



General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 575** Current Policy and Practices in Industrial Training (3) Analysis of training and development practices and their articulation with business practices.

#### **Current Policy and Practices in Industrial Training (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 1996  
 Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 578** Process Consultation in Organization Development (3) This course provides a foundation in process consultation. Process refers to how groups interact and how people get along.

#### **Process Consultation in Organization Development (3)**

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 582** Assessing Data: Organizational Diagnosis (3) This course familiarizes students with approaches to assessing and feeding back data in organization development (OD) and consulting services.

#### **WF ED 582 Assessing Data: Organizational Diagnosis (3)**

This course familiarizes students with approaches to assessing and feeding back data in organization development (OD) and consulting services. It helps students to develop the specialized competencies essential to diagnosing organizations for change efforts/interventions.

Students in the course will learn various ways by which to define and conceptualize assessment, feedback, and diagnosis for OD and consulting efforts. Students will learn how to distinguish between the unique approaches to organizational diagnosis used by OD consultants and by management consultants to detect the underlying root causes of problems rather than the mere symptoms of such problems. OD consultants who work inside organizations (internal consultants) may face unique challenges in organizational diagnosis that differ from those challenges faced by consultants who are brought in from outside (external consultants), and this course will explore those challenges faced by each type of consultant and how those consultants may overcome those special challenges. The course will encourage students to identify the consulting competencies that OD consultants need to diagnose organizational problems, and the students will be invited to compare themselves to those competencies so that they will know what special skills they need to develop to be effective organizational diagnosticians and how to develop those skills. The course reviews the important elements necessary in establishing a strategic diagnostic plan for OD, implementing it, and evaluating the assessment and feedback strategy. Students will learn how to demonstrate the skills essential to separating symptoms (presenting problems) from underlying root causes during initial meetings and contacts with prospective OD sponsors and clients. Additionally, the course will examine how to prepare assessment and feedback protocols and reports for OD and change management interventions. Finally, the course will summarize current thinking and research on organizational diagnosis, assessment and feedback methods as well as ethical issues affecting organizational diagnosis and OD assessment and feedback.

General Education: None  
 Diversity: None  
 Bachelor of Arts: None  
 Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 585** Appraising Organization Change and Development and Consulting (3) This course familiarizes students with approaches to evaluating organization development (OD) and consulting services.

#### **Appraising Organization Change and Development and Consulting (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 588** Platform Skills for Human Resource Development Professionals (3) Platform skills focuses on theory and practice related to delivering well-crafted and effective training presentations.

**Platform Skills for Human Resource Development Professionals (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Spring 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 590** Industrial Training Professional Seminars (1) Study of special topics relating to problems, practices, methodologies and special competency needs in industrial training.

**Industrial Training Professional Seminars (1)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 595A** Field Based Project in Industrial Training (2-5) Students identify a training and/or organization development problem in industry and/or business and carry out contract problem analysis and resolutions.

**Field Based Project in Industrial Training (2-5)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 595B** Workforce Education Administrative Internship (2-15) Supervised study with an administrator or researcher at a cooperating school, state governmental agency, or research institution.

**Workforce Education Administrative Internship (2-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 595C** Internship in Cooperative Vocational Education (1-10) Validation of teaching and co-op coordinator competencies learned in prerequisite courses during interaction with professional staff while functioning under the supervision of a certified cooperative coordinator.

**Internship in Cooperative Vocational Education (1-10)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 1997  
Prerequisite:

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 596** Individual Studies (1-9) Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Individual Studies (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 597** Special Topics (1-9) Formal courses given on a topic or special interest subject which may be offered infrequently.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 597A** Scholarly Inquiry (3) The purpose of this course are to help WF ED doctoral students: (a) initiate their programs of studies for doctoral degrees; (b) develop a working knowledge of the structure and processes for earning doctoral degrees at Penn State.

**Scholarly Inquiry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 597A** Scholarly Inquiry (3) The purpose of this course are to help WF ED doctoral students: (a) initiate their programs of studies for doctoral degrees; (b) develop a working knowledge of the structure and processes for earning doctoral degrees at Penn State.

**Scholarly Inquiry (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 597B** Diffusion of Innovations (3) The course focuses on research and practice about getting new ideas adopted. It is designed for graduate students from any discipline who are interested in managing change. The problem of moving innovations into practice is common. Some of the diverse interest areas that might find value in this course include: health prevention and care, all forms of technology transfer, advertising and marketing, educational and behavioral change, lifelong learning, outreach and extension services, workforce and management development, and community development (just to name a few).

**Diffusion of Innovations (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2013 Ending: Fall 2013 Future: Fall 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 598** Special Topics (1-9) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Special Topics (1-9)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Fall 2001

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 600** Thesis Research (1-15) No description.

**Thesis Research (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 601** Ph.D. Dissertation Full-Time (0) No description.

**Ph.D. Dissertation Full-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 602** Supervised Experience in College Teaching (1-3 per semester/maximum of 6) An opportunity for graduate students to teach a college level course under the supervision of an experience professor.

**Supervised Experience in College Teaching (1-3 per semester/maximum of 6)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 610** Thesis Research Off Campus (1-15) No description.

**Thesis Research Off Campus (1-15)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 611** Ph.D. Dissertation Part-Time (0) No description.

**Ph.D. Dissertation Part-Time (0)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 1996

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 880** Facilitating Groups and Teams (3) This course provides students with necessary skills to facilitate small groups and teams.

**WF ED 880 Facilitating Groups and Teams (3)**

This course acquaints students with the role of facilitator and provides a comprehensive introduction to facilitation. Small

group facilitators focus on group process and help groups work collectively to accomplish common goals. The course will build student skills in facilitation, acquaint students with the competencies of facilitation, review the role of facilitation in small group situations, and explore current research and practice in small group/team facilitation. The course examines theoretical and practical perspectives of facilitation and provides opportunities to practice facilitation techniques and build facilitation skills.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 881 Marketing Organization Development (3)** This course familiarizes students with the unique issues in marketing organization development (OD) and OD consulting services.

### **Marketing Organization Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 883 Organization Change and Development Interventions (3)** This course focuses on organization change and development interventions, where an intervention means a change effort.

### **Organization Change and Development Interventions (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 884 Appreciative Inquiry (3)** This course provides a foundation in the theories, principles and techniques of Appreciative Inquiry (AI).

### **WF ED 884 Appreciative Inquiry (3)**

This course provides a foundation in the theories, principles and techniques of Appreciative Inquiry (AI), sometimes called "positive change theory" or "positive organizational scholarship." Students will build practical competencies necessary to carry out various AI interventions based on the theories and techniques of organization development and change management. The course will teach students how to define Appreciative Inquiry (AI) and distinguish it from alternative approaches to organization development (OD) and change management (CM). The course describes how AI relates to training and development and other performance improvement interventions, summarizes the history of AI, explains important theories of organizations and describes how small group and large group change interventions using AI differ from training interventions, describes each step in a common AI model and explain how it is applied. The course also reviews ethical issues affecting AI, identifies and summarizes future organizational trends affecting AI, and describes what they might mean for practitioners who use AI.

General Education: None  
Diversity: None  
Bachelor of Arts: None  
Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**WF ED 886 Laboratory in Organization Change and Development (3)** Students will work in teams to carry out an OD intervention in a field setting.

### **Laboratory in Organization Change and Development (3)**

General Education: None  
Diversity: None  
Bachelor of Arts: None

Effective: Summer 2013

**Note** : Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.



## **GRADUATE PROGRAMS**

Graduate programs are arranged in alphabetical order, accessible by clicking the links for each letter of the alphabet and then the link for the program name (see left side of this page).

If you do not know the exact name of a program, you can type a word connected with the subject area into the bulletin's search engine and choose "Degree Programs" from the drop-down menu under "Area." That will give you a list of programs that contain the search term you typed.

Within each program description, specific information varies. Typical descriptions include contact information, a graduate faculty list, degrees conferred, requirements, and links to course descriptions. In most cases, a link to the home page of the program, which will take you out of the bulletin site to the program's site, is in the description.





## Agricultural and Biological Engineering (A B E)

[Program Home Page](#)

PAUL H. HEINEMANN, *Head of the Department of Agricultural and Biological Engineering*  
250 Agricultural Engineering Building  
814-865-7792

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Nicole R. Brown, Ph.D. (Virginia Tech) Associate Professor of Wood Chemistry
- Dennis E. Buffington, Ph.D. (Minnesota), P.E. Professor of Agricultural Engineering
- Jeff Catchmark, Ph.D. (Lehigh) Assistant Professor of Agricultural Engineering
- Ali Demirci, Ph.D. (Iowa State) Associate Professor of Agricultural Engineering
- Herschel A. Elliott, Ph.D. (Delaware) P.E. Professor of Agricultural Engineering
- Robert E. Graves, Ph.D. (Massachusetts) P.E. Professor of Agricultural Engineering
- James M. Hamlett, Ph.D. (Iowa State) P.E. Associate Professor of Agricultural Engineering
- Paul H. Heinemann, Ph.D. (Florida) Professor of Agricultural Engineering
- James W. Hilton, Ph.D. (Iowa State) Associate Professor of Agricultural Engineering
- John Janowiak, Ph.D. (Washington State) Professor of Wood Products Engineering
- Albert R. Jarrett, Ph.D. (Penn State) P.E. Professor of Agricultural Engineering
- Armen Kemanian, Ph.D. (Washington) Assistant Professor of Production Systems and Modeling
- Jude Liu, Ph.D. (Manitoba, Canada) Assistant Professor of Agricultural Engineering
- Judd Michael, Ph.D. (Penn State) Associate Professor of Wood Products Business Management
- Dennis J. Murphy, Ph.D. (Penn State) C.S.P. Distinguished Professor of Agricultural Engineering
- Virendra M. Puri, Ph.D. (Delaware) Distinguished Professor of Agricultural Engineering
- Thomas L. Richard, Ph.D. (Cornell) Associate Professor of Agricultural Engineering
- C. Alan Rotz, Ph.D. (Penn State) Adjunct Professor of Agricultural and Biological Engineering
- Howard Salis, Ph.D. (Minnesota) Assistant Professor of Agricultural and Biological Engineering
- Robert D. Shannon, Ph.D. (Indiana) Associate Professor of Agricultural Engineering
- Paul M. Smith, Ph.D. (Virginia Tech) Professor of Forest Products Marketing
- Eileen F. Wheeler, Ph.D. (Cornell) Professor of Agricultural Engineering

Agricultural and Biological Engineering offers students the opportunity to gain expertise in areas of engineering for biological/agricultural systems corresponding to their professional interests. Graduate students select research projects (and supporting course work) from a wide range of interest areas that match faculty research expertise. Research projects are available in physical properties of biological materials, plant and animal production systems, food engineering, wood engineering, agricultural structures, agricultural safety, food safety, bulk solids handling and storage, agricultural systems engineering, agricultural by-product utilization, forage processing and handling systems, electronics instrumentation, online computer control systems, erosion and sedimentation control, waste management, water quality, and natural resources management and conservation.

Excellent facilities, including equipment and instrumentation, are available for research in the designated areas. Among the special facilities are field plot areas; a full-scale sedimentation basin test facility; hydraulic flumes; sedigraph; gas and ion chromatography units; atomic absorption unit; rainfall simulators; food properties lab; food equipment and processing lab; microbiological engineering lab; computer vision systems; hydraulic and pneumatic test stands; fabrication shop; electronics instrumentation; microcomputer laboratory; controlled environment chambers; wood structures lab; and wood mechanics lab. Collaborative arrangements allow access to a large variety of other resources: Penn State Institutes of the Environment; Particulate Materials Center; Housing Research Center; Center for Food Manufacturing; USDA Pasture Systems and Watershed Management Research Lab; a mushroom research and demonstration facility and a 1,500-acre agricultural research center for cooperative work with agronomic and horticultural production systems as well as animal production systems.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

An undergraduate major in engineering is normally a prerequisite to work in the major. Students without an undergraduate engineering degree will be considered for admission on a provisional basis pending the completion of a number of additional credits to be specified on an individual basis.

All students must submit scores from the General Aptitude Test of the Graduate Record Examinations (GRE) prior to admission (except those who have an ABET-accredited engineering degree). There is no minimum GRE score required for admission, as this is only one of several qualifications considered in the admission review process. However, financial assistance is often influenced by the degree of success exhibited by GRE scores and grade-point averages (GPAs) from previous engineering programs. International applicants must submit OFFICIAL transcripts, degree, and diploma certificates in both English and the native language.

Photocopies will not be accepted. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test or a score of 213 on the computer-based test is required for admission. The TOEFL exam must be taken within three years of the application date.

All applicants must provide the department with official transcripts of all their previous course work (in duplicate), a statement of purpose written by the applicant, and at least three letters of recommendation. Admission into the A B E Graduate Program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of students for which department resources are available.

### Entrance to Master of Science Program

Completion of an undergraduate degree in agricultural or biological engineering or in another related engineering discipline is required for direct admission to the A B E graduate program. Students need at least a 2.50 (4.00 base) junior/senior grade-point average to be considered for admission.

A student with an undergraduate degree in a non-engineering field can be admitted to the M.S. program on a provisional basis, which continues until completing the engineering undergraduate requirements in mathematics, physics, engineering sciences (thermodynamics, statics, dynamics, strength of materials, fluid-mechanics and electrical circuitry), and 6 credits of 400-level Agricultural and Biological Engineering courses. Upon completion of these preparatory courses with a minimum grade-point average of 2.75, the student will be admitted to the graduate program.

### Entrance to Doctor of Philosophy Program

The requirement for direct acceptance is an M.S. degree with a research thesis in an engineering or science discipline and a B.S. degree from an engineering program. Only very highly qualified students will be accepted into the Ph.D. program directly from a B.S. engineering program.

A student with an undergraduate degree in a non-engineering field can be admitted to the Ph.D. program on a provisional basis, which continues until completing the engineering undergraduate requirements in mathematics, physics, engineering sciences (thermodynamics, statics, dynamics, strength of materials, fluid mechanics and electrical circuitry), and 6 credits of 400-level Agricultural and Biological Engineering courses.

### Master's Degree Requirements

All candidates for the M.S. degree must prepare a thesis, complete a minimum of 30 graduate credits (including a minimum of 6 credits of research), and



obtain a minimum grade-point average of 3.00. Only grades of C or better are accepted for graduate credit. Each program should include at least one course each from the areas of agricultural and biological engineering, agricultural/biological science, mathematics or statistics, and A B E 500 Research Methods. A total of at least 12 credits of course work must be at the 500 level. All courses must be approved by the student's advisory committee as having significance and value for the degree program. All requirements for a master of science degree, whether satisfied at Penn State or elsewhere, must be met within five years from the first semester of graduate study.

Additional program details are contained in a graduate syllabus, available from the department.

### Doctoral Degree Requirements

Official entrance into a Ph.D. program occurs upon successful completion of the Ph.D. Candidacy Exam. Ph.D. degree requirements include successful completion of the following: approved graduate course work, Ph.D. language and communication requirements, a comprehensive examination, and defense and approval of a dissertation.

No specified number of courses completed or credits earned are required by the department. However, the candidate must complete at least 9 credits of Agricultural and Biological Engineering (A B E) course work beyond the baccalaureate degree. Six credits must be 500-level A B E courses (excluding A B E 500, 590, 594, 595, 596); the remaining 3 credits must be in any A B E 460 course or higher. Unless previously taken, all Ph.D. students must complete A B E 500. The student's doctoral advisory committee will recommend the minimum requirements in such supporting areas as mathematics, engineering, agricultural/biological sciences, and physical sciences. The candidate is expected to develop a program of study and submit it to the appointed doctoral advisory committee for consideration and approval. All Ph.D. students are required to participate in resident education or extension teaching activities for the equivalent of at least one semester during their graduate program. A typical plan of study consists of about 90 credits beyond the baccalaureate degree with about 30 of the total credits for research. All requirements for a Ph.D. degree, whether satisfied on this campus or elsewhere, must be completed within seven years after passing the candidacy examination.

**PH.D. LANGUAGE AND COMMUNICATION REQUIREMENT**--The purpose of the communication requirement is to strengthen the student's professional communication skills. The candidate must take a minimum of two courses (a minimum total of 5 credits) and receive a grade of B or better in each course taken. Course selections must be approved by the academic adviser prior to registration. Courses used to satisfy this requirement must include the substantial practice of writing and/or speaking.

#### Other Relevant Information

Continuous fall and spring registration is required for all graduate students until the thesis is approved.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Faculty updated: 5/24/13

## Architectural Engineering (A E)

LINDA M. HANAGAN, *Graduate Program Officer*  
 104 Engineering A  
 814-863-2084  
[gpoarc@enqr.psu.edu](mailto:gpoarc@enqr.psu.edu)

### Degree Conferred:

- [Ph.D., M.S., M.A.E., M.Eng.](#)
- [Integrated Programs](#)

### The Graduate Faculty

- Chimay J. Anumba, Ph.D. (U Leeds, UK); D.Sc. (Loughborough, UK) P.E. Head; Professor of Architectural Engineering
- William P. Bahnfleth, Ph.D. (Illinois) P.E. Professor of Architectural Engineering
- Thomas E. Boothby, Ph.D. (Washington) P.E., R.A. Professor of Architectural Engineering
- James D. Freihaut, Ph.D. (Penn State) Professor of Architectural Engineering
- Louis F. Geschwindner, Jr., Ph.D. (Penn State) P.E. Professor Emeritus of Architectural Engineering
- Linda M. Hanagan, Ph.D. (Virginia Tech) P.E. Associate Professor of Architectural Engineering
- Kevin Houser, Ph.D. (Penn State) P.E. Professor of Architectural Engineering
- Robert M. Leicht, Ph.D. (Penn State) Associate Professor of Architectural Engineering
- Ali M. Memari, Ph.D. (Penn State) P.E. Professor of Architectural Engineering
- John I. Messner, Ph.D. (Penn State) Professor of Architectural Engineering
- Richard G. Mistrick, Ph.D. (Penn State) P.E. Associate Professor of Architectural Engineering
- Stanley A. Mumma, Ph.D. (Illinois) P.E. Professor Emeritus of Architectural Engineering
- M. Kevin Parfitt, M.Eng. (Cornell) P.E. Associate Professor of Architectural Engineering
- David R. Riley, Ph.D. (Penn State) Associate Professor of Architectural Engineering
- Stephen Treado, Ph.D. (Maryland) P.E. Associate Professor of Architectural Engineering
- Michelle Vigeant, Ph.D. (Nebraska) Assistant Professor of Architectural Engineering and Acoustics

Students may specialize in building construction, building illumination systems, building mechanical and energy systems, or building structural systems.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission to the Ph.D. and M.S. programs.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission to the AE graduate programs. Students accepted into the Architectural Engineering program generally have an undergraduate degree in mechanical engineering, electrical engineering, civil engineering, architectural engineering, science, or architecture.

All degree candidates are required to provide a letter of intent outlining the student's intended area of study as well as three letters of recommendation. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

A limited number of undergraduate students in the B.A.E. program will be considered for admission to one of two integrated undergraduate-graduate degree programs. The first leads to the student earning both the B.A.E. and M.A.E. degrees and involves a graduate-level component in the capstone senior project. The second provides the student with the opportunity to earn both the B.A.E. and M.S. degrees and involves a research-oriented thesis in addition to the capstone undergraduate senior project. Students who are currently enrolled in the 7th semester of the B.A.E. degree program may apply to one of the two integrated programs and will be admitted following a positive review by the faculty committee on graduate admissions. Application materials for both programs are available on the AE Department website. To be considered for admission to either program, students must have attained a GPA of at least 3.0 and a grade of C or better in all classes listed as AE. A commitment from an AE graduate faculty member to serve as the student's M.S. thesis adviser is necessary for admission to the B.A.E./M.S. program.

### Degree Requirements

A thesis is required for the M.S. degree, which consists of 24 credits of courses and a 6-credit research thesis. A minimum of 12 of the course credits must be completed at the graduate (500) level. A student's program of courses in the M.S. program is developed in cooperation with the student's academic adviser.

For the Ph.D. degree, a dissertation that displays a student's ability to conduct high-quality original scholarly work is required of all Ph.D. students. Each student accepted into the Ph.D. degree program must pass the Ph.D. Candidacy Examination, which requires students to display an understanding of basic material in all AE option areas, along with an in-depth understanding of material covered in the AE undergraduate courses within their area of focus. This examination must be taken no later than the beginning of the student's second year in the program. Each Ph.D. student must also pass an English Proficiency Examination that is administered by the department, typically during the first semester. The student's program of courses is developed in cooperation with the student's Ph.D. committee. It is recommended that this consist of approximately 30 credits of courses beyond the master's degree, although there is no established minimum or maximum. At the conclusion of the student's course work, the Ph.D. student must take a two-day written comprehensive examination that is developed by the student's Ph.D. committee. Following the comprehensive exam, continuous registration is required for all Ph.D. graduate students until the dissertation is approved. Each student presents a comprehensive thesis proposal to his/her committee prior to starting his/her dissertation research and must present the results of this research in a final oral examination.

The M.Eng. degree is a nonthesis professional master's degree. Candidates for the M.Eng. degree are required to complete 30 credits of course work. A minimum of 18 credits must be at the 500 level or above. Students must follow the approved program of courses for one of the four available specialty areas. Minor modifications to these programs are permitted, with approval of the Graduate Program Officer. Each student must also complete a capstone project/report, supervised by a member of the graduate faculty.

Students admitted to an integrated program (B.A.E./M.A.E. or B.A.E./M.S.) must maintain a GPA in all classes used toward the M.A.E. or M.S. degree of at least 3.0. For both the integrated B.A.E./M.A.E. and B.A.E./M.S. degree programs, 30 credits of the 172 total credits required to receive both degrees are applied toward the master's degree (up to 12 credits count toward both degrees). A minimum of 18 credits is required at the graduate level (500, 600 and 800 level). For the B.A.E./M.A.E. degree program, all of graduate credits are course credits. For the B.A.E./M.S. degree program, a thesis is required and six credits of thesis research (600 or 610) must be included in the candidate's academic course plan. Approved integrated program course sequences are available for each of the four undergraduate option areas. These sequences specifically identify the 12 credits of courses that count toward both degrees. Each student must submit a course plan detailing the graduate component for approval when applying to this program and must request approval from the Graduate Program Officer for any proposed modifications to this plan following admission to the program.

All students in the M.Eng., M.S., and Ph.D. programs must also attend a minimum of 10 approved lectures during their degree program.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. A limited number of research and teaching assistantships, scholarships, and fellowships are available to M.S. and Ph.D. students in the Department of Architectural Engineering. The intent of these assistantships and awards is to support students conducting research under faculty supervision. For this reason, students in the M.S. and Ph.D. programs who receive these types of financial support are expected to complete their degree program, including the thesis or dissertation, and may not transfer to the Master of Engineering degree program.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ARCHITECTURAL ENGINEERING \(A E\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-073

Review Date: 02/21/2012

Faculty updated: 5/15/13

## Art Education (A ED)

### [Program Home Page](#)

CHRISTINE M. THOMPSON, *Art Education Graduate Coordinator*  
30E Borland Building  
814-865-6570  
[cmt15@psu.edu](mailto:cmt15@psu.edu)

### Degrees Conferred:

Ph.D., M.S., M.P.S., Ph.D. and M.S. Dual Degrees in Art Education and Women's Studies

### The Graduate Faculty

- Patricia Amburgy, Ph.D. (Illinois) Associate Professor of Art Education
- Booker Stephen Carpenter II, Ph.D. (Penn State) Professor of Art Education and Postbaccalaureate Certification Officer in Art Education
- Charles R. Garoian, Ph.D. (Stanford) Professor of Art Education
- Yvonne M. Gaudelius, Ph.D. (Penn State) Assistant Vice President and Associate Dean for Undergraduate Education; Professor of Art Education
- Grace Hampton, Ph.D. (Arizona State) Professor of Art, Art Education, and Integrative Arts
- Karen Keifer-Boyd, Ph.D. (Oregon) Professor of Art Education and Women's Studies
- Wanda B. Knight, Ph.D. (Ohio State) Associate Professor of Art Education
- Kimberly Powell, Ph.D. (Stanford) Assistant Professor of Curriculum and Instruction and Art Education
- Mary Ann Stankiewicz, Ph.D. (Ohio State) Professor of Art Education
- Graeme Sullivan, Ph.D. (Ohio State) Professor of Art Education; Director, School of Visual Arts
- Christine Marmé Thompson, Ph.D. (Iowa) Professor of Art Education

This program helps students prepare for careers in college teaching, administration, research, public school art teaching, and art supervision.

### Admission Requirements

For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, enrollment, and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Students who seek admission to the graduate program must make formal application to The Graduate School and admissions committee of the Art Education program. To be admitted without deficiencies, the student is expected to have completed either a baccalaureate degree in art education or a program considered by the admissions committee to provide an appropriate background for the application's degree objectives. Related programs include work in studio art, art history, art education, education, museum education, etc. Deficiencies may be made up by course work that is not counted as credit toward an advanced degree. Students pursuing graduate degrees may simultaneously take course work leading to teaching certification and art supervisory certification. The students who plan to teach art education at the college level should note that some institutions require professors to hold a public school art teaching certificate and to have had public school teaching experience.

Students with a minimum 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The most qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 average may be made for students with special backgrounds, abilities, and interests. Transcripts should indicate high attainment in appropriate academic and creative work. Letters of recommendation should attest to scholarship and ability to work independently. In addition to the above requirements, there are specific requirements for degree programs:

#### Ph.D. & M.S. Application Materials:

1. Completed official Penn State Graduate School Application for Admission.
2. Scores from the Graduate Record Examinations (GRE) or from the Miller Analogies Test (MAT) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.
3. Submit a one- to two-page Statement of Professional Intent which includes: (a) professional objectives, (b) how these objectives would be furthered by graduate study, (c) the areas in which research and creative work are planned, (d) what the applicant hopes to do with the graduate degree he or she is seeking to attain, and (e) evidence that the applicant is prepared to undertake graduate level work.
4. Submit an example of scholarly writing.
5. Submit three (3) letters of recommendation. Letters of recommendation should attest to the applicant's scholarship and ability to work independently.
6. Submit two (2) official transcripts from all institutions of higher education attended.
7. Submit a Portfolio (optional). Applicants may submit images of their creative works that represent arts-based research or images that illustrate their conception of art.
8. Indicate in your Statement of Professional Intent if you would like to be considered for an Assistantship/Fellowship.

#### M.P.S. Application Materials:

1. Completed official Penn State Graduate School Application for Admission.
2. Statement of purpose in pursuing the M.P.S. in Art Education.
3. Three letters of recommendation.
4. Teaching portfolio to include teaching philosophy and a sample of curricular materials developed by the applicant.
5. A critical reflective written response to an article provided in the GRADS application site. The response should outline the key arguments made by the author(s), a critical evaluation of the logic and assumptions in the article, and a connection to the applicant's own instructional or professional experience.
6. Curriculum vitae with evidence of professional leadership and service.
7. Two official transcripts from all institutions attended, including official military transcripts (if applicable). (All college or university transcripts are required regardless of the length of time that has passed, the grades earned, or the accreditation of the institutions attended.)
8. International applicants whose first language is not English or who have received a baccalaureate or master's degree from an institution in which the language of instruction is not English, please refer to the international students page for more information about language proficiency.

### Master's Degree Requirements

A minimum of 30 graduate credits is required for the M.S. and M.P.S. degrees. Students must take a minimum of 15 credits in art education. Of those, M.S. candidates are expected to complete the following 3-credit core: A ED 502, 505; 536 or 588; and A ED 590 (1 credit for each two semesters enrolled in course work). Students must take additional credits to total a minimum of 15 credits. All master's degree candidates must also complete 6 credits of foundational studies at the 400 level or above in areas such as art history, studio, philosophy, educational theory and policy, educational psychology, psychology, and anthropology. The remaining 9 credits are made up of elective studies.

*Additional M.S. requirements.* For M.S. candidates, 18 credits of course work must be at the 500 level or above. M.S. candidates must prepare and orally defend a thesis. Requirements include 6 credits of thesis research within the 30 credits.

*Additional M.P.S. requirements.* Students who seek admission to the M.P.S. in Art Education program should have current or recent teaching positions in a school, museum, cultural institution, or other community site at the time of application, with the expectation that the student continue to teach art in schools, museum, or other sites throughout the M.P.S. program. Applicants admitted to the degree program who have accumulated credits as non-degree graduate students may have up to 15 credits of coursework accumulated in non-degree status applied to their degree, with approval of the program.

For the M.P.S. in Art Education program, a minimum of 30 graduate credits is required. Students must complete 18 credits in 500-level courses and above, with a minimum of 6 credits at the 500-level. A minimum of 18 credits in art education includes the following Internet-based 3-credit courses: A ED 811, 812, 813, 814, 815, and A ED 594. Selecting from World Campus offering in other programs, students must take an additional 6 credits of Foundational courses at the 400 level or above in art history, studio, philosophy, educational theory and policy, educational psychology, psychology, and/or anthropology, and 6 credits of Elective courses.

M.P.S. in Art Education program participants can start in any semester, taking one online art education course and one or more foundation or elective courses in other programs per semester. A ED 594 is the culminating experience for the program with an action research project in one's teaching context.

### Doctoral Degree Requirements

*Admission to Candidacy.* Once admitted to the doctoral program, all students must take a candidacy examination, which is given during the first year that the student is in residence. During the candidacy examination there is a review of (1) the student's professional resume; (2) a statement regarding the general direction of the student's research interests and possible areas of thesis inquiry; (3) completed graduate courses; (4) proposed course of study for subsequent semesters; (5) selected graduate papers written by the student; (6) slides or original work if studio inquiry is part of the student's program of study.

*English competence.* At or before the candidacy exam, all candidates for doctoral degrees are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the requirement for the doctoral program. Competency must be formally attested to by the student's committee before the comprehensive examination is held.

*Course requirements.* All doctoral students are expected to complete the following 3-credit core courses: A ED 502, 505, 536, 588; and A ED 590 (1 credit for each two semesters enrolled in course work).

*Additional Ph.D. requirements.* All Ph.D. students must complete at least 2 continuous semesters of residency after being admitted to candidacy. Although not required by the program, Ph.D. students are strongly encouraged to complete a minor area of study. A foreign language is not required of Ph.D. candidates. Instead, the inquiry and foreign language requirement for the Ph.D. is met through 12 credits of graduate-level course work in a related discipline as determined by the student's committee. All Ph.D. students are required to complete 18 credits of course work in art education. These 18 credits comprise the core courses plus two other courses in art education at the 400-level or above.

*Comprehensive examination.* Ph.D. candidates are required to take a written and oral comprehensive examination once their course work is substantially completed. The examination, prepared by the student's doctoral committee, covers all phases of the student's doctoral work both inside and outside the field of art education.

*Doctoral dissertation.* Ph.D. candidates are required to complete a dissertation on a topic of research approved by the student's doctoral committee. The dissertation must be defended before the academic community at a final oral examination.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [ART EDUCATION \(A ED\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-014

Review Date: 06/12/2012

Faculty updated: 5/15/13



## Applied Behavior Analysis (ABA)

### [Program Home Page](#)

KIMBERLY A. SCHRECK, *Coordinator*  
 Penn State Harrisburg  
 777 West Harrisburg Pike  
 Middletown, PA 17057  
 717-948-6048  
[kas24@psu.edu](mailto:kas24@psu.edu)  
[www.hbg.psu.edu](http://www.hbg.psu.edu)

### Degree Conferred:

M.A.

### The Graduate Faculty

Richard M. Foxx, Ph.D. (Southern Illinois) *Professor of Psychology*  
 Kimberly A. Schreck, Ph.D. (Ohio State) *Associate Professor of Psychology*

The program, offered at Penn State Harrisburg, helps master's level graduates prepare to function in community settings as applied behavior analysts, and to provide the academic training necessary for graduates to apply for national board certification in behavior analysis. The overall model emphasizes the core areas of the discipline including the scientific basis of behavior analysis, as well as how biological, social, and individual differences affect human behavior. Training will emphasize the development of both assessment and intervention skills.

The program helps prepare graduates to work in hospitals, medical schools, mental health centers, health maintenance organizations, a wide variety of educational settings, forensic settings, research facilities, and in center- and home-based programs for individuals with autism and developmental disabilities.

The program is intended for both part- and full-time students. Courses will be scheduled for fall and spring semesters. Admission is in the fall and spring semesters only.

### Admission Requirements

Students will be admitted on a competitive basis and must submit the following:

- a completed Graduate School online application and payment of the application fee
- two official transcripts of all colleges and universities attended
- three letters of recommendation
- a brief (two-page) interest statement

The applicant must have either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants must have at least 18 credits in education, psychology, or related disciplines with a cumulative grade-point average of 3.0 or above in the last 60 credits. Scores from the Graduate Record Examinations are required in the verbal, quantitative, and analytic portions.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for the provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

A personal interview may be required.

### Transfer Credits

Subject to the limitations given below, a maximum of 10 credits of high-quality graduate work done at a regionally accredited institution or recognized degree-granting institution may be applied toward the requirements for the master's degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree at Penn State. Transferred academic work must have been completed within five years prior to the date of the first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of a regionally accredited university. Pass-fail grades are not transferable to an advanced degree program unless the "Pass" can be substantiated by the former institution as having at least B quality.

The ABA program cannot guarantee approval by the Behavior Analysis Certification Board of courses taken at other institutions, even those institutions that also have BACB University Approved Coursework.

### Degree Requirements

Requirements for the M.A. in Applied Behavior Analysis include 30 credits in required course work, including the master's project paper, supervised internship experience, and 6 elective credits for a total of 36 credits.

**ABA Core Courses** (to be offered annually) are required for all students in the program.

#### APPLIED BEHAVIOR ANALYSIS (ABA)

500. Experimental Analysis of Behavior (3)  
 511. Behavior Modification (3)  
 522. Single Subject Research (3)  
 533. Applied Analysis of Behavior (3)  
 577. Behavioral Assessment and Treatment  
 588. Ethics and Legal issues in ABA (3)  
 594A. Research Project (3)  
 595. Internship (9)

#### Elective Courses (6 credits)

#### APPLIED BEHAVIOR ANALYSIS (ABA)

555. Behavioral Interventions in Autism (3)  
 566. Behavioral Pediatrics (3)  
 594A. Research Project (3-15)  
 597. Special Topics (1-3)

**PSYCHOLOGY-CI (PSYC)**

592. Current Topics (3)

**PSYCHOLOGY (PSYCH)**

443. Treatment and Education in Developmental Disabilities (3)

The culminating project in ABA 594A Research Project requires the completion of a master's project (e.g., research manuscript, training manual, literature review manuscript, or publication). The type and scope of the project is agreed upon by the student's research chair.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-129

Review Date: 01/15/2013

UCA Revision #1: 11/8/06

## Astrobiology (ABIOL)

JAMES F. KASTING, Program Coordinator  
2217 Earth and Engineering Sciences Building  
814-863-8761; [Astrobiology Research Center](#)

### Degree Conferred

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., i.e., Ph.D. in (graduate program name) and Astrobiology.

The following graduate programs offer dual degrees in Astrobiology: Astronomy and Astrophysics; Biology; Biochemistry, Microbiology, and Molecular Biology; Geosciences; and Meteorology.

### The Graduate Faculty

- Michael A. Arthur, Ph.D. (Princeton) Professor of Geosciences
- Susan L. Brantley, Ph.D. (Princeton) Professor of Geosciences; Director, Earth and Environmental Systems Institute
- Jean E. Brenchley, Ph.D. (California, Davis) Professor of Microbiology and Biotechnology
- Donald A. Bryant, Ph.D. (UCLA) Ernest C. Pollard Professor in Biotechnology; Professor of Biochemistry and Molecular Biology
- Albert Welford Castleman, Jr., Ph.D. (Polytechnic Inst of Brooklyn) Eberly Distinguished Chair in Science; Evan Pugh Professor of Chemistry
- Matthew Fantle, Ph.D. (California, Berkeley) Assistant Professor of Geosciences
- James G. Ferry, Ph.D. (Illinois) Stanley Person Professor of Molecular Biology
- Katherine H. Freeman, Ph.D. (Indiana) Professor of Geosciences
- S. Blair Hedges, Ph.D. (Maryland) Professor of Biology
- Christopher H. House, Ph.D. (California) Associate Professor of Geosciences; Director, Penn State Astrobiology Research Center
- James F. Kasting, Ph.D. (Michigan) Distinguished Professor of Geosciences
- Lee R. Kump, Ph.D. (South Florida) Professor of Geosciences
- Jennifer Macalady, Ph.D. (California, Davis) Associate Professor of Geosciences
- Suvrath Mahadevan, Ph.D. (Penn State) Assistant Professor of Astronomy and Astrophysics
- Hiroshi Ohmoto, Ph.D. (Princeton) Professor of Geochemistry
- Mark E. Patzkowsky, Ph.D. (Chicago) Professor of Geosciences
- Beth Shapiro, Ph.D. (Oxford) Assistant Professor of Biology
- Steinn Sigurdsson, Ph.D. (Cal Tech) Associate Professor of Astronomy and Astrophysics
- Aleksander Wolszczan, Ph.D. (Copernicus U, Poland) Evan Pugh Professor of Astronomy and Astrophysics
- Jason Wright, Ph.D. (California, Berkeley) Assistant Professor of Astronomy and Astrophysics

The Astrobiology dual-title degree program is administered by the Department of Geosciences for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, defines the nature of the candidacy examination and assigns the examining committee, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences and the Eberly College of Science and, where appropriate, other graduate programs in the University. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Astrobiology, while maintaining a close association with major program areas of application.

Astrobiology is a field devoted to the exploration of life outside of Earth and to the investigation of the origin and early evolution of life on Earth. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School; (2) one of the participating major graduate programs; and (3) the Astrobiology program committee. Usually students will apply and be accepted into the major program first. Application to the dual-title degree program can occur upon matriculation, but should be completed before the candidacy examination in the major program is scheduled.

### Admission Requirements

Graduate students with research and educational interests in astrobiology may apply to the Astrobiology Dual-Title Degree Program. Candidates must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating the career goals they hope to serve by attaining an Astrobiology dual title, and a statement of support from their dissertation adviser. A strong undergraduate preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the major graduate program in which they are enrolled, in addition to the minimum requirements of the Astrobiology program. The minimum course requirements for the dual-title in Astrobiology are ABIOL 574 Planetary Habitability (3 credits), ABIOL 590 Astrobiology Seminar (2 credits), ABIOL 570 Astrobiology Field Experience (2 credits), and at least 2 credits of 400- or 500-level course work outside of the student's major program in an area relevant to Astrobiology (through consultation with their adviser). All students must pass a candidacy examination that assesses their potential in the field of astrobiology. This examination may be part of the candidacy examination in the student's major graduate program if an Astrobiology faculty member serves on the examination committee and if acceptable to the major program. If not, the Astrobiology dual-title program will offer a second candidacy examination. The structure and timing of the second candidacy examination will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the Astrobiology program, but this person may be the adviser and have an appointment in the major program of study. The field of Astrobiology should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Astrobiology is required. A public oral presentation of the dissertation is required.

### Financial Aid

Financial aid is generally available through the major program and through highly competitive University Graduate Fellowships (UGF). In addition, Penn State's Astrobiology Research Center (PSARC) provides support for students through research assistantships and graduate fellowships. Typically, students in Astrobiology are supported 12 months per year on some form of assistantship, fellowship, or summer wages provided by PSARC, UGF, or their home department.

### Other Relevant Information

Students intrigued by the possibility of pursuing research in Astrobiology should visit the [PSARC website](#) and the [NASA Astrobiology Institute website](#).

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ASTROBIOLOGY \(ABIOL\) course list](#)

Last Revised by the Department: Fall Semester 2004

Blue Sheet Item #: 32-04-078



## Accounting (ACCTG)

### [Program Home Page](#)

PAUL E. FISCHER, *Chair*  
 Department of Accounting, Smeal College of Business  
 354 Business Building  
 814-865-0041  
 pef5@psu.edu

### Degrees Conferred:

[Master of Accounting in Accounting \(M.Acc.\)](#)  
[Integrated B.S. in Accounting and Master of Accounting in Accounting Program](#)

### The Graduate Faculty

Orie E. Barron, Ph.D. (Oregon) Professor of Accounting  
 Robert P. Crum, D.B.A. (Kentucky) Associate Professor of Accounting  
 Mark W. Dirmsmith, Ph.D. (Northwestern) Deloitte & Touche Professor of Accounting  
 Charles R. Enis, D.B.A. (Maryland) Associate Professor of Accounting  
 Paul E. Fischer, Ph.D., (Rochester) Professor of Accounting  
 Dan Givoly, Ph.D. (NYU) Ernst & Young Professor of Accounting  
 Guojin Gong, Ph.D. (Iowa) Assistant Professor of Accounting  
 Steven J. Huddart, Ph.D. (Yale) Professor of Accounting  
 Bin Ke, Ph.D. (Michigan State) Associate Professor of Accounting  
 J. Edward Ketz, Ph.D. (Virginian Tech) Associate Professor of Accounting  
 Michelle Liu, Ph.D. (MIT Sloan) Assistant Professor of Accounting  
 Henock Louis, Ph.D. (Ohio State) Associate Professor of Accounting  
 James McKeown, Ph.D. (Michigan State) Mary Jean and Frank P. Smeal Professor of Accounting  
 Karl Muller, Ph.D. (Illinois) Associate Professor of Accounting  
 Charles H. Smith, Ph.D. (Penn State) KPMG Professor Emeritus of Accounting  
 Amy Xue Sun, Ph.D. (Carnegie Mellon) Assistant Professor of Accounting

The Department of Accounting offers a Master of Accounting that is designed to allow students to complete the educational requirements for becoming a certified public accountant in Pennsylvania as well as most other states. Certified public accountants conduct independent audits and provide accounting, tax, and management advisory services. The program prepares students to enter into careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements state in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Entry to the program is competitive and subject to available space. Criteria for evaluating applicants include: professional and academic accomplishments, GMAT scores, personal Data from application forms and, possibly, interviews or examinations. Work on the M.Acc. degree generally begins in the fall semester.

Typically, student who meet the admissions requirements can complete the program in one full year.

Students who apply to the program should have an undergraduate educational background equivalent to a Bachelor Science degree from the Penn State University Smeal College of Business. Students who apply to the program should have completed the equivalent of the following Penn State University accounting courses: ACCTG 211, ACCTG 403W, ACCTG 404, ACCTG 405, ACCTG 471, and ACCTG 472. Applicants to the program from outside Penn State may be required to take an entry exam to demonstrate mastery of the material covered in these courses prior to beginning coursework in the master's program.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have maintained a junior-senior grade-point average of at least 3.00 on Penn State's grading scale of A (4.00) to D (1.00). In addition, an applicant is expected to have maintained a grade-point average of 3.00 for the required accounting courses.

Applicant to the program are generally required to take the Graduate Management Admission Test (GMAT). For dates, locations, and other information about the test, write for the Bulletin of Information, Graduate Management Admission Test, Educational Testing Services, Princeton, NJ 08540; www.gmat.org; 800-982-6740.

Applicants whose first language is not English or who have received a baccalaureate or master's degree from an institution in which the language of instruction is not English must take either the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) module and submit the results of that test with the application for admission. The TOEFL test is offered in different formats depending on location. A score of at least 600 on the paper-based TOEFL or 250 on the computer-based TOEFL must be attained. A minimum total score of 100, along with a minimum score of 23 on the speaking portion, is required for the Internet-based test (iBT). Information about the TOEFL can be obtained by writing to the Educational Testing Service, Box 6155, Princeton, NJ 08541-6155 or visiting their Web site at www.toefl.org. Alternatively, a minimum composite score of 7.0 on the IELTS test is required for admission. Information about the IELTS can be obtained by contacting IELTS International, 100 E Corson St, Suite 200, Pasadena, CA 91103 or by visiting its Web site at www.ielts.org.

Additionally, the program requires: (1) a completed Smeal College of Business application for graduate study including Graduate School application fee, and (2) official transcripts from all completed graduate and undergraduate course work.

### Degree Requirements

Students must complete a minimum of 30 credit hours of graduate instruction. All of the 30 credit hours must be earned in 400-level, 500-level, or 800-level courses. At least 18 of the 30 credit hours must be earned in 500-level and 800-level courses, and at least 6 of the 30 credit hours must be earned in 500-level courses.

Students must complete the following required courses as part of the 30 credit hours of graduate instruction:

#### ACCOUNTING (ACCTG)

- 432. Accounting Information Systems (3)
- 440. Advanced Managerial Accounting (3)
- 803. Forensic Accounting (3)
- 806. Advanced Topics in Taxation (3)
- 873. Advanced Topics in Financial Reporting (3)
- 881. Financial Statement Analysis (3)

#### BUSINESS ADMINISTRATION (B A)

- 517. Leadership Communications (3)

#### **BUSINESS LAW (B LAW)**

- 444. Advanced UCC and Commercial Transactions (3)

#### **FINANCE**

- 531. Financial Management (3)

ACCTG 803 will be the capstone course for the program, with the final project integrating material learned in the other program courses. Student must also take an additional 3 credit (elective) course selected in consultation with their adviser.

#### **Integrated B.S. in Accounting and Master of Accounting in Accounting Program**

The Department of Accounting offers an integrated program allowing students to receive a B.S. in Accounting and Master of Accounting (M.Acc.) degrees within a five-year period. Students typically are admitted into the integrated program in the spring of the second year of the undergraduate program and the program is completed in the subsequent three years. The program is designed to meet the educational requirements for becoming a certified public accountant in Pennsylvania as well as most other states. Certified public accountants conduct independent audits and provide accounting, tax, and management advisory services. The program prepares students to enter into careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement. In addition, the program is appropriate for students having an interest in entering law school and graduate programs in business, such as M.B.A. programs or doctoral programs.

#### **Admission Requirements**

Students will generally apply for the program in the spring of their second year of undergraduate study. To apply for the program students must:

(1) be enrolled in the Smeal College of Business or Division of Undergraduate Studies and intend to complete the entrance-to-major requirements by the end of the spring semester in which they apply

and

(2) complete a Graduate School application for graduate study.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have grade-point average of at least 3.20 on Penn State's grading scale of A (4.00) to D (1.00).

In addition, the Department may request an interview with an applicant, or require a GMAT exam or other exam. Admissions decisions will be based upon the student's application, undergraduate record, SAT scores and, if applicable, interviews and examination results.

Admitted students must have completed ACCTG 211 with superior performance by the end of the spring semester in which they apply for admission to the program. A student who has not satisfied this requirement by the admissions deadline may be provisionally admitted pending completion of ACCTG 211 with a superior performance.

#### **Degree Requirements**

Students must complete the requirements for a B.S. in accounting with the following alterations:

Some of prescribed courses for the B.S. must be taken in sections that are available only to students enrolled in the program. These prescribed courses, which all count toward the undergraduate degree in accounting, are: ACCTG 403W, ACCTG 404, ACCTG 405, ACCTG 471, and ACCTG 472.

The student need not satisfy the requirement that 6 credit hours be completed from the following list of courses: ACCTG 406, ACCTG 432, ACCTG 473, and ACCTG 481.

The following courses cannot be used to satisfy the degree requirements of the integrated program: ACCTG 406, ACCTG 410, ACCTG 411, ACCTG 422, ACCTG 450, ACCTG 473, and ACCTG 481.

Students must complete the Master of Accounting Requirements, which total 30 credit hours of graduate instruction, in addition to completing 120 credit hours of undergraduate instruction.

The following courses, totaling 9 credits hours, will double-count towards both the B.S. and Master of Accounting degrees: B LAW 444(3), FIN 531(3), and ACCTG 881(3).

#### **Courses**

Graduate courses carry numbers from 500 to 599 or 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-06-037; Integrated 38-06-038

Review Date: 04/13/2010

Last updated by Publications: 1/22/10 (link check)

## Applied Clinical Psychology (ACPSY)

### [Program Home Page](#)

THOMAS G. BOWERS, *Graduate Program Coordinator*  
 Penn State Harrisburg  
 W-311 Olmsted Building  
 777 West Harrisburg Pike  
 Middletown, PA 17057  
 717-948-6040

### Degree Conferred:

M.A.

### The Graduate Faculty

- John Steven Backels, Ph.D. (Ball State) Affiliate Assistant Professor of Psychology
- Michael A. Becker, Ph.D. (SUNY, Albany) Associate Professor of Psychology
- Thomas G. Bowers, Ph.D. (Virginia Tech) Associate Professor of Psychology
- Gina M. Breisford, Ph.D. (Bowling Green) Assistant Professor of Psychology
- Barbara A. Bremer, Ph.D. (Bryn Mawr) Associate Professor of Psychology
- Richard Fiene, Ph.D. (Newport) Associate Professor of Human Development and Family Studies
- Marissa Harrison, Ph.D. (SUNY, Albany) Assistant Professor of Psychology
- Rebecca M. LaFountain, Ed.D. (William and Mary) Assistant Professor of Psychology
- Senel Poyrazli, Ph.D. (Houston) Associate Professor of Counseling Psychology
- Kimberly A. Schreck, Ph.D. (Ohio State) Associate Professor of Psychology
- Maria A. Turkson, Ph.D. (Maryland) Assistant Professor of Psychology
- Xu Xu, Ph.D. (Northern Illinois) Assistant Professor of Psychology

The Master of Arts in Applied Clinical Psychology program helps students prepare to work as mental health professionals in a variety of settings and is intended to provide a broad training program in empirically validated clinical psychology which, when accompanied by an additional 12 credits in advanced graduate studies in psychology and/or counseling, can provide the academic training necessary for graduates to apply for master's level licensing as a professional counselor in the Commonwealth of Pennsylvania. The M.A. program requires 48 credits of course work. An optional 12-credit certificate program is available in the area of clinical health psychology through the School of Behavioral Sciences and Education for students seeking licensure.

The overall model emphasizes the scientific bases of behavior, including biological, social, and individual difference factors. The training model is health-oriented rather than pathology-oriented and emphasizes the development of helping skills, including both assessment and intervention.

The degree program is intended for both part- and full-time students. Students are admitted fall semester only. The deadline for admission is May 1.

### Admission Requirements

Students will be admitted on a competitive basis and must submit the following:

- completed application form with the application fee
- two official transcripts of all colleges and universities attended
- three professional letters of recommendation
- a brief (two-page) interest statement
- verbal, quantitative, and analytical scores on the Graduate Record Examinations

The applicant must have a bachelor's degree from a regionally accredited academic institution or the equivalent, must have completed at least 18 credits in psychology, and must have a cumulative grade-point average of 3.0 or above in the last 60 credits of course work. The undergraduate work must include a statistics course and a psychology research methods course with grades of B or higher. A personal interview is required.

### International Students

All applicants whose first language is not English or who have not received a baccalaureate degree from an institution in which the language of instruction is English must take the Test of English as a Foreign Language (TOEFL), [www.toefl.org](http://www.toefl.org). The test must be passed with a score of 550 (paper-based test) or 213 (computer-based test) or higher.

All students with international credentials must submit transcripts to Educational Credential Evaluators, Inc. (ECE) for a "Course by Course" academic evaluation of transcripts and degree. An ECE application can be obtained on the Web at [www.ece.org](http://www.ece.org).

### Transfer Credits

Penn State allows for the approval of up to 10 transfer credits to graduate programs.

### Grade-Point Average

Students must have a 3.00 grade-point average to graduate from the program.

### Financial Aid

There is a limited number of scholarships and research grants available, as well as graduate assistantships. Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact the Financial Aid Office at 717-948-6307.

### Degree Requirements

The M.A. in Applied Clinical Psychology requires 48 credits of coursework. Included in the core courses are 100 hours of clinical practicum, 600 hours of supervised internship experience, and a master's research paper.

Psychology Core Courses (23 credits) provide a foundation in professional ethics, individual differences and cultural diversity, the scientific bases of behavior, and scientific research skills. These courses are intended to facilitate the development of an awareness of the context in which clients live and in which interventions must work.

### PSYCHOLOGY (PSYC)

- 500. Ethics and Professional Practice in Psychology and Counseling (3)
- 501. Cultural Competency in Psychology (3)
- 502. Applied Social Psychology (3)
- 520. Research Methods (4)
- 521. Statistics (4)
- 524. Biological Basis of Behavior (3)

- 530. Research Paper (3)

Clinical Core Courses (25 credits) provide a general background in clinical diagnosis, assessment, and interventions with appropriate supervised experience to allow students to develop the clinical skills appropriate for master's level practitioners.

#### **PSYCHOLOGY (PSYC)**

- 510. Human Growth and Development (3)
- 517. Psychopathology (3)
- 518. Interviewing and Counseling (3)
- 519. Theories and Models of Psychotherapy (3)
- 540. Group Interventions (3)
- 571. Tests and Measurement (3)
- 595A. Clinical Practicum (1)
- 595B. Clinical Internship (6)

#### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PSYCHOLOGY \(PSYC\) course list](#)

Last Revised by the Department: Fall Semester 2004

Blue Sheet Item #: 32-07-018

Review Date: 6/15/04

Faculty last updated: 7/26/12



## Acoustics (ACS)

[Program Home Page](#)

VICTOR W. SPARROW, *Interim Chair of the Graduate Program in Acoustics*  
217A ARL Building  
Phone: 814-865-6364; Fax: 814-865-3119

### Degrees Conferred:

Ph.D., M.S., M.Eng.

### The Graduate Faculty

- Sridhar Anandkrishnan, Ph.D. (Wisconsin, Madison) Professor of Geosciences
- Anthony A. Atchley, Ph.D. (U Mississippi) Associate Dean for Research and Administration, College of Engineering; Professor of Acoustics
- Ingrid M. Blood, Ph.D. (Bowling Green) Professor of Communication Sciences and Disorders
- David L. Bradley, Ph.D. (Penn State) Senior Scientist; Professor of Acoustics
- Kenneth Brentner, Ph.D. (Cambridge) Professor of Aerospace Engineering
- Timothy Brungart, Ph.D. (Penn State) Senior Research Associate; Associate Professor of Acoustics
- Russell C. Burkhardt, Ph.D. (Penn State) Research Associate; Assistant Professor of Acoustics
- Dean Capone, Ph.D. (Penn State) Research Associate; Assistant Professor of Acoustics
- R. Lee Culver, Ph.D. (California, San Diego) Senior Research Associate; Associate Professor of Acoustics
- John Fahnlne, Ph.D. (Penn State) Research Associate; Assistant Professor of Acoustics
- Thomas A. Frank, Ph.D. (Wisconsin) Professor of Communication Sciences and Disorders
- Thomas B. Gabrielson, Ph.D. (Penn State) Senior Scientist; Professor of Acoustics
- Steven L. Garrett, Ph.D. (UCLA) United Technologies Corporation Professor of Acoustics
- Stephen A. Hambric, D.Sc. (George Washington) Senior Scientist; Associate Professor of Acoustics
- Charles W. Holland, Ph.D. (Penn State) Senior Scientist; Professor of Acoustics
- Robert M. Keolian, Ph.D. (U California) Senior Research Associate; Associate Professor of Acoustics
- Michael H. Krane, Ph.D. (Penn State) Research Associate; Assistant Professor of Bioengineering
- John S. Lamancusa, Ph.D. (Wisconsin, Madison) Professor of Mechanical Engineering
- George Lesieutre, Ph.D. (California, Los Angeles) Professor of Aerospace Engineering
- Clifford J. Lissenden III, Ph.D. (U Virginia) Professor of Engineering Science and Mechanics
- Lyle Long, Ph.D. (George Washington) Distinguished Professor of Aerospace Engineering
- Anthony Lyons, Ph.D. (Texas A&M) Senior Scientist; Associate Professor of Acoustics
- Eric R. Marsh, Ph.D. (MIT) Professor of Mechanical Engineering
- Julian D. Maynard, Ph.D. (Princeton) Distinguished Professor of Physics
- Timothy McDevitt, Ph.D. (Penn State) Senior Research Associate; Associate Professor of Acoustics
- Dennis K. McLaughlin, Ph.D. (MIT) Professor of Aerospace Engineering
- Richard J. Meyer, Jr., Ph.D. (Penn State) Senior Research Associate; Associate Professor of Materials Science and Engineering
- Philip J. Morris, Ph.D. (Southampton) Boeing Professor of Aerospace Engineering
- Andrew A. Nyblade, Ph.D. (U Michigan) Professor of Geosciences
- Matthew Poese, Ph.D. (Penn State) Research Associate in Acoustics
- Karl M. Reichard, Ph.D. (Virginia Tech) Research Associate; Assistant Professor of Acoustics
- Joseph L. Rose, Ph.D. (Drexel) Paul Morrow Professor of Earth and Engineering Sciences
- Daniel A. Russell, Ph.D. (Penn State) Professor of Acoustics; Director, Acoustics Continuing and Distance Education
- Victor W. Sparrow, Ph.D. (Illinois, Urbana-Champaign) Professor of Acoustics
- David C. Swanson, Ph.D. (Penn State) Senior Research Associate; Associate Professor of Acoustics
- Stephen C. Thompson, Ph.D. (Case Western Reserve) Senior Scientist; Professor of Acoustics
- Bernhard R. Tittmann, Ph.D. (UCLA) Schell Professor of Engineering Science and Mechanics
- Martin W. Trethewey, Ph.D. (Michigan Tech) Arthur Glenn Professor of Mechanical Engineering
- Richard Tutwiler, Ph.D. (Penn State) Senior Research Associate; Associate Professor of Acoustics
- Michelle Vigeant, Ph.D. (Nebraska, Lincoln) Assistant Professor of Acoustics and Architectural Engineering

The aim of this program is to enable the student interested in acoustics to obtain an integrated program covering acoustical science and engineering applications of acoustics.

Student curricula are individually tailored and integrated through a selection of core and elective courses in areas such as basic acoustics, physical acoustics, underwater acoustics, signal processing, optics, architectural acoustics, medical ultrasonics, aeroacoustics, vibrations, wave propagation, speech, physiological acoustics, psychoacoustics, thermoacoustics, hydroacoustics, and computational acoustics. The courses are offered by the Graduate Program in Acoustics and by other participating University departments, including Aerospace Engineering, Architectural Engineering, Bioengineering, Electrical Engineering, Engineering Science and Mechanics, Mechanical Engineering, Meteorology, Geosciences, Physics, Speech Communication, and Communication Disorders.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Entering students should hold a bachelor's degree in physics, engineering, mathematics, or a closely related field that would provide substantial preparation in mathematics (a minimum of two semesters of calculus-based physics and mathematics to include complex variables and differential equations). In addition, an undergraduate knowledge of statics and dynamics, linear algebra, and electronic circuit analysis, and the ability to use mathematical analysis software is expected. Students with a 3.00 junior/senior average (on a 4.00 scale), appropriate course backgrounds, and a B+ or better average in mathematics, physical science, and engineering courses will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. An individual with nontechnical background may also apply, but acceptance into the program will depend significantly on the applicant's undergraduate background and motives to pursue advanced study in acoustics. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds and abilities.

Scores from the Graduate Record Examinations (GRE) are required. For applicants required by the Office of Graduate Enrollment to take the TOEFL, minimum require TOEFL scores are 237 (computer-based test) or 580 (paper-based test).

### Other Relevant Information

In addition to the acoustics courses listed here, the following courses on acoustics and closely related areas are available: AERSP 511, 524, 525; A E 458, 520; BIOE 506, 516; CMPEN 485; E E 460, 530, 557, 560, 561, 562; E SC 536, 537; E MCH 412, 516, 521, 524A,B,C, 525, 527, 528, 560, 562, 570; GEOSC 504, 507A,B; 551; M E 471, 554; PHYS 443, 533. This list may change as other departments continue to add new courses relevant to acoustics.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ACOUSTICS \(ACS\) course list](#)

Faculty updated: 6/28/13

UCA Revision #2: 7/30/07

## Adult Education (ADTED)

### [Program Home Page](#)

KYLE PECK, *Director of Graduate Studies*  
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[caf17@psu.edu](mailto:caf17@psu.edu)

ELIZABETH J. TISELL, *Coordinator of Doctoral Program in Adult Education, Penn State Harrisburg*  
717-948-6640; [Program Home Page](#)

### Degrees Conferred:

Ph.D., D.Ed., M.Ed., M.D./M.Ed.

### The Graduate Faculty

- William Anderson, D.Ed. (Penn State) *Adjunct Assistant Professor*
- Irene Baird, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Rebecca Beatty, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Thomas Bettinger, D.Ed. (Penn State) *Adjunct Assistant Professor*
- Felicia Brown-Haywood, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Barbara Frey, D.Ed. (Penn State) *Adjunct Assistant Professor*
- Ilhan Kucukaydin, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Gary W. Kuhne, D.Ed. (Penn State) *Associate Professor of Education*
- Michael G. Moore, Ph.D. (Wisconsin) *Professor of Education*
- Esther S. Prins, Ph.D. (Cornell) *Associate Professor of Education*
- Ladislaus (Ladi) M. Semali, Ph.D. (California) *Associate Professor of Education*
- Fred M. Schied, Ed.D. (Northern Illinois) *Associate Professor of Education*
- Kay Shattuck, D.Ed. (Penn State) *Adjunct Assistant Professor*
- Heather Stuckey, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Ann Swartz, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Edward W. Taylor, Ed.D. (Georgia) *Professor of Education*
- Melody M. Thompson, D.Ed. (Penn State) *Associate Professor of Education*
- Patricia Thompson, D.Ed. (Penn State) *Affiliate Assistant Professor of Education*
- Elizabeth J. Tisdell, Ed.D. (Georgia) *Professor of Education*
- Robin Redmon Wright, Ph.D. (Texas A & M) *Assistant Professor of Education*

Adult Education extends through the life span from late adolescence to advanced age and takes place in a rich diversity of organizational as well as informal settings. The purpose of the Adult Education program is to increase the knowledge and competence of those who work with adult learners. Coursework, reading assignments, research projects, internships, informal discussions, and the dissertation all provide opportunities for in-depth and challenging learning experiences. The programs are interdisciplinary, and students are advised to seek learning in supporting fields within the University.

The Ph.D., D.Ed., and M.Ed. degrees are offered only at University Park. The M.Ed. is also offered through the World Campus, and through the joint M.D./M.Ed. program. Harrisburg offers the D.Ed. degree.

### Admission Requirements (for M.Ed., D.Ed., and Ph.D.)

Scores from the Graduate Record Examinations (GRE), or from the Miller Analogies Test (MAT), are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in the program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Applicants with a total Verbal and Quantitative score above 1100 on the GRE, a junior/senior average of 3.00 (on a 4.00 scale), and a graduate average of 3.50 are usually admitted to the Ph.D. or D.Ed. program. Applicants with a junior/senior average of 2.70, a graduate average of 3.20, and a GRE total score of 1000 but with special backgrounds, abilities, and interests also may be admitted to the doctoral programs with only the baccalaureate degree, but they will earn the master's degree en route. The Miller Analogies Test may be accepted in place of the GRE for admission to the graduate program in Adult Education. A sample of student writing and a "career letter" in which applicants explain how the proposed studies in adult education relate to their careers are required for each degree. A proctored writing sample is required of doctoral students. Three letters of reference (at least two from faculty members for Ph.D. applicants) that evaluate the candidate's aptitude for graduate study are required.

Applicants who exhibit exceptional qualities without meeting all of the stated requirements for admission may be considered for provisional admission while removing identified deficiencies. Deficiencies must be rectified within the first two semesters in the program; courses taken to remove deficiencies are considered to be prerequisites and do not earn credit toward the doctoral degree.

### Admissions Requirements for Joint M.D./M.Ed.

Those who wish to apply for admission to the joint M.D./M.Ed. degree program would have to meet the admissions requirements for the degrees in each program. Prospective students interested in simultaneously pursuing an M.D. and M.Ed. must first apply to the Penn State College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the MD degree at Penn State. They are encouraged to identify themselves as candidates for the joint-degree program at this time. However, medical students who realize after accepting admission into Penn State's College of Medicine that they are interested in the joint M.D./M.Ed. can apply for admission to the joint degree during their first three years in the College of Medicine. Given that students will already be enrolled in the College of Medicine it will be possible for faculty to observe their academic record and counsel them on the advisability of the joint-degree.

### General Master's Degree Requirements

The M.Ed. program in Adult Education consists of a required core of 24 credits in ADTED courses and 9 elective credits. The 24 core ADTED credits include the following six specified courses: ADTED 460, ADTED 505, ADTED 506, ADTED 507, ADTED 510, ADTED 588. Students then choose an additional six credits (2 courses) from the following ADTED courses: ADTED 470, ADTED 501, ADTED 531, ADTED 532, ADTED 542, ADTED 575.

M.Ed. students are required to write a master's paper, in lieu of a thesis, as part of the required 33 credits of course work. A minimum of 18 credits out of the 33 must be taken at the 500 level or above and a minimum of 24 credits must be in ADTED prefix courses.

### Ph.D. and D.Ed. Doctoral Degree Requirements

Ph.D. students are required to take 12 core credits in Adult Education, 12 credits in an emphasis area that is composed of Adult Education and supporting courses outside Adult Education, and 18 research credits, in addition to the residency requirement, candidacy and comprehensive examinations, and continuous registration during the dissertation research. All students are required to be computer literate as determined by their doctoral committee and will be assessed for communication skills during core adult education courses. Students with a knowledge of a second language (as demonstrated by having lived in a foreign country for at least one year, speaking a native language other than English, or having studied another language in post-secondary education for at least two years) will be given preference in admission to the Ph.D. program.

D.Ed. students who do not have previous experience in adult education are expected to acquire the equivalent of one year of experience in one or more fields of adult education practice prior to receiving their D.Ed. degree. A candidacy examination is administered after students complete 9-15 credits. During the comprehensive examination, in addition to being examined in their area of specialization, all D.Ed. students will be examined in the core adult education areas. A minimum of 24 credits in coursework must be taken in Adult Education. A minimum of 15 credits must be taken outside Adult Education as a minor or General Studies option. A minimum of 6 research credits is required.

Students in the Ph.D. program focus on research in Globalization and Lifelong Learning selecting one emphasis area (Distance Education, Literacy for Culturally and Linguistically Diverse Populations, Comparative Lifelong Learning, or Learning in Work and Communities). Research credits develop the background knowledge and tools to enable them to engage in original research. D.Ed. students conduct applied research with the goal of improving practice in the general adult education field.

*Prerequisites for the Ph.D. Program:* ADTED 460, Introduction to Adult Education, and ADTED 507, Research and Evaluation in Adult Education, or their equivalents, are prerequisites to admission to the Ph.D. program. Another prerequisite is a basic statistics course, such as EDPSY 400 or AEE 521, required as part of the Penn State master's degree program in Adult Education. As prerequisites they do not count toward the requirements of the Ph.D. program although they may be completed while taking required Ph.D. courses.

### **Joint M.D./M.Ed. Degree Requirements**

As noted in Section D of the Guidelines for Joint Degrees document approved by Graduate Council on January 17, 2007, at least 20% and no more than 40% of the total credits required for the graduate program are met by substitution of courses from the professional program, in this case, the M.D. program. As such, nine credits from the M.D. program will meet the substitution requirement into the M.Ed., and nine credits from the M.Ed. will be accepted into the M.D. program, from among the courses that reflect the interdisciplinary common ground between the two programs. It is to be noted that the course requirements for the joint degree are the same for students admitted to the M.Ed. in Adult Education, with the exception that ADTED 501: Foundations of Medical Education is required for the Joint M.D./M.Ed., and will substitute for ADTED 470: Intro to Distance Education (which is required for the stand-alone M.Ed. degree.) The requirements for the M.Ed. overall include General Adult Education Core (15 credits), Research Requirement (9 credits), and Electives (9 credits). A master's paper is required that carries no course credit, but the course work facilitates the development of the master's paper. Other than the nine credits that will be accepted into the M.D. as part of the joint degree program, the remainder of the M.D. requirements are the same as for those students pursuing the M.D. only.

### **Student Aid**

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### **[ADULT EDUCATION \(ADTED\) course list](#)**

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-012

Review Date: 06/12/2012

Faculty updated: 3/1/13

## Agricultural and Extension Education (AEE)

[Program Home Page](#)

RAMA RADHAKRISHNA, *Interim Head of the Department*  
114 Ferguson Building  
814-865-1688

### Degrees Conferred:

Ph.D., M.S., M.Ed.

### The Graduate Faculty

- Connie D. Baggett, Ph.D. (Penn State) Associate Professor of Agricultural and Extension Education
- Blannie E. Bowen, Ph.D. (Ohio State) Professor of Agricultural and Extension Education
- Cathy F. Bowen, Ph.D. (Ohio State) Professor of Agricultural and Extension Education
- Mark A. Brennan, Ph.D. (Penn State) Associate Professor of Agricultural and Extension Education
- Thomas H. Bruening, Ph.D. (Iowa State) Associate Professor of Agricultural and Extension Education
- Ann H. Dodd, Ph.D. (Penn State) Associate Professor of Agricultural and Extension Education
- John C. Ewing, Ph.D. (Ohio State) Assistant Professor of Agricultural and Extension Education
- Daniel D. Foster, Ph.D. (Ohio State) Assistant Professor of Agricultural and Extension Education
- James W. Hilton, Ph.D. (Iowa State) Associate Professor of Agricultural and Extension Education
- Tracy S. Hoover, Ph.D. (Penn State) Professor of Agricultural and Extension Education
- Patreese D. Ingram, Ed.D. (Western Michigan) Professor of Agricultural and Extension Education
- Matthew S. Kaplan, Ph.D. (CUNY) Professor of Agricultural and Extension Education
- Claudia C. Mincemoyer, Ph.D. (Penn State) Professor of Agricultural and Extension Education
- James H. Mortensen, Ph.D. (Penn State) Professor of Agricultural Education
- Daniel F. Perkins, Ph.D. (Michigan State) Professor of Agricultural and Extension Education
- Rama B. Radhakrishna, Ph.D. (Penn State) Professor and Interim Head of Agricultural and Extension Education
- Jan F. Scholl, Ph.D. (Iowa State) Associate Professor of Agricultural and Extension Education
- Barbara K. Wade, Ph.D. (Penn State) Affiliate Assistant Professor of Agricultural and Extension Education
- Nicole S. Webster, Ph.D. (Michigan State) Associate Professor of Agricultural and Extension Education
- Edgar P. Yoder, Ph.D. (Ohio State) Professor of Agricultural and Extension Education

Graduate programs emphasize agricultural or extension education (including preparation for employment in college or university programs), youth and family programming, state-level administration, local-level administration, private industry and international education. A minor may be taken in an area of the student's choice or in general studies. Programs may include courses needed for certification in other fields of education.

### Admission Requirements

All applicants must submit a letter of application, two or three typewritten pages in length, describing their professional experience, education, career goals, and reasons for pursuing the degree. Applicants must ensure that three departmental recommendation and evaluation forms from individuals knowledgeable about the applicant are forwarded to the department. Only the most qualified applicants will be admitted to the graduate program. The graduate program may provisionally admit selected applicants pending resolution of the requirements listed here or applicants with special skills and experiences. Requirements listed here are in addition to the general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

### Master's Degrees

Prerequisite for admission to a master's program is a demonstrated professional interest in agricultural and extension education and/or applied youth and family education. Applicants whose junior-senior grade-point average (GPA) is under 3.00 on a 4.00 scale for their baccalaureate degree are required to submit Graduate Record Examinations (GRE) scores.

*Master of science:* This program is intended for those who are interested in defining, developing, or evaluating educational programs, both formal or nonformal, through public and private agencies and organizations serving youth, families or the agriculture community.

*Master of education:* Prerequisite for admission to this program is a minimum of 18 credits in professional education courses (including educational psychology and teaching and/or professional internship) or certification as a teacher of agriculture, or equivalent professional experience, including extension.

### Doctoral Degree

An applicant should have a minimum average of 3.40 on a 4.00 scale on all previous graduate work or a minimum combined score of 1000 on the verbal and quantitative sections of the GRE. Two years of appropriate professional experience is required either prior to admission or before the degree is awarded. An interview with the graduate faculty is recommended of all applicants prior to admission into a doctoral program. Applicants to the doctoral program must submit evidence of ability to write a scholarly paper or thesis and demonstrate a teaching-level competence of English.

### Master's Degree Requirements

A program of study agreement between adviser and student, including planned course work (approved by the student's committee) and time frame, should be completed before beginning the second semester of study. Successful performance on a four-hour written essay exam, plus a one-hour oral exam, is required of all M.S. and M.Ed. candidates near the completion of their course work for the degree. The master's candidate is required to successfully complete an oral defense of a paper or thesis.

### Doctoral Degree Requirements

Two years of appropriate professional experience is required either prior to admission or before the doctoral degree is completed.

### Other Relevant Information

Selection and appointment of a thesis adviser and doctoral committee follows admission to candidacy. The candidate consults the department head or graduate officer in selecting an adviser. The candidate, in cooperation with an adviser, selects the doctoral committee. The chair of the committee is not necessarily the thesis adviser, but the thesis adviser is a member of the committee.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[AGRICULTURAL AND EXTENSION EDUCATION \(AEE\) course list](#)

## Dual-Title Graduate Degree in Agricultural and Extension Education (AEE) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international agriculture extension and education may apply to the Agricultural and Extension Education/INTAD Dual-Title Doctoral Degree Program. The goal of the dual-title degree AEE/INTAD Ph.D. program is to enable graduate students from AEE to acquire the knowledge and skills of their primary area of specialization in AEE, while at the same time gaining the perspective and methods needed to work internationally. Graduate study in this program seeks to prepare students to assume leadership roles in developing contemporary curricula and programs, conducting high quality research and development activities, and disseminating new knowledge in these areas in both national and international settings. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student.

### Admission Requirements

A student must first apply and be admitted to the AEE graduate program and the Graduate School at Penn State. For admission a student should have a strong background in agricultural and extension education, educational theory and policy, and teaching methods. Courses in research and statistics are recommended. Once accepted into the AEE program, the student can then request admission to the dual-title program by providing a statement of intent to the INTAD Academic Program Committee for the dual-title degree program. The application consists of a written personal statement indicating the career goals a student hopes to accomplish by earning a dual-title AEE/INTAD degree.

Further information about the admissions process will be posted on [www.cas.psu.edu/international](http://www.cas.psu.edu/international).

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Agricultural and Extension Education program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, determined by the student, their INTAD advisor, and their AEE program advisor.

#### Degree Requirements for ENT/INTAD Dual-Title M.S.

The Master's in AEE/INTAD is a dual-title degree awarded to students who are admitted to both the AEE master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the AEE degree:

#### Course Requirements

Complete a minimum of 12 INTAD course credits (400, 500 or 800-level) as follows:

9 credits from the core curriculum:

- Program Design and Delivery (AEE 450, 3 credits)
- Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
- International Agricultural Development Seminar (INTAD 820, 3 credits)

3 credits of internship or applied courses/independent studies with international development content

#### Thesis

Students pursuing a Master of Science (M.S.) must write a master's thesis on a topic that reflects both the graduate program in agricultural and extension education and the dual-title offering in INTAD. All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

#### Final Examination

Candidates for the INTAD dual-title M.S. degree will also be required to pass a final oral examination covering the general field of AEE and also include elements of INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the students in consultation with their INTAD advisors and their major program advisors. Students and advisors should maintain the INTAD Masters Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

#### Degree Requirements for ENT/INTAD Dual-Title Ph.D.

The doctoral degree in Agricultural and Extension Education and INTAD is a dual-title degree awarded only to students who are admitted to the AEE doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in AEE and INTAD, in addition to the AEE Department requirements, are as follows:

#### Course Requirements

Students must complete a minimum of 18 INTAD graduate course credits with study in the following curriculum categories:

9 credits from core INTAD courses including

- International Agricultural Development Seminar (INTAD 820, 3 credits)
- International Rural Social Change (R SOC 517, 3 credits)
- Human Dimensions of Natural Resources (R SOC 555, 3 credits)
- OR
- Sociology of Agriculture (R SOC 508, 3 credits)

9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

#### Candidacy

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student advisor in consultation with the INTAD program coordinators.

#### Committee Composition

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

### **Comprehensive Exam**

At the end of the coursework, candidates for the dual-title doctoral degree in AEE and INTAD will be required to pass an oral comprehensive examination based on their thesis proposal and area of specialization in agricultural and extension education, while reflecting their dual-title degree curriculum. A separate comprehensive examination is not required by the INTAD program, but a section of the exam must be on international agriculture and the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive examination.

### **Dissertation and Dissertation Defense**

Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both Agricultural and Extension Education and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400-499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education by not to meet requirements for an advanced degree.

[International Agriculture and Development Course \(INTAD\) course list](#)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-005

Review Date: 06/21/2011

Last updated by Publications: 11/29/11

## Aerospace Engineering (AERSP)

[Program Home Page](#)

GEORGE A. LESIEUTRE, Head of the Department  
229 Hammond Building  
814-865-2569; Fax: 814-865-7092; [gradaero@engr.psu.edu](mailto:gradaero@engr.psu.edu)

### Degrees Conferred:

Ph.D., M.S., M.Eng.

### The Graduate Faculty

- Sven G. Bilén, Ph.D. (Michigan) Associate Professor of Engineering Design and Electrical Engineering, and Aerospace Engineering
- Kenneth S. Brentner, Ph.D. (Cambridge) Professor of Aerospace Engineering
- Cengiz Camci, Ph.D. (Von Karman Institute) Professor of Aerospace Engineering
- Stephen C. Conlon, Ph.D. (Penn State) Research Associate; Assistant Professor of Aerospace Engineering
- Joseph F. Horn, Ph.D. (Georgia Tech) Associate Professor of Aerospace Engineering
- Robert F. Kunz, Ph.D. (Penn State) Senior Research Associate; Associate Professor of Aerospace Engineering
- Jack W. Langelaan, Ph.D. (Stanford) Associate Professor of Aerospace Engineering
- George A. Lesieutre, Ph.D. (California, Los Angeles) Professor of Aerospace Engineering
- Deborah A. Levin, Ph.D. (Cal Tech) Professor of Aerospace Engineering
- Lyle N. Long, D.Sc. (George Washington) Distinguished Professor of Aerospace Engineering and Mathematics
- Mark D. Maughmer, Ph.D. (Illinois) Professor of Aerospace Engineering
- Dennis K. McLaughlin, Ph.D. (MIT) Professor of Aerospace Engineering
- Robert G. Melton, Ph.D. (Virginia) Professor of Aerospace Engineering
- Michael M. Micci, Ph.D. (Princeton) Professor of Aerospace Engineering; Director of Graduate Studies
- Philip J. Morris, Ph.D. (Southampton) Boeing/A. D. Welliver Professor of Aerospace Engineering
- Edward C. Smith, Ph.D. (Maryland) Professor of Aerospace Engineering
- David B. Spencer, Ph.D. (Colorado) Professor of Aerospace Engineering

Opportunities for graduate study are available in the following areas: low-speed aerodynamics, airplane and helicopter aerodynamics; V/STOL aircraft, turbulence, astrodynamics, turbomachinery, air breathing propulsion, aeroacoustics, gas dynamics, stability and control of aerospace vehicles, aerospace structures, structural dynamics, aeroelasticity, rotorcraft engineering, computational fluid dynamics, experimental fluid dynamics, space propulsion, space vehicle dynamics, and high-performance computing.

### Admission Requirements

Applicants must submit official scores from the Graduate Record Examinations (GRE) for admission to the graduate program and consideration for financial assistance. In addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the Graduate Bulletin, the department poses a number of specific requirements. The entering M.Eng. or M.S. student must hold a bachelor's degree in engineering, physical science, or mathematics, and may be required to complete (without degree credit) undergraduate course work in fluid and solid mechanics and intermediate mathematical analysis, if not already completed. The department will consider students with a 3.0 junior/senior grade-point average (GPA) on a 4.0 scale; students with special backgrounds, abilities, or interests may request a waiver to this GPA requirement. The best-qualified applicants will be accepted up to the number of spaces that are available. Admission to the Ph.D. program requires satisfactory completion of a master's program in engineering, physical science, or mathematics. Admission to the Ph.D. program prior to completion of a master's degree may be considered upon the student passing the Ph.D. candidacy exam. A student must have completed at least 18 course credits beyond the baccalaureate degree in order to take the Ph.D. candidacy exam, and is not granted official status as a doctoral candidate until the master's degree is complete and the candidacy exam has been passed. Application materials are available at: [www.aero.psu.edu](http://www.aero.psu.edu).

### M.Eng., M.S., and Ph.D. Core Requirements

1. Basic field theories. Complete two courses for 6 credits, one from a prescribed list in each of two of the following categories: fluid mechanics, solid mechanics, or system dynamics.
2. Numerical/computational methods. Complete one 3-credit course that addresses the numerical analysis of differential equations, from a prescribed list.
3. Applied mathematics. Complete one 3-credit, 500-level course from a prescribed list.
4. Teaching assistants and teaching aides who have classroom or laboratory instructional responsibilities must satisfactorily complete ENGR 588. Those with responsibilities limited to grading, holding office hours, and offering problem sessions must take ENGR 588 or a grading seminar.

### Master of Engineering Degree Requirements

The M.Eng. degree is a nonthesis professional master's degree. A total of 30 credits is required, including courses in the core requirements. Twenty-one credits must be in Aerospace Engineering courses with at least 18 credits at the 500 level. A student may count a maximum of 6 credits of 400-level course work toward the degree. Each student must complete a scholarly paper (for 2 credits of AERSP 596), which includes a literature review and some additional experiment or analysis, and must complete the graduate colloquium (for 1 credit of AERSP 590).

### Master of Science Degree Requirements

A total of 30 credits is required, including courses in the core requirements. Twelve credits must be in Aerospace Engineering courses with at least 6 credits at the 500 level. A student may count a maximum of 6 credits of 400-level course work toward the degree. Six credits of thesis research are also required. A completed M.S. thesis and its public presentation are required for graduation.

### Doctoral Degree Requirements

There is no foreign language requirement for the Ph.D. degree; however, students must demonstrate proficiency in reading, writing, and speaking English through an examination administered by the department. This must be completed to satisfy the Graduate School's requirement before taking the comprehensive exam. The candidate's doctoral committee decides which, if any, courses are required in addition to those specified in the core requirements; this typically involves 24 course credits beyond the M.S. degree. Ph.D. candidates must also demonstrate evidence of experimental experience.

Over the course of a Ph.D. program, the department and doctoral committee administer three examinations: The candidacy examination is given as a preliminary aptitude test before the end of the second semester following admission to the program. A comprehensive examination, which covers the major and minor fields of study, is administered after the candidate has substantially completed the required course work. The final oral examination, which is related mainly to the dissertation, is given after the candidate has satisfied all other degree requirements. All Ph.D. students must maintain continuous registration until the thesis is approved. A completed Ph.D. dissertation and its public defense are required for graduation.

### Student Aid

Graduate assistantships and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit



these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[AEROSPACE ENGINEERING \(AERSP\) course list](#)

Faculty updated: 3/21/13

## African Studies

B. IKUBOLAJEH LOGAN, Director of the African Studies Program  
214A Willard Building  
814-863-2427; Fax 814-863-3578  
bil2@psu.edu

### Degrees Conferred

Students electing this degree program through participating programs earn a degree with a dual title at the Ph.D. level, i.e., in (graduate program name) and African Studies.

The following graduate program offers a dual degree in African Studies: Ph.D. in Political Science.

### Graduate Faculty

Michael Adewumi (Illinois Institute of Technology) Vice Provost of Global Programs  
Collins Airhihenbuwa (University of Tennessee, Knoxville) Professor and Head of Biobehavioral Health  
Gabeba Baderoon (University of Cape Town) Assistant Professor of Women's Studies and African Studies  
Robert Crane (University of Colorado, Boulder) Professor of Geography  
William Dewey (Indiana University, Bloomington) Associate Professor of Art History  
Francis Doodoo (University of Pennsylvania, Philadelphia) Professor of Sociology  
Tanya Furman (MIT/Woods Hole Oceanographic Institute) Professor of Geosciences  
Thomas Hale (University of Rochester) Professor of Comparative Literature  
Errol Henderson (University of Michigan) Associate Professor of Political Science  
Thaddeus Ityokumbul (University of Western Ontario) Associate Professor of Mineral Processing and Geo-Environmental Engineering  
Michael Jacobson (North Carolina State University) Associate Professor of Forestry  
Denis Jett (University of Witwatersrand) Professor of International Affairs  
Brian King (University of Colorado, Boulder) Assistant Professor of Geography  
Doug Lemke (Vanderbilt University) Associate Professor of Political Science  
B. Ikubolajeh Logan (University of California, Los Angeles) Professor of African Studies and Geography  
Sinfree Makoni (University of Edinburgh) Associate Professor of African Studies and Applied Linguistics  
Tiyana Maluwa (Cambridge University) Associate Dean for International Affairs  
Kidane Mengisteab (University of Denver) Professor of African Studies and Political Science  
Anthony Olurinsola (Howard) Associate Professor and Head, Film, Video and Media Studies  
Iyunola Osagie (Cornell University) Associate Professor of English  
Kwado Osseo-Asare (University of California, Berkeley) Distinguished Professor of Metallurgy  
Ladislav Semali (University of California, Los Angeles) Associate Professor, College of Education  
Erica Smithwick (Oregon State University) Assistant Professor of Geography  
Kevin Thomas (University of Pennsylvania) Assistant Professor of African Studies, Sociology and Demography  
Petra Tschakert (University of Arizona) Associate Professor of Geography  
Yaw Yeboah (MIT) Professor and Head, Energy and Mineral Engineering, Energy and Mineral Engineering  
Vivian Yenika-Agbaw (Penn State) Associate Professor, College of Education

### Program Objectives of the Dual-Title Doctoral Degree Program in African Studies

The primary objective of the dual title degree program in African Studies is to expand teaching, research and scholarship on Africa and African societies at Penn State. This is accomplished by providing multidisciplinary training for Penn State doctoral students, who are undertaking graduate studies on Africa-related topics in a number of allied disciplines, such as geography, history, political science, sociology, comparative literature, public health, forestry, agricultural sciences, and international studies. The program complements training on Africa for graduate students in other areas such as business, law, and engineering. The program provides these various disciplines with an intellectual and physical location at which their African scholarship can be put to the most effective use for graduate students. The program uses the research projects and institutional networks of core and affiliate African Studies graduate faculty to provide research opportunities and linkages in Africa for Penn State doctoral students. The program aims to produce Penn State doctoral graduates, who have a comparative advantage for African Studies-related employment in academia, bilateral and multilateral agencies and international think-tanks.

### Admission Requirements

Students must apply and be admitted to the primary graduate program and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to the major program and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in their primary program.

General Graduate Council requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

### Degree Requirements

The Dual-Title Doctoral Degree in African Studies is awarded to students who are admitted to a Ph.D. program that has adopted the dual-title degree program in African Studies. The minimum course requirements for the dual-title Ph.D. degree in African Studies are as follows.

- Course work and other requirements of the primary program.
- AFR 501(3)
- 18 credits of Africa-related coursework at the 400 or 500-level; a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- As many as 6 of the 18 credits may come from the primary program as approved by the student's academic advisers in the primary program and the African Studies Program.
- No more than 6 credits may be taken at the 400-level and no more than 6 combined credits may come from individual studies courses and/or foreign studies courses.
- Communication and foreign language requirements will be determined by the student and the academic advisers from the primary program and the African Studies Program.

The choice of electives in African Studies is to be proposed by the student subject to approval by the academic advisers from the primary program and the African Studies Program. The suite of selected courses should have an integrated, intellectual thrust, which probes a thematic, national or regional issue and that is complementary to the student's specialty in the primary program.

### Language Requirement

The language requirement for the dual-title degree program is determined by the academic advisers in the primary program and the African Studies Program, in accordance with the existing language requirements of the primary program.

### Candidacy Examination

The dual-title degree is guided by the Candidacy Exam procedure of the primary program. The candidacy exam for the dual-title degree may be given after at least 18 post-baccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the primary program. There will be a single candidacy examination, containing elements of both the major discipline and African Studies.

### **Doctoral Committee Composition**

The doctoral committee of a dual-title doctoral degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least one member of the African Studies graduate faculty. The chair of the committee is typically from the primary program. If the chair is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies should be appointed as co-chair.

### **Comprehensive Examination**

After completing all course work, doctoral candidates for the dual-title doctoral degree in the primary discipline and African Studies must pass a comprehensive examination that includes written and oral components. Written components are administered on a candidate's primary discipline and in African Studies. The African Studies representative on the student's doctoral committee develops questions for and participates in the evaluation of the comprehensive examination. The African Studies component of the exam is based on the student's thematic, national or regional area of interest and specialization in African Studies.

### **Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both the primary discipline and African Studies.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-013

Review Date: 06/12/2012

## Agricultural, Environmental, and Regional Economics (AEREC)

### [Program Home Page](#)

ANN R. TICKAMYER, Head of the Department of Agricultural Economics and Rural Sociology  
103 Armsby Building  
814-865-5461

### Degrees Conferred:

Ph.D., M.S.

The graduate program emphasizes economic theory and quantitative methods as applied to the food and agricultural system, natural resources and the environment, and regional economics and economic development.

### Graduate Option in Watershed Stewardship

M.S. students in this program may elect the Graduate Option in Watershed Stewardship. This option provides enhanced educational opportunities for students with an interest in water resources management. The Watershed Stewardship Option attracts students from several graduate programs and educates them to facilitate team-oriented, community-based watershed management planning directed at water resource problems. The Watershed Stewardship Option is coordinated with similar options in other graduate programs through the Center for Watershed Stewardship. The Graduate Option in Watershed Stewardship requires 18 credits of graduate course work when taken with the M.S. degree in Agricultural, Environmental and Regional Economics: 6 credits of breadth courses, 3 credits of environmental economics, 1 credit of Watershed Stewardship Seminar (AEREC 591), and 8 credits of Watershed Stewardship Practicum I and II (AEREC 570 and AEREC 571). Breadth courses consist of 3 credits of graduate course work from water resources science and 3 credits from either humanities or communications/design. For M.S. students, the 3 credits in environmental economics consist of Resource and Environmental Economics I (AEREC 519). In the watershed stewardship practicum courses, students work in multidisciplinary teams with community, government and business leaders to analyze and understand natural resource problems and creatively synthesize appropriate solutions in a written watershed management plan.

Lists of acceptable water resources science, humanities, and communication/design courses are maintained by the Center for Watershed Stewardship. Students may petition the Agricultural, Environmental and Regional Economics Graduate Program Committee and the Center for Watershed Stewardship to substitute higher level or equivalent courses to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other equivalent (400- or 500-level) degree requirements in the Agricultural, Environmental and Regional Economics graduate program with the concurrence of their adviser and the Agricultural, Environmental and Regional Economics Graduate Program Committee. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

### Admission Requirements

Scores from the Graduate Record examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students entering the master's program should have a total of 9 credits in agricultural economics and/or economics. Students entering the doctoral program should have successfully completed courses in intermediate micro- and macroeconomic theory, in differential and integral calculus and linear algebra, and in intermediate statistics. Students are permitted to enter the master's and doctoral programs with deficiencies but must pass courses to eliminate deficiencies as soon as possible.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Doctoral Degree Requirements

There is no foreign language requirement for the Ph.D. degree; rather, the student must satisfactorily complete courses in economic theory and quantitative methods.

### Other Relevant Information

Students in this program may elect the dual-title degree program option in Operations Research for the Ph.D. and M.S. degrees.

Students may qualify for admission to the dual-title degree program option in Demography consisting of interdisciplinary course work, with special emphasis on the economic, social, and geographic issues arising from the dynamics of population change.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [AGRICULTURAL ECONOMICS \(AG EC\) course list](#)

### Dual-Title Degree in Agricultural Economics (AEREC) and International Agriculture and Development (INTAD)

Graduate students with education and research interests in food and agribusiness economics, environmental and natural resource economics, and regional economic development may apply to the Agricultural, Environmental, and Regional Economics and INTAD Dual-Title Doctoral Degree Program. The goal of the program is to provide graduate students from AEREC with state-of-the-art training in economics and quantitative methods in the program areas described above, while also providing the perspective and methods needed for work in the international arena.

### AEREC Admission Requirements

For admission to the dual-title doctoral degree under this program, a student must first apply and be admitted to the AEREC graduate program. Once accepted into the program, the AEREC student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. The application includes a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title AEREC/INTAD degree. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

## Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Agricultural, Environmental and Regional Economics program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, determined by the student, their INTAD advisor, and their AEREC program advisor.

### Degree Requirements for AEREC/INTAD Dual Title M.S.

The Master's in AEREC and INTAD is a dual-title degree awarded to students who are admitted to the AEREC master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the AEREC degree, dual-title degree students must:

#### Courses

Complete a minimum of 12 INTAD course credits (400, 500, or 800 level) as follows:

9 credits from the core curriculum

- Program Design and Delivery (AEE 450, 3 credits)
- Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
- International Agricultural Development Seminar (INTAD 820, 3 credits)

3 credits of internship or applied courses/ independent studies with international development content

### Master's Thesis & Final Oral Examination

Write a master's thesis on a topic that reflects both the graduate program in agricultural, environmental and regional economics and the dual-title offering in INTAD.

The thesis committee for the dual-title master's degree will consist of two graduate faculty members from AEREC and one graduate faculty member from INTAD. All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Candidates for the dual-title master's degree in AEREC and INTAD will also be required to pass a masters' thesis defense covering the general field of Agricultural, Environmental and Regional Economics and elements of INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate major program requirements and those of the INTAD program. Final course selection is determined by the students in consultation with their INTAD advisors and their major program advisors. Students and advisors should maintain the INTAD Master's Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

### Degree Requirements for AEREC/INTAD Dual-Title Ph.D.

The doctoral degree in AEREC and INTAD is a dual-title degree awarded only to students who are admitted to the AEREC doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in AEREC and INTAD, in addition to the AEREC requirements, are as follows.

#### Courses

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

9 credits from the core curriculum, which includes:

- International Agricultural Development Seminar (INTAD 820, 3 credits)
- International Rural Social Change (R SOC 517, 3 credits)
- Human Dimensions of Natural Resources (R SOC 555, 3 credits)
- OR
- Sociology of Agriculture (R SOC 508, 3 credits)

9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Courses totaling a minimum of 18 credits must be taken at the 500-level or above; particular courses may satisfy both the AEREC requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisors and their major program advisors.

Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

### Candidacy

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student advisor in consultation with the INTAD program coordinators.

### Committee Composition

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

### Comprehensive Exam

Students in the Ph.D. program are required to pass a comprehensive examination. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the exam and the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive examination.

### Doctoral Thesis & Final Oral Examination

Ph.D. students enrolled in the dual-title degree program are required to write a Ph. D. dissertation on a topic that reflects their original research and education in both AEREC and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. Upon completion of the student's doctoral thesis, a final oral examination is scheduled.

The exam is administered by the student's doctoral committee and focuses on the student's thesis research. A public oral presentation of the dissertation is required.

#### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400-499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-004

Review Date: 06/21/2011

Last updated by Publications: 7/23/10

## Agronomy (AGRO)

[Program Home Page](#)

R. P. MARINI, *Head of the Department of Plant Science*  
102 Tyson Building  
814-865-2571

M. H. HALL, *Chair of the Graduate Program in Agronomy*  
414 Agricultural Sciences and Industries Building  
814-863-1019

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Douglas B. Beegle, Ph.D. (Penn State) Distinguished Professor of Agronomy
- Surinder Chopra, Ph.D. (Vrije U of Brussels) Associate Professor of Maize Genetics
- William S. Curran, Ph.D. (Illinois) Professor of Weed Science
- Marvin H. Hall, Ph.D. (Minnesota) Professor of Forage Management
- David R. Huff, Ph.D. (California, Davis) Associate Professor of Turfgrass Breeding and Genetics
- John Kaminski, Ph.D. (Maryland) Assistant Professor of Turfgrass Management
- Heather D. Karsten, Ph.D. (Cornell) Associate Professor of Crop Production/Ecology
- Armen Kemanian, Ph.D. (Washington) Assistant Professor of Production Systems and Modeling
- Peter J. Landschoot, Ph.D. (Rhode Island) Professor of Turfgrass Science
- Dawn Luthe, Ph.D. (Iowa State) Professor of Plant Stress Biology
- Jonathan Lynch, Ph.D. (California, Davis) Professor of Plant Nutrition and Agronomy
- Andrew S. McNitt, Ph.D. (Penn State) Professor of Soil Science
- David A. Mortensen, Ph.D. (North Carolina State) Professor of Weed Ecology/Biology
- Gregory W. Roth, Ph.D. (Penn State) Professor of Agronomy
- Maxim J. Schlossberg, Ph.D. (Georgia) Associate Professor of Turfgrass Nutrition and Soil Fertility
- Robert Howard Skinner, Ph.D. (Missouri) Adjunct Associate Professor of Agronomy

Agronomy graduate programs emphasize research that increases the efficiency of production of agronomic crops, improves the quality of food, feed, and fiber available for humans and animals, assists in the use and development of land resources, develops an understanding of the basic soil-plant-animal climate complex of which humans are a part, and improves the overall quality of the human environment. Within this framework, students may specialize in soil science, crop science, or soil and crop management, including turfgrass management. Areas of specialization in soil science include chemistry, fertility, genesis and morphology, microbiology, mineralogy, and physics. Crop science specialties include breeding and genetics, ecology and management, physiology, and weed science.

Research facilities include a 340-acre experimental farm with irrigation facilities, a 22-acre turfgrass research center, and 18-acre landscape management research center, greenhouses, service areas, and a number of well-equipped experimental laboratories. The department enjoys close collaboration with the USDA Pasture Systems and Watershed Management Research Laboratory, which adds substantial strength to the research and graduate education capabilities of the department.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission. At the discretion of the graduate standards committee, a student may be admitted provisionally for graduate study in the program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Prerequisites for major work in agronomy vary with the area of specialization and the degree sought, but courses in chemistry, mathematics, physics, geology, basic and applied biological sciences, and English communication skills are required. A baccalaureate degree in basic or applied natural sciences is preferred for M.S. degree applicants.

A minimum junior/senior grade-point average 3.00 (on a 4.00 scale) is required in all courses in the biological and physical sciences regardless of when taken. Exceptions to these requirements may be made for students with special backgrounds, abilities, and interests.

For admission to the Ph.D. program, an M.S. or equivalent degree with an emphasis on basic and applied natural sciences is preferred. Applicants for the Ph.D. program will be evaluated on the quality of work completed in all previous degree programs.

Students who lack some of the prerequisite courses may be admitted but are required to take these courses without degree credit. The best-qualified applicants will be accepted up to the number of spaces available for new students.

### Master's Degree Requirements

In addition to the general requirements for the M.S. degree as defined by the Graduate School, the department requires 6 credits of 400- or 500-level formal courses in a minor or general studies area. Participation in at least one Master's students are required to participate regularly in a departmental seminar and to register for at least 1 credit of the seminar during the M.S. program. Students must register for at least 1 credit of AGRO 602 Teaching Experience. An advisory committee will be appointed for each student, and additional courses and requirements may be determined by this advisory committee.

A thesis based on field and/or laboratory research is required for the M.S. degree.

M.S. candidates must pass a final examination.

### Doctoral Degree Requirements

Beyond the general requirements for the Ph.D. defined by the Graduate School, the department has a number of specific requirements regarding course level and distribution that are defined in the departmental publication "Graduate Degrees in Agronomy." While a minimum number of courses for the degree is not specified, the doctoral advisory committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of agronomy and to have a perspective of the general field. Normally, 55 to 60 credits in formal course work beyond the B.S. degree are required. Doctoral candidates are required to participate regularly in a departmental seminar and to register for at least 2 credits of the seminar during the Ph.D. program. A teaching experience, consisting of two separate semesters, is also required of all Ph.D. students.

The communication and foreign language requirement for the Ph.D. degree may be met either by demonstrating a knowledge of at least one foreign language or by completing at least 6 credits of course work in an area of English communications approved by the student's advisory committee.

### Other Relevant Information

Every student has a close professional relationship with his or her faculty adviser. While research that is done for the thesis will be on subjects that fall within the ongoing research program of the adviser, students are encouraged to propose research projects that are of interest to them. For the most part, all costs relative to the research program will be covered by the department. The department encourages professional development of students through participation in meetings of relevant professional societies and organizations.

### **Student Aid**

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[AGRONOMY \(AGRO\) course list](#) See also  
[Soil Science](#)

DATE LAST REVIEWED: 5/11/04

Last Revised by the Department: Summer Session 2008

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Review Date: 1/15/08

Faculty updated: 9/25/12



## American Studies (AMSTD)

### [Program Home Page](#)

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 Penn State Harrisburg  
 777 W. Harrisburg Pike  
 Middletown, PA 17057-4898  
 Phone: 717-948-6201  
 email: amstd@psu.edu

### Degrees Conferred:

M.A., Ph.D.

### The Graduate Faculty

- Michael L. Barton, Ph.D. (Pennsylvania) Professor of American Studies and Social Science
- Erin R. Battat, Ph.D. (Harvard) Assistant Professor of American Studies and Ethnic Studies
- Simon J. Bronner, Ph.D. (Indiana) Distinguished Professor of American Studies and Folklore
- Anthony B. Buccitelli, Ph.D. (Boston) Assistant Professor of American Studies and Communications
- John R. Haddad, Ph.D. (Texas) Associate Professor of American Studies and Literature
- Charles Kupfer, Ph.D. (Texas) Associate Professor of American Studies and History
- Anne A. Verplanck, Ph.D. (William and Mary) Associate Professor of American Studies and Heritage Studies
- David Witwer, Ph.D. (Brown) Associate Professor of American Studies and History

### The M.A. Degree Program

The M.A. degree program, offered at Penn State Harrisburg, emphasizes the study of American society and culture. It serves students who want to investigate the American experience and apply their studies in a variety of professions, including education, government, communications, and museums. It is the distinguishing characteristic of the program that the large majority of its course offerings are taught by faculty trained in the discipline of American Studies and these courses have the AM ST prefix for "American Studies." The program offers a number of concentrations including folklore, cultural history (politics, popular culture, media studies), international American Studies, material and visual culture (art, architecture, craft, landscape, food, clothing, medicine), public heritage (museums, historic preservation, archiving, cultural resource management), race and ethnicity, and regional studies.

The campus is located in a rich cultural region, which includes Amish Farmlands, Gettysburg, Hershey, Steelton, Ephrata, Carlisle, York, and Harrisburg. Additionally, proximity to the major cities of Philadelphia, Pittsburgh, Baltimore, Washington, D.C., and New York offer a host of research options for students. Strong ties with local educational and cultural institutions, including the Pennsylvania Historical and Museum Commission, State Museum of Pennsylvania, Landis Valley Museum, Hershey Museum, National Civil War Museum, and the Dauphin County Historical Society, Cumberland County Historical Society, and other public heritage resources provide excellent learning opportunities for students.

The M.A. degree can be earned by full- or part-time study. Most 500-level courses are offered in the evening as the program strives to meet students' needs.

### Admission Requirements

The M.A. degree program in American Studies accepts students from a wide array of disciplines--particularly art, history, English, sociology, and anthropology--but recommends educational preparation related to the interdisciplinary study of American culture. An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. All applicants must submit: a completed Graduate School online application form with the application fee; two official transcripts of all colleges and universities attended (minimum of 2.75 junior/senior grade-point average on a 4.00 scale); two letters of recommendation from individuals who can attest to the student's ability to handle graduate study; a statement of intent (approximately 500 to 1,000 words outlining their preparation for study, proposed fields of study, and career goals); and a sample of written work (seminar paper or equivalent research paper) as evidence of their American research and writing skills.

Students applying for scholarships and assistantships are requested to submit general examination scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application. The GRE is recommended, but not required, for admission.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 500 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Degree Requirements

The student is required to take a minimum of 30 credits in American Studies, including at least 18 credits in the 500 series; AM ST 500, 591, and AM ST 580 or 600 are required. AM ST 500 should be taken within the first two semesters of study; AM ST 591 should be taken in the last two semesters of study. Usually in the last semester of study, students are required to complete their program with a major paper by taking AM ST 580 (Project) or thesis, in which case AM ST 600 is taken. The choice of AM ST 580 to fulfill graduation requirements is for an original scholarly master's paper or project. One to 6 credits in AM ST 580 can be earned; the typical number of credits for the culminating project is 3. The choice of AM ST 600 is for a thesis and is taken for 6 credits. The thesis must follow the guidelines established by the Thesis Office of the Graduate School (see <http://www.gradsch.psu.edu/current/thesis.html>).

Advanced undergraduate courses (400-level) that have not counted toward a student's undergraduate degree may be considered for transfer into the graduate student's requirement of 30 credits of American Studies with permission of the program and approval of the Graduate School. At least 20 of the 30 credits must be earned at the Harrisburg location where the program is offered. Courses not having an American Studies designation but which are relevant to American Studies may be considered for inclusion in the student's requirement of 30 credits of American Studies with permission of the program.

### The Ph.D. Program

The Doctor of Philosophy Program in American Studies represents the study of the United States as an academic field with its own developed theories, methods, and applications. Taking advantage of its location in a capital region with internationally known heritage sites and American Studies resources such as the Gettysburg Battlefield, Three-Mile Island, Hershey, Steelton, Anthracite Coal Region, and Amish Country, it emphasizes critical cultural inquiry and the application of American Studies to public heritage, public policy, and cultural resource management--including governmental work, museums, cultural agencies, education, archives and records management, public policy, and communications. A foundation for this application is an understanding of the American experience developed within the intellectual legacy of American Studies.

Graduates of the program are typically oriented toward public practice as well as scholarship in American Studies--integrating perspectives on United States history, culture, and society. Students have opportunities for internships and field experiences outside the classroom. In addition to preparation for academic teaching and writing, the program is distinctively concerned among other doctoral departments of American Studies with the production of public scholars and leadership careers outside of academe. The program strives to cover America broadly in its national and international contexts, work with local resources and institutions, and to develop a focus on cultural expression and identity, including areas of material and visual culture; folk and popular culture; race,

ethnicity, and gender; and literature, performance, and media.

The program requires enrollment as a full-time student for at least two consecutive semesters--9 credits per semester (summer sessions not included). A doctoral student is required to complete the program, including defense and acceptance of the doctoral dissertation, within eight years after admission to candidacy.

### Admission Requirements

Applicants for the Doctor of Philosophy in American Studies must hold a master's degree in American Studies, or a related field emphasizing American cultural scholarship and public heritage work such as history, English, sociology, political science, folklore, cultural studies, performance studies, ethnic studies, gender studies, communications, art history, museum and library studies, education, and cultural resource management.

Students are required to submit the following:

- a completed Graduate School online application with the application fee;
- two transcripts of all undergraduate and graduate course work;
- scores from the Graduate Record Examination (GRE);
- three letters of reference attesting to both academic and professional capabilities. (At least two of these letters should be from academic sources, such as professors or academic advisers);
- a letter of 500 to 1000 words outlining significant scholarly and applied experience, career goals, commitment to American Studies as a field, and academic objectives;
- a recent personal curriculum vitae;
- a paper from a graduate course taken previously or publication demonstrating research and compositional skills.

Admission is highly competitive and the best-qualified students will be admitted subject to space availability and compatibility of the student with the program's research mission. Successful applicants with an M.A. typically have a GPA of 3.5 or above (on a 4.0 scale) in their graduate work.

### International Students

International applicants must hold the equivalent of an American master's degree. They must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 500 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Residency

Over some twelve-month period during the interval between admission to the Ph.D. program and completion of the Ph.D. program, the candidate must spend at least two semesters (summer sessions are not included) as a registered full-time student (9 credits per semester) engaged in academic work at Penn State Harrisburg.

### The Curriculum

Students progress through the following phases and take courses designated by their doctoral committee as part of their study for the Ph.D.

### Candidacy

In this initial phase, the student must (1) make up any deficiencies in graduate courses in American Studies noted in the letter of acceptance, and (2) complete with a grade of B or better the following courses--AM ST 500 (Theory and Method), two sections of AM ST 502 (Problems in American Studies) on different topics, AM ST 591 (Seminar), and (3) pass a candidacy examination. Admitted students who have met all course prerequisites begin the core courses with AM ST 500 (Theory and Method). Students who have already taken AM ST 500 within three years of admission may begin their program of study with AM ST 502 (Problems in American Studies).

The candidacy examination is administered by a special committee appointed by the director of the doctoral program. After the exam is passed, a student is advanced to doctoral candidacy. General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field of American Studies. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed. In most cases, the same individual (e.g., dissertation adviser) is a member of the Graduate Faculty in both the major and dual-title fields, and in such cases may serve as sole chair.

At least one regular member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the "Outside Field Member." In cases where the candidate is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser's primary appointment is held (i.e., the adviser's administrative home; in the case of tenure-line faculty, this is the individual's tenure home). This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student's dissertation adviser and also represent a field outside the student's major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

If the candidate has a minor, that field must be represented on the committee by a "Minor Field Member." The doctoral committee is appointed by the Graduate School dean through the Office of Graduate Enrollment Services, upon recommendation of the head of the major program, soon after the student is admitted to candidacy. The dean may on occasion appoint one or more members of the committee in addition to those recommended by the head of the program.

A person who is not a member of the Graduate Faculty (and may not be affiliated with Penn State) who is otherwise qualified and has particular expertise in the candidate's research area may be added as a "Special Member," upon recommendation by the head of the program and approval of the dean of the Graduate School (via the Office of Graduate Enrollment Services). A Special Member is expected to participate fully in the functions of the doctoral committee. If the Special Member is asked only to read and approve the doctoral dissertation, that person is designated a Special Signatory. Occasionally, Special Signatories may be drawn from within the Penn State faculty in particular situations.

Graduate Faculty officially appointed by the Graduate School to a doctoral committee who then leave Penn State may maintain that committee appointment for up to one year if the student's graduate program and the Graduate School dean, through the Office of Graduate Enrollment Services, approve the request for this exception. A retired or emeritus faculty member may serve as a doctoral committee chair if, and only if, he/she was officially appointed and began chairing the committee prior to retirement and has the continuing approval of the program head and the Graduate School dean, through the Office of Graduate Enrollment Services. Otherwise, the committee must be revised to either remove the faculty member from the committee or change the individual's appointment to a Special Member.

The membership of doctoral committees should be periodically reviewed by the head of the program to ensure that all members continue to qualify for service on the committee in their designated roles. For example, if type of appointments, employment at the University, etc., have changed since initial appointment to the committee, changes to the committee membership may be necessary. If changes are warranted, they should be made as soon as possible to prevent future problems that may delay academic progress for the student (e.g., ability to conduct the comprehensive or final examinations).

The graduate program head must also periodically review the Graduate Faculty listing for his/her program on both the [Graduate School's website](#) and the graduate program's listing in the *Graduate Bulletin* to ensure that those listings are accurate.

The chair or at least one co-chair must be a member of the graduate faculty of the specific doctoral program in which the candidate is enrolled. A retired or emeritus faculty member may chair a doctoral committee if he/she was officially appointed and began chairing the committee prior to retirement and has the continuing approval of the head of the graduate program. The primary duties of the chair are to: (1) maintain the academic standards of the doctoral program and the Graduate School and assure that all procedures are carried out fairly, (2) ensure that the comprehensive and final examinations are conducted in a timely fashion, (3) arrange and conduct all meetings, and (4) ensure that requirements set forth by the committee are implemented in the final version of the dissertation.

The doctoral committee is responsible for approving the broad outline of the student's program and should review the program as soon as possible after the student's admission to candidacy. Moreover, continuing communication among the student, the committee chair, the research supervisor, and the members of the committee is strongly recommended, to preclude misunderstandings and to develop a collegial relation between the candidate and the committee.

### The Comprehensive Examination

Students must be registered as a full-time or part-time degree student for the semester (excluding summer session) in which the comprehensive examination is taken. The timing of the examination is after coursework in subfields is completed. The written examination consists of three parts and is administered by the student's doctoral committee. One is in the area of Theory and Method and an additional two subfields of study from a list of five areas covered in the program. The five subfields of specialization are:

1. Public Heritage, Cultural Resource Management, and Museum Studies;
2. Folk and Popular Culture (material and visual culture, literature and media, language, performance, media, and music);
3. Interdisciplinary History and Politics (history of ideas, philosophy, and politics; biography and oral history; everyday life and socioeconomic studies; government, public policy, and diplomacy);
4. Society and Ethnography (race, ethnicity, class, gender, age; religion and belief; comparative culture and transnationalism);
5. Regional, Environmental, Urban, and Local Studies.

Additional subfields of study within American Studies may be selected with the approval of the student's doctoral committee. An oral defense of the comprehensive examination is scheduled after the written examination, at which time it is customary for the candidate to present the dissertation proposal.

Although the exact number of courses required in each subfield may vary among students, typically four per subfield are required. Doctoral committees meet with students at least once each academic year. Written and oral comprehensive examinations in the three areas are given at the end of the study period.

### The Dissertation

Under guidance from the doctoral committee, the candidate prepares a detailed research proposal that serves as the basis for the written dissertation covering an aspect of American Studies. The dissertation should represent a significant contribution to knowledge, show familiarity with the intellectual heritage of American Studies, be presented in a scholarly manner, reveal an ability on the part of the candidate to do independent research of high quality, and indicate considerable experience in using a variety of research techniques and forms of primary evidence. The contents and conclusions of the dissertation must be defended at the time of the final oral examination. Once the research proposal is approved, the student can enroll in AM ST 600 (Thesis in American Studies) for on-campus work or AM ST 610 (Thesis Research Off-Campus). The writing and defense of this original contribution to the theory and practice of American Studies is the capstone to the Ph.D. program. A student must be registered continuously for each Fall and Spring semester, beginning with the first semester after the comprehensive examination requirement and residency requirement have been met, until the dissertation is accepted and approved by the dissertation committee. To maintain continuous registration, candidates may register for noncredit AM ST 601 (Ph.D. Dissertation Full-Time) or 611 (Ph.D. Dissertation Part-Time), with payment of the special dissertation preparation fee; students who want to combine course work with dissertation preparation must register for AM ST 600 or 611 (not 601 which is for full-time dissertation preparation) plus course registration at the regular per-credit fee. For more information on academic procedures, see [http://bulletins.psu.edu/bulletins/whitebook/academic\\_procedures.cfm](http://bulletins.psu.edu/bulletins/whitebook/academic_procedures.cfm)

The final examination of the doctoral candidate is an oral examination (defense) administered and evaluated by the entire doctoral committee. This oral defense is open to the public and related in large part to the dissertation, but it may cover the candidate's whole program of study. The Committee may restrict part of the defense to its members and the candidate. The candidate must be registered as a full-time or part-time degree student for the semester in which the oral defense is held.

### Grade-Point Average and Time Limit

A minimum grade-point average of 3.0 (on a 4.0 scale) for work done in the American Studies doctoral program at the University is required for doctoral candidacy, for admission to the comprehensive examination, the final oral examination, and for graduation.

A doctoral student is required to complete the program, including acceptance of the doctoral dissertation, within eight years from the date of successful completion of the candidacy examination. Extensions may be granted by the Director of Graduate Enrollment Services in appropriate circumstances.

### Financial Aid

A limited number of scholarships, loans, and grants are available from the University. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find available options from the University, contact the Financial Aid Office at 717-948-6307. For more information, see [php.scripts.psu.edu/dept/iit/hbg/academics/gradaid.php](http://php.scripts.psu.edu/dept/iit/hbg/academics/gradaid.php)

### Graduate School Funding Programs

Full-time incoming doctoral students starting in the fall semester with a record of scholarly excellence may qualify for a University Graduate Fellowship, Buntun-Waller Graduate Scholar Awards, and other programs. Interested students should contact the program chair, who is responsible for nominating students. For more information, see [www.gradsch.psu.edu/prospective/funding/programs.html](http://www.gradsch.psu.edu/prospective/funding/programs.html)

### Capital College Funding Programs

Full-time incoming graduate students may qualify for a Capital College Assistantship and other programs. Students must be nominated for an assistantship by the program chair. For more information, see [php.scripts.psu.edu/dept/iit/hbg/academics/gradaid.php](http://php.scripts.psu.edu/dept/iit/hbg/academics/gradaid.php)

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [AMERICAN STUDIES \(AM ST\) course list](#)

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-05-160

Review Date: 02/19/2013

Date last updated by Publications: 05/23/11

## Animal Science (AN SC)

[Program Home Page](#)

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Daniel R. Hagen, *Graduate Officer*  
[drh@psu.edu](mailto:drh@psu.edu)

324 Henning Building  
 814-863-3665

### Degrees Conferred:

Ph.D., M.S., M.P.S.

### The Graduate Faculty

- Paul A. Bartell, Ph.D. (Virginia) Assistant Professor of Avian Biology
- Craig R. Baumrucker, Ph.D. (Purdue) Professor of Animal Nutrition/Physiology
- John W. Comerford, Ph.D. (Georgia) Associate Professor of Dairy and Animal Science
- Chad Dechow, Ph.D. (Tennessee) Associate Professor of Dairy Genetics
- Francisco J. Diaz, Ph.D. (Wisconsin-Madison) Assistant Professor of Reproductive Biology
- Robert G. Elkin, Ph.D. (Purdue) Professor of Poultry Nutritional Biochemistry
- Terry D. Etherton, Ph.D. (Minnesota) Distinguished Professor of Animal Nutrition
- Daniel R. Hagen, Ph.D. (Illinois) Professor of Animal Science
- Harold W. Harpster, Ph.D. (Michigan State) Professor of Animal Nutrition
- Kevin J. Harvatine, Ph.D. (Cornell) Assistant Professor of Nutritional Physiology
- Arlyn J. Heinrichs, Ph.D. (Ohio State) Professor of Dairy and Animal Science
- Lisa A. Holden, Ph.D. (Penn State) Associate Professor of Dairy and Animal Science
- R. Michael Hulet, Ph.D. (Texas A&M) Associate Professor of Poultry Science
- Kenneth B. Kephart, Ph.D. (Penn State) Professor of Animal Science
- Daniel M. Kniffen, Ph.D. (West Virginia) Assistant Professor of Dairy and Animal Science
- Wansheng Liu, Ph.D. (Northwestern A&F) Associate Professor of Genomics
- Edward W. Mills, Ph.D. (Purdue) Associate Professor of Dairy and Animal Science
- Jon M. Oatley, Ph.D. (Washington State) Assistant Professor of Reproductive Physiology
- Troy Ott, Ph.D., PAS (Florida) Associate Professor of Reproductive Physiology
- Joy L. Pate, Ph.D. (New Hampshire) Professor of Reproductive Physiology; C. Lee Rumberger and Family Chair in Agricultural Sciences
- Paul H. Patterson, Ph.D. (Wisconsin) Associate Professor of Poultry Science
- Ramesh Ramachandran, Ph.D. (Maryland) Assistant Professor of Avian Biology
- Cooduvalli S. Shashikant, Ph.D. (Osmania) Associate Professor of Molecular and Developmental Biology
- W. Burton Stanier, Ph.D. (Virginia Tech) Assistant Professor of Equine Science
- Ann W. Swinker, Ph.D. (West Virginia) Associate Professor of Equine Science
- Gabriella A. Varga, Ph.D. (Maryland) University Distinguished Professor of Animal Science
- Regina Vasilatos-Younken, Ph.D. (Penn State) Professor of Poultry Science

Students may specialize in animal care and management, breeding and genetics, growth and development, lactational biology, nutrition, or reproductive biology. Well-equipped research laboratories and various agricultural animals, as well as small-animal models and wildlife species, are available.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Prerequisite to graduate work is the completion of an undergraduate major in animal science, dairy science, poultry science, or a related biological science.

Scores from the Graduate Record Examinations (GRE) are required for admission (average percentile at least 50 percent in verbal, quantitative, and analytical components). The quantitative reasoning component is recommended, but the program will accept scores from the mathematical reasoning component. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission on a competitive basis.

Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

### Degree Requirements

The M.P.S. is a professional program designed to prepare individuals for specialist and management positions in county agricultural extension, government, or industry and does not require a thesis. The academic M.S. and Ph.D. programs require a thesis and are designed for those primarily interested in education and research. The requirements of these programs are detailed in the departmental publication "Graduate Student Handbook in Animal Science." The communication or foreign language requirement for the Ph.D. degree may be satisfied by competence in either one foreign language or communication skills.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ANIMAL SCIENCE \(AN SC\) course list](#)

Last Revised by the Department: Summer Session 2008

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Updated by Publications: 12/20/11

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## Anatomy (ANAT)

### [Program Home Page](#)

PATRICIA J. McLAUGHLIN, Director, Anatomy Graduate Program  
College of Medicine  
Penn State Milton S. Hershey Medical Center  
Hershey, PA 17033  
717-531-6414

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- David A. Antonetti, Ph.D. (Penn State) Associate Professor of Cellular and Molecular Physiology
- Alistair J. Barber, Ph.D. Assistant Professor of Ophthalmology
- Colin J. Barnstable, D.Phil., Professor and Chair of Neural and Behavioral Sciences
- Cheston M. Berlin, M.D. (Harvard) Professor of Pediatrics
- James R. Connor, Ph.D. (California, Berkeley) Professor and Vice Chair of Neurosurgery
- Henry J. Donahue, Ph.D., (California, Santa Barbara), Professor of Orthopaedics and Rehabilitation, and Vice Chair of Basic Science Research
- H. Paul Ehrlich, Ph.D. Professor of Surgery
- Loren A. Evey, Ph.D. Assistant Professor of Neural and Behavioral Sciences
- Ronald R. Gomes Jr., Ph.D., Assistant Professor of Orthopaedics and Rehabilitation
- Andras Hajnal, M.D., Ph.D. (Pécs University Medical School) Professor of Neural and Behavioral Sciences
- Xuemei Huang, M.D. (Beijing Medical University) Associate Professor of Neurology
- Charles H. Lang, Ph.D., (Hahnemann) Professor and Vice Chair of Cell and Molecular Physiology
- Alphonse E. Leure-duPree, Ph.D. (London) Professor of Neural and Behavioral Sciences
- David X. Liu, Ph.D. (CUNY) Assistant Professor of Neural and Behavioral Sciences
- Patricia McLaughlin, D.Ed. (Penn State) Professor of Neural and Behavioral Sciences
- Christopher Niyibizi, Ph.D. (McGill, Montreal) Associate Professor of Orthopaedics and Rehabilitation
- Ann Ouyang, M.D. (Guy's Hospital Medical School, London) Professor of Medicine
- David S. Phelps, Ph.D. (Temple) Professor of Pediatrics
- Joseph W. Sassani, M.D. (Thomas Jefferson) Professor of Ophthalmology
- Joyce Tombran-Tink, Ph.D., Professor of Neural and Behavioral Sciences
- Thomas C. Vary, Ph.D. (Penn State) Distinguished Professor of Cell and Molecular Physiology
- Ian S. Zagon, Ph.D. (Colorado) Distinguished Professor of Neural and Behavioral Sciences
- Shaomin Zhang, M.D., Ph.D. (Tokyo) Assistant Professor of Neural and Behavioral Sciences

The graduate program emphasizes the general areas of gross anatomy, history, histology/cytology, neuroanatomy/neurophysiology, or appropriate combinations of these areas. Approaches offered include morphological (descriptive, comparative, developmental), functional (physiological, chemical), and experimental.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

A bachelor's degree reflecting a reasonable background in zoology, biology, mathematics, or chemistry is required. Students with a 3.00 junior/senior average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Applicants must provide complete transcripts and three letters of recommendation. A personal interview is desirable.

### Doctoral Degree Requirements

Students must earn a total of at least 35 didactic credits; there are ten required courses, including ANAT 503, ANAT 505, ANAT 506, ANAT 512, ANAT 590, ANAT 602, BMS 501, BMS 502, HES 515 (or equivalent course), IBIOS 591, NEURO 511, and NEURO 530 plus an additional 6 credits in elective courses. Course work must be completed with an overall grade-point average of 3.0 or better. A grade of B(-) or better is required in ANAT 503, ANAT 505, ANAT 506, ANAT 512, and NEURO 511. Each student also must serve as a teaching assistant in SBMP 715 for one semester. In addition, a student must satisfactorily complete the following: (a) candidacy examination, (b) comprehensive examination, and (c) written and oral defense of thesis. Students must demonstrate competency in the English language. Attendance and participation in college-wide seminars, colloquium, and/or journal clubs is highly recommended.

### Other Relevant Information

This program is offered only through the College of Medicine at the Penn State Milton S. Hershey Medical Center.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [ANATOMY \(ANAT\) course list](#)

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-425

Review Date: 6/12/07

Faculty updates: 10/15/12

## Anthropology (ANTH)

[Program Home Page](#)

GEORGE R. MILNER, *Head*  
 Department of Anthropology  
 409 Carpenter Building  
 814-865-2509  
 814-863-1474 (fax)  
[anthropology@psu.edu](mailto:anthropology@psu.edu)

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- Stephen J. Beckerman, Ph.D. (New Mexico) Associate Professor of Anthropology
- Anne Buchanan, Ph.D. (Texas) Research Associate for Biological Anthropology
- Nathan Craig, Ph.D. (California, Santa Barbara) Assistant Professor of Anthropology
- E. Paul Durrenberger, Ph.D. (Illinois, Urbana-Champaign) Professor of Anthropology
- Kenneth G. Hirth, Ph.D. (Wisconsin-Milwaukee) Professor of Archaeological Anthropology
- Carrie Hritz, Ph.D. (Chicago) Assistant Professor of Anthropology
- Nina G. Jablonski, Ph.D. (Washington) Distinguished Professor of Anthropology
- Patricia L. Johnson, Ph.D. (Michigan) Associate Professor of Anthropology, Demography, and Women's Studies
- Jeffrey A. Kurland, Ph.D. (Harvard) Associate Professor Emeritus of Anthropology and Human Development
- Stephen A. Matthews, Ph.D. (U Wales, College of Cardiff) Associate Professor of Sociology and Anthropology
- Joseph W. Michels, Ph.D. (California, Los Angeles) Professor Emeritus of Anthropology
- George R. Milner, Ph.D. (Northwestern) Professor of Anthropology; Head of the Department of Anthropology
- Warren T. Morrill, Ph.D. (Chicago) Professor Emeritus of Anthropology
- Lee A. Newsom, Ph.D. (Florida) Associate Professor of Anthropology
- George Perry, Ph.D. (Arizona State) Assistant Professor of Anthropology
- David Puts, Ph.D. (Pittsburgh) Assistant Professor of Anthropology
- Joan T. Richtsmeier, Ph.D. (Northwestern) Professor of Biological Anthropology
- Timothy M. Ryan, Ph.D. (Texas, Austin) Assistant Professor of Anthropology, Geosciences, and Information Sciences and Technology
- Pat Shipman, Ph.D. (NYU) Adjunct Professor of Anthropology
- Mark D. Shriver, Ph.D. (Texas) Associate Professor of Anthropology
- Dean R. Snow, Ph.D. (Oregon) Professor of Anthropology
- Alan Walker, Ph.D. (U London) Evan Pugh Professor of Anthropology and Biology
- David L. Webster, Ph.D. (Minnesota) Professor of Anthropology
- Kenneth M. Weiss, Ph.D. (Michigan) Evan Pugh Professor of Anthropology
- James W. Wood, Ph.D. (Michigan) Professor of Anthropology and Demography

The master's program is designed to train students in general anthropology. The doctoral program is structured to train students in the following areas of specialization: ethnology (with subspecialization in social anthropology, demographic anthropology, cultural evolution, and ecology); archaeology (with subspecialization in cultural ecology, analytical approaches, technological methods, and culture areas); biological anthropology (with subspecialization in human adaptability, genetics, biological demography, human evolution, and the behavioral biology of human and non-human primates).

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Undergraduate preparation must include 12 credits in anthropology and archaeology or their equivalent. A student with an excellent record but who does not meet these requirements may be admitted provided course deficiencies are made up without graduate credit. Students with a 3.00 or higher junior/senior average (on a 4.00 scale) and with appropriate course backgrounds who have research interests directly related to the special anthropological competencies within the department will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

M.A. candidates may submit either a thesis or a term paper. If the latter is chosen, 6 credits in 500-level courses in the major field must be scheduled in lieu of thesis credits. The M.A. degree may be bypassed by exceptional candidates for the Ph.D. degree.

### Doctoral Degree Requirements

The communication and foreign language requirement for the Ph.D. degree includes a reading knowledge of a foreign language plus an option from among additional foreign languages, field languages, linguistics, or statistics.

### Dual-Title Ph.D. in Anthropology and Bioethics

#### Degree Requirements

Anthropology Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. To qualify for the dual-title degree, students must satisfy the requirements of the Anthropology Ph.D. program. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their Anthropology advisor and their Bioethics program advisor.

#### Additional Course Work

The dual-title Ph.D. in Anthropology and Bioethics requires eighteen credits of course work, as follows:

- Seven required credits (BIOET 501, BIOET 502, and BIOET 590), plus at least three additional BIOET credits at the 500 level.
- Eight additional credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level. The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee.

#### Candidacy

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by Anthropology. During the candidacy process, the student will also be assessed for candidacy to the Bioethics program, and at least one member of the candidacy committee must come from the Bioethics program.

#### Comprehensive Exam

At least one member of the doctoral committee will be a faculty member affiliated with the Bioethics Program. The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

**Dissertation and dissertation defense**

A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

**Student Aid**

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following award typically has been available to post-comprehensive graduate students in this program:

**HILL FELLOWSHIPS FOR STUDY IN ANTHROPOLOGY**

Details available from Professor Nina G. Jablonski, Department of Anthropology, 409 Carpenter Building, University Park campus.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ANTHROPOLOGY \(ANTH\) course list](#)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-006

Review Date: 06/21/2011

Faculty updated: 4/2/12

## Applied Linguistics (APLNG)

[Program Home Page](#)

JOAN KELLY HALL, *Department Head*  
Linguistics and Applied Language Studies  
305 Sparks Building  
814-865-7365

### Degree Conferred:

Ph.D.  
Dual-Title Ph.D. Degree in Applied Linguistics and Asian Studies

### The Graduate Faculty

- Gabriela Appel-Lantolf, Ph.D. (Delaware) Senior Lecturer in German and Applied Linguistics
- Suresh Canagarajah, Ph.D. (Texas, Austin) Edwin Erle Sparks Professor of Applied Linguistics, English, and Asian Studies
- Joan Kelly Hall, Ph.D. (SUNY Albany) Professor of Applied Linguistics
- Karen E. Johnson, Ph.D. (Syracuse) Kirby Professor in Language Learning and Applied Linguistics
- Professor of Applied Linguistics
- Celeste Kinginger, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Applied Linguistics
- James Lantolf, Ph.D. (Penn State) Greer Professor of Language Acquisition and Applied Linguistics
- Xiaofei Lu, Ph.D. (Ohio State) Assistant Professor of Applied Linguistics
- Sinfree Makoni, Ph.D. (Edinburgh, Scotland) Associate Professor of Applied Linguistics and African Studies
- Mark A. Ouellette, Ph.D. (Pennsylvania) Senior Lecturer in Applied Linguistics
- Sandra J. Savignon, Ph.D. (Illinois, Urbana-Champaign) Professor of Applied Linguistics
- Robert Schrauf, Ph.D. (Case Western) Associate Professor of Applied Linguistics
- Susan Strauss, Ph.D. (California, Los Angeles) Associate Professor of Applied Linguistics
- Steve Thorne, Ph.D. (California, Berkeley) Assistant Professor of Applied Linguistics

The Ph.D. in Applied Linguistics helps prepare scholars who will conduct systematic examinations of individual and societal multilingualism in order to build and test theories of how linguistic systems develop, are acquired, used, and taught in global contexts. The Ph.D. degree program includes the foundational theory and research of linguistics, applied linguistics, second language acquisition, psycholinguistics, and sociolinguistics. It will prepare doctoral candidates to utilize a range of research perspectives, both qualitative and quantitative, e.g., sociocultural, historical, linguistic, stylistic, discourse analytical. Overall, the purpose of the research undertaken in graduate study in Applied Linguistics will be to illuminate, in all its complexity, the multiple dimensions of the study of language as a mode of social existence, communication, and cognition.

### Admission Requirements

Applicants are required to submit transcripts of all previous course work from institutions of higher learning. In addition, scores from the Graduate Record Examinations (GRE) are required for applicants who have received a degree from an institution of higher education in the United States or abroad in which the medium of instruction is English. GRE scores are optional for applicants who have received a degree from an institution of higher education in which the medium of instruction is a language other than English. All applicants are required to submit three letters of reference (at least two from faculty with whom the applicant has studied) evaluating aptitude for doctoral study. Applicants must submit at least one sample of scholarly writing (published or unpublished research paper, thesis, etc.) and an academic statement describing their teaching and research experience and their specific professional goals and interests.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 600 for the paper-based test, 250 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. In addition, international applicants are encouraged to submit a cassette tape recording on which they describe their career goals and the reasons for wanting to pursue doctoral studies at Penn State.

### Candidacy Evaluation

In the third semester (a minimum of 18 credits) of graduate study, all candidates must satisfactorily complete a candidacy evaluation in which they are required to present a portfolio of work completed in their program of study. The portfolio will include a transcript of the candidate's academic record, a program plan, samples of scholarly work in Applied Linguistics and related areas, and a brief description of the proposed dissertation research, showing relevant course work completed and projected. Following submission of this portfolio, the candidate will meet with the members of his/her doctoral committee for an oral candidacy evaluation. The purpose of this evaluation is threefold: (a) to determine whether the candidate has achieved a level of learning and understanding sufficient to justify acceptance as a doctoral candidate, (b) to discover what further study is required to bring the candidate to the competence required for the research being proposed, and (c) to secure approval of a program of course work and independent study to achieve the requisite competence. The particulars of each candidate's program of study and research are defined on the basis of the candidacy evaluation.

### English Language Competence

During course work prior to the candidacy examination, candidates will be assessed for communicative competence in reading, writing, and speaking English. Should a higher level of competence be required, the candidate will be directed to the appropriate resources. International candidates will be advised that the passage of the minimal TOEFL requirement does not demonstrate the level of competence required for completion of the Ph.D. program.

### English Language Competence

During course work prior to the candidacy examination, candidates will be assessed for communicative competence in reading, writing, and speaking English. Should a higher level of competence be required, the candidate will be directed to the appropriate resources. International candidates will be advised that the passage of the minimal TOEFL requirement does not demonstrate the level of competence required for completion of the Ph.D. program.

### Additional Language Competence

All candidates must demonstrate competence in reading relevant research literature in one language other than English and intermediate speaking competence in an additional language. The additional language competence requirements may be demonstrated in a variety of ways.

### Committee Composition

The doctoral committee will consist of four or more active members of the Graduate Faculty and must include at least two faculty in the major field. One member of the doctoral committee must be from outside of the candidate's field of study. Members of the Graduate Faculty with courtesy appointments in LALS who are members of the Applied Linguistics Graduate Faculty may serve as the chair of the doctoral committee with approval of the Director of LALS.

### Comprehensive Examination

All doctoral candidates must pass a comprehensive examination designed to assess mastery of and ability to synthesize and integrate theoretical issues in Applied Linguistics. This examination is taken upon completion of all course work and the fulfillment of all degree requirements. The content and format of the comprehensive exam will be established by the members of the candidate's doctoral committee in accordance with degree requirements of LALS and consist of two course papers that are of publishable quality and two or three research papers based on questions developed by members of the doctoral



committee. The original papers must be submitted by end of semester prior to that in which the student plans to take the comprehensive exam. The student will be given two months' time in which to complete and submit these exam papers. Within three weeks of submission of the exam papers, the student will take an oral exam based on the original research papers and the exam papers. Candidates who fail the examination on the first attempt may repeat it once. Candidates who fail the examination the second time will not be permitted to continue in the program.

### Dissertation

Each doctoral candidate is required to conduct an original and independent research project representing a significant contribution to knowledge in the field of study. The project should be presented in a scholarly manner, show an ability on the part of the candidate to do independent research of high quality, and demonstrate considerable experience in using appropriate research techniques. The content and conclusions of the dissertation will be defended at the time of the final oral examination. A written dissertation proposal is required and must be approved at a proposal hearing by a majority vote of the candidate's dissertation committee. A majority vote is also required for approval of the completed written dissertation at the final oral defense.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Dual-Title Graduate Degree in Applied Linguistics and Asian Studies

Graduate students with research and educational interests in international education may apply to the Applied Linguistics/Asian Studies Degree Program. The goal of the dual-title degree Applied Linguistics and Asian Studies is to enable graduate students from Applied Linguistics to acquire the knowledge and skills of their major area of specialization in Applied Linguistics while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent linguists who are experts in Asian Studies as well. The dual-title degree in Applied Linguistics and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see <http://asian.la.psu.edu/graduate.shtml>).

### Admission Requirements

For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to the Applied Linguistics graduate program. Once accepted into the Applied Linguistics program, the student can apply to the Admissions Committee of the Asian Studies. The Asian Studies Admissions Committee reviews applications and recommends students for admission to the Asian Studies program to the Graduate School. Students already in their first and second years of the Applied Linguistics graduate program may also apply to the dual-title program.

Applicants are required to submit transcripts of all previous course work from institutions of higher learning. In addition, scores from the Graduate Record Examinations (GRE) are required for applicants who have received a degree from an institution of higher education in the United States or abroad in which the medium of instruction is English. GRE scores are optional for applicants who have received a degree from an institution of higher education in which the medium of instruction is a language other than English.

There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and Applied Linguistics, though applicants interested in the program should also make their interest in the dual-degree program known clearly on their applications and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

General Graduate School requirements are stated in the [GENERAL INFORMATION](#) section of the Graduate Bulletin.

### Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the Applied Linguistics program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies advisor, and their Applied Linguistics program advisor.

Upon a student's acceptance by the Asian Studies Admissions Committee, the student will be assigned an Asian Studies academic advisor in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their advisor. The student and advisor will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Applied Linguistics department and the Asian Studies program.

### Requirements for the Applied Linguistics/Asian Studies Ph.D.

The doctoral degree in Applied Linguistics and Asian Studies is awarded only to students who are admitted to the Applied Linguistics doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Applied Linguistics and Asian Studies are as follows:

60 credits beyond the master's degree, INCLUDING

- 1 credit of APLNG 580
- 6 credits in foundations courses, which may include but need not be limited to the following: APLNG 591, APLNG 597 (Special Topics)
- 6 credits in research methods, which may include but need not be limited to the following: APLNG 593, APLNG 597 (Language Analysis), APLNG 581, APLNG 586.
- 6 credits in Applied Linguistics electives, to be selected in consultation with the applied linguistics advisor
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Applied Linguistics, as approved by the student's doctoral advisor and the Asian Studies Program director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Applied Linguistics.
- All-skills proficiency in one Asian language AND intermediate speaking competence in an additional language other than English

Particular courses may satisfy both the Applied Linguistics requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisors and their major program advisors.

[APPLIED LINGUISTICS \(APLNG\) course list](#)

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-089

Review Date: 01/12/2010

Date last updated by Publications: 5/23/11

## Statistics (STAT)

[Program Home Page](#)

BRUCE G. LINDSAY, *Head of the Department*  
326 Thomas Building  
814-865-1348

### Degrees Conferred:

- [M.A.S.](#)
- [M.S., M.A.](#)
- [Ph.D.](#)
- [Integrated B.S. in Statistics and Master of Applied Statistics \(M.A.S.\)](#)

### The Graduate Faculty

- Michael G. Akritas, Ph.D. (Wisconsin) Professor of Statistics
- Naomi S. Altman, Ph.D. (Stanford) Associate Professor of Statistics
- Charles E. Antle, Ph.D. (Oklahoma State) Professor Emeritus of Statistics
- Steven F. Arnold, Ph.D. (Stanford) Professor of Statistics
- Gutti Jogesh Babu, Ph.D. (ISI-Calcutta, India) Professor of Statistics
- Jesse L. Barlow, Ph.D. (Northwestern) Professor of Computer Science and Engineering, and Statistics
- Ottar N. Bjørnstad, Ph.D. (Oslo, Norway) Professor of Biology, Entomology, and Statistics
- Marilyn T. Boswell, Ph.D. (California, Riverside) Associate Professor Emeritus of Statistics
- Francesca Chiaromonte, Ph.D. (Minnesota) Associate Professor of Statistics and Public Health Sciences
- Vernon M. Chinchilli, Ph.D. (North Carolina) Distinguished Professor of Biostatistics and Statistics
- Mosuk Chow, Ph.D. (Cornell) Associate Professor of Statistics; Senior Research Associate
- Linda M. Collins, Ph.D. (USC) Professor of Human Development and Family Studies, and Statistics
- Enrique del Castillo, Ph.D. (Arizona State) Associate Professor of Industrial Engineering and Statistics
- Manfred Denker, Ph.D. (Nürnberg) Professor of Statistics and Mathematics
- Duncan Fong, Ph.D. (Purdue) Professor of Marketing and Statistics
- John Fricks, Ph.D. (North Carolina) Assistant Professor of Statistics
- Debashis Ghosh, Ph.D. (Washington) Associate Professor of Statistics and Public Health Sciences
- Murali Haran, Ph.D. (Minnesota) Assistant Professor of Statistics
- William L. Harkness, Ph.D. (Michigan State) Professor Emeritus of Statistics
- Thomas P. Hettmansperger, Ph.D. (Iowa) Professor Emeritus of Statistics
- Robert A. Hultquist, Ph.D. (Oklahoma State) Professor Emeritus of Statistics
- David R. Hunter, Ph.D. (Michigan) Associate Professor of Statistics
- Bing Li, Ph.D. (Chicago) Professor of Statistics
- Jia Li, Ph.D. (Stanford) Associate Professor of Statistics and Computer Science and Engineering
- Runze Li, Ph.D. (North Carolina) Professor of Statistics
- John C. Liechty, Ph.D. (Cambridge) Associate Professor of Marketing and Statistics
- Dennis K. J. Lin, Ph.D. (Wisconsin) University Distinguished Professor of Statistics and Supply Chain Management
- Bruce G. Lindsay, Ph.D. (Washington) Willaman Professor of Statistics
- David T. Mauer, Ph.D. (Michigan) Associate Professor of Public Health Sciences and Statistics
- Ganapati P. Patil, Ph.D., D.Sc. (Michigan) Distinguished Professor Emeritus of Mathematical Statistics
- Calyampudi R. Rao, Sc.D. (Cambridge) Eberly Professor Emeritus of Statistics
- Donald St. P. Richards, Ph.D. (UWI) Professor of Statistics
- James L. Rosenberger, Ph.D. (Cornell) Professor of Statistics
- Thomas A. Ryan, Jr., Ph.D. (Cornell) Associate Professor Emeritus of Statistics
- Joseph L. Schafer, Ph.D. (Harvard) Associate Professor of Statistics
- Michele L. Shaffer, Ph.D. (Penn State) Associate Professor of Public Health Sciences and Statistics
- Damla Sentürk, Ph.D. (California, Davis) Assistant Professor of Statistics
- Durland L. Shumway, Ph.D. (Penn State) Assistant Professor of Statistics; Research Associate
- Laura B. Simon, Ph.D. (Penn State) Lecturer in Statistics
- Aleksandra B. Slavkovic, Ph.D. (Carnegie Mellon) Assistant Professor of Statistics
- Linda C. Strauss, Ph.D. (Penn State) Assistant Professor of Statistics; Research Associate
- Arkady A. Tempelman, D.Sc. (Vilnius, Lithuania) Professor of Statistics and Mathematics
- Rongling Wu, Ph.D. (U of Washington) Professor of Public Health Sciences and Statistics
- Fuqing Zhang, Ph.D. (North Carolina State) Professor of Meteorology and Statistics
- Yu Zhang, Ph.D. (Southern California) Assistant Professor of Statistics
- Zhibiao Zhao, Ph.D. (Chicago) Assistant Professor of Statistics

Graduate instruction and research opportunities are available in most areas of statistics and probability, including linear models, nonparametric statistics, robustness, statistical computing, analysis of count data, multivariate analysis, experimental design, reliability, stochastic processes and probability (applied and theoretical), distribution theory, statistical ecology, and biometrics.

Graduate students can gain practical experience in the application of statistical methodology through participation in the department's statistical consulting center and collaborative research activities. In addition, collaborative projects with other departments provide longer term experience and support for selected students. Most students gain valuable teaching experience by assisting in the teaching and grading of courses. In addition, Ph.D. candidates with proper qualifications can receive support for teaching undergraduate courses.

The Master of Applied Statistics (M.A.S.) program is a professional degree designed to provide training in statistics focused on developing data analysis skills, and exploration of all core areas of applied statistics, without going deeply into the mathematical statistics foundations. It aims to provide its graduates with broad knowledge in a wide range of statistical application areas.

The Doctor of Philosophy (Ph.D.), Master of Arts (M.A.), and Master of Science (M.S.) degrees in Statistics are designed for advanced studies in applied and theoretical statistics. Special emphases include biostatistics, statistical ecology, environmental statistics, genometrics, biometrics and statistical computation. The M.S. degree is appropriate preparation for the department's Ph.D. degree.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. Entering graduate students in statistics for whom English is not the first language are required to take the TOEFL (Test of English as a Foreign Language) examination. The results of this examination must be received by the Department of Statistics at least six months prior to the requested date of admission to the Graduate School and must pass the PSU test of spoken English in the first year of the program. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). Applicants with lower scores may be considered for provisional admission.

While applications from all students (including those who already have done graduate work) are reviewed, completion of a standard calculus sequence is regarded as a prerequisite. Students with a 3.00 or better junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students hoping to earn a Ph.D. in statistics may apply directly to the Ph.D. program without need for a master's degree.

## Degree Requirements

### Professional Master of Applied Statistics Requirements

For the M.A.S. degree, a minimum of 30 credits and a minimum grade-point average of 3.0 are required for graduation. Of the 30 credits, 24 must be courses from the Statistics department and 21 must be at the 500 level. The candidate must complete 6 credits in applied statistics (STAT 501, STAT 502), 6 credits in mathematical statistics (STAT 414, STAT 415) and 3 credits in statistical consulting (STAT 580-581). For all M.A.S. students, the Stat 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience. To complete the remaining credit requirements, a candidate can select 9-15 credits from the following applied statistics courses: STAT 464, STAT 480, STAT 500, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, and STAT 510. In addition, students with suitable backgrounds may choose up to 6 credits from a departmental list of additional courses with approval from their adviser.

### Master of Arts and Master of Science Degree Requirements

For the M.A. and M.S. degrees, a candidate must complete at least 30 credits, including at least 27 at the 500 or 600 level; 21 of the 27 500-level credits must be formal course work from the department of Statistics. A candidate must complete 6 credits in applied statistics (STAT 511, STAT 512), 6 credits in mathematical statistics (STAT 513, STAT 514), 3 credits in stochastic processes (STAT 515) and 3 credits in statistical consulting (STAT 580-581). The student must also pass a written master's qualifying examination taken at the end of the first year. Finally, an M.A. candidate must submit an acceptable master's paper to the department, and an M.S. candidate must submit a thesis.

### Doctoral Degree Requirements

In addition to the course requirements for the M.A. and M.S. degrees given above, a Ph.D. candidate in Statistics must complete further courses in linear models (STAT 551), asymptotic tools (STAT 553), statistical inference (STAT 561), and advanced probability (STAT 517), as well as 15 credits of electives taken from STAT 518, STAT 544, STAT 545, STAT 552, STAT 562, STAT 564, STAT 565, and STAT 572, or other courses suggested by the Ph.D. committee and approved by the Graduate Studies Committee. The student also must pass a written Ph.D. qualifying exam, typically during the second year, and a comprehensive exam given at the end of the third year. The comprehensive exam will have a written component, whose content will be determined and administered by the student's Ph.D. graduate committee, and an oral component, which includes the presentation of a thesis research proposal. The candidate then must submit an acceptable Ph.D. thesis and defend it.

The Ph.D. in Statistics offers options in Biometrics, Biostatistics, Environmental Statistics, and Genometrics. The course and the examination requirements remain the same under these options, however, the candidate must take 15 credits from a list of courses identified by the option.

### Minor in Statistics Requirements

The Department of Statistics has three possible options for a Graduate Minor in Statistics:

- **Option 1:** STAT/MATH 414-415 and at least three 500-level courses from the department.
- **Option 2:** Five or more courses totaling 15 credits at the 500-level from the department. Stat 464 may also count toward the 15 credits.
- **Option 3:** Four 500-level courses totaling 12 credits from the department and one additional course of 3 credits approved by the department head or graduate studies chairman.

Please note: STAT 500 will not be counted toward the Graduate Minor in Statistics under any option.

For all options, a 3.5 GPA is required in the courses to be counted toward the minor. Completion of one of the options listed above, with the specified grade-point average, and the signature on the Graduate Minor Program form [www.stat.psu.edu/grad/degrees/Minor/Graduate\\_Minor\\_Application\\_Form.pdf](http://www.stat.psu.edu/grad/degrees/Minor/Graduate_Minor_Application_Form.pdf) constitutes approval of the Minor in Statistics. The candidate must indicate the wish to have a Graduate Minor in Statistics when the diploma card is filed and indicate the semester the Ph.D. degree is expected.

### Other Relevant Information

Students in the Statistics program may elect the dual-title degree program option in Operations Research for the Ph.D. and M.S. degrees. (See also Operations Research.)

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. GRE scores are required for consideration for assistantships.

### Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master's degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analyst. Research divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

### Application Process

The number of openings in the integrated B.S./M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Statistics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program, including the two courses: STAT 414 and STAT 415 and the students must apply to the program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of the department's undergraduate program committee.
- Must be accepted into the M.A.S. program in Statistics.

For the IUG B.S./M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate-level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

#### STATISTICS (STAT)

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)

Assuming all requirements for the B.S. are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. Degree if they desire.

### Degree Requirements

IUG Statistics B.S. prescribed Statistics courses (25 credits)

**STATISTICS (STAT)**

- 220. Basic Statistics (3)
- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 416. Stochastic Modeling (3)
- 464. Applied Nonparametric Statistics (3)
- 470W. Problem Solving and Communication in Applied Statistics (3)
- 480. Introduction to Statistical Analysis System (SAS) (1)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)

Note that students in IUG Statistics B.S. take STAT 501 and STAT 502 instead of STAT 460 and STAT 462 for the regular Statistics B.S.

**IUG Statistics M.A.S. requirement (30 credits)****STATISTICS (STAT)**

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)
- 580.\*\* Statistical Consulting Practicum (2)
- 581.\*\*Statistical Consulting Practicum II (1)

**Electives (15 credits)**

Select from STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, STAT 510 and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

\*\*For all students in the M.A.S. program, the STAT 581 courses will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

**Integrated B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.)**

The Integrated Undergraduate-Graduate (IUG) degree with B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

**Application Process**

The number of openings in the integrated B.A./B.S. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A./B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department's undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.A./B.S. in Mathematics and M.A.S. degree, 120 credits are required for the B.A./B.S. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.A./B.S. and M.A.S. degrees, six of these are at the 500 level:

**STATISTICS (STAT)**

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)

Assuming all requirements for the B.A./B.S. in Mathematics are completed, students in the program can complete the B.A./B.S. degree and not advance to the M.A.S. degree if they desire.

**Degree Requirements**

IUG Math B.A./B.S. students must fulfill the Math B.A./B.S. requirement while counting these prescribed Statistics courses (15 credits)

**STATISTICS (STAT)**

- 220.\* Basic Statistics (3)
- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)

**IUG M.A.S. Requirements (30 credits)****STATISTICS (STAT)**

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)
- 580. Statistical Consulting Practicum (2)
- 581.\*\* Statistical Consulting Practicum II (1)

**Electives: (15 credits)**

Select from STAT 464, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, STAT 510 and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

For the IUG B.A./B.S. in Mathematics and M.A.S. degree, the four courses: STAT 414, STAT 415, STAT 501 and STAT 502 can apply to both the B.A./B.S. and M.A.S. degrees.

\*Can be waived for students with an equivalent course, e.g., STAT 250 or STAT 301.

\*\* For all students in the M.A.S. program, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[STATISTICS \(STAT\) course list](#)

LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

IUG PROGRAM - B.S. in Statistics and Master of Applied Statistics  
Last Revised by the Department: Summer Session 2003  
Blue Sheet Item #: 31-05-138

IUG PROGRAM - B.A./B.S. in Mathematics and Master of Applied Statistics  
Last Revised by the Department: Fall Semester 2006  
Blue Sheet Item #: 34-06-361 and 34-06-361A  
Review Date: 4/11/06

REVISED BY SENATE: 1/5/06 [course number update]

Last updated by Publications: 8/17/09

## Applied Psychological Research (APSYR)

### [Program Home Page](#)

THOMAS G. BOWERS, *Graduate Program Coordinator*  
 Penn State Harrisburg  
 W-311 Olmsted Building  
 777 West Harrisburg Pike  
 Middletown, PA 17057  
 717-948-6040

### Degree Conferred:

M.A.

### The Graduate Faculty

- John Steven Backels, Ph.D. (Ball State) Affiliate Assistant Professor of Psychology
- Michael A. Becker, Ph.D. (SUNY, Albany) Associate Professor of Psychology
- Thomas G. Bowers, Ph.D. (Virginia Tech) Associate Professor of Psychology
- Gina M. Breisford, Ph.D. (Bowling Green) Assistant Professor of Psychology
- Barbara A. Bremer, Ph.D. (Bryn Mawr) Associate Professor of Psychology
- Richard Fiene, Ph.D. (Newport) Associate Professor of Human Development and Family Studies
- Marissa Harrison, Ph.D. (SUNY, Albany) Assistant Professor of Psychology
- Senel Poyrazli, Ph.D. (Houston) Associate Professor of Counseling Psychology
- Maria A. Turkson, Ph.D. (Maryland) Assistant Professor of Psychology
- Xu Xu, Ph.D. (Northern Illinois) Assistant Professor of Psychology

The Master of Arts program in Applied Psychological Research focuses on the development of research skills within the context of scientific training in psychology. The program requires 35 credits of course work (29 credits of core courses and 6 credits of electives).

The program is designed to meet the needs of students who plan careers in research or administration within human service or similar organizations, who plan to conduct research in other settings, or who plan to pursue doctoral study. Students can select electives and research experiences to reflect their individual interests in consultation with their adviser.

The program is intended for both part- and full-time students. Students are admitted for fall semester only. The deadline for admission is May 1.

### Admission Requirements

Students will be admitted on a competitive basis and must submit the following:

- a completed application form with the application fee
- two official transcripts of all colleges and universities attended
- three professional letters of recommendation
- a brief (two-page) interest statement
- verbal, quantitative, and analytical scores on the Graduate Record Examinations

The applicant must have a bachelor's degree from a regionally accredited academic institution, must have completed at least 18 credits in psychology, and must have a cumulative grade-point average of 3.0 or above in the last 60 credits of coursework. The undergraduate work must include a statistics course and a psychology research methods course with grades of B or higher. A personal interview is required.

### Transfer Credits

Penn State allows for the approval of up to 10 transfer credits to graduate programs.

### Degree Requirements

The M.A. in Applied Psychological Research requires 35 credits of course work, including 6 credits of supervised research experience and a master's research paper.

**Psychology Core Courses** (29 credits) (provide a foundation in professional ethics, individual differences and cultural diversity, the scientific bases of behavior, and scientific research skills)

#### PSYCHOLOGY (PSYC)

- 500. Ethics and Professional Practice in Psychology (3)
- 501. Cultural Competency in Psychology (3)
- 502. Applied Social Psychology (3)
- 520. Research Methods (4)
- 521. Statistics (4)
- 524. Biological Basis of Behavior (3)
- 530. Research Paper (3)
- 594. Applied Psychological Research (6)

**Elective Courses** (6 credits) (should be selected in consultation with the student's adviser in support of the student's research focus) Possible elective courses include:

#### PSYCHOLOGY (PSYC)

- 400. Health Psychology (3)
- 403. Adult Development (3)
- 405. Child Development (3)
- 406. Adolescence (3)
- 409. Child Behavior Disorders (3)
- 410. Psychology of the Differently-Abled (3)
- 415. Abnormal Psychology (3)
- 421. Behavior Modification (3)
- 425. Cognition and Perception (3)
- 427. Learning Theory (3)
- 465. Psychology of Women (3)
- 482. Personality Theory (3)
- 514. Preventive Psychology (3)
- 515. Clinical Health Psychology (3)
- 516. Child Health Psychology (3)
- 525. Forensic Psychology (3)
- 526. Behavioral Systems in Criminal Justice (3)
- 535. Behavioral Management (3)

## **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PSYCHOLOGY \(PSYC\) course list](#)

SCR 29-07-034

Faculty updates: 7/26/12

## Architecture (ARCH)

### [Program Home Page](#)

MEHRDAD HADIGHI, Head, Department of Architecture  
130 Stuckeman Family Building  
814-863-2450; [Arch-Head@psu.edu](mailto:Arch-Head@psu.edu)

ALEXANDRA STAUB, Professor in Charge of Graduate Program in Architecture  
320 Stuckeman Family Building  
814-865-4239; [acs11@psu.edu](mailto:acs11@psu.edu)

[gradarch@psu.edu](mailto:gradarch@psu.edu)

### Degrees Conferred:

- [M.Arch.](#)
- [Integrated B.Arch./M.Arch. in Architecture](#)
- Ph.D.

### Ph.D. Graduate Faculty

- Chimay Anumba, Ph.D. (Leeds) Professor of Architectural Engineering
- Irina Aristarkhova, Ph.D. (Moscow) Assistant Professor of Women Studies and Art
- Jin Baek, Ph.D. (Penn) Assistant Professor of Architecture
- Mark Bailora, Ph.D. (McGill) Associate Professor of Integrative Arts and Music
- Thomas E. Boothby, Ph.D. (Washington) P.E., R.A. Professor of Architectural Engineering
- Malika Bose, Ph.D. (Wisconsin) Associate Professor of Landscape Architecture
- Gary L. Catchen, Ph.D. (Columbia) Professor of Nuclear Engineering
- James Cooper, Ph.D. (Virginia) Assistant Professor of Architecture
- Madhuri Desai, Ph.D. (Berkeley) Assistant Professor of Art History
- Mary I. Frecker, Ph.D. (Michigan) Professor of Mechanical Engineering
- Jawaid Haider, Ph.D. (Penn State) Professor of Architecture
- Deryck Holdsworth, Ph.D. (British Columbia) Professor of Geography
- Larry Gorenflo, Ph.D. (California - Santa Barbara) Associate Professor of Landscape Architecture
- Loukas Kalisperis, Ph.D. (Penn State) Professor of Architecture
- James Kalsbeek, M.S. Arch. (Cincinnati) Associate Professor of Architecture
- Donald E. Kunze, Jr., Ph.D. (Penn State) Associate Professor of Architecture and Integrative Art
- Nancy Locke, Ph.D. (Harvard) Associate Professor of Art History
- John I. Messner, Ph.D. (Penn State) Assistant Professor of Architectural Engineering
- Richard G. Mistrick, Ph.D. (Penn State) P.E. Associate Professor of Architectural Engineering
- Timothy Murtha, Ph.D. (Penn State) Assistant Professor of Landscape Architecture
- Ute Poerschke, Ph.D. (Cottbus, Germany) Associate Professor of Architecture
- Daniel Purdy, Ph.D. (Cornell) Associate Professor of German
- Sarah K. Rich, Ph.D. (Yale) Assistant Professor of Art History
- Timothy W. Simpson, Ph.D. (Georgia Tech) Professor of Industrial and Mechanical Engineering
- Elizabeth Smith, Ph.D. (NYU) Associate Professor of Art History
- Alexandra Staub, Ph.D. (Cottbus, Germany) Associate Professor of Architecture
- Allan Stoekl, Ph.D. (SUNY, Buffalo) Professor of French and Comparative Literature
- S. Shyam Sundar, Ph.D. (Stanford) Professor of Media Studies and Communications
- Robin Thomas, Ph.D. (Columbia) Assistant Professor of Art History
- Robert Yarber, M.F.A. (Louisiana) Distinguished Professor of School of Visual Art
- Craig Zabel, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Art History

### M.Arch. Graduate Faculty

- Peter Aeschbacher, M.Urban Planning (University of California) Associate Professor of Architecture and Landscape Architecture
- Nathaniel Belcher, M.Arch. (Harvard) Director and Professor of Architecture and Landscape Architecture
- Daniel Cardoso Llach, Ph.D. (MIT) Assistant Professor of Architecture
- Denise Costanzo, Ph.D. (Penn State) Assistant Professor of Architecture
- James Cooper, Ph.D. (Virginia) Assistant Professor of Architecture
- Christine Gorby, M.Arch. (Harvard) Associate Professor of Architecture
- Mehrdad Hadighi, M.Arch. (Cornell) Professor and Department Head of Architecture
- Jawaid Haider, Ph.D. (Penn State) Professor of Architecture
- Rebecca Henn, M.Dgn. (Harvard) Assistant Professor of Architecture
- Lisa Iulo, M.Arch. (CUNY) Assistant Professor of Architecture
- Loukas Kalisperis, Ph.D. (Penn State) Professor of Architecture
- James Kalsbeek, M.S.Arch. (Cincinnati) Associate Professor of Architecture
- Jodi L. LaCoe, M.Arch. (McGill) Instructor in Architecture
- Darla Lindberg, M.Arch. (Iowa State) Associate Professor of Architecture
- Katsuhiko Muramoto, M.Arch. (Cranbrook Academy) Associate Professor of Architecture
- Madis Pihlak, M.C.P. (Berkeley) Associate Professor of Architecture and Landscape Architecture
- Ute Poerschke, Ph.D. (Cottbus, Germany) Associate Professor of Architecture
- Marcus Shaffer, M.Arch. (Virginia Tech) Assistant Professor of Architecture
- Alexandra Staub, Ph.D. (Cottbus, Germany) Associate Professor of Architecture
- Daniel Willis, M.S.Arch. (Penn State) Professor of Architecture
- James Wines, B.S. (Syracuse) Professor of Architecture
- Scott W. Wing, M.Arch. (Princeton) Associate Professor of Architecture

The Master of Architecture (M.Arch.) degree program in Architecture offers two distinct tracks:

1. The post-professional Master of Architecture track. Post-professional degrees do not qualify the recipient for professional licensure in the United States. This track is intended for students already holding a professional degree in architecture, and in exceptional cases, for students with nonprofessional architectural degrees who seek to develop a better understanding of architecture. The post-professional Master of Architecture track is a two-year (four-semester) research-based track supporting a number of areas of research inquiry, specially designed for students interested in advanced research and independent work. It is expected that such students will have previously studied the technical and professional aspects of architectural practice and are primarily interested in strengthening the intellectual underpinnings of their work through intensive studio investigations, design applications, and rigorous theoretical inquiry.
2. The professional Master of Architecture track. This track is designed for students with undergraduate baccalaureate degrees in fields other than architecture and for those holding a non-professional baccalaureate degree in architecture. This program does qualify the recipient for professional licensure in the United States. The three-year (seven-semester) program helps prepare students to become leaders in the profession of architecture. Students enroll in a two-year preparatory core curriculum that prepares them with techniques, principles, histories, theories, and technologies related to the discipline of architecture. In the final year of the program the students join the post-professional curriculum, where independent thinking and advanced research are the model.



For applicants interested in this track who have completed architecture or architecture-related coursework, there will be a review of transcripts to assess completion of materials covered in preparatory classes. A faculty review committee will assess each accepted applicant's transcripts for possible preparatory course equivalents. If preparatory courses have been fulfilled with equivalent undergraduate or graduate coursework, students will be eligible for advancement. Accordingly, time to complete degree requirements may be reduced.

The Doctor of Philosophy (Ph.D.) degree program in Architecture is a research-based degree supporting a number of areas of research inquiry. The program's distinguishing quality is its broad-based research core, grounded in contemporary critical theory and methods. Faculty include Penn State scholars with an expertise in architectural theory, the design process, digital design, digital fabrication, building construction and technology, cultural and environmental behavior, housing, urban design, and sustainability. Visiting scholars further enhance the program and course offerings. The program allows opportunities for graduate students to assist in undergraduate courses and work with the research centers of the department. It is expected that students will have previously studied the technical and professional aspects of architectural practice and are primarily interested in strengthening the intellectual underpinnings of their work through intensive investigation, design applications, and rigorous theoretical inquiry.

### M.Arch. Admission Requirements

All applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

A minimum grade-point average [GPA] of 3.0 on a 4.0 scale is required

All applicants for admission to the Master of Architecture degree program must submit:

- a completed Graduate School application, found online at <http://www.gradsch.psu.edu/portal/>, and payment of the application fee
- two official copies of all undergraduate transcript[s]
- Graduate Record Exam [GRE] scores
- a statement of intent, which should be primarily a description of the applicant's professional goals, desired option and subjects of study, and the area(s) of anticipated architectural inquiry
- a minimum of three letters of recommendation from faculty members acquainted with the applicant's academic history and/or recommendations by an undergraduate review committee
- a portfolio of creative and design work executed at the undergraduate level or under professional guidance or independently, provided that such work can be evidenced as executed by the applicant, is an important part of the graduate application. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required. The portfolio and "statement of intent" should be submitted online via Slideroom at [www.stuckemanpsu.slideroom.com](http://www.stuckemanpsu.slideroom.com).
- other evidence of academic excellence, such as awards, design and scholarly achievements, and other recognitions that the applicant wishes to have considered by the admissions committee

International students also must submit TOEFL scores as noted below in the section titled "English Language Requirements."

#### Additional information regarding admission to the M.Arch. degree program

1. The post-professional Master of Architecture track. M.Arch degree applicants interested in this track should hold a five-year professional degree in architecture.
2. The professional Master of Architecture track. The baccalaureate degree may be in a field other than architecture or be a non-professional baccalaureate degree in architecture. This M.Arch. track culminates in a professional degree, currently in candidacy status for National Architectural Accrediting Board (NAAB) accreditation.

The M.Arch. degree program at Penn State draws heavily on core professional knowledge and competency classes taken by undergraduate students in our B.Arch. curriculum. Thus, 21 credits at the 400 level and 46 credits at the 100, 200, and 300 levels will be required as preparatory courses. Students in the professional Master of Architecture track will be admitted provisionally as M.Arch. students until these preparatory requirements are met.

### Ph.D. Admission Requirements

To be admitted into the Doctor of Philosophy in Architecture degree program, an applicant must have received a professional degree in architecture from a regionally accredited institution and a masters degree in architecture or related field. Outstanding candidates who do not hold a professional architecture degree but who satisfy all other entrance to major requirements may be admitted by the Ph.D. program director with the concurrence of the Department Head. Scores from the Graduate Record Examination (GRE) will be required for admission. An overall minimum grade-point average of 3.20 for graduate and undergraduate degrees is required for admission. In addition to submitting the application to the University for admission to the Graduate School and payment of the application fee, all applicants must submit the following to the Department of Architecture: 1) an official transcript from all institutions of higher education attended, both undergraduate and graduate, 2) official diploma/certificates for each degree obtained, 3) three letters of recommendation, 4) a statement of intent, and 5) a CV.

The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.20 grade-point average may be made for students with special backgrounds, abilities, and interests.

### English Language Requirements

The language of instruction at Penn State is English. International applicants for all Architecture degrees must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement if they have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec) England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### M.Arch. Degree Requirements

1. The post-professional Master of Architecture track. The capstone of the M.Arch. program is a Master's Thesis or Thesis [Design] Project, which requires the student to identify and formulate an area of inquiry within which he or she will be expected to do original research and to complete a project or a written thesis that tests the theoretical ideas. The Master of Architecture is a 30-credit program that requires 24 credits of course work and 6 credits of thesis or thesis project. At least 18 credits must be at the 500 or 600 levels, and at least 20 credits must be taken in residence at University Park. The core courses consist of a total of 12 credits.

A graduate student may be able to complete the requirements for the M.Arch. degree in one year. Those students who are awarded an assistantship will require more than two semesters to complete the requirements for the M.Arch. degree. Directed electives include courses related to one of the three options from other disciplines, such as Landscape Architecture, Geography, Sociology, Philosophy, Psychology, and Computer Science, as well as within the Department of Architecture. Architectural Research (ARCH 591) is specifically designed for each of the three options and counts toward the 12 credits necessary to satisfy the option within the major. The thesis requirement can be fulfilled in two ways: through a written thesis, which conforms to the scholarly standards of Graduate Council or through a design project that tests theoretical ideas. A written monograph will accompany all thesis design projects.

#### REQUIRED COURSES:

##### ARCHITECTURE (ARCH)

- 511. Theoretical Perspectives in Architecture (3)
- 520. Methods of Inquiry (3)
- 536. Design Inquiry (6)
- 541. Topics in Theory (3)
- 542. Topics in Community and Urban Design (3)

- 543. Topics in Digital Design (3)
- 550. Ethics in Architecture (3)
- 600. Thesis (6)

Electives (6)

2. The professional Master of Architecture track. This 97-credit track requires the completion of 67 credits of preparatory coursework, some of which may have been completed in the applicant's undergraduate coursework, in addition to the 30 credits of advanced coursework referenced above in the section describing the post-professional track. The professional M.Arch. may be completed in three years (seven semesters). For applicants who have completed architecture or architecture-related coursework, there will be a review of transcripts to assess completion of materials covered in preparatory classes. A faculty review committee will assess each accepted applicant's transcripts for possible preparatory course equivalents. If preparatory courses have been fulfilled with equivalent undergraduate or graduate coursework, students will be eligible for advancement. Accordingly, time to complete degree requirements may be reduced.

List of Courses:

67 preparatory credits

**30 required credits (bold face)**

Preparatory Courses:

**ARCHITECTURE (ARCH)**

- 121. Visual Communications I (2)
- 122. Visual Communications I (2)
- 203. Materials and Building Construction I (3)
- 204. Materials and Building Construction II (3)
- 210. Intro. to Architecture & Planning Theories (3)
- 231. Architectural Design I (6)
- 232. Architectural Design II (6)
- 331. Architectural Design III (6)
- 332. Architectural Design IV (6)
- 431. Architectural Design V (6)
- 432. Architectural Design VI (6)
- 451. Architectural Professional Practice (3)
- 480. Tech. Sys. Integration (3)
- 491. Architectural Design VII (6)
- 492. Architectural Design VIII (6)

A total of 6 credits from:

**ARCHITECTURE (ARCH)**

- 495. Internship
- 496. Independent Study
- 499. Foreign Study

**ARCHITECTURAL ENGINEERING (AE)**

- 211. Introduction to Environmental Control Systems (3)
- 421. Architectural Structural Systems I (3)
- 422. Architectural Structural Systems II (3)
- 424. Environmental Control Systems I (3)

**ART HISTORY (ART H)**

- 201. Ancient to Medieval Architecture (3)
- 202. Renaissance to Modern Architecture (3)

**REQUIRED COURSES:**

**ARCHITECTURE (ARCH)**

- **511. Theoretical Perspectives in Architecture (3)**
- **520. Methods of Inquiry (3)**
- **536. Design Inquiry (6)**
- **541. Topics in Theory (3)**
- **542. Topics in Community and Urban Design (3)**
- **543. Topics in Digital Design (3)**
- **550. Ethics in Architecture (3)**
- **600. Thesis (6)**

Electives (6)

**Ph.D. Degree Requirements**

The capstone of the Ph.D. program is a dissertation, which requires the student to identify and formulate an area of inquiry within which he or she will be expected to conduct high-quality original scholarly research. Each student accepted into the Ph.D. degree program must pass the Ph.D. Candidacy Examination, which requires students to display an understanding of basic material in all areas, along with an in-depth understanding of material covered in courses within their area of focus. This examination must be passed within three semesters, not counting summer session, of entry into the doctoral program. The student's program of courses is developed in cooperation with the student's Ph.D. committee. It is recommended that this consist of approximately 30 credits of courses beyond the master's degree. At the conclusion of the student's course work, the Ph.D. student must take a written comprehensive examination that is developed by the student's Ph.D. committee. Following the comprehensive exam, continuous registration is required for all Ph.D. graduate students until the dissertation is approved. Each student presents a comprehensive thesis proposal to his/her committee prior to starting his/her dissertation research and must present the results of this research in a final oral examination.

**Ph.D. Course Work**

- 6 credits of Critical Theory and Methods in Architecture (ARCH 512)
- 12 credits of Architectural Research and/or Design Inquiry (ARCH 520, 536, 591)
- 12 credits of research-area related courses such as Computational Methods in Architectural Design or Pedagogical Topics in Architecture (ARCH 522, 545, 590)
- 12 credits of Dissertation

**Integrated B.Arch./M.Arch. in Architecture**

The Department of Architecture offers a limited number of academically superior students enrolled in the fourth year of the Bachelor of Architecture degree program the opportunity to enroll in an integrated program leading to both the B.Arch. and the M.Arch. degrees. The program permits the student to integrate the fifth year of the professional B.Arch. degree with the M.Arch. degree into a continuous program of study culminating in the award of both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially, and to earn the two degrees in a shorter period of time. In particular, the program encourages the student to integrate the undergraduate thesis design project with the master's thesis, thereby achieving a greater depth of inquiry. The

number of openings to this special program is limited; admission is by invitation of the faculty and is extremely selective.

### Admission Requirements

Applicants to the integrated program must be enrolled in the fourth year of a B.Arch. program or otherwise qualified to apply for admission to the fifth year of the B.Arch. program at Penn State. To be admitted, applicants must be able to meet the following requirements:

--Must be provisionally accepted into the post-professional M.Arch. track at Penn State (see application requirements for the M.Arch. degree above.)

--Must have a minimum 3.20 junior/senior overall grade-point average (on a 4.0 scale) as well as: (1) a minimum 3.20 GPA in architectural design courses (studio), and (2) a minimum 3.20 GPA in all course work except architectural design courses (studio).

--In addition to the other application requirements for the post-professional M.Arch. track, the IUG applicant shall provide a Plan of Study of no more than 1,500 words. The plan shall clearly describe the student's proposed general thesis topic and a strategy for pursuing it, including a list of proposed courses and a list of faculty whom the student foresees as contributing to the course of study.

The best-qualified students will be accepted up to the number of spaces available for new students. Acceptance to the program prior to the completion of all required course work is provisional, contingent upon meeting the previous requirements.

### Degree Requirements

Students must complete the requirements for both the B.Arch. and post-professional track of the M.Arch. degrees with the exception that not more than 12 credits earned in either degree program may be used to meet the requirements of both degrees. Therefore, a minimum total of 48 credits are required to complete the Integrated B.Arch.-M.Arch. program and earn both degrees. The student must maintain a minimum 3.2 overall GPA and shall achieve no less than a B grade in each required course.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. All applicants who are accepted are considered for departmental financial aid.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2010

Blue Sheet Item #: 39-04-585

Review Date: 01/11/2011

Faculty updated: 5/13/13

## Art (ART)

### [Program Home Page](#)

CRISTIN MILLETT, *Studio Graduate Programs Coordinator in Art*  
 210 Patterson Building  
 814-865-0444  
[clm23@psu.edu](mailto:clm23@psu.edu)

### Degrees Conferred:

M.F.A.

### The Graduate Faculty

- Micaela Amato, M.F.A. (Colorado) *Professor of Art and Women's Studies*
- Irina Aristarkhova, Ph.D. (Russian Academy of Sciences) *Assistant Professor of Women's Studies and Visual Arts*
- John Bowman, B.F.A. (Rutgers) *Professor of Art*
- Paul Chidester, M.F.A. (Art Institute, Chicago) *Associate Professor of Art*
- Bonnie Collura, M.F.A. (Yale) *Assistant Professor of Art*
- Charles R. Garoian, Ph.D. (Stanford) *Professor of Art Education*
- Robin L. Gibson, M.F.A. (Wisconsin, Madison) *Associate Professor of Art*
- Lonnie Graham, M.F.A. (San Francisco Art Inst) *Associate Professor of Art*
- Matthew Kenyon, M.F.A. (Virginia Commonwealth) *Assistant Professor of Art*
- Jerrold Maddox, M.F.A. (Indiana) *Professor of Art*
- Cristin Millett, M.F.A. (Arizona State) *Associate Professor of Art*
- Helen O'Leary, M.F.A. (Art Institute, Chicago) *Professor of Art*
- Simone Ostoff, M.F.A. (Maryland) *Associate Professor of Art*
- Elizabeth Quackenbush, M.F.A. (Rochester Inst of Technology) *Professor of Art*
- Carlos Rosas, M.F.A. (Cranbrook Academy of Art) *Associate Professor of Art*
- Steven Rubin, M.F.A. (California, San Diego) *Assistant Professor of Photography*
- Jean Sanders, M.F.A. (Wisconsin, Madison) *Associate Professor of Art*
- Keith Shapiro, M.F.A. (Penn State) *Associate Professor of Integrative Arts and Art*
- Christopher P. Staley, M.F.A. (Alfred) *Distinguished Professor of Art*
- Graeme Sullivan, Ph.D. (Ohio State) *Professor of Art Education; Director, School of Visual Arts*
- Robert Yarber, M.F.A. (Louisiana State) *Distinguished Professor of Art*

M.F.A. program is planned to provide professional emphasis in a specific area of art.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The Master of Fine Arts program in art, with its emphasis on professional study, is designed for the mature individual who by previous training and study has sufficiently prepared for the undertaking. It is strongly suggested that applicants have a minimum of 12 credits of art history at the undergraduate level. Any qualified student who has graduated from an accredited college that offers a bachelor of arts, bachelor of science, or bachelor of fine arts in the area of art of the equivalent may seek admission. The School of Visual Arts requires a minimum of 3.00 junior/senior grade-point average (on a 4.00 scale) for admission to the master of fine arts program. Exceptions to the minimum 3.00 average may be made for students with special backgrounds, abilities, and interests.

In addition to the previous requirements, all applicants must submit:

1. A portfolio of his/her work to illustrate his/her preparation for graduate study. A portfolio of slides, rather than actual work, is required. A selection of no fewer than twenty examples should be presented. The majority should be in the area of the applicant's interest.
2. A statement of professional aims. This statement should include the applicant's intentions for his/her proposed study. Some indications of his/her philosophy, beliefs, and goals in regard to education and art should give evidence that he/she is prepared to undertake the work outlined for the Master of Fine Arts program.
3. Three letters of reference attesting to the applicant's scholarship and ability to work independently.

### Degree Requirements

The School of Visual Arts requires a minimum total of 60 credits for the Master of Fine Arts degree. Not more than 10 credits may be transferred from other accredited graduate institutions. Of the 60 credits required for graduation, candidates are expected to complete the following distribution of credits: 30 credits in a major area of concentration, 12 credits in art history and critical studies, 10 credits in related areas, and 8 credits in graduate seminar.

### Additional M.F.A. Requirements

For M.F.A. candidates, at least 24 credits of the required 60 credits must be at the 500 level. In addition to course work, M.F.A. candidates must pass a candidacy review, which is usually held at the end of the second semester of study, submit an artist's statement, pass the M.F.A. comprehensive oral examination and produce an M.F.A. exhibition.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [ART \(ART\) course list](#)

Last Revised by the Department: Spring Semester 2005

Blue Sheet Item #: 33-03-308

Review Date: 11/23/04

Date last updated by Publications: 8/15/11

## Art History (ART H)

[Program Home Page](#)

CRAIG ZABEL, *Head of the Department*  
240 Borland Building  
814-865-6326  
[cw2@psu.edu](mailto:cw2@psu.edu)

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- Brian A. Curran, Ph.D. (Princeton) Associate Professor of Art History
- Anthony Cutler, Ph.D. (Emory) Evan Pugh Professor of Art History
- Madhuri Desai, Ph.D. (California, Berkeley) Assistant Professor of Art History and Asian Studies
- Roland E. Fleischer, Ph.D. (Johns Hopkins) Professor Emeritus of Art History
- Hellmut Hager, Ph.D. (Universität Bonn) Evan Pugh Professor and Professor Emeritus of Art History
- Charlotte M. Houghton, Ph.D. (Duke) Associate Professor of Art History
- Nancy Locke, Ph.D. (Harvard) Associate Professor of Art History
- Leo Mazow, Ph.D. (North Carolina, Chapel Hill) Affiliate Associate Professor of Art History
- Patrick McGrady, Ph.D. (SUNY, Binghamton) Affiliate Assistant Professor of Art History
- Randy J. Ploog, Ph.D. (Penn State) Affiliate Assistant Professor of Art History
- Jeanne Chenault Porter, Ph.D. (Michigan) Associate Professor Emerita of Art History
- Sarah K. Rich, Ph.D. (Yale) Associate Professor of Art History
- Joyce Henri Robinson, Ph.D. (Virginia) Affiliate Associate Professor of Art History
- Elizabeth B. Smith, Ph.D. (NYU, Institute of Fine Arts) Associate Professor of Art History
- Robin Thomas, Ph.D. (Columbia) Assistant Professor of Art History
- Elizabeth Walters, Ph.D. (NYU, Institute of Fine Arts) Associate Professor of Art History
- Kristi Ann Wormhoudt, Ph.D. (Iowa) Affiliate Assistant Professor of Art History
- Craig Zabel, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Art History

Graduate work is offered in the following areas: Ancient, Byzantine, Medieval, Renaissance, Baroque, Modern, Contemporary, American, African, and Asian art and architectural history.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, and analytical) are required for admission to the Department of Art History. Special emphasis will be given to the verbal part of the GRE scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Candidates with a 3.00 junior/senior grade-point average and a minimum of 21 credits in art history will be considered for admission to the master's program. Lacking these, a promising candidate may be accepted on condition that deficiencies be remedied, but without graduate degree credit. Applicants to the Ph.D. program must have an M.A. in art history or a closely related field. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

### Master's Degree Requirements

Candidates for the M.A. degree are required to complete a minimum total of 36 credits (including a master's thesis or paper), divided as follows:

- ART H 551 (3 credits), to be taken during one's first fall semester
- 9 credits at the 400 level, of which 3 credits must be taken in each of the following three areas: (1) African/Asian/Oceania/Pre-Columbian Americas, (2) Ancient, Byzantine/Medieval, (3) Renaissance/Baroque/Modern/Contemporary
- 9 credits of 500-level seminars in art history (ART H 551, and ART H 596 may not be used to fulfill this requirement). Each seminar in this 9-credit requirement must be taken with a different faculty member.
- 9 additional credits in art history at the 400 or 500 level. With the approval of one's adviser and the graduate officer, 3 credits of this requirement may be a course at the 400 or 500 level outside the Department of Art History.
- 6 credits of ART H 600 for a master's thesis or 6 credits of ART H 596 for a master's paper. ART H 596 may be used only by a master's candidate for a master's paper; all other individual studies should use ART H 496.

In addition, candidates must demonstrate a reading proficiency in two foreign languages. One of these languages must be German, and the other being French, Italian, or Spanish. On the recommendation of a student's adviser, and with the approval of the graduate officer, a student may substitute one of the above-named languages with another foreign language deemed appropriate for a specialized field. Proficiency in one language must be demonstrated before the end of one year of study. A reading knowledge of the second language must be demonstrated before the end of the second year. A master's examination must also be passed before completing the M.A. degree.

### Doctoral Degree Requirements

Thirty additional credits, not including doctoral dissertation research, are required for the Ph.D. At least 24 of these credits must be in art history and 3 to 6 must be in a related area outside art history. At least 9 of the art history credits must be at the 500 level, exclusive of Art History 510 and Art History 596. At the discretion of the candidate's doctoral committee, the candidate may be required to take additional specialized courses pertaining to his or her major area of study. For students who have received a master's degree from another university, a reading competency in German and in French or Italian must be demonstrated before the end of one year of study. For the Ph.D., a candidacy examination, a comprehensive examination, and a final oral examination must be successfully completed in addition to the student's doctoral dissertation.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ART HISTORY \(ART H\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-015

Review Date: 06/12/2012

Last updated by Publications: 8/19/09



## Asian Studies (ASIA)

Eric Hayot  
 Director of Asian Studies  
 441 Burrowes Building  
 814-865-1188  
 ehayot@psu.edu

### Degrees Conferred:

Students electing this program through primary departments will earn a Ph.D. in (graduate program name) and Asian Studies.

The following graduate programs offer dual degrees in Asian Studies: Applied Linguistics, Comparative Literature, and History.

### Faculty

Asian Studies faculty include individuals with budgeted appointments in Asian Studies and individuals with courtesy joint appointments. The following faculty members have budgeted or courtesy joint appointments in Asian Studies:

Jonathan Abel, Assistant Professor of Comparative Literature and Asian Studies  
 David Atwill, Assistant Professor of History and Asian Studies  
 Erica Brindley, Assistant Professor of Religious Studies and History and Asian Studies  
 Suresh Canagarajah, Kirby Professor of Language Learning, English, and Asian Studies  
 Gretchen Caspar, Associate Professor of Political Science and Asian Studies  
 Kumkum Chaggerjee, Associate Professor of History and Asian Studies  
 Tina Chen, Associate Professor of English and Asian Studies  
 Madhuri Desai, Assistant Professor of Art and Art History and Asian Studies  
 Charlotte Eubanks, Assistant Professor of Comparative Literature and Asian Studies  
 Eric Hayot, Associate Professor of Comparative Literature and Asian Studies  
 Ronnie Hsia, Edwin Earle Sparks Professor of History and Asian Studies  
 Alexander Huang, Assistant Professor of Comparative Literature and Asian Studies  
 On-cho Ng, Professor of History and Religious Studies and Asian Studies  
 Sumita Raghuram, Associate Professor of Labor Studies and Employment Relations and Asian Studies  
 Bee-yan Roberts, professor of Economics and Asian Studies  
 Gonzalo Rubio, Associate Professor of Classics and Mediterranean Studies and Asian Studies  
 Denis Simon, Professor of International Affairs  
 Mrinalini Sinha, Professor of History, Women's Studies, and Asian Studies  
 Gregory Smits, Associate Professor of History and Asian Studies  
 Susan Strauss, Associate Professor of Applied Linguistics and Asian Studies  
 Reiko Tachibana, Associate Professor of Comparative Literature and Asian Studies  
 Xiaoye You, Assistant Professor of English and Asian Studies

### Program Objectives of a Dual-Title Degree in Asian Studies

A dual-title degree in Asian Studies and a given discipline acknowledges and fosters scholarly work across the disciplines, and increases the intellectual rigor and breadth of graduate work. The dual-title degree teaches student to synthesize knowledge within and across disciplinary boundaries.

The primary advantages of a dual-title degree includes the intellectual and academic advantages of interdisciplinarity, strengthening the reputation of individual programs/departments through innovative degree programs, increased recruitment of quality graduate students, and improved placement of doctoral graduates.

The dual-title degree program in Asian Studies does not duplicate any other degree program at Penn State.

### Admission Requirements

In addition to the admission requirements set forth by the Graduate School and the cooperating department, students seeking admission to the dual-title program will be admitted to graduate study in Asian Studies by an admissions committee of Asian Studies-affiliated faculty. Students must be admitted to a primary program before applying for the dual-title degree. Therefore, the Asian Studies program will follow the timetable and admission requirements of the cooperating department. Applicants should have a junior/senior cumulative average of a 3.00 (on a 4.00 scale) and appropriate course background. Prospective students seeking admission to the dual-title degree program will write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and Asian Studies-related research.

### Degree Requirements

The requirements for the dual-title Ph.D. include Asia-related coursework, Asia-related components to the candidacy and comprehensive exams, strong all-skills proficiency in one Asian language and either two-years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student's field; and the completion of an Asian Studies-related dissertation.

### Ph.D. Requirements

Coursework: 15 credits of Asia-related coursework at the 400 or 500 level. At least 9 of these 15 credits will be from ASIA 501, 502, and 597; the remainder may come from Asian Studies or from the student's home department, as approved by the student's doctoral adviser and the Asian Studies program director of graduate studies.

Language requirement: Students will show strong all-skills proficiency in one Asian language and either two years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student's field.

Graduate committee, examinations, dissertation: A representative of the Asian Studies program will serve on the student's doctoral committee, which will take the student's home departmental practice into consideration in determining how to include an appropriate Asian Studies component in the student's candidacy and comprehensive examinations and in the dissertation.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are in the STUDENT AID section of the *Graduate Bulletin*.

### Course Listings

Courses in Asian Studies

ASIA 401. East Asian Studies (3)  
 ASIA 501. Asian Studies: Theories, Methods, and Archives I (1-3)  
 ASIA 502. Asian Studies: Theories, Methods, and Archives II (1-3)  
 ASIA 594. Research Topics (1-15)  
 ASIA 595. Internship (1-12)  
 ASIA 596. Independent Study  
 ASIA 597. Special Topics in Asian Studies

ASIA 599. Foreign Studies (3 per semester, maximum of 4)  
ASIA 600. Thesis Research

[Asian Studies \(ASIA\) course list](#)

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item #: 37-07-029

Review Date: 06/16/2009

Last updated by Publications: 3/2/10



## Astronomy and Astrophysics (ASTRO)

[Program Home Page \(Opens New Window\)](#)

DONALD P. SCHNEIDER, *Head of the Department of Astronomy and Astrophysics*  
525 Davey Laboratory  
814-865-0418

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- W. Nielsen Brandt, Ph.D. (Cambridge, UK) Distinguished Professor of Astronomy and Astrophysics
- David N. Burrows, Ph.D. (Wisconsin) Senior Scientist/Professor of Astronomy and Astrophysics
- Jane Charlton, Ph.D. (Chicago) Professor of Astronomy and Astrophysics
- Robin Ciardullo, Ph.D. (California, Los Angeles) Professor of Astronomy and Astrophysics
- Stephane Coutu, Ph.D. (Cal Tech) Professor of Physics
- Douglas Cowen, Ph.D. (Wisconsin--Madison) Professor of Physics
- Michael Eracleous, Ph.D. (Columbia) Associate Professor of Astronomy and Astrophysics
- Abraham D. Falcone, Ph.D. (New Hampshire) Senior Research Associate
- Eric D. Feigelson, Ph.D. (Harvard) Professor of Astronomy and Astrophysics
- Lee Samuel Finn, Ph.D. (Cal Tech) Professor of Physics and Astronomy and Astrophysics
- Derek B. Fox, Ph.D. (MIT) Assistant Professor of Astronomy and Astrophysics
- Gordon P. Garmire, Ph.D. (MIT) Evan Pugh Professor Emeritus of Astronomy and Astrophysics
- Caryl Gronwall, Ph.D. (California, Santa Cruz) Senior Scientist
- Xuexing Li, Ph.D. (Columbia) Assistant Professor of Astronomy and Astrophysics
- Kevin Luhman, Ph.D. (Arizona) Assistant Professor of Astronomy and Astrophysics
- Peter Mészáros, Ph.D. (California, Berkeley) Eberly Chair and Distinguished Professor of Astronomy and Astrophysics
- John A. Nousek, Ph.D. (Wisconsin) Professor of Astronomy and Astrophysics
- Christopher Palma, Ph.D. (Virginia) Senior Lecturer in Astronomy and Astrophysics
- George G. Pavlov, Ph.D. (Ioffe Physical-Technical Institute) Senior Scientist and Professor of Astronomy and Astrophysics
- Lawrence W. Ramsey, Ph.D. (Indiana) Professor of Astronomy and Astrophysics
- Mercedes Richards, Ph.D. (Toronto) Professor of Astronomy and Astrophysics
- Peter W. A. Roming, Ph.D. (Brigham Young) Senior Research Associate
- Donald P. Schneider, Ph.D. (Cal Tech) Head; Distinguished Professor of Astronomy and Astrophysics
- Steinn Sigurdsson, Ph.D. (Cal Tech) Associate Professor of Astronomy and Astrophysics
- Paul Sommers, Ph.D. (Texas, Austin) Professor of Physics and Astronomy and Astrophysics
- Leisa K. Townsley, Ph.D. (Wyoming) Senior Scientist
- Richard A. Wade, Ph.D. (Cal Tech) Associate Professor of Astronomy and Astrophysics
- Aleksander Wolszczan, Ph.D. (Copernicus U, Poland) Evan Pugh Professor of Astronomy and Astrophysics
- Jason Wright, Ph.D. (California, Berkeley) Assistant Professor of Astronomy and Astrophysics

The graduate program in Astronomy & Astrophysics prepares students for careers in astronomy, space science and education. Graduate instruction and research opportunities are available in theoretical, observational, and instrumental astronomy and astrophysics. Currently active areas of theoretical research include high-energy astrophysics (including theory of neutron stars, black holes, and gamma ray bursts), relativity and cosmology, stellar dynamics and planet formation, and computational methodology. Observational areas include spectroscopic and photometric observations of high-redshift quasars, galaxies and the intergalactic medium; gamma-ray bursts; X-ray and visible light studies of quasars, starburst and other active galaxies; visible light studies of nearby galaxies and their stellar populations; infrared study of brown dwarfs and protoplanetary disks; spectroscopy and modeling of binary, magnetically active, pre- and post-main sequence stars; spectroscopic searches for planetary systems. Instrumental areas include: development of X-ray telescopes and detectors; and high-precision visible and near-infrared light spectrographs. Department faculty members participate in several university cross-disciplinary organizations: Astrobiology Research Center, Center for Astrostatistics, Center for Gravitational Physics and Geometry, and the Center for Gravitational Wave Physics.

The Department played a seminal role in and leads many science investigations using two NASA-launched satellites, the Chandra X-ray Observatory and the Swift panchromatic gamma-ray burst mission, and the innovative 9-meter Hobby-Eberly Telescope located at the McDonald Observatory in Texas. Faculty and students also observe with other space-based observatories (GALEX, Hubble Space Telescope, Spitzer Space Telescope, XMM-Newton) and ground-based telescopes (Gemini and other national facilities, Magellan, Keck, South Africa Large Telescope, Very Large Telescopes). Physics faculty members closely associated with the Department are involved in particle and gravitational wave observations using the Auger, AMANDA, Ice Cube, and LIGO instruments. The Department has extensive computing facilities, and research is also conducted with university and national supercomputing resources.

Graduate students also have ample opportunity to acquire experience in undergraduate teaching and public outreach.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), including the Physics test, are required for admission. In addition, students coming from non-English speaking undergraduate institutions must submit scores from the TOEFL (Test of English as a Foreign Language) or IELTS (International English Language Testing System) examination. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Normally, students admitted to the program are required to have a bachelor's degree in physics and/or astronomy with a grade-point average of at least 3.0 in their junior/senior courses in physics, astronomy, math, and related subjects. Typical GRE scores for entering students are 720 or more on the general test, and 680 or more on the Physics test. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). The minimum acceptable score for the TOEFL is 590 for the paper-based test, 243 for the computer-based test, or a total score of 96 with a 23 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5.

### Degree Requirements

Course requirements for the Ph.D. consists of 30 credits of 3-credit courses, 3 credits of ASTRO 596 for directed research in the second year, 3 credits of ASTRO 589 Seminars in current research, 1 credit of ASTRO 590 Colloquium, and 1 credit of ASTRO 602 for supervised teaching. The ten 3-credit courses must include ASTRO 501, ASTRO 502, at least four additional ASTRO 500-level courses, and at least two PHYS 500-level courses. One 400-level class may be substituted. A GPA of 3.2 in these courses is required.

The Candidacy Examination is an oral examination with broad coverage of covering any area of astronomy. Students who fail the Examination may make a second attempt. At the Comprehensive Examination, the student presents a significant body of original research conducted at Penn State. This Examination tests the student's mastery of the chosen field of research. The student prepares an extended written report and oral presentation, and answers questions on the research and closely related areas. The Comprehensive Exam can be passed, failed with option retake, or failed followed by dismissal from the Ph.D. program. Graduation requires the completion of a dissertation of original research and a thesis defense before the Doctoral Committee.

While all students are admitted into the Ph.D. program, occasionally students terminate with a M.S. degree. This requires completion of the Ph.D. course requirements (except the three topical seminars) with 3.00 grade point average, passage of the Candidacy Exam, and submission of a suitable thesis.

### Student Aid

Graduate Teaching Assistantships, externally funded graduate Research Assistantships, and/or University fellowships are typically provided to student

admitted and continuing in good standing. Many students also apply for externally funded fellowships. University sources of funding are described in the [STUDENT AID](#) section of the Graduate Bulletin.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ASTRONOMY AND ASTROPHYSICS \(ASTRO\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

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Last updated by Publications: 8/2/11

## Business Administration (B A)

SUSAN H. XU, *Director of Ph.D. and M.S. Programs*  
351 Business Building  
814-865-7669; [Program Home Page](#)

CARRIE MARCINKEVAGE, *Director of MBA Program*  
220 Business Building  
814-863-0474; [Program Home Page](#)

### Degrees Conferred:

Ph.D., M.S., M.B.A, M.D./M.B.A.

### The Graduate Faculty

- Brent W. Ambrose, Ph.D. (Georgia) Smeal Professor of Real Estate; Director, Institute for Real Estate Studies, Professor of Insurance and Real Estate
- Ori E. Barron, Ph.D. (University of Oregon) Professor of Accounting; PricewaterhouseCoopers Teaching Fellow in Accounting; Director of Smeal College Schreyer Honors Program
- Russell Barton, Ph.D. (Cornell) Professor of Supply Chain and Information Systems; Co-Director, MMM Degree Program; Associate Director, CMTOC
- Hans Baumgartner, Ph.D. (Stanford) Professor of Marketing
- Gary E. Bolton, Ph.D. (Carnegie Mellon) Schwartz Professor of Business; Laboratory for Economic Management and Auctions
- Lisa Bolton, Ph.D. (Florida) Associate Professor of Marketing
- Forrest S. Briscoe, Ph.D., (MIT Sloan) Assistant Professor of Management
- Daniel R. Cahoy, JD (Franklin) Associate Professor of Business Law
- Quanwei (Charles) Cao, Ph.D. (Chicago) Smeal Chair Professor in Finance
- Jennifer Coupland Chang, Ph.D. (Northwestern) Clinical Associate Professor in Marketing Paiste Fellow in Teaching and Learning
- Christopher Craighead, Ph.D. (Clemson) Assistant Professor of Supply Chain Management
- Keith Crocker, Ph.D. (Carnegie Mellon) The William Elliott Professor of Insurance and Risk Management
- Robert P. Crum, D.B.A. (Kentucky) Associate Professor of Accounting
- Wayne DeSarbo, Ph.D. (Pennsylvania) Smeal Chair Distinguished Chaired Professor of Marketing
- Min Ding, Ph.D. (Pennsylvania) Professor of Marketing and Robert G. Schwartz Fellow
- Mark W. Dirsmith, Ph.D. (Northwestern) Deloitte & Touche Professor of Accounting
- Peter Ebbes, Ph.D. (Groningen) Assistant Professor of Marketing
- Charles R. Enis, D.B.A. (Maryland) Associate Professor of Accounting
- Heber Farnsworth, Ph.D. (Washington) Assistant Professor of Finance
- Laura Field, Ph.D. (California, Los Angeles) Associate Professor of Finance
- Paul E. Fischer, Ph.D. (Rochester) Chair, Department of Accounting; Professor of Accounting
- Duncan Fong, Ph.D. (Purdue) Chair, Department of Marketing; Professor of Marketing
- Raghu Garud, Ph.D. (Minnesota) Alvin H. Clemens Professor of Entrepreneurial Studies; Professor of Management and Organization, Research Director of the Farrell Center for Entrepreneurial Studies
- Fariborz Ghadar, D.B.A. (Harvard) Director, Center for Global Business Studies; William A. Shreyer Professor of Global Management, Policies, and Planning
- Dennis A. Gioia, Ph.D. (Florida State) Chair, Department of Management and Organization; Robert & Judith Klein Professor of Management
- Gary L. Gittings, Ph.D. (Penn State) Instructor in Supply Chain and Information Systems
- Dan Givoly, Ph.D. (NYU) Ernst & Young Professor of Accounting
- Marvin Goldberg, Ph.D. (Illinois) Irving & Irene Bard Emeritus Professor
- Guojin Gong, Ph.D. (Iowa) Assistant Professor of Accounting
- Barbara L. Gray, Ph.D. (Case Western Reserve) Professor of Organizational Behavior; Director, Center for Research in Conflict and Negotiation
- Rajdeep Grewal, Ph.D. (Cincinnati) Irving & Irene Bard Professor of Marketing
- Olesya Grishchenko, Ph.D. (New York) Assistant Professor of Finance
- V. Daniel Guide, Jr., Ph.D. (Georgia) Professor of Operations and Supply Chain Management; Charles & Lillian Binder Faculty Fellow
- Donald Hambrick, Ph.D. (Penn State) Smeal Chaired Professor of Management
- Terry P. Harrison Ph.D. (Tennessee) Professor of Supply Chain and Information Systems; Earl P. Strong Executive Education Professor in Business
- David Haushalter, Ph.D. (Purdue) Associate Professor of Finance; Academic Director Smeal Trading Room
- Jingzhi (Jay) Huang, Ph.D. (Northwestern) Associate Professor of Finance; David H. McKinley Professor of Business
- Zan Huang, Ph.D. (Arizona) Assistant Professor of Supply Chain and Information Systems
- Steven J. Huddart, Ph.D. (Yale) KPMG Professor of Accounting
- Stephen E. Humphrey, Ph.D. (Michigan State) Associate Professor of Management
- Peter Iliev, Ph.D. (Brown) Assistant Professor of Finance
- Austin J. Jaffe, Ph.D. (Illinois) Chair, Department of Insurance and Real Estate; Philip H. Sieg Professor of Business Administration; Director, International Programs; Associate Director, Institute for Real Estate Studies
- Elena Katok, Ph.D. (Penn State) Professor of Supply Chain Management; Co-Director, Laboratory for Economic Management and Auctions
- J. Edward Ketz, Ph.D. (Virginia Tech) Associate Professor of Accounting
- William Kracaw, Ph.D. (Utah) Chair, Department of Finance; David Sykes Professor of Finance
- Glen E. Kreiner, Ph.D. (Arizona State) Associate Professor of Management
- Mirko Kremer, Ph.D. (Mannheim) Assistant Professor of Supply Chain Management
- Akhil Kumar, Ph.D. (California, Berkeley) Professor of Information Systems
- Alok Kumar, Ph.D. (Wisconsin) Assistant Professor of Marketing
- Anthony Kwasnica, Ph.D. (Cal Tech) Associate Professor of Business Economics; Laboratory for Economic Management and Auctions
- John Liechty, Ph.D. (Cambridge) Associate Professor of Marketing and Statistics
- Gary L. Lilien, D.E.S. (Columbia) Distinguished Research Professor of Management Science; Research Director, Institute for the Study of Business Markets
- Dennis K. J. Lin (Wisconsin) University Distinguished Professor of Statistics and Supply Chain Management
- Henock Louis, Ph.D. (Ohio State) Associate Professor of Accounting
- Michelle B. Lowry, Ph.D. (Rochester) Associate Professor of Finance; Calderwood Faculty Fellow in Business
- James McKeown, Ph.D. (Michigan State) Mary Jean and Frank P. Smeal Chaired Professor Emeritus of Accounting
- Margaret Meloy, Ph.D. (Cornell) Associate Professor of Marketing
- James A. Miles, Ph.D. (Penn State) Professor of Finance; Joseph F. Bradley Fellow of Finance
- Vilmos F. Misangyi, Ph.D. (Florida) Assistant Professor of Management
- Karl Muller, Ph.D. (Illinois) Associate Professor of Accounting; Smeal Research Fellow in Accounting
- Chris J. Muscarella, Ph.D. (Purdue) Professor of Finance; L. W. 'Roy' and Mary Lois Clark Teaching Fellow
- Robert A. Novack, Ph.D. (Tennessee) Associate Professor of Supply Chain Management and Information Systems
- Ralph Oliva, Ph.D. (Rensselaer) Professor of Marketing; Executive Director, Institute for the Study of Business Markets
- Timothy Pollock, Ph.D. (Illinois) Associate Professor of Management
- Lisa L. Posey, Ph.D. (Pennsylvania) Associate Professor of Business Administration
- Arvind Rangaswamy, Ph.D. (Northwestern) Senior Associate Dean for Research and Faculty; Jonas H. Anchel Professor of Marketing
- Edward T. Reutzel, Ph.D. (Penn State) Associate Professor of Supply Chain Management
- Sajay Samuel, Ph.D. (Penn State) Clinical Associate Professor of Accounting & STS
- Jeffery M. Sharp, J.D. (Oklahoma) Associate Professor of Business Law
- Dennis P. Sheehan, Ph.D. (California) The Virginia and Louis Benzak Professor of Finance; Associate Dean of MBA Programs
- Jun Shu, Ph.D. (California, Berkeley) Assistant Professor of Supply Chain and Information Systems
- Timothy Simin, Ph.D. (Washington) Assistant Professor of Finance
- Charles H. Smith, Ph.D. (Penn State) KPMG Professor Emeritus of Accounting
- Charles C. Snow, Ph.D. (California) Professor of Business Administration; Mellon Foundation Faculty Fellow

- Fenghua Song, Ph.D. (Washington/St. Louis) Assistant Professor of Finance
- Alan J. Stenger, Ph.D. (Minnesota) Professor of Supply Chain Management
- John Stevens, Ph.D. (SUNY) Professor of Management and Organization
- Amy Xue Sun, Ph.D. (Carnegie Mellon) Assistant Professor of Accounting
- Gerald I. Susman, Ph.D. (UCLA) Emeritus Robert and Judith Klein Professor of Management; Director of the Center for the Management of Technological and Organizational Change; Director of the Smeal Sustainability Council
- Douglas J. Thomas, Ph.D. (Georgia Tech) Associate Professor of Supply Chain and Information Systems
- James B. Thomas, Ph.D. (Texas) Dean, Professor of Information Sciences and Management
- Evelyn A. Thomchick, Ph.D. (Clemson) Associate Professor of Supply Chain Management
- Sandra Transchel, Ph.D. (Mannheim) Assistant Professor of Supply Chain Management
- Linda K. Treviño, Ph.D. (Texas A&M) Professor of Organizational Behavior and Ethics; Distinguished Professor
- Wenpin Tsai, Ph.D. (London) Professor of Business Administration
- John E. Tyworth, Ph.D. (Oregon) Chair, Department of Supply Chain and Information Systems; Professor of Supply Chain Management
- Joel Vanden, Ph.D. (Berkeley) Associate Professor of Finance
- Albert A. Vicere, D.Ed. (Penn State) Professor of Business Administration
- Qiong Wang, Ph.D. (Florida) Assistant Professor of Marketing
- Jared Williams, Ph.D. (Northwestern) Assistant Professor of Finance
- Karen Winterich, Ph.D. (Pittsburgh) Assistant Professor of Marketing
- J. Randall Woolridge, Ph.D. (Iowa) Professor of Finance and The Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow; President, Nittany Lion Fund, LLC
- Susan H. Xu, Ph.D. (Rensselaer) Professor of Management Science and Supply Chain Management; Director, Ph.D. Program
- Jiro Yoshida, Ph.D. (Berkeley) Assistant Professor of Business

The Master of Business Administration program is a professional degree designed to prepare individuals for managerial positions in business, government, and nonprofit institutions. The M.B.A. curriculum blends technical rigor, managerial theory, and integrative learning experiences through case studies and other teaching methods. A managerial communications course is fully integrated into the program.

The Master of Science in Business Administration program is highly flexible and designed for advanced study in a specialized field. The M.S. program is directed toward the development of competency within a defined area of management. Fields such as accounting and management science are examples of career opportunities requiring specialized knowledge and skill, including research.

The Doctor of Philosophy degree in the Business Administration program offers advanced graduate education for students focused on research careers at leading business schools. The faculty of the college views the Ph.D. as evidencing scholarship at the highest level.

## Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants to the master's programs are required to take the Graduate Management Admission Test (GMAT); whereas applications to the doctoral program are required to take either the GMAT or the Graduate Record Examination (GRE) administered by the Educational Testing Service throughout a year. For dates, locations, and other information about the test, write for the Bulletin of Information, Graduate Management Admission Test, Educational Testing Service, Princeton, NJ 08540; [www.gmat.org](http://www.gmat.org); 800-982-6740.

Criteria for evaluating applicants include professional and academic accomplishments, GMAT scores, recommendations, and personal data from application forms that provide indications of future academic and professional accomplishment.

Work on the M.B.A. degree may be started fall semester only. M.S. and Ph.D. candidates may begin either the fall or spring semester. However, only rarely are admissions for the M.S. and Ph.D. programs granted for spring semester. Individuals from all undergraduate disciplines are encouraged to apply.

## Master's Degree Requirements

The M.B.A. program consists of two distinct portions: (1) preprogram competency expectations, including accounting, economics, mathematics, and statistics; and (2) 60 credits of graduate courses. Individuals who did not have adequate preparation in accounting, economics, mathematics, and statistics in their undergraduate programs are expected to develop the required minimum level of competency before graduate study can begin. The time required to complete this graduate program, based on full-time study, is twenty-one months. The student body is divided into diverse sections of approximately forty students, with each section proceeding through the same core classes each semester. Emphasis is placed on student interaction and shared learning both inside and outside the classroom.

The M.S. program consists of two distinct portions: (1) approximately 33 acceptable undergraduate foundation credits in business administration, economics, and mathematics; and (2) 30 graduate credits in business administration or related areas, including a paper or thesis. An applicant may be admitted without foundation courses, but they must be made up without degree credit. A professional paper and 3 additional credits of graduate-level course work can be substituted for the thesis.

## Doctoral Degree Requirements

**Competency Expectations:** Entrance into the doctoral program in business administration does not require the completion of an undergraduate degree specifically in business. While almost any major at the undergraduate level may be acceptable, graduate study in business administration does presume a minimum level of competency in mathematics, statistics, and computing. No transcript credit is required for entering doctoral candidates in these areas, except where specified by particular fields of specialization. However, it must be emphasized that lack of minimum competency in mathematics, statistics and computing could be a significant disadvantage to the candidate.

**Breadth Requirement:** All candidates are expected to develop a broad understanding of the functions of the business organization. To achieve breadth, all Ph.D. candidates must show competency by completing 12 credits of graduate course work in a minimum of two of the approved fields of study within the Smeal College of Business and in economics. The 12 credits in the breadth requirement must be taken in fields outside or separate from a candidate's primary, supporting, and research competency fields.

**Primary Field Requirements:** All candidates are required to achieve competency in a primary field of business administration. The primary field is the sphere of scholarship that commands the most extensive and intensive portion of a program and is the area in which the dissertation research and major professors are selected. Primary fields may be selected from the following: accounting; finance; insurance and real estate; management and organization; marketing; and supply chain and information systems.

Graduate work in a selected primary field may require competency in prerequisite areas, including undergraduate work in the field itself as well as prior work in mathematics, statistics, computer science, economics, and social and behavioral sciences. The prerequisite work will be specified by each primary field.

**Supporting Field Requirements:** All candidates must select a supporting field of study from business administration or related outside areas. Those spheres of scholarship complement the candidate's primary field. Supporting fields from business administration include all the primary fields. Outside supporting fields include, but are not limited to, anthropology, civil engineering, computer science, economics, industrial engineering, mathematics, political science, psychology, sociology, and statistics.

**Research Methods Field:** All candidates must develop a broad understanding of the scientific research process and in-depth competency in the research methods used in the primary field. Each candidate's doctoral committee shall specify a minimum of four graduate-level courses/12 credits (beyond the M.B.A. core courses) to constitute a supporting field in research methods. These courses should cover specific methods and tools relevant for research in the primary fields. A member of the doctoral committee shall be designated to represent the research methods field and shall be responsible for evaluating the candidate's competence in the field.

**Research Paper and Presentation Requirement:** To introduce students early to the research process, each Ph.D. student must complete a written research paper with two years after admission to the Ph.D. program. The student must then present the paper at an open departmental workshop or seminar within one semester after the paper is approved by the department committee and chair. The student must work under the guidance of a Research Paper Supervisor (who may or may not later be the thesis adviser). The research paper supervisor mentors the student, possibly suggesting the research topic, monitoring progress, providing ideas and feedback, and helping the student develop appropriate research, writing, and presentation skills. The paper must substantially represent the student's work, and must be written by the student. The paper must clearly define and motivate the problem being addressed, contain a

comprehensive literature review, and present the research contributions and conclusions. Approval of written paper and presentation can be used as a means to satisfy the University's English competence and communication requirement (to be completed before the comprehensive examination).

## Other Degree Programs

### QUALITY AND MANUFACTURING MANAGEMENT MASTER'S PROGRAM (QMM)

The QMM program is an integrated, one-year academic program requiring 30 credits and leading to a master's degree in Manufacturing Management. The Penn State College of Engineering and Smeal College of Business have jointly developed this curriculum so as to integrate the viewpoints and fundamentals of the disciplines on engineering and business as applied to quality and manufacturing management. The objective of the QMM program is to develop graduates who are prepared to assume leadership positions in manufacturing and to contribute through functional integration to the firm's competitiveness in global markets.

### M.B.A./M.M.M. CONCURRENT DEGREE PROGRAM

This concurrent degree program, an intensive two-year program that combines the M.B.A. degree and M.M.M. degree, is available for students interested in both degrees. In order to complete the concurrent degree within the two-year period, the student must opt for the Supply Chain Management portfolio in the MBA program.

### M.B.A./M.H.A. CONCURRENT DEGREE PROGRAM

The MBA program of Smeal College of Business and the Department of Health Policy and Administration of the College of Health and Human Development offer a concurrent degree program that will enable a student to finish in two academic years both a master's degree in Business Administration (M.B.A.) and a master's degree in Health Administration (M.H.A.). An M.B.A./M.H.A. graduate will be well-grounded in business management, health management, and the skills and expertise associated with functional areas of health services management. During the two academic years and intervening summer, the student will complete 63 credits of course work and a professional internship of 400 hours in a health care organization.

### FIVE-YEAR SCIENCE B.S./M.B.A. PROGRAM

This program is the result of collaboration between the Eberly College of Science and Smeal College of Business. With the accelerated nature of the program, students can earn a B.S. degree in science and an M.B.A. degree in five calendar years after graduation from high school. For the first three and one-half years, including the first semester of the M.B.A. curriculum, students are enrolled as undergraduates in the Eberly College of Science. For the remaining three semesters, participants are graduate students formally enrolled in the Smeal College of Business M.B.A. program. Successful completion of this program results in a B.S. degree in Science awarded by the Eberly College of Science during year four and an M.B.A. from the Smeal College of Business at the end of year five.

## Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, other awards are available to graduate students in Smeal College of Business.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [ACCOUNTING \(ACCTG\) course list](#)

Dr. Dan Givoly, *Chair*, 814-865-0041

### [BUSINESS ADMINISTRATION \(B A\):](#)

*The following courses require matriculation into the MBA program at University Park campus and are considered part of the MBA core curriculum:*

- 500. MARKETING MANAGEMENT (1-3)
- 501. MANAGEMENT (2)
- 502. TEAM PROCESSES AND PERFORMANCE (1-3)
- 504. ETHICAL LEADERSHIP (2)
- 505. NEGOTIATION THEORY AND SKILLS (1-3)
- 510. SUPPLY CHAIN AND OPERATIONS MANAGEMENT (1-3)
- 511. FINANCIAL ACCOUNTING (1-3)
- 512. RISK & DECISION (2)
- 515. BUSINESS STATISTICS FOR CONTEMPORARY DECISION MAKING (2)
- 517. LEADERSHIP COMMUNICATIONS (1-3)
- 521. INTRODUCTION TO MANAGERIAL ACCOUNTING (2)
- 523. INFORMATION TECHNOLOGY (2)
- 531. INTRODUCTION TO FINANCE (1-3)
- 532. GLOBAL BUSINESS ENVIRONMENT (1)
- 533. ECONOMICS FOR MANAGERS (2)
- 535. GLOBAL PERSPECTIVES (1)
- 536. INTERNATIONAL IMMERSION (2)
- 571. STRATEGIC MANAGEMENT (1-3)
- 575. CAPSTONE BUSINESS CASE (4)

*Courses outside the MBA core:*

- 528. BUSINESS SIMULATION (1-3)
- 545. BUSINESS, GOVERNMENT & INTERNATIONAL ECONOMICS (2)
- 565. STRATEGIC LEADERSHIP (1-3)
- 574. BUSINESS RESEARCH (1-3)
- 596. INDIVIDUAL STUDIES (1-9)
- 599. FOREIGN STUDY - BUSINESS ADMINISTRATION (1-12)

### [BUSINESS LAW \(B LAW\)](#)

525. BUSINESS LAW FOR INNOVATION & COMPETITION (2)

### [BUSINESS LOGISTICS \(B LOG\) course list](#)

Dr. John E. Tyworth, *Chair*, 814-865-1866

### [E-BUSINESS \(EBIZ\) course list](#)

### [ENTREPRENEURSHIP \(ENTR\)](#)

500. INNOVATION AND ENTREPRENEURSHIP (1-3)

### [FINANCE \(FIN\)](#)

515. NITTANY LION FUND MANAGER (3)

555. GLOBAL FINANCE (1-3)

570. FINANCIAL MODELING (2)

Dr. William A. Kracaw, *Chair*, 814-863-0486

[INFORMATION SCIENCES AND TECHNOLOGY \(IST\) course list](#)[INSURANCE \(INS\) course list](#)

Dr. Austin Jaffe, *Chair*, 814-865-1190

[INTERNATIONAL BUSINESS \(I B\)](#)

555.GLOBAL FINANCE (1-3)

Dr. Fariborz Ghadar, *Director*, 814-865-0544

[MANAGEMENT AND ORGANIZATION \(MGMT\)](#)

561. GLOBAL STRATEGY AND ORGANIZATION (1-3)

565. POWER & INFLUENCE (2)

Dr. Dennis Gioia, *Chair*, 814-865-2194

[MANAGEMENT INFORMATION SYSTEMS \(M I S\) course list](#)[MANAGEMENT SCIENCE AND INFORMATION SYSTEMS \(MS&IS\) course list](#)

John E. Tyworth, *Chair*, 814-865-1866

[MARKETING \(MKTG\) course list](#)

Dr. Hans Baumgartner, *Chair*, 814-863-3559

[OPERATIONS AND INFORMATION SYSTEMS MANAGEMENT \(OISM\) course list](#)[OPERATIONS MANAGEMENT \(OPMGT\) course list](#)[REAL ESTATE \(R EST\)](#)

515. PROPERTY RIGHTS IN A GLOBAL ECONOMY (2)

Dr. Austin Jaffe, *Chair*, 814-865-1190

[SUPPLY CHAIN MANAGEMENT \(SCM\) course list](#)**JOINT DEGREE OFFERING WITH THE PENN STATE DICKINSON SCHOOL OF LAW**

Smeal College of Business, University Park campus  
The Penn State Dickinson School of Law

**Degrees Conferred:**

J.D. (Dickinson) M.B.A. (The Smeal College)

*Joint degree program.* Smeal College of Business and the Penn State Dickinson School of Law offer a joint degree program leading to the degrees of Juris Doctor (J.D.) and Master of Business Administration (M.B.A.). We live in a global society where complex legal structures interact with dynamic and powerful market forces. Individuals with backgrounds in both business and law have a distinct advantage in understanding this interaction and are uniquely positioned for success in our modern society. The Juris Doctor/Master of Business Administration (J.D./M.B.A.) joint degree program provides outstanding, highly motivated students the opportunity to combine a Juris Doctor degree from the Penn State's Dickinson School of Law (DSL), one of America's oldest and most respected law schools, with an M.B.A. degree from Penn State's internationally ranked Smeal MBA Program (Smeal). Participants in this program earn both a Juris Doctor degree and a Master of Business Administration in four years compared to the five years required to earn the two degrees separately.

*Admission to the program.* In order to be admitted to the program, students may: (a) first be admitted and enrolled in either Smeal College or Dickinson and subsequently admitted to the other program; or (b) be admitted to the joint program prior to commencing studies at Penn State. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates.

**Admission Requirements**

Candidates must apply to DSL and Smeal separately and must meet each school's requirements. Visit the following Web sites for additional information regarding each school's application.

For DSL:

<http://www.dsl.psu.edu/admissions/applyjd.cfm>

For Smeal: <http://www.smeal.psu.edu/mba/admission/apply>

*Dickinson.* All applicants for the JD program must hold a bachelor's degree from a regionally accredited institution and are required to take the Law School Admissions Test (LSAT). Applicants must submit a JD application form; pay a \$60 nonrefundable application fee if using electronic methods (a \$70 nonrefundable application fee if using a downloaded application); submit a complete Law School Data Assembly Service (LSDAS) report; and provide two examples of written expression, an overview of your academic and professional experiences, and two letters of recommendation.

*MBA program in Smeal College.* All applicants for the MBA program must hold a bachelor's degree from a regionally accredited institution and are required to take the Graduate Management Admission Test (GMAT). They must also complete the online application (consisting of the application form, a professional resume, work history, and three essays); provide two copies of their prior academic transcripts; submit two letters of recommendation, and pay a \$60 nonrefundable application fee.

*Credit Requirements:* The J.D. degree at DSL requires a minimum of 88 credits and the Smeal M.B.A. degree requires a minimum of 60 credits. For students enrolled in the JD/MBA Program, DSL accepts the transfer of twelve (12) Smeal credits which all come from Smeal's required core curriculum. Similarly, Smeal accepts the transfer of twelve (12) credits from the DSL required core curriculum with the possibility of four (4) additional credits eligible for transfer from DSL's elective courses. Twelve of these credits come from the DSL required core curriculum while the possible other four of these credits would come from DSL's elective courses. Accordingly, students must take a **minimum** of 76 credits from DSL and 44-48 credits from Smeal in order to complete the JD/MBA program.

Pursuant to University policy, the transfer credits may not be applied to their corresponding joint degree until a participant has completed at least one year of study in both DSL and Smeal.

*Current DSL Students:* Students currently enrolled at DSL in the JD program may apply to the JD/MBA program during their first or second year of study by applying for admission to Smeal.

*Sequence.* Students may choose to conduct their study in either of the two sequences shown below. Each "Year" refers to the traditional academic year beginning in late August and concluding in May. In addition, DSL offers a limited number of courses during the summer term. Smeal does not offer any classes over the summer term.

**Option 1**

Year 1: JD Foundation Course work at either the Carlisle or the University Park location

Year 2: MBA Foundation Course work at the University Park location

Year 3: Combination of JD and MBA Course work at the University Park location

Year 4: JD Upper Level Course work at either the Carlisle or the University Park location

**Option 2**

Year 1: JD Foundation Course work at either the Carlisle or the University Park location

Year 2: JD Upper Level Course work at either the Carlisle or the University Park location

Year 3: MBA Foundation Course work at the University park location

Year 4: Combination of JD and MBA Course work at the University Park location. Students complete at least one year at University Park campus and one year at Dickinson before being able to cross-count courses. It is anticipated that after one year at each location, a student will spend one additional semester at Smeal and three more semesters at Dickinson

**Transfer of Credits: M.B.A.** Twelve (12) credits from Dickinson course work may be transferred toward the M.B.A. degree at Smeal. Courses for which such credit may be applied shall be subject to approval by Smeal based on relevance to the MBA program. Students must obtain a grade satisfactory to Smeal for any J.D. course work to be credited toward the M.B.A. degree. (Up to four (4) additional DSL credits may be considered for transfer to Smeal.)

**Transfer of Credits: J.D.** A maximum of 12 credits for M.B.A. course work may be transferred for credit toward the J.D. degree at the Dickinson School of Law. Courses for which such credit may be applied shall be subject to approval by the Dickinson faculty. Students must obtain a grade satisfactory to Dickinson for any M.B.A. course work to be credited toward the J.D. degree.

**Advising of Students.** All students in the program shall have two advisers, one from Smeal and one from Dickinson. Periodic interaction between the two advisers is encouraged.

**Graduation.** It is anticipated that students will complete a minimum of 44 credits from the Smeal College and 76 credits from The Dickinson School of Law in order to obtain the joint M.B.A. and J.D. degrees from those institutions. However, a student can graduate with one degree before the other as long as he/she has completed all of the requirements for that degree.

## JOINT DEGREE OFFERING WITH THE PENN STATE HERSHEY COLLEGE OF MEDICINE

Hershey College of Medicine, Hershey campus  
Smeal College of Business, University Park campus

Degrees Conferred: M.D. (Hershey) M.B.A. (The Smeal College)

**Joint degree program.** Smeal College of Business and the Penn State Hershey College of Medicine offer a joint degree program leading to the degrees of Medical Doctor (M.D.) and Master of Business Administration (M.B.A.). The objective of the program is to produce highly qualified clinicians who also understand the challenges of running a business. The Medical Doctor/Master of Business Administration (M.D./M.B.A.) joint degree program provides outstanding students the opportunity to combine a Medical Doctor degree from the College of Medicine, a highly respected medical college and medical center, with an M.B.A. degree from Penn State's internationally ranked Smeal MBA Program (Smeal). Participants in this program earn both a Medical Doctor degree and a Master of Business Administration in five years compared to the six years required to earn the two degrees separately.

**Admission to the program.** In order to be admitted to the program, students must first be admitted and enrolled in the COM as a medical student and subsequently admitted to Smeal. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates.

### Admission Requirements

Candidates must apply to the College of Medicine and the Smeal College of Business separately and must meet each school's requirements. Visit the following websites for additional information regarding each schools application.

For COM: <http://www.hmc.psu.edu/md/admissions/requirements.html>

For Smeal: [www.smeal.psu.edu/mba/admission/apply](http://www.smeal.psu.edu/mba/admission/apply)

*College of Medicine: Specific Admission Requirements for the M.D. Degree Program*

**Biology:** One year of college biology plus laboratory is required.

**Chemistry:** Two years of college chemistry (organic and inorganic) with laboratory is required.

**Humanities:** One-half year (or one semester) of humanities is required. Courses recommended are in disciplines such as philosophy, history, literature, language, anthropology, ethics, and theology.

**Physics:** One year of college physics with laboratory is required.

**Mathematics:** One year of college mathematics is required. Biomedical science emphasizes the quantitative approach. Students should have a background in calculus, basic statistical methods, and probability.

**Behavioral Science:** One semester of college study in the behavioral sciences is required. Courses recommended are in disciplines such as psychology, sociology, cultural anthropology, and ecology.

**English:** Although there is no formal course requirement for English, students are expected to have a strong background in writing, oral communication, and critical reading skills.

Applicants for admission to the College of Medicine are required to have completed three years of undergraduate study at an accredited college or university.

Applicants for admission to the College of Medicine must have completed a baccalaureate degree by the time of matriculation.

Applicants are strongly encouraged to complete required science courses before applying. All academic prerequisites must be completed before matriculation.

Completion of the Medical College Admissions Test (MCAT) is required for application to the College of Medicine. Applicants are encouraged to take the examination during the spring of the application year. The College of Medicine will not accept MCAT test scores earlier than three calendar years previous to the year of matriculation, nor those taken during the year of matriculation (January dates).

*Smeal College of Business: Specific Admission Requirements for the MBA Program*

For admission to the Graduate School, U. S. applicants must have received, from a regionally accredited institution, a bachelor's degree with requirements substantially equivalent to those at Penn State. (Penn State is accredited by the Middle States Association of Colleges and Schools.) International applicants must have a tertiary (postsecondary) degree that is deemed comparable to a four-year U. S. bachelor's degree to apply for admission. This degree must be from an officially recognized degree-granting institution in the country in which it operates. All applicants are required to take the Graduate Management Admissions Test (GMAT). They must also complete the online application (consisting of the application form, a professional resume, work history, and three essays); provide two copies of their prior academic transcripts; submit two letters of recommendation, and pay a nonrefundable application fee. All international applicants whose first language is not English must take the TOEFL (Test of English as a Foreign Language) and submit the results of that test with the application for admission. International applicants are exempt from the TOEFL requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

**Credit Requirements:** The MD degree at College of Medicine requires a minimum of two hundred twenty nine (229) credits and the Smeal College of Business MBA degree requires a minimum of sixty (60) credits. For students enrolled in the MD/MBA Program, the College of Medicine accepts the transfer of forty five (45) Smeal credits, forty one (41) of which come from Smeal's required core curriculum and four (4) of which come from Smeal electives. Similarly, Smeal accepts a transfer of at least twelve (12) credits from the College of Medicine, nine (9) of which come from the required core curriculum and three (3) from prescribed electives, with the possibility of three (3) additional credits eligible for transfer from the College of Medicine's elective courses. Accordingly, students must take **minimum** of two hundred nine (209) credits from the College of Medicine and forty five (45) credits from the Smeal College of Business in order to complete the MD/MBA program.

Pursuant to University policy, the transfer credits may not be applied to their corresponding joint degree until a participant has completed at least one year of study in both the College of Medicine and the Smeal College of Business.

**Current College of Medicine Students:** Students currently enrolled at the College of Medicine in the MD program may apply to the MD/MBA program during their first three years at the College of Medicine by applying for admission to the Smeal College of Business.

*Sequence:* Students may choose to conduct their study in either of the two sequences shown below. Each "Year" refers to the traditional academic year beginning in late August and concluding in May. The College of Medicine students can expect to take courses during the summer. The Smeal College of Business does not offer any classes over the summer term.

Years 1-3: MD foundation and advanced coursework at the College of Medicine.

Year 4: MBA foundation coursework at the University Park location.

Year 5: Combination of MD and MBA coursework at the University Park location.

*Transfer of Credits MBA:* fifteen (15) credits from the College of Medicine course work may be transferred toward the MBA degree at Smeal. Courses for which such credit may be applied shall be subject to approval by Smeal based on relevance to the MBA program. Students must obtain a grade satisfactory to Smeal (High Pass or Low Pass) for any MD course work to be credited toward the MBA degree.

*Transfer of Credits MD:* A maximum of forty five (45) credits for MBA course work may be transferred for credit toward the MD degree at the COM. Courses for which such credit may be applied shall be subject to approval by the College of Medicine faculty. Students must obtain a grade satisfactory to the College of Medicine (a grade of "C" or higher) for any MBA course work to be credited toward the MD degree.

*Advising of Students:* All students in the program shall have two advisers, one from the Smeal College of Business and one from the College of Medicine. Periodic interaction between the two advisers is encouraged.

*Graduation:* It is anticipated that students will complete a minimum of two hundred nine (209) credits from the College of Medicine and forty five (45) credits from the Smeal College of Business in order to obtain the joint MBA and MD degrees from those institutions. However, a student can graduate with one degree before the other as long as he/she has completed all of the requirements for that degree.

Faculty updated: 5/10/12

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-03-086

Review Date: 11/08/2011



## Business Administration (B ADM)

[Program Home Page](#)

ALFRED G. WARNER, *Director of the M.B.A. Program*  
Penn State Erie, The Behrend College  
5101 Jordan Road  
Erie, PA 16563

### Degree Conferred:

M.B.A.

### Associate Members of the Graduate Faculty

- Kerry A. Adzima, Ph.D. (West Virginia) Assistant Professor of Economics
- S. Saad Andaleeb, Ph.D. (Illinois) Professor of Marketing
- Pelin Bicen, Ph.D. (Texas Tech University) Assistant Professor of Marketing
- Brian L. Boscaljon, Ph.D. (Texas Tech) Associate Professor of Finance
- Charles A. Brown, Ph.D. (Kent State) Associate Professor of Accounting
- Michael E. Brown, Ph.D. (Penn State) Associate Professor of Management
- Ozgun Caiskan Demirag, Ph.D. (Georgia Institute of Technology) Assistant Professor of Management
- Michael Chuang, Ph.D. (University of Illinois at Urbana-Champaign) Assistant Professor of Management
- Ashutosh V. Deshmukh, Ph.D. (Memphis State) Professor of Accounting
- David T. Doran, Ph.D. (Pittsburgh) Associate Professor of Accounting
- James F. Fairbank, Ph.D. (Penn State) Associate Professor of Management
- Michael G. Filbeck, D.B.A. (Kentucky) Professor of Finance and Samuel Patton Black III Chair in Insurance and Risk Management
- John L. Fizel, Ph.D. (Michigan State) Professor of Economics
- Hunter Holzhauser, Ph.D. (Mississippi State University) Assistant Professor of Finance
- Eric C. Jackson, Ph.D. (Michigan State) Assistant Professor of Management
- William Johnson, Ph.D. (York University) Associate Professor of Management
- James A. Kurre, Ph.D. (Wayne State) Associate Professor of Economics
- Kenneth K. T. Louie, Ph.D. (Illinois) Associate Professor of Economics
- John M. Magenau, Ph.D. (SUNY, Buffalo) Associate Professor of Management
- Phylis M. Mansfield, Ph.D. (Memphis) Associate Professor of Marketing
- Ido Millet, Ph.D. (Pennsylvania) Professor of Management Information Systems
- Diane H. Parente, Ph.D. (SUNY, Buffalo) Professor of Management
- Jeffrey K. Pinto, Ph.D. (Pittsburgh) Professor of Management and Andrew Morrow and Elizabeth Lee Black Chair in Management Technology
- Mary Beth Pinto, Ph.D. (Pittsburgh) Professor of Marketing
- Matthew E. Swinarski, Ph.D. (SUNY, Buffalo) Assistant Professor of Management Information Systems
- Margaret A. Thoms, Ph.D. (Ohio State) Professor of Management
- Ray R. Venkataraman, Ph.D. (Illinois Inst of Tech) Associate Professor of Management
- Alfred G. Warner, Ph.D. (Ohio State) Associate Professor of Management
- Jessica Xin Zhao, Ph.D. (SUNY, Buffalo) Assistant Professor of Finance

The Penn State Erie M.B.A. is a general degree emphasizing development of the planning and problem-solving skills crucial in middle and upper management. Course work emphasizes the integration of business functions and the practical application of theory in the business world, using cases, simulated problems and actual situations students are experiencing at work. Many students are fully employed professionals who bring a wealth of knowledge and experience to the classroom. Both full-time and part-time study are possible and the program can be completed by attending evening and daytime classes.

### Admission Requirements

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants are required to take the Graduate Management Admissions Test (GMAT) administered by the Educational Testing Service, Box 966, Princeton, NJ 08541; telephone (609) 771-7330.

Admission decisions are based on the following: undergraduate grade-point average; the degree of correspondence between the applicant's objectives and those of the program; three letters of reference; and GMAT score. Favorable consideration will be given to applicants who have significant work experience. An applicant's GMAT score plus undergraduate grade-point average (multiplied by 200) must total at least 1,050 to be considered for admission. A minimum GMAT score of 450 is required. However, admission is competitive and higher scores may be required, depending on the qualifications of the applicants. Entering graduate students for whom English is not the first language are required to have a TOEFL (Test of English as a Foreign Language) score of at least 550 on the paper-based test and at least 213 on the computer-based test, or 80 points on the new Internet-based test with a minimum of 23 points on the speaking portion; or the International English Language Testing System (IELTS) with a minimum composite score of 6.5 for admission. Admission is open during the fall and spring semesters, as well as during the summer session.

Applicants must demonstrate proficiency in writing by having earned a grade of B or higher in a college English composition or writing course or by achieving a score of four or higher on the GMAT Analytical Writing Assessment. Students who fail to meet at least one of these two criteria must complete a college English composition or writing course and earn a grade of B or higher or retake the GMAT test and score four or higher on the Analytical Writing Assessment. This requirement must be satisfied during either the first semester or summer session of the student's matriculation.

All students must be computer literate and have ready and reliable access to a computer and the Internet to successfully complete the MBA program. Students must know how to use word processing software, log-on to an Internet provider, and use E-mail. Additionally, MBS students must have a working knowledge of Microsoft Office programs including Word, Excel, Power Point, and Access.

### Master's Degree Requirements

The Master of Business Administration degree program consists of three parts:

**Foundation Core Courses (15 credits):** These courses introduce students to accounting, economics, finance, management, marketing, operations management, and the application of quantitative methods to the analysis of business problems. Completion of the foundation core, consisting of B ADM 500, B ADM 501, and B ADM 503, prepares students for the program's advanced required courses and electives. The foundation core is required of all applicants who have not completed an undergraduate degree in business or previous undergraduate or graduate course work relevant to the foundation core requirements.

Applicants who have, within seven years prior to the date of their admission to degree candidacy, completed a baccalaureate degree in business from a regionally accredited institution that includes course content equivalent to the foundation core courses may be exempted from part or all of this requirement as long as the previously completed courses carry grades of B or higher. An applicant who, within seven years prior to his or her admission to degree candidacy, completed a baccalaureate degree in a non-business field from a regionally accredited institution that includes equivalent undergraduate or graduate courses carrying a grade of B or higher also may be exempted from relevant portions of the foundation core courses. Applicants who have maintained currency of knowledge through relevant business experience and continuing professional education in one or more of the areas within the foundation core courses and who completed relevant course work more than seven years prior to admission to degree status may also be exempted from relevant portions of foundation core requirements. Exemption from foundation core requirements is granted in accordance with the course exemption guidelines for the MBA program.

**Advanced Required Courses (21 credits):** These courses build on the knowledge base established in the foundation core and provide greater depth of knowledge in the subject areas included. This component of the MBA program consists of seven 3-credit courses that cover advanced topics in cost management, managing effective organizations, quantitative methods for business, leadership and ethics, corporate finance, marketing strategy, and strategic management and business policy.

All students are required to complete this requirement which includes B ADM 510, B ADM 512, B ADM 513, B ADM 514, B ADM 526, B ADM 532 and B ADM 554 unless they can demonstrate advanced knowledge of the course subject matter through prior course work, extensive experience and/or advanced professional education. Students who believe they have knowledge of an advanced required course must submit a written request and documentation describing their knowledge of the course subject matter. If approved, the student will substitute an additional elective course for the advanced required course.

**Elective Courses (9 credits):** All students are required to take 9 credits of elective courses covering advanced topics of their choice. Electives must include at least 3 credits of Management Information Science course work from the program approved list of courses. MBA students may apply a maximum of 6 credits of approved 400-level course work toward elective requirements. Course work at the 400 level must be approved by the director of the MBA program and cannot have been used for another degree.

**Transfer Credits:** Students may transfer a maximum of 9 credit hours from another regionally accredited graduate program or recognized degree-granting institution to fulfill elective or advanced required courses. Application of transfer credits to the student's academic program must be approved by the director of the MBA program and be in compliance with Graduate School requirements described in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

## Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Foundation Core Courses:

#### BUSINESS ADMINISTRATION (B ADM)

- 501. Costs, Competition, and Market Performance (6)
- 502. Demand, Operations, and Firm Performance (6)
- 503. Integrated Business Analysis (3)

### Advanced Required Courses:

#### BUSINESS ADMINISTRATION (B ADM)

- 510. Cost Management for Decision Making and Control (3)
- 512. Managing Effective Organizations (3)
- 513. Quantitative Methods for Business (3)
- 514. Strategic Planning and Business Policy (3)
- 526. Leadership and Ethics (3)
- 532. Corporate Finance (3)
- 554. Marketing Strategy (30)

### Elective Courses:

#### BUSINESS ADMINISTRATION (B ADM)

- 511. Information Systems Management and Strategy (3)
- 520. Entrepreneurial Ventures (3)
- 521. Leadership Seminar (3)
- 522. Business Solutions (3)
- 523. International Business (3)
- 524. Operations Strategy (3)
- 525. Innovation and Change Management (3)
- 530. Investment Theory (3)
- 531. Business Forecasting (3)
- 532. Corporate Finance (3)
- 533. Derivatives (3)
- 550. Global Marketing (3)
- 551. Marketing Research (3)
- 552. Service Marketing (3)
- 553. Consumer Behavior (3)
- 562. Financial Statement Analysis (3)
- 563. Financial Electronic Commerce (3)
- 590. Colloquium (1-3)
- 595. Internship (1-18)
- 596. Independent Studies (1-9)
- 597. Special Topics (1-9)
- 598. Special Topics (1-9)
- 599. Foreign Studies (1-12)

#### ECONOMICS (ECON)

- 410. Economics of Labor Markets (3)
- 420. Money, Banking, and Economic Activity (3)
- 430. Regional Economic Analysis (3)
- 440. Industrial Organization (3)
- 450. Managerial Economics (3)
- 460. Business Forecasting Techniques (3)
- 462. Advanced Business Forecasting Techniques (3)
- 470. International Trade and Finance (3)
- 485. Econometric Techniques (3)
- 497. Special Topics (1-6)

#### FINANCE (FIN)

- 400. Problems in Financial Management (3)
- 410. Introduction to Investments (3)
- 430. Estate Planning (3)
- 450. Retirement Planning (3)
- 460. Investment Analysis (3)
- 470. International Financial Management (3)
- 480. Advanced Financial Analysis (3)
- 497. Special Topics (1-6)

#### MANAGEMENT (MANGT)

- 510. Project Management (3)

**MANAGEMENT (MGMT)**

- 410. Project Management (3)
- 420. Conflict Management (3)
- 440. Advanced Human Resource Management (3)
- 461. International Management (3)
- 497. Special Topics (1-6)

**MANAGEMENT INFORMATION SYSTEMS (MIS)**

- 430. Systems Analysis (3)
- 435. Systems Design and Implementation (3)
- 440. Expert Systems (3)
- 445. Management Reporting Systems (3)
- 470. Advanced Applications Development (3)
- 497. Special Topics (1-6)

**MARKETING (MKTG)**

- 400. Retailing (3)
- 410. Personal Selling (3)
- 420. Sales Management (3)
- 470. Global Marketing (3)
- 497. Special Topics (1-6)

**SUPPLY CHAIN MANAGEMENT (SCM)**

- 445. Operations Planning and Control (3)
- 455. Logistics Systems Analysis and Design (3)
- 460. Purchasing and Materials Management (3)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BUSINESS ADMINISTRATION \(B ADM\):](#)

[ECONOMICS \(ECON\) course list](#)

[FINANCE \(FIN\) course list](#)

[INTERNATIONAL BUSINESS \(INT B\) course list](#)

[MANAGEMENT \(MGMT\) course list](#)

[MANAGEMENT INFORMATION SYSTEMS \(MIS\) course list](#)

[MARKETING \(MKTG\) course list](#)

[SUPPLY CHAIN MANAGEMENT \(SCM\) course list](#)

Date Last Updated by Publications: 6/9/08

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-009

Review Date: 06/21/2011

## Business Administration (BADMN)

[Program Home Page](#)

RICHARD YOUNG, *Graduate Program Director*  
Penn State Harrisburg, School of Business Administration  
777 West Harrisburg Pike  
E-355 Olmsted Building  
Middletown, PA 17057-4898  
717-948-6140; [mbahbq@psu.edu](mailto:mbahbq@psu.edu)

### Degree Conferred:

M.B.A.

### The Graduate Faculty

- Thomas Amlie, Ph.D. (Maryland) *Associate Professor of Accounting*
- Nihal Bayraktar, Ph.D. (Maryland) *Associate Professor of Economics*
- Marie Blouin, Ph.D. (Buffalo) *Assistant Professor of Accounting*
- Melvin Blumberg, Ph.D. (Penn State) *Professor of Management*
- Terence A. Brown, D.B.A. (Maryland) *Associate Professor of Transportation and Marketing*
- Qiang Bu, Ph.D. (Massachusetts) *Assistant Professor of Finance*
- Thomas Buttross, Ph.D. (Mississippi) *Associate Professor of Accounting*
- Refik Culpun, Ph.D. (NYU) *Professor of Management and International Business*
- Patrick Cusatis, Ph.D. (Penn State) *Associate Professor of Finance*
- Raymond Gibney Jr., Ph.D. (Pittsburgh) *Assistant Professor of Management*
- Jean E. Harris, Ph.D. (Virginia Tech) *Associate Professor of Accounting*
- Indrit Hoxha, Ph.D. (Houston) *Assistant Professor of Economics*
- Rhoda Joseph, Ph.D. (Baruch) *Associate Professor of Information Systems*
- Erdener Kaynak, Ph.D. (Cranfield) *Professor of Marketing*
- Mukund S. Kulkarni, Ph.D. (Kentucky) *Chancellor, Professor of Finance*
- Roderick Lee, Ph.D. (Penn State) *Assistant Professor of Information Systems*
- David A. Morand, Ph.D. (Cornell) *Professor of Management*
- Dinesh Pai, Ph.D. (Rutgers) *Assistant Professor of Supply Chain Management*
- Parag C. Pendharkar, D.B.A. (Southern Illinois) *Professor of Information Systems*
- Robert D. Russell, Ph.D. (Pittsburgh) *Assistant Professor of Management*
- Stephen P. Schappe, Ph.D. (Ohio State) *Director, School of Business Administration; Associate Professor of Management*
- Richard Scheib, J.D. (Georgetown) *Instructor in Accounting*
- Girish Subramanian, Ph.D. (Temple) *Professor of Information Systems*
- Peter Swan, Ph.D. (Michigan) *Associate Professor of Logistics and Operations Management*
- Zinaida Taran, Ph.D. (Rutgers) *Assistant Professor of Marketing*
- Oranee Tawatuntachai, Ph.D. (New Orleans) *Associate Professor of Finance*
- Premal P. Vora, Ph.D. (Penn State) *Associate Professor of Finance*
- Ji Wu, Ph.D. (Drexel) *Assistant Professor of Economics*
- Richard R. Young, Ph.D. (Penn State) *Professor of Supply Chain Management*
- Ugur Yucelt, Ph.D. (New School) *Associate Professor of Marketing*

### The Program

Students served by the M.B.A. program are, primarily, nontraditional and reside in south-central Pennsylvania. With the exception of a small percentage of students who are full-time, they are employees of area businesses, state and local governments, and not-for-profit organizations, who study on a part-time basis. In order to accommodate both full- and part-time students, courses are offered primarily in the late afternoon and evening--with occasional offerings on weekends.

The program is intended not only to satisfy current individual needs for professional growth, but also to foster lifelong learning. As an outcome of the program, students may expect to gain participative strengths, problem solving and critical thinking skills, technical expertise, and desirable attitudes and values, particularly ethical values needed in the conduct of business.

To strengthen the educational experience, the Program places high priority on teaching and currency of curriculum, with an emphasis on oral and written communication, research, and cross-functional integration of concepts.

### Admission Requirements

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Decisions are based primarily on undergraduate junior/senior grade-point average and scores from either the Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE).

(Please visit

[www.mba.com/](http://www.mba.com/)

for more information about the GMAT) or [www.ets.org/gre](http://www.ets.org/gre) for information about the GRE). Postbaccalaureate course work, professional experience, and the statements provided in the application are also taken into account.

Students are also required to submit:

- --a completed online application form with application fee
- --two copies of official transcripts from all colleges or universities attended
- --GMAT or GRE test scores (the test must have been taken within the past five years)
- --two letters of recommendation

For complete admission information, on-line application, and the latest updates on admission requirements and procedures, please consult the College Web page at

[www.hbg.psu.edu/](http://www.hbg.psu.edu/)

### International Students

The language of instruction at Penn State is English. All international applicants must take and submit scores from the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana,

Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

All students with international credentials must submit transcripts for a "course by course" academic evaluation of transcripts and degree.

### Application Dates

Candidates may enter the program at the beginning of the fall or spring semester, or the summer session. To allow time for applications to be processed, all information, including the GMAT or GRE score, should be received by the admissions office no later than July 18 for admission to the fall semester, November 18 for the spring semester, and April 18 for admission to the summer session.

Applicants from outside the United States must follow the early-admission dates in order to allow the necessary clearances and paperwork to be processed in time. International application deadline dates are:

- Fall Semester--May 31
- Spring Semester--September 30
- Summer Session--February 28

### Preparation for the Program

**Analytic Skills Requirement:** Prior to enrolling in their M.B.A. course work, students must demonstrate competence in analytic skills. This requirement can be satisfied in one of two ways: (1) by satisfactory completion of college-level courses in calculus and statistics such as QUANT 310 or MATH 110, plus STAT 200; or (2) by successful completion of proficiency examinations in calculus and statistics approved by the M.B.A. Program. This requirement must be satisfied by the first semester or summer session of the student's matriculation, and completed with a grade of C or higher.

**Credit by examination:** Interested students should obtain a Credit by Examination form from Enrollment Services and consult with the M.B.A. Program to obtain a list of suggested preparatory materials and schedule the exam.

**Computer Skills Requirement:** Students are required to demonstrate proficiency in the use of microcomputer applications. This requirement can be satisfied through a college-level microcomputer applications course within the past five years with a grade of B or higher, or by documented, significant, computer-related work experience. If this requirement has not been met prior to admission, a college-level microcomputer course such as MIS 103 or COMPSC 203 is required. Course work must be completed by the first semester or summer session of the student's matriculation with a grade of B or higher.

**Communications Skills Requirement:** Successful completion of the M.B.A. Program requires the ability to think clearly, and to write and speak persuasively. Part of this requirement can be satisfied by achieving a score of "4" or higher on the Graduate Management Admission Test (GMAT) Analytical Writing Assessment. If this score is not achieved, students must satisfy this requirement through additional course work in writing skills such as ENGL 202D or other work developed in consultation with the M.B.A. Program. This requirement must be satisfied by the first semester or summer session of the student's matriculation. All courses taken must be completed with a grade of B or higher. The speech component of this requirement is satisfied through individual and group presentations in BUS 500 and other courses in the M.B.A. Program.

### Foundation Courses:

The MBA Program is grounded in the academic disciplines of accounting, finance, economics, marketing, management, and information sciences, among others, in order to provide students with the conceptual foundation required for competent pursuit of more advanced studies in business administration as well as the ethical and legal management of profit and non-profit organizations. This background can be provided by course work taken as part of a comprehensive and integrated, four-year degree program at an accredited, college-level institution, or through graduate course work. All courses must have been completed with a grade of B or higher, within seven years prior to admission to the M.B.A. Program. Course work not meeting the tests of relevancy, quality, or currency must be taken at the graduate level prior to starting the 30-credit M.B.A. Program. Time limits may be waived by the M.B.A. Program on the basis of post-graduation training or current and relevant work experience. Courses available at Penn State Harrisburg that provide the necessary foundation for graduate business study include: ACCT 501, BUS 500, BUS 505, BUSEC 502, BUSEC 503, MNGMT 511; either MNGMT 522 or MNGMT 523; and MRKT 513.

### Degree Requirements

The M.B.A. degree requires 30 credits of course work at the graduate level (500-level or higher). These credits are distributed over two clusters of courses: Prescribed Courses and Elective Courses/Tracks.

**Prescribed Courses:** 18 credits, aimed at developing general competence for overall management. ACCT 540, BUS 515, BUS 588, BUS 589, FINAN 521, INFSY 540, MNGMT 514, MKTG 514.

**Elective Courses/Tracks:** 12 credits. Students may elect courses in clusters of "Tracks" organized around a common theme designed to be integrative and cohesive. The Tracks provide competencies and skill sets for decision making in five areas: (1) the E-business Track is intended to provide competencies enabling managers to develop and implement a global marketing strategy using Internet-based technology; (2) the Human Resource Management Track is intended to provide competencies enabling managers to organize and operate high performing work organizations that are both efficient and human; (3) the Financial Analysis Track provides competencies needed to control competitive performance, and to develop improvement and innovation in all parts of the organization; (4) the Accounting Track is designed to offer those additional courses for students having prior academic preparation in accounting to enable them to take the Certified Public Accountant examination; and (5) the General Business Track is provided for students who wish to develop a broad generalist program, or who have a particular personal or professional goals not met by one of the other tracks.

### Tracks:

**E-business:** The objective of this Track is to examine and apply concepts, models, and techniques from the fields of business and information technology for value chain management and support of the domestic and global strategy of the business enterprise. Internet technologies that enable opportunities in marketing, sales, research and development, promotion, procurement, inventory control, manufacturing, supply chain management, order status checking, and payment systems are examined.

- INFSY 543 Foundations of E-business (3)
- MRKT 586 Internet Marketing (3)

Select 6 credits:

Select 6 credits from INFSY 544(3); MRKT 587(3); or, in consultation with an adviser, from courses in such areas as supply chain management; research and development; promotion; inventory control; procurement; international finance; and international management to meet the objectives of the Track.

**Human Resource Management:** The objective of this Track is to examine and apply models and techniques from human resources management, labor relations, and behavioral science for the planning and organization of work and work systems to promote cooperation and collaboration, individual and group initiative, innovation, motivation, and flexibility. Also examined are techniques and mechanisms used to develop and maintain a work environment and work climate supportive of performance excellence, full participation, employee well-being and satisfaction, and personal and organizational learning and growth.

- MNGMT 505 Managing Human Resources(3)
- MNGMT 515 Labor Management Relations(3)
- MNGMT 545 Employment Law for Business(3)

Select 3 credits:

Select 3 credits from MNGMT 520(3); MNGMT 570(3); or, in consultation with an adviser, from courses in such areas as human resources management; labor relations; behavioral science; and international management to meet the objectives of the Track.

**Accounting:** The objective of this track is to provide the student, when combined with an undergraduate degree in accounting or sufficient additional coursework, with the stipulated number of academic credits to meet the education requirements of the Pennsylvania Institute of Certified Public Accountants for taking the C.P.A. examination. Emphasis is placed on advanced level accounting skills including auditing, financial reporting, and taxation.

In consultation with their adviser, a student shall select 12 credits from the following:

- ACCT 504 Auditing Theory and Practice (3)
- ACCT 510 Business Tax Planning: Theory and Practice (3)

- ACCT 545 Strategic Cost Management (3)
- ACCT 572 Financial Reporting I (3)
- ACCT 573 Financial Reporting II (3)

*Financial Analysis:* The objective of this Track is to examine and apply models and techniques from finance and accounting for the planning, analysis, control, and improvement of competitive performance, organizational health, ethical business practices, performance capabilities, and progress toward key business results, strategic objectives, and changing organizational goals. Particular emphasis is placed on approaches for translating those analyses into priorities for improvement and opportunities for innovation at all levels, and in all parts of the organization.

- FINAN 531 Managing Financial Operations(3)
- ACCT 561 Financial Statement Analysis II(3)

Select 6 credits:

Select 6 graduate credits in Accounting and/or Finance, in consultation with an adviser, to meet the objectives of the Track.

*General Business:* The objective of this Track is to allow students to select graduate courses that meet their personal and professional goals.

Select 12 credits:

Select 12 graduate credits, in consultation with an adviser, to meet the objectives of the Track. With Program approval, a maximum of 6 graduate credits may be selected in courses outside the School of Business Administration.

### Transfer Credit and Course Substitutions

*Transfer Credits:* Up to 10 transfer credits may be applied toward the degree. However, credits used to complete a previous degree may not be applied. Transfer credits must have been completed within the past five years, appear on a graduate transcript, and have been passed with a B grade or higher and been earned in an equivalent graduate-level program at a regionally accredited, college-level institution. It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg.

*Course substitutions:* Some students enter the Program with advanced coursework in one or more subject areas (e.g., a degree in accounting plus a C.P.A.) making some prescribed coursework redundant. Except for BUS 588 and BUS 589, both of which must be taken at Penn State Harrisburg, students may petition or be advised by the Program to replace up to 6 credits in Prescribed Courses with an equivalent number of credits of more advanced graduate courses in the same subject area. Courses must have been completed at a regionally accredited institution within the past five years and have earned a grade of B or higher.

### Grade-point Average and Time Limit

A 3.00 (out of 4.00) minimum grade-point average is required for the M.B.A. degree. All course work must be completed within six years, or seven consecutive summers of matriculation.

### Financial aid

A limited number of scholarships, fellowships, and research grants are available, as well as several graduate assistantships. For more information on these, contact the School of Business Administration.

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact the Financial Aid Office, 717-948-6307.

### Graduate School Assistantships

Full-time graduate students who are interested in an assistantship should contact the graduate program coordinator. Students must be nominated for an assistantship by their program coordinator.

Students applying for an assistantship should submit scores from the Graduate Management Admissions test, or similar examinations by January 30.

## Joint Degree Offering with the Penn State Dickinson School of Law

Penn State Harrisburg, the Capital College, School of Business Administration  
The Penn State Dickinson School of Law

Degrees Conferred: J.D. (Dickinson)  
M.B.A. (The Capital College)

### Joint Degree Programs

The Dickinson School of Law and the School of Business Administration of Penn State Harrisburg offer cooperative programs leading to the degrees of Juris Doctor (J.D.) to be granted by the Dickinson School of Law and the Master of Business Administration (M.B.A.) to be granted by Penn State Harrisburg, The Capital College. This joint degree opportunity facilitates the completion of both a law degree and a professional master's degree in business administration.

### Admission Requirements

The concurrent programs require that the student first be admitted to The Dickinson School of Law. Subsequently, the student is *recommended* for and *applies* for admission to the Graduate School for the Penn State Harrisburg M.B.A. Program.

The following are required for applicants:

*The Dickinson School of Law:* Completed Law School application; Law School Admission Test (LSAT) score; Law School Data Assembly Service (LSDAS) report; one page personal statement; employment record since high school; two letters of recommendation.

*M.B.A. Program:* Completed Graduate School application; Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE); letter of recommendation from the Associate Dean of the Dickinson School of Law; evidence of proficiency in analytic skills through college-level calculus and statistics demonstrated either by completion of courses or successful completion of proficiency examinations approved by the M.B.A. Program; evidence of proficiency in microcomputer applications skills; proficiency in writing evidenced by a score of "4" or higher on the Analytical Writing Assessment portion of the GMAT or GRE; evidence of proficiency in the academic disciplines of accounting, finance, economics, marketing, management and information sciences equivalent to that provided by completion of an integrated four-year business program, or completion of additional course work at the graduate level. Each course must have been completed with a grade of B or higher within seven years prior to admission to the M.B.A. program. The School of Business Administration will review the applicant's transcripts for acceptability of the courses.

No courses from the M.B.A. program may count toward the J.D. program until the student is matriculated at The Dickinson School of Law. However, graduate-level courses taken in the M.B.A. program at Penn State Harrisburg, or at another regionally accredited graduate-level institution may be applied to the M.B.A. in accordance with the transfer policies of Graduate Council.

### Transfer of Credits

Nine credits of course work at The Dickinson School of Law may be transferred toward the M.B.A. degree, subject to Program approval. Students must obtain a grade satisfactory to the M.B.A. program in order for the credits to be transferable. Nine credits of M.B.A. courses may be transferred for credit toward the J.D. degree at The Dickinson School of Law, subject to the approval of the School of Law.

### Advising of Students

All students in the joint degree program have two advisers, one in the School of Business Administration and one from the faculty at The Dickinson School of Law. Because the joint degree program is designed to be taken in synchrony with the objective that both degrees will be earned simultaneously, students who do not demonstrate progress toward completion of both degrees may be denied continuation in the joint degree program. Such a decision will rest jointly with the faculties of the M.B.A. program and the J.D. program.

## Tuition

The Dickinson School of Law and Penn State Harrisburg will each charge their own tuition to students in the joint degree program.

## Additional Information

For more information and the latest updates on the joint degree program, call the Law school at 717-240-5207 or 800-840-1122, or visit the Law School and Penn State Harrisburg web sites at:

[Law.psu.edu/](http://Law.psu.edu/)

[www.hbg.psu.edu/](http://www.hbg.psu.edu/)

## Concurrent Degree Offering with the Penn State Hershey College of Medicine Biomedical Sciences Program

Penn State Harrisburg, The Capital College, School of Business Administration  
Penn State Hershey College of Medicine, Biomedical Sciences Program

Degrees Conferred:

Ph.D. (Hershey)

M.B.A. (The Capital College)

## Concurrent Degree Programs

The Penn State Hershey College of Medicine, Biomedical Sciences Program, and the School of Business Administration of Penn State Harrisburg, The Capital College offer cooperative programs leading to the degrees of doctor of philosophy (Ph.D.) to be granted by the Hershey College of Medicine, and the Master of Business Administration (M.B.A.) to be granted by the Capital College. This concurrent degree opportunity facilitates the completion of both a doctorate in biomedical sciences and a professional master's degree in business administration. The program is designed primarily for students interested in pursuing a career involving high-quality independent research and positions of management responsibility within the biomedical sciences community.

### Admission Requirements:

The concurrent programs require that the student first be admitted to The Biomedical Sciences graduate degree program. Subsequently, the student is *recommended* for and *applies* for admission to the Graduate School for the Penn State Harrisburg M.B.A. program.

The following are required for applicants:

*Biomedical Sciences Program:* Completed application; Graduate Record Examination (GRE) score; a bachelor's degree reflecting a reasonable background in zoology or biology, mathematics and chemistry; a minimum junior/senior grade point average of 3.00 and with appropriate course backgrounds; two letters of recommendation; a curriculum vitae; a description of career goals. Reading knowledge of one or two foreign languages is recommended.

*M.B.A. Program:* Completed Graduate School application; Graduate Management Admission test (GMAT) or Graduate Record Examination (GRE) score; letter of recommendation from the department chair of the Biomedical Sciences Program; evidence of proficiency in analytic skills through college-level calculus and statistics demonstrated either by completion of course or successful completion of a mathematics proficiency examination approved by the program; evidence of proficiency in microcomputer applications skills; proficiency in writing evidenced by a score of "4" or higher on the Writing Assessment portion of the GMAT or GRE; evidence of proficiency in the academic disciplines of accounting, finance, economics, marketing, management and information sciences equivalent to that provided by completion of an integrated four-year business program, or completion of additional course work at the graduate level. Each course must have been completed with a grade of B or higher within seven years prior to admission to the M.B.A. program. The School of Business Administration will review the applicant's transcripts for acceptability of the courses.

No courses from the M.B.A. program may count toward the Ph.D. until the student is admitted to the Biomedical Sciences program. However, graduate-level courses taken in the M.B.A. program at Penn State Harrisburg, or at another graduate-level institution, may be applied to the M.B.A. in accordance with the transfer policies of Graduate Council.

## Transfer of Credits

Nine credits of course work in biomedical sciences may be transferred toward the M.B.A., subject to program approval. Students must obtain a grade satisfactory to the M.B.A. program in order for the credits to be transferable. Nine credits of M.B.A. coursework may be transferred for credit toward the Ph.D. degree, subject to the approval of the Biomedical Sciences program.

## Advising of Students

All students in the concurrent program have two advisers, one in the School of Business Administration, and one from the faculty in the Biomedical Sciences program. Because the concurrent program is designed to be taken in synchrony with the objective that both degrees will be earned simultaneously, students who do not demonstrate progress toward completion of both degrees may be denied continuation in the concurrent program. Such a decision will rest jointly with the faculties of the M.B.A. and the Biomedical Sciences Ph.D. programs.

## The Course Matrix

For more information and the latest updates on the concurrent programs, call the Biomedical Sciences program at 717-531-1045 or visit the Web sites at:

[www.http://med.psu.edu/web/biomedical-sciences/home](http://www.http://med.psu.edu/web/biomedical-sciences/home)

[www.hbg.psu.edu/programs/master-business-administration](http://www.hbg.psu.edu/programs/master-business-administration)

[ACCOUNTING \(ACCT\) course list](#)

[BUSINESS \(BUS\) course list](#)

[FINANCIAL ANALYSIS \(FINAN\) course list](#)

[INFORMATION SYSTEMS \(INFSY\) course list](#)

[MANAGEMENT \(MNGMT\) course list](#)

[MARKETING \(MRKT\) course list](#)

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 33-04-268

Editorial changes completed: 3/4/2013

Review Date: 01/18/05

Faculty updated: 10/23/12

Law School and Penn State Harrisburg web sites at:



## Biobehavioral Health (BB H)

[Program Home Page](#)

Collins O. Airhihenbuwa, *Head, Department of Biobehavioral Health*  
315 Health and Human Development Building East  
814-863-7256

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Frank M. Ahern, Ph.D. (Hawaii) Senior Research Scientist, Biobehavioral Health
- Collins O. Airhihenbuwa, Ph.D. (Tennessee) Professor of Biobehavioral Health
- Donald H. Ford, Ph.D. (Penn State) Professor Emeritus of Human Development
- John Graham, Ph.D. (USC) Professor of Biobehavioral Health and Human Development
- Douglas A. Granger, Ph.D. (California) Associate Professor of Biobehavioral Health and Human Development and Family Studies
- Byron C. Jones, Ph.D. (Arizona) Professor of Biobehavioral Health and Pharmacology; Professor in Charge of the Graduate Program
- Gary King, Ph.D. (Boston) Professor of Biobehavioral Health
- Laura Cousino Klein, Ph.D. (U of the Health Sciences) Associate Professor of Biobehavioral Health
- Patricia Barthalow Koch, Ph.D. (Penn State) Associate Professor of Biobehavioral Health
- Gerald E. McClearn, Ph.D. (Wisconsin) Evan Pugh Professor of Human Development and Psychology
- Elizabeth J. Susman, Ph.D. (Penn State) Jean Phillips-Shibley Professor of Human Development and Nursing
- David J. Vandenberg, Ph.D. (Penn State) Associate Professor of Biobehavioral Health
- George P. Vogler, Ph.D. (Colorado) Associate Professor of Biobehavioral Health
- Sheila G. West, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Biobehavioral Health
- Linda Ann Wray, Ph.D. (Southern California) Professor of Biobehavioral Health

The graduate program in Biobehavioral Health (BB H) is an interdisciplinary graduate program provided by the College of Health and Human Development and involving faculty from its departments. The focus of the program is on the interaction of biological, behavioral, sociocultural, and environmental variables in the etiology and prevention of health problems and in the promotion of healthy human development. The program is designed to cultivate competence in basic and applied research, in the evaluation of biobehavioral health intervention strategies, and in university teaching. Graduates are prepared for research, teaching, or policy roles in health care settings, private and public research laboratories, government agencies, and universities including medical schools.

Special resources available in the college that students may draw upon and potentially participate in for their research programs include a Health and Human Development Consultation Center, Nutrition Clinic, and Speech and Hearing Clinic; Centers for Gerontology, the Study of Child and Adolescent Development, Developmental and Health Genetics, Locomotion Studies, Worksite Health Enhancement, and Developmental and Health Research Methodology; special laboratories in Behavioral Endocrinology, Biomechanics, Human Performance, Motor Behavior, and Nutrition; and extensive computer resources. Additional resources, including elaborate mainframe and super computer capabilities, are available in other parts of the University.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

College graduates with an undergraduate or master's degree, or a health professions degree emphasizing biological and/or behavioral sciences, or an interdisciplinary program combining aspects of these will be considered for admission. Applicants should have a minimum grade-point average of 3.00 (A=4.00), an above-average score on the GRE or MCAT, and three supporting recommendations. At the discretion of the graduate program, exceptions may be made to these requirements for students with special backgrounds, abilities, and interests. Admission will be offered to candidates who are the best qualified, in the judgment of the faculty, taking all factors in to account.

Entering students should have a basic background in biological sciences, the behavioral sciences, or a combination of the two. In addition, they should have a basic background in quantitative methods. They should have competence in English, as reflected in a Test of English as a Foreign Language (TOEFL) score of 600 or above. In exceptional cases, superior students who do not meet these requirements may be admitted provisionally, while correcting their deficiencies. This must occur during their first two semesters in the program.

### Master's Degree Requirements

M.S. degree candidates must take five core courses in biobehavioral health and 12 additional credits in methods individually designed in consultation with and with the approval of their adviser and committee. All M.S. degree candidates must complete a formal master's thesis or a master's paper. Candidates selecting the thesis option must complete an additional 6 credits of master's thesis research (BB H 600) for a total of 33 credits. Candidates selecting the paper option must complete an additional 6 credits of individual studies (BB H 596) in lieu of the 6 thesis credits. The master's thesis will typically describe original research. The master's paper may describe original research, but may also involve a substantial review of the literature, or a substantial description of a new research-related procedure. The choice of thesis or paper options will be made by the student in consultation with the adviser. The student's advisory committee judges the quality and acceptability of the paper or thesis. Additionally, the thesis must be submitted to, and accepted by the Graduate School M.S. candidates' grade-point average of all course work through completion of M.S. degree requirements must be 3.0 or higher.

M.S. program course requirements: BB H core courses (15 credits: BB H 501, BB H 502, BB H 503, BB H 504, BB H 505); other methods courses (12 credits minimum: courses at the 400 or 500 level to be selected in consultation with the student's adviser); research credits (6 credits minimum or 6 thesis credits)

### Doctoral Degree Requirements

Formal admission to the doctoral program depends on satisfactory completion of the candidacy examination. This exam is designed to assess the student's potential and academic preparation for doctoral study. The candidacy exam may be given after at least 18 credits have been earned in graduate courses beyond the baccalaureate and must be completed no later than the end of the third semester (summer sessions do not count).

**Communication and Language Requirement.** Doctoral students must demonstrate competency in spoken English as judged by the faculty and in technical writing as demonstrated in research papers and/or publications. In addition, they must demonstrate competence in one of the following areas: (1) a foreign language; (2) computer science; (3) college teaching; (4) logic or philosophy of science.

**Other Requirements.** All students must take five core courses in Biobehavioral Health and 12 additional credits in research methods individually designed in consultation with and with the approval of the student's adviser and committee to develop doctoral-level competence in biobehavioral health and one or more related specialized areas.

### Dual-Title Ph.D. in Bioethics

#### Degree Requirements

Biobehavioral Health Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. To qualify for the dual-title degree, students must satisfy the requirements of the Biobehavioral Health Ph.D. program. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their Biobehavioral Health advisor and their Bioethics program advisor.

#### Additional coursework

The dual-title Ph.D. in Biobehavioral Health and Bioethics requires twelve credits of coursework beyond the requirements for the Ph.D. in Biobehavioral

Health, as follows:

- Seven required credits (BIOET 501, BIOET 502, and BIOET 590), plus at least three additional BIOET credits at the 500-level.
- Two additional credits from a list of approved electives at the 400 or 500-level. The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee.

*Candidacy.* In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by Biobehavioral Health. During the candidacy process, the students will also be assessed for candidacy to the Bioethics program, and at least one member of the candidacy committee must come from the Bioethics program but not a member of the Biobehavioral Health faculty.

*Comprehensive exam.* The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

*Dissertation and dissertation defense.* A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [BIOBEHAVIORAL HEALTH \(BB H\) course list](#)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-007

Review Date: 06/21/2011

Last updated by Publications: 10/06/09

## Biogeochemistry

### [Program Home Page](#)

JENNIFER L. MACALADY, *Program Coordinator*  
210 Deike Building  
814-865-6330  
[imacalad@geosc.psu.edu](mailto:imacalad@geosc.psu.edu)

### Degree Conferred:

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., e.g., Ph.D. in (graduate program name) and Biogeochemistry.

The following graduate programs offer dual degrees in Biogeochemistry: Biochemistry, Microbiology, and Molecular Biology; Civil Engineering; Chemistry; Ecology; Environmental Engineering; Geosciences; Materials Science and Engineering; and Soil Science.

### The Graduate Faculty

Michael A. Arthur, Ph.D. (Princeton) Professor of Geosciences  
Elizabeth W. Boyer, Ph.D. (Virginia) Associate Professor of Water Resources  
Susan L. Brantley, Ph.D. (Princeton) Professor of Geosciences  
Jean E. Brenchley, Ph.D. (California, Davis) Professor of Microbiology and Biotechnology  
Rachel A. Brennan, Ph.D. (Urbana-Champaign) Associate Professor of Civil and Environmental Engineering  
Mary Ann Bruns, Ph.D. (Michigan State) Associate Professor of Agronomy/Soil Microbiology  
William Burgos, Ph.D. (Virginia Tech) Professor of Environmental Engineering  
Hunter J. Carrick, Ph.D. (Michigan) Associate Professor of Aquatic Ecology  
Brian A. Dempsey, Ph.D. (North Carolina) Professor of Environmental Engineering  
Patrick Drohan, Ph.D. (Penn State) Assistant Professor of Pedology  
David M. Eissenstat, Ph.D. (Utah State) Professor of Woody Plant Physiology  
Matthew Fantle, Ph.D. (California, Berkeley) Assistant Professor of Geosciences  
James G. Ferry, Ph.D. (Illinois) Stanley Person Professor of Biochemistry and Molecular Biology  
Katherine H. Freeman, Ph.D. (Indiana) Professor of Geosciences  
Michael Gooseff, Ph.D. (Colorado) Associate Professor of Civil Engineering  
Peter Heaney, Ph.D. (Johns Hopkins) Professor of Mineral Sciences  
Christopher House, Ph.D. (California) Assistant Professor of Geosciences  
Jason Kaye, Ph.D. (Colorado State) Assistant Professor of Soil Biogeochemistry  
Armen Kemanian, Ph.D. (Washington) Assistant Professor of Production Systems and Modeling  
Peter Kleinman, Ph.D. (Cornell) Adjunct Associate Professor of Soil Science  
Roger Koide, Ph.D. (California, Berkeley) Professor of Horticultural Ecology  
James D. Kubicki, Ph.D. (Yale) Associate Professor of Geochemistry  
Lee R. Kump, Ph.D. (South Florida) Professor of Geosciences  
Bruce E. Logan, Ph.D. (California, Berkeley) Kappe Professor of Environmental Engineering  
Jennifer L. Macalady, Ph.D. (California, Davis) Assistant Professor of Geosciences  
Carmen Enid Martinez, Ph.D. (Rutgers) Associate Professor of Environmental Soil Chemistry  
Karl T. Mueller, Ph.D. (California, Berkeley) Professor of Chemistry  
Kwadwo Osseo-Asare, Ph.D. (California, Berkeley) Distinguished Professor of Metallurgy, and Energy and Geo-environmental Engineering  
John M. Regan, Ph.D. (Wisconsin) Associate Professor of Environmental Engineering  
Erica A. H. Smithwick, Ph.D. (Oregon State) Assistant Professor of Geography  
Ming Tien, Ph.D. (Michigan State) Professor of Biochemistry  
Denice H. Wardrop, Ph.D. (Penn State) Associate Professor of Geography and Ecology

The Biogeochemistry Dual-Title Degree Program will be administered by the Department of Geosciences for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences, College of Agricultural Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Programs. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Biogeochemistry, while maintaining a close association with major program areas of study. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School and (2) one of the participating major graduate programs; and then subsequently to (3) the Biogeochemistry program committee. Students may only apply to the dual-title program once they have been accepted into a major program. Once a student has been accepted to a major program, application to the dual-title degree program can occur immediately or at a later time, such as upon matriculation. The application to the dual-title degree program, however, should be completed before the candidacy examination in the major program is scheduled.

### Admission Requirements

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Candidates must submit transcripts of their undergraduate and graduate coursework, a written personal statement indicating their interests in the interdisciplinary arena of Biogeochemistry and their career goals they hope to serve by attaining a Biogeochemistry dual-title, and a statement of support from their dissertation advisor, if assigned. A strong undergraduate preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the major graduate program in which they are enrolled, in addition to the minimum requirements of the Biogeochemistry program. Students are required to have two advisors from separate disciplines: one individual serving as a primary advisor in their major degree program (i.e., Soil Science, BMMB, Material Science & Engineering, Chemistry, Ecology, Environmental Engineering or Geosciences) and a secondary advisor in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. The major program advisor normally will also be a member of the Biogeochemistry faculty. The two faculty advisors can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

To fulfill the course requirements for the dual-title in Biogeochemistry, students must complete a total of 15 graduate credits chosen in consultation with the advisor from an approved list of courses in the areas of biochemistry and microbiology, environmental chemistry, environmental engineering, geochemistry, materials science and engineering, and soil science. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. In all cases, the result of a single candidacy exam for both entrance to the student's major Ph.D. program and this dual-title program will be reported to the graduate school. When possible, the candidacy exam will involve a single examination that includes biogeochemistry. However, in some cases, such as with the Chemistry Department, existing candidacy procedures preclude use for the Biogeochemistry dual-title program. In these instances that require a major program's existing candidacy procedure to be augmented by a biogeochemistry examination, the structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise within Biogeochemistry. The field of Biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Biogeochemistry is required. A public oral presentation of the dissertation is required, which may be part of the final defense within the major degree program.

### Financial Aid

Graduate assistantships and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. A limited number of Research Assistantships are also available through the Biogeochemistry Dual-Title Degree Program.

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185

Review Date: 4/15/08

Last updated by Publications: 8/1/12

## Biotechnology (BIO T)

[Program Home Page](#)

ROBERT A. SCHLEGEL, *Department Head, Biochemistry and Molecular Biology*

RONALD D. PORTER, *Director*

LOIDA J. ESCOTE-CARLSON, *Co-Director*  
519 Wartik Laboratory  
814-863-5751

### Degree Conferred:

- [Master of Biotechnology](#)
- [Integrated B.S. in Biotechnology - Master of Biotechnology in Biotechnology Program](#)
- [Integrated B.S. in Animal Sciences - Master of Biotechnology in Biotechnology](#)

### The Graduate Faculty

- Jean E. Brenchley, Ph.D. (California, Davis) Professor of Microbiology and Biotechnology
- John E. Carlson, Ph.D. (Illinois) Associate Professor of Molecular Genetics
- Barbara J. Christ, Ph.D. (British Columbia) Professor of Plant Pathology
- Diana Cox-Foster, Ph.D. (Illinois) Professor of Entomology
- Wayne R. Curtis, Ph.D. (Purdue) Professor of Chemical Engineering and Biotechnology
- Ali Demirci, Ph.D. (Iowa) Assistant Professor of Agricultural and Biological Engineering
- Richard F. Devon (California, Berkeley) Associate Professor of Engineering Design and Graphics
- Min Ding, Ph.D. (Pennsylvania, Wharton School) Assistant Professor of Marketing
- Stephanie Doores, Ph.D. (Maryland) Associate Professor of Food Science
- J. Larry Duda, Ph.D. (Delaware) Professor of Chemical Engineering
- Nina V. Fedoroff, Ph.D. (Rockefeller U) Willaman Professor of Life Sciences
- Henry C. Foley, Ph.D. (Penn State) Professor of Chemical Engineering
- Majid R. Foolad, Ph.D. (California, Davis) Professor of Plant Genetics
- Richard J. Frisque, Ph.D. (Wisconsin) Professor of Molecular Virology
- Frederick E. Gildow, Ph.D. (Cornell) Professor of Plant Pathology
- Simon G. Gilroy, Ph.D. (Edinburgh) Associate Professor of Biology
- Mark J. Gultinan, Ph.D. (California, Irvine) Associate Professor of Plant Molecular Biology
- Roy H. Hammerstedt, Ph.D. (Minnesota) Professor Emeritus of Biochemistry
- Ross C. Hardison, Ph.D. (Iowa) Professor of Biochemistry
- Kelli Hoover, Ph.D. (California, Davis) Assistant Professor of Entomology
- Bhushan M. Jayarao, Ph.D. (Hungary) Associate Professor of Veterinary Science
- Seogchan Kang, Ph.D. (Wisconsin) Associate Professor of Plant Pathology
- Lynn Kozlowski, Ph.D. (Columbia) Professor of Biobehavioral Health
- Gretchen A. Kuldau, Ph.D. (California, Berkeley) Assistant Professor of Plant Pathology
- Hong Ma, Ph.D. (Mass Med Inst) Professor of Biology
- Wojciech Makalowski, Ph.D. (Poznan U, Poland) Associate Professor of Biology
- Bruce A. McPheron, Ph.D. (Illinois) Associate Professor of Entomology
- Webb Miller, Ph.D. (Washington) Professor of Computer Science and Engineering
- Christopher A. Mullin, Ph.D. (Cornell) Professor of Entomology
- Michael V. Pishko, Ph.D. (Texas) Associate Professor of Chemical Engineering
- B. Franklin Pugh, Ph.D. (Wisconsin) Associate Professor of Biochemistry and Molecular Biology
- C. Channa Reddy, Ph.D. (India) Distinguished Professor of Veterinary Science
- Robert A. Schlegel, Ph.D. (Harvard) Professor of Biochemistry and Molecular Biology
- Cooduvalli Shashikant, Ph.D. (India) Associate Professor of Molecular and Developmental Biology
- David T. Wilson, Ph.D. (Western Ontario) Professor of Marketing; Alvin H. Clemens Professor of Entrepreneurial Studies
- Andrew L. Zydney, Ph.D. (MIT) Professor of Chemical Engineering

The Master of Biotechnology degree program is offered through a collaboration of the Life Sciences Consortium with the Department of Biochemistry and Molecular Biology and the Department of Chemical Engineering. It is a multidisciplinary program involving at least thirty-two regular faculty members from fourteen different academic departments in Penn State University as well as ad hoc mentors from the academic faculty and from industry. The Master of Biotechnology curriculum is designed to give students broad knowledge and training in the scientific and practical aspects of biotechnology. It involves innovative, hands-on, and multidisciplinary learning approaches to educate and train students in the science behind biotechnology, its business and legal aspects, and the ethical and social issues that it brings about. In addition, the courses and the activities required of all students in this program intend to develop team working and communication skills, which are very important in industry in particular. Graduates of this program are expected to have the knowledge and training for diverse career options: as academic educators, as scientists in both academic and industry settings, as members of decision-making business and management teams in government and biotechnology industries, as bioentrepreneurs, and as members and leaders of governmental, public, and private organizations that deal with social, ethical and legal issues in biotechnology. Furthermore, because of their broad knowledge in biotechnology, graduates of this program are expected to fill a niche in industry where knowledge and ability to interphase and communicate with various functional groups within the organization are required.

### Admission Requirements

Applications will be considered in accordance with the requirements of the Graduate School as described in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. The program is appropriate for students with a baccalaureate degree in biological sciences, chemistry, or engineering or other baccalaureate degrees that include sufficient credits from relevant courses in the life sciences. Applicants must have a minimum junior/senior grade point average of 3.00 (on a 4.00 scale). Graduate Record Examinations (GRE) scores are required with a combined total of at least 1700 points for the verbal, quantitative, and analytical tests. Typically, students are admitted as part of a cohort to commence studies in the fall. The best-qualified applicants will be accepted up to the number of spaces available for new students.

### Degree Requirements

A minimum of 30 graduate credits is required for completion of the program, 18 credits of which must be from courses in the 500 level. Students are required to take 16 to 19 credits from core courses described below. Additional credits are from industry internship and elective courses which are determined based on the interest and career track the student decides to pursue: agriculture, medical applications, or diversified. All Master of Biotechnology candidates are required to write a research paper based on a research project conducted in an academic research laboratory or in industry. A student whose research project is conducted in an academic laboratory will be required to do an internship in industry.

### Core Courses

#### AGRICULTURAL AND BIOLOGICAL ENGINEERING (A B E)

- 468. MICROBIOLOGICAL ENGINEERING

#### BIOCHEMISTRY AND MOLECULAR BIOLOGY (B M B)

- 400. MOLECULAR BIOLOGY OF THE GENE (3)

### BIOTECHNOLOGY (BIOTC)

- 479. METHODS IN BIOFERMENTATIONS (3)

### INTEGRATIVE BIOSCIENCES (IBIOS)

- 571. CURRENT ISSUES IN BIOTECHNOLOGY (2)
- 590. LSC COLLOQUIUM SEMINAR SERIES (1)
- 591. ETHICS IN THE LIFE SCIENCES (1)
- 593. MOLECULAR BIOLOGY LABORATORY (3)
- 594. RESEARCH PROJECT IN BIOTECHNOLOGY (3-6)

### Electives

These courses are chosen from offerings in various academic departments based on students' interest or track and career objectives. These include IBIOS 595 (Industry Internship), which is required unless a student already opted to do IBIOS 594 (Research Project) in industry, and IBIOS 597C (Special Topics: Advanced Laboratory Techniques in the Life Sciences), another elective course that is virtually required of students who intend to pursue research and development careers in industry. This is a modular laboratory course dealing with specialized techniques currently used in life sciences research: mammalian cell culture and monoclonal antibody production, quantitative cell analysis by flow cytometry and digital microscopy, nucleic acid sequence analysis, high-throughput analysis of nucleic acids using microarrays, protein analysis by mass spectrometry, techniques in animal transgenics, and other specialized techniques a student may arrange to work on with a research laboratory on campus.

### Integrated B.S. in Biotechnology - Master of Biotechnology in Biotechnology Program

The integrated B.S. in Biotechnology-Master of Biotechnology degree program is designed to enable qualified undergraduate students in the B.S. Biotechnology program to graduate in five years with the Master of Biotechnology degree. The requirements of the Master of Biotechnology degree are designed to prepare students for diverse career opportunities in the burgeoning biotechnology industry. The integrated B.S. Biotechnology-Master of Biotechnology program will enhance the preparation and qualifications of B.S. Biotechnology students seeking entry-level positions in biotechnology and related industries. At the same time, students develop a practical knowledge of the laboratory techniques that underlie current research in the life sciences that will serve as excellent preparation for those students in the Master of Biotechnology program who later decide to pursue further graduate degrees.

A maximum of 12 credits will be cross-counted towards the B.S. and Masters degrees, from the following courses:

- B M B 400(2-3)
- BIOTC 479(3)
- IBIOS 571(2)
- IBIOS 591(1)
- IBIOS 593(3)

### B.S. Biotechnology Requirements:

#### Total credits required: 125

GENERAL EDUCATION: 46 credits (15 of these are included in the REQUIREMENTS FOR THE MAJOR)  
REQUIREMENTS FOR THE MAJOR: 94-95 credits

- Prescribed courses: 67 credits
- Additional courses: 6-9 credits
- Supporting courses and related areas: 18-21 credits

### Master of Biotechnology Requirements:

Total credits required: 30 (18 of which must be from 500-level courses)

- Required courses: 16-19 credits
- Electives: 11-14 credits

### Integrated B.S. in Animal Sciences - Master of Biotechnology in Biotechnology

The integrated B.S. in Animal Sciences Master of Biotechnology in Biotechnology degree program is designed to enable qualified undergraduate students in the B.S. Animal Sciences program to graduate in five years with the Master of Biotechnology degree. The requirements of the Master of Biotechnology degree are designed to prepare students for diverse career opportunities in the burgeoning biotechnology industry. The integrated B.S. in Animal Sciences Master of Biotechnology in Biotechnology program will enhance the preparation and qualifications of B.S. Animal Sciences students seeking entry-level positions in biotechnology and related industries. At the same time, students develop a practical knowledge of the laboratory techniques that underlie current research in the life sciences that will serve as excellent preparation for those students in the Master of Biotechnology program who later decide to pursue further graduate degrees.

A maximum of 12 credits will be cross-counted towards the B.S. and Masters degrees\*.

Year	Semester	B.S. Animal Sciences (125 credits required) credits completed
I	Fall	15
	Spring	16
II	Fall	15.5
	Spring	16
III	Fall	15
	Spring	15.5
IV	Fall	15*
	Spring	17*
<b>Total credits for B.S.</b>		<b>125</b>

\* The following courses to be taken in these semesters will be cross-counted towards the B.S. and Master of Biotechnology degrees:

- BIOTC 479. Methods in Biofermentation OR CH E 409 (3 credits)
- B M B 400. Molecular Biology of the Gene (2-3 credits)
- IBIOS 571. Current Issues in Biotechnology (2 credits)
- IBIOS 591. Ethics in the Life Sciences (1 credit)
- IBIOS 593. Molecular Biology Laboratory (3 credits)

**Total credits  
cross-counted in B.S.  
and Master of  
Biotechnology degrees**                      **12 credits, 6 of which are 500-level credits**

Master of Biotechnology in Biotechnology (30 credits required, 18 of which must be 500-level)

IV	Summer	IBIOS 595 or equivalent in AN SC (2 credits) Internship
V	Fall	IBIOS 594. Research Project (3-6 credits)
	Spring	IBIOS 590. Colloquium (1 credit) Electives, 500-level (3-6 credits) Other graduate level electives (6 credits)
<b>Minimum total credits earned for Summer and 5th year</b>		<b>18 credits, at least 12 of which are 500-level credits</b>

#### Admission Requirements

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

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[AGRICULTURAL AND BIOLOGICAL ENGINEERING \(A B E\) course list](#)

[BIOCHEMISTRY, MICROBIOLOGY, and MOLECULAR BIOLOGY \(BMMB\) course list](#)

[BIOTECHNOLOGY \(BIOTC\) course list](#)

[INTEGRATIVE BIOSCIENCES \(IBIOS\) course list](#)

Last Revised by the Department: Summer Session 2006

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Review Date: 4/11/06

DATE LAST REVIEWED BY PUBLICATIONS: 6/30/05

## Bioengineering (BIOE)

[Program Home Page \(Opens New Window\)](#)

CHENG DONG, *Head of the Department of Bioengineering and Chair of the Intercollege Graduate Degree Program in Bioengineering*  
205 Hallowell Building  
814-865-1407  
814-863-0490 (Fax)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Mohammad Reza Abidian, Ph.D. (Michigan) Assistant Professor of Bioengineering, Materials Science and Engineering, and Chemical Engineering
- James H. Adair, Ph.D. (Florida) Professor of Materials Science and Engineering, and Bioengineering
- Reka Albert, Ph.D. (Notre Dame) Professor of Physics
- Harry R. Allcock, Ph.D. (London) Evan Pugh Professor of Chemistry
- James G. Brasseur, Ph.D. (Stanford) Professor of Mechanical Engineering and Bioengineering
- Justin Brown, Ph.D. (Virginia) Assistant Professor of Bioengineering
- Paul W. Brown, Ph.D. (Wisconsin) Professor of Ceramic Science and Engineering
- Peter J. Butler, Ph.D. (CUNY) Associate Professor of Bioengineering
- Wenwu Cao, Ph.D. (Penn State) Professor of Mathematics and Materials Science
- Brent A. Craven, Ph.D. (Penn State) Research Associate in Applied Science
- Wayne Curtis, Ph.D. (Purdue) Professor of Chemical Engineering and Biotechnology
- Melik C. Demirel, Ph.D. (Carnegie Mellon) Associate Professor of Engineering Science and Mechanics
- Henry Donahue, Ph.D. (California, Santa Barbara) Michael and Myrtle Baker Professor of Orthopaedics and Rehabilitation, and Cellular and Molecular Physiology, and Bioengineering
- Cheng Dong, Ph.D. (Columbia) Distinguished Professor of Bioengineering, and Engineering Science and Mechanics
- Patrick Drew, Ph.D. (Brandeis) Assistant Professor of Engineering Science and Mechanics, and Neurosurgery
- Qiang Du, Ph.D. (Carnegie Mellon) Professor of Mathematics
- Arnold A. Fontaine, Ph.D. (Penn State) Senior Scientist in Applied Research Laboratory
- Mary I. Frecker, Ph.D. (Michigan) Professor of Mechanical Engineering and Bioengineering
- Andris Freivalds, Ph.D. (Michigan) Professor of Industrial Engineering
- Bruce Gluckman, Ph.D. (Pennsylvania) Associate Professor of Engineering Science and Mechanics, Neurosurgery, and Bioengineering; Associate Director, Penn State Center for Neural Engineering
- Esther Gomez, Ph.D. (California, Berkeley) Assistant Professor of Chemical Engineering and Bioengineering
- William O. Hancock, Ph.D. (Washington, Seattle) Professor of Bioengineering
- William E. Higgins, Ph.D. (Illinois, Urbana-Champaign) Professor of Electrical Engineering and Bioengineering
- Kane M. High, M.D. (Penn State) Associate Professor of Anesthesiology
- Jun (Tony) Huang, Ph.D. (UCLA) Associate Professor of Engineering Science and Mechanics
- Christine Keating, Ph.D. (Penn State) Professor of Chemistry
- Michael H. Krane, Ph.D. (Penn State) Research Associate, Applied Research Laboratory
- Robert F. Kunz, Ph.D. (Penn State) Senior Research Associate, Applied Research Laboratory; Associate Professor of Aerospace Engineering
- Herbert H. Lipowsky, Ph.D. (California, San Diego) Professor of Bioengineering, and Engineering Science and Mechanics
- Sheereen Majd, Ph.D. (Michigan) Assistant Professor of Bioengineering
- Keefe B. Manning, Ph.D. (Virginia Commonwealth) Associate Professor of Bioengineering
- Costas D. Maranas, Ph.D. (Princeton) Donald B. Broughton Professor of Chemical Engineering
- Richard S. Meyer, Ph.D. (Penn State) Research Associate in Applied Research
- Thomas Neuberger, Ph.D. (Wurzburg, Germany) Research Assistant, The Huck Institutes of the Life Sciences; Assistant Professor of Bioengineering
- Joseph L. Rose, Ph.D. (Drexel) Paul Morrow Professor of Engineering Science and Mechanics in Design and Manufacturing
- Gerson Rosenberg, Ph.D. (Penn State) Jane A. Fetter Professor of Surgery and Bioengineering
- Jeffrey L. Schiano, Ph.D. (Illinois) Associate Professor of Electrical Engineering
- Steven J. Schiff, M.D., Ph.D. (Duke) Brush Chair Professor of Engineering; Professor of Neurosurgery, and Engineering Science and Mechanics; Director, Penn State Center for Neural Engineering
- Neil A. Sharkey, Ph.D. (California, Davis) Professor of Kinesiology, Orthopaedics, and Rehabilitation
- Christopher Siedlecki, Ph.D. (Case Western Reserve) Professor of Surgery and Bioengineering
- Margaret Slattery, Ph.D. (Penn State) Assistant Professor of Bioengineering
- Srinivas Tadigadapa, Ph.D. (Cambridge) Professor of Electrical Engineering and Bioengineering
- Akif Undar, Ph.D. (Texas, Austin) Associate Professor of Pediatrics, Surgery, and Bioengineering
- Erwin A. Vogler, Ph.D. (Indiana) Professor of Materials Science and Engineering, and Bioengineering
- William J. Weiss, Ph.D. (Penn State) Professor of Surgery and Bioengineering
- Jian Yang, Ph.D. (Chinese Academy of Sciences) Associate Professor of Bioengineering
- Qing X. Yang, Ph.D. (Georgia Tech) Professor of Radiology and Bioengineering
- John Yen, Ph.D. (California, Berkeley) University Professor of Information Sciences and Technology; Professor of Computer Science and Engineering, and Bioengineering
- Qiming Zhang, Ph.D. (Penn State) Distinguished Professor of Electrical Engineering
- Sulin Zhang, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Engineering Science and Mechanics, and Bioengineering
- Siyang Zheng, Ph.D. (Cal Tech) Assistant Professor of Bioengineering

This intercollege program provides graduate level training in engineering and the life sciences, and their integration. Students graduating from this program will have acquired expertise in the application of engineering principles to fundamental problems in biology, clinical problems in medicine, or in the development of new biomedical instrumentation. They are also expected to produce scholarly work to be published in peer-reviewed journals and presented at national conferences. Graduate curricula and student assessment in bioengineering is under the direction of the program chair and a graduate curriculum committee that is composed of graduate faculty representing several departments in the Colleges of Engineering, Health and Human Development, Science, and Medicine.

Opportunities for specialized research are offered by graduate faculty working on electrical, mechanical, and biophysical properties of biological materials and the application of this knowledge to understanding molecular, cellular, tissue, and organ level processes involved in health and disease. Specific applications include: artificial organs, biomaterials, bioMEMs, nanotechnology, biophotonics, cellular and medical imaging, cardiovascular engineering, cell signaling and protein dynamics, mechanobiology, neural interfaces, tissue engineering and regenerative medicine. Extensive computer facilities and specialized equipment are available to support a combination of studies that employ experimental observations and their analysis through mathematical modeling and computer simulations.

### Admission Requirements

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral



English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Students with a degree in engineering, physics, or the life sciences are eligible for admission. All students must have a strong background in physics and mathematics. This background should include chemistry, calculus-based physics, and mathematics through calculus and differential equations. Students who lack this background may still be considered for provisional admission but will have to make up any deficiency early in their graduate program. These remedial courses will be required in addition to the stated graduate program course requirements. Students with a 3.0 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to the minimum average may be made for students with special backgrounds, abilities, and interests.

Scores from the Graduate Record Examinations (GRE) are required for admission. However, under certain circumstances a student may be admitted for graduate study in the Bioengineering program without these scores.

### Master's Degree Requirements

A minimum of 30 credits are required for a Master's Degree in Bioengineering, with at least 24 credits at the 500-level or above. Students must take the following: at least 12 credits of lecture- or laboratory-based coursework at the 500-level, an additional 6 credits of lecture- or laboratory-based coursework at the 400- or 500-level, a 1-credit research ethics course, a 1-credit graduate seminar for every semester in attendance, and a minimum of 6-credits of 600-level thesis research.

Courses: Upon entering the program, a student, along with his/her research adviser, will select an academic advisory committee consisting of three members of the Intercollege Graduate Degree Program (IDGP) in Bioengineering Graduate Faculty (including the adviser). Working with this committee, students will select courses appropriate to their research and their professional goals. Students must select at least 18 credits of lecture- or laboratory-based courses that include at least 12 credits at the 500-level and the remaining credits at the 400- or 500-level. Coursework must include at least 6 credits each in bioengineering, life sciences, and technical/quantitative electives. In addition, students will register for the graduate program seminar series during each of the semesters in attendance and will complete a 1-credit research ethics course. Students will select additional coursework and research credits, as appropriate, to obtain the total minimum of 30 credits.

Graduate credits earned at other institutions but *not* used to earn a degree may be used to satisfy master's degree requirements, up to the maximum allowable and that meet eligibility requirements as specified by Graduate Council policy in the Graduate Bulletin, provided that at least 20 credits are taken at a Penn State location where the program is offered (University Park or Hershey).

Thesis: A thesis is required for the M.S. degree. This thesis will be defended in front of the student's academic advisory committee.

### Doctoral Degree Requirements

Courses: Upon entering the program, but prior to taking the candidacy exam, a student, along with his/her research adviser, will select an academic advisory committee consisting of three members of the IDGP in Bioengineering Graduate Faculty (including the adviser). Working with this committee, students will select courses appropriate to their research and their professional goals. Students must select courses totaling at least 6 credits each in bioengineering, life sciences, and technical/quantitative electives. At least 12 credits must be lecture- or laboratory-based (not independent study) and at the 500-level. Students must then complete at least 6 additional credits at the 500-level in courses relevant to their research. In addition to these minimum 24 course credits, students will register for the graduate program seminar series for every semester until passing the comprehensive exam and will complete a 1 credit graduate course in bioengineering ethics. The total minimum number of course credits to be completed is 29, which includes 24 course credits (with at least 18 course credits at the 500-level and the remaining credits at the 400-level or above), 1 credit of bioengineering ethics, and at least 4 graduate seminar credits. 600-level research credits are assigned every semester in attendance. Graduate courses taken at other institutions, including those used toward a degree, may be used to satisfy some of the Ph.D. degree requirements at Penn State, but in these cases credits are not transferred. Regardless of previous courses taken, every doctoral student must take a minimum of 6 course credits at the 500-level at the University Park or Hershey campuses.

Supporting courses are available at University Park and the Penn State Milton S. Hershey Medical Center in anatomy, biochemistry, biology, biophysics, chemistry, laboratory animal medicine, materials science, mathematics, physics, physiology, and the engineering departments.

Exams: After completion of the first year, completion of at least 18 graduate credits and within three semesters (not including summer) of entry into the doctoral program, all students must complete and pass the candidacy exam, which consists of a written research proposal on a topic outside the student's Ph.D. project and its oral defense. This exam also tests for English competency, which is a requirement. A comprehensive examination consisting of a written research proposal on the student's Ph.D. project and its oral presentation is administered by the student's doctoral committee, typically at the end of second year of residency. A final oral examination based on a defense of the doctoral dissertation is required of all candidates. This exam occurs typically after the fourth or fifth year of residency and consists of a formal public seminar followed by a closed meeting of the doctoral committee and the candidate.

In preparation for the comprehensive exam, students, along with their adviser will choose a doctoral committee. The doctoral committee consists of a minimum of four members of the Graduate Faculty including the adviser, who serves as the chair. The adviser must be a member of the Intercollege Graduate Degree Program (IGDP) in Bioengineering. At least three committee members must be members of the IGDP in Bioengineering. The committee must also include an "Outside Field Member" who is not a member of the IGDP in Bioengineering. Finally, at least one member of the doctoral committee must have his/her primary appointment outside the administrative unit in which the adviser's primary appointment is held. The Graduate School will appoint the committee and notify all persons concerned.

Completion of the Ph.D. requirements includes acceptance of the dissertation, as indicated by the signatures of at least two-thirds of the doctoral committee, including the dissertation adviser, committee chair, and the program chair on its approval page. In addition, the dissertation must meet the editorial standards of the Graduate School Office of Theses and Dissertations.

Students must continue to register at appropriate times until the dissertation is approved.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [BIOENGINEERING \(BIOE\) course list](#)

Last Revised by the Department: Spring Semester 2013

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Faculty updated: 10/5/12

## Bioethics (BIOET)

### [Program Home Page](#)

JONATHAN H. MARKS, Director of the Bioethics Program  
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814-865-5938  
[bioethics@psu.edu](mailto:bioethics@psu.edu)

### Degree Conferred

Students electing to pursue this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e. Ph.D. in [major program name] and Bioethics.

The following graduate programs offer dual degrees in bioethics: Ph.D. in Anthropology, Ph.D. in Biobehavioral Health, and Ph.D. in Communication Arts and Sciences.

### Graduate Faculty

Sarah E. Ades, Ph.D. (MIT) Associate Professor of Biochemistry and Molecular Biology  
Frank Ahern, Ph.D. (Hawaii) Senior Research Associate in Biobehavioral Health  
Collins O. Airhihenbuwa, Ph.D. (Tennessee), Professor of Biobehavioral Health; Department Head, Biobehavioral Health  
Jesse Ballenger, Ph.D. (Case Western Reserve) Associate Professor of Science, Technology, and Society  
Michael Berube, Ph.D. (Virginia) Paterno Family Professor in Literature  
Victoria Braithwaite, D.Phil. (Oxford) Professor of Fisheries and Biology  
Anne Buchanan, Ph.D. (Texas) Senior Research Associate in Anthropology and Science, Technology, and Society  
Greg Eghigian, Ph.D. (Chicago) Director of the Science, Technology, and Society Program; Associate Professor of Modern History, and Science, Technology, and Society  
Richard Frisque, Ph.D. (Wisconsin) Professor of Molecular Virology; Interim Head, Department of Biochemistry and Molecular Biology  
Michael Hecht, Ph.D. (Illinois) Distinguished Professor of Communication Arts and Sciences, and Crime, Law, and Justice  
Marianne Hillemeier, Ph.D. (Michigan) Associate Professor of Health Policy and Administration, and Demography  
John Horgan, Ph.D. (University College, Cork) Associate Professor of Science, Technology, and Society, Information Sciences and Technology, and Psychology; Director, International Center for the Study of Terrorism  
Judith Hupcey, Ed.D. (Columbia) Associate Professor of Nursing, School of Nursing; Associate Professor of Humanities, College of Medicine  
Byron Jones, Ph.D. (Arizona) Professor of Biobehavioral Health  
Susan Loeb, Ph.D. (Penn State) Assistant Professor of Nursing  
Jonathan H. Marks, M.A., B.C.L. (Oxford), Associate Professor of Bioethics, Humanities, and Law  
Stephen A. Matthews, Ph.D. (Cardiff), Associate Professor of Sociology, Anthropology and Demography  
Jennifer Mensch, Ph.D. (Emory) Professor of Philosophy, and Science, Technology, and Society  
Michelle Miller-Day, Ph.D., (Arizona State) Associate Professor of Communication Arts and Sciences  
Roxanne Parrott, Ph.D. (Arizona) Professor of Communication Arts and Sciences  
Janice Penrod, Ph.D. (Penn State) Associate Professor of Nursing, School of Nursing; Associate Professor of Humanities, College of Medicine  
Kathleen Postle, Ph.D. (Wisconsin) Professor of Biochemistry and Molecular Biology  
Dennis Scanlon, Ph.D. (Michigan) Associate Professor of Health Policy and Administration  
Steven J. Schiff, M.D., Ph.D. (Duke) Brush Chair Professor of Engineering  
Chloe Silverman, Ph.D. (Pennsylvania) Assistant Professor of Science, Technology, and Society, and Women's Studies  
Carol Smith, Ph.D. (Alabama) Associate Professor of Nursing  
Rachel Smith, Ph.D. (Michigan State) Assistant Professor of Communication Arts and Sciences  
Susan Squier, Ph.D. (Stanford) Brill Professor of Women's Studies, English, and Science, Technology, and Society  
Nancy Tuana, Ph.D. (California) DuPont/Class of 1949 Professor of Philosophy, Women's Studies, and Science, Technology, and Society; Director, Rock Ethics Institute  
Donald B. Thompson, Ph.D. (Illinois) Professor of Food Science  
George Vogler, Ph.D. (Colorado at Boulder) Professor of Biobehavioral Health; Director, Center of Developmental and Health Genetics  
Kenneth Weiss, Ph.D. (Michigan) Evan Pugh Professor of Biological Anthropology and Genetics

The bioethics dual-title program is housed in the College of the Liberal Arts with administrative support (e.g., staff support) provided by the Rock Ethics Institute, similar to, for example, the Huck Institutes of the Life Sciences' support of the BIOS Intercollege Graduate Degree Program. The Bioethics Program Committee, which contains representatives from participating colleges and departments, maintains the program's definition and goals, identifies faculty and courses relevant to the program, and recommends policies and procedures for the program's operation.

### Program Objectives of Dual-Title Degree in Bioethics

The dual-title graduate degree in bioethics will acknowledge and foster scholarly work across disciplines, increasing the intellectual rigor and breadth of graduate work through immersion in both bioethics and the primary discipline. The dual-title degree will also provide opportunities for students to learn how to synthesize knowledge and develop expertise within and across disciplinary boundaries.

In addition to the intellectual and academic advantages of interdisciplinarity, the dual-title degree program will strengthen the reputation of individual programs/departments through an innovative degree program, increase recruitment of top quality graduate students, and increase job opportunities for students after graduation.

Dual-title degree programs do not duplicate other degree programs at Penn State University.

### Admission Requirements

Dual-title bioethics graduate students will first be admitted to their major programs in accordance with the requirements stipulated by the Graduate Council and the major program. They will then be admitted to graduate study in the Bioethics program by an admissions committee consisting of faculty affiliated with the Bioethics program. Applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research.

### Degree Requirements

General requirements for the dual-title Ph.D. in [major program name] and Bioethics are listed below.

- 7 required credits (BIOET 501, BIOET 502, and BIOET 590). At least three additional BIOET credits at the 500 level.
- Eight additional credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level.
- Comprehensive examination in bioethics and the related field, with the format and content to be determined by agreement with the major department.
- Dissertation on a bioethics-related topic or that includes a substantial bioethics component.

### Language Competency Requirements

The student will fulfill the language requirement specified by the major department through which the student is admitted to the dual-title degree program.

### Candidacy Requirement

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the major

program. During the candidacy process, the student will also be assessed for candidacy to the dual-title program, and at least one member of the candidacy committee must come from the dual-title program. Faculty members who hold appointments in both programs may serve in a combined role.

### Committee Composition

In accordance with the Graduate Council's requirements, the doctoral committee shall contain at least four members. At least one of the committee members must be a faculty-member affiliated with the Bioethics Program. Where major programs are supportive of this, graduate students will be encouraged to have a second committee member so qualified. Faculty members who hold appointments in both programs may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the bioethics program must be designated as co-chair of the committee. The dual-title representative(s) will be expected to participate in constructing and grading comprehensive examination questions that cover the secondary area of study. The Outside Member will be appointed in accordance with the Graduate School's Graduate Student Committee Procedures. The Graduate Council's current policy is that the Outside Member cannot have more than a 25% budgetary connection with either the graduate major program or the dual-title degree program.

### Comprehensive Exams

The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their major field.

### Dissertation

A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

### Student Aid

When available, graduate assistantships available to students in this program and other forms of student aid will be described in the STUDENT AID section of the Graduate Program.

### Course Listing

Required Courses:

All students in the dual-title bioethics program are required to take the following three courses, which will provide a rigorous grounding in general theory, methods and the scholarly literature of bioethics:

#### BIOETHICS (BIOET)

- 501. PERSPECTIVES AND METHODS IN BIOETHICS (3)
- 502. PERSPECTIVES IN MACRO-BIOETHICS (3)
- 590. BIOETHICS COLLOQUIUM (1)

In addition, students will be required to take at least three additional BIOET credits at the 500-level. These course offerings will be enhanced over time, and will initially include:

#### BIOETHICS (BIOET)

- 503. ETHICS AND THE RESPONSIBLE CONDUCT OF BIOMEDICAL RESEARCH (3)
- 597. SPECIAL TOPICS IN BIOETHICS (1-3)

In addition, this rubric will be used to cross-list courses with a substantial bioethics-related component including courses in bioethics and health law offered by the Dickinson School of Law and courses in bioethics and medical humanities offered by the Department of Humanities in the College of Medicine at Hershey. (Approval for cross-listing will be obtained on a case-by-case basis.) It may also be used to create courses that run concurrently with a bioethics-related seminar series and/or lecture series run by the Rock Ethics Institute.

With the approval of the Director of the Bioethics Graduate Program, students may also fulfill the requirement for the three additional 500-level BIOET credits through one of four alternatives:

- BIOET 594. RESEARCH TOPICS
- BIOET 596. INDIVIDUAL STUDIES

BIOET 590. COLLOQUIUM (since the topics will vary from semester, students may take this course in subsequent semesters for additional credit OR An additional elective course determined to satisfy this requirement on the grounds that the syllabus indicates a sufficiently strong bioethics content.

### Elective Courses

Students in the program will take the remaining credits by choosing from a wide variety of existing elective courses at the 400 and 500 levels from a list maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. Students also have the right to petition the Director of the Bioethics Graduate Program to request that additional courses be added to the list of electives. The elective courses chosen by the student must be approved by either the Director of the Bioethics Graduate Program or, with the agreement of the Director, by another member of the Bioethics Program Committee. These courses are currently offered by a variety of departments (including BB H, BMMB, CAS, FRNSC, H ADM, HLHED, H P A, IBIOS, NURS, NUTR, PHIL, PHS, S T S, and WMNST) and they encompass a variety of subject areas including clinical ethics, research ethics, public health and health policy, health law, environmental ethics and policy, global and comparative health, biotechnology, and medical humanities. A list of courses available as elective credits for graduate students in the bioethics program is included below.

In addition, students may pursue an internship or practicum, provided that this is approved in advance by the Director of the Bioethics Graduate Program:

- BIOET 595. INTERNSHIP (1-3)

### List of Elective Courses

The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. The list currently includes the following courses:

- ANTH/BIOL 460 HUMAN GENETICS (3)
- ANTH/BIOL 460H HUMAN GENETICS (4)
- ANTH 471H BIOLOGY, EVOLUTION AND SOCIETY (3)
- BB H 501 BIOBEHAVIORAL SYSTEMS IN HEALTH AND DEVELOPMENT: THEORY AND PROCESSES (3)
- BB H 504 BEHAVIORAL HEALTH INTERVENTION STRATEGIES (3)
- BB H 551 WORLD HEALTH PROMOTION (3)
- BMH 490 BIOETHICS AND MEDICAL HUMANITIES CAPSTONE (3)
- BMMB 509 ETHICS IN BIOMEDICAL SCIENCE (1)
- CAS 453 HEALTH COMMUNICATION THEORY AND RESEARCH (3)
- CAS 557 HEALTH COMMUNICATION (3)
- CAS 562 QUALITATIVE METHODS (3)
- FRNSC 561 ETHICS IN FORENSIC SCIENCE (1)
- H ADM 539 HEALTH SYSTEMS ORGANIZATION (3)
- H ADM 540 HEALTH ADMINISTRATIVE POLICY FORMULATION (3)
- H ADM 541 HEALTH ECONOMICS AND POLICY (3)
- H ADM 542 HEALTH CARE POLITICS AND POLICY (3)
- H ADM 543 LONG-TERM CARE ADMINISTRATION AND POLICY (3)

H ADM 551 HEALTH CARE LAW (3)  
H P A 401 (IL) COMPARATIVE HEALTH SYSTEMS (3)  
H P A 510 HEALTH SERVICES FINANCING AND POLICY (3)  
H P A 511 RESEARCH SEMINAR ON HEALTH SERVICES FINANCING AND POLICY (3)  
H P A 520 INTRODUCTION TO HEALTH SERVICES ORGANIZATION AND DELIVERY (3)  
H PA 521 RESEARCH SEMINAR ON HEALTH SERVICES ORGANIZATION AND DELIVERY (3)  
H P A 540 EPIDEMIOLOGICAL APPLICATIONS IN HEALTH SERVICES RESEARCH (3)  
H P A 541 POVERTY, RACE, ETHNICITY AND CHILD HEALTH (3)  
H P A 545 INTRODUCTION TO HEALTH ECONOMICS (3)  
H P A 822 CLINICAL ISSUES FOR HEALTH SERVICES MANAGEMENT (3)  
H P A 836 HEALTH LAW (3)  
HLHED 516 EVALUATION OF HEALTH EDUCATION AND PROMOTION PROGRAMS (3)  
HLHED 552 CURRENT HEALTH EDUCATION ISSUES (3)  
HLHED 553 MULTICULTURAL HEALTH ISSUES (3)  
IBIOS 591 ETHICS IN THE LIFE SCIENCES (1)  
NURS 464 (US;IL) DYING AND DEATH (3)  
NURS 501 ISSUES IN NURSING AND HEALTH CARE (3)  
NURS 580 EPISTEMOLOGY OF NURSING SCIENCE (3)  
NURS 581 DEVELOPING THEORETICAL CONSTRUCTS RELEVANT TO NURSING (3)  
NURS 587 ETHICS IN NURSING RESEARCH (1)  
NUTR/S T S 430 (IL) GLOBAL FOOD STRATEGIES: PROBLEMS AND PROSPECTS FOR REDUCING WORLD HUNGER (3)  
PHIL 403 ENVIRONMENTAL ETHICS (3)  
PHIL 418 ETHICS (3)  
PHIL/S T S 432: MEDICAL AND HEALTH CARE ETHICS (3)  
PHS 570 HEALTH ECONOMICS AND ECONOMIC EVALUATION (3)  
S T S 555 HUMAN DIMENSIONS OF NATURAL RESOURCES (3)  
S T S 589 ETHICS AND VALUES IN SCIENCE AND TECHNOLOGY (3)  
WMNST/BB H 458: CRITICAL ISSUES IN REPRODUCTION (3)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-008

Review Date: 06/21/2011

Publications check of faculty list; links fixed: 3/1/12

## Biology (BIOL)

[Program Home Page](#)

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814-865-4562  
[gradinfo@email.bio.psu.edu](mailto:gradinfo@email.bio.psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Sarah M. Assmann, Ph.D. (Stanford) Waller Professor of Biology
- Michael Axtell, Ph.D. (California, Berkeley) Associate Professor of Biology
- Iliana B. Baums, Ph.D. (Miami) Assistant Professor of Biology
- Ottar N. Bjørnstad, Ph.D. (Oslo) Professor of Entomology and Biology
- Victoria Braithwaite, D.Phil. (Oxford, UK) Professor of Fisheries and Biology
- Tomas Carlo, Ph.D. (Colorado, Boulder) Assistant Professor of Biology
- Isabella Cattadori, Ph.D. (Stirling, UK) Assistant Professor of Biology
- Douglas R. Cavener, Ph.D. (Georgia) Professor of Biology; Head of the Department
- Gong Chen, Ph.D. (Shanghai) Associate Professor of Biology
- Daniel J. Cosgrove, Ph.D. (Stanford) Professor and Holder of the Eberly Chair in Biology
- Richard J. Cyr, Ph.D. (California, Irvine) Professor of Biology
- Claude W. dePamphilis, Ph.D. (Georgia) Professor of Biology
- Nina V. Fedoroff, Ph.D. (Rockefeller) Evan Pugh Professor; Willaman Professor of the Life Sciences
- Charles R. Fisher, Ph.D. (California, Santa Barbara) Professor of Biology
- Michael Gannon, Ph.D. (Texas Tech) Associate Professor of Biology (Altoona)
- Simon G. Gilroy, Ph.D. (Edinburgh) Associate Professor of Biology
- Mark J. Gultinan, Ph.D. (California, Irvine) Professor of Plant and Molecular Biology
- Kyung-An Han, Ph.D. (SUNY, Buffalo) Assistant Professor of Biology
- Lauraine Hawkins, Ph.D. (New Mexico) Assistant Professor of Biology (Mont Alto)
- S. Blair Hedges, Ph.D. (Maryland) Professor of Biology
- Rod M. Heisey, Ph.D. (California, Davis) Professor of Biology (Schuylkill)
- Dale Holen, Ph.D. (Wisconsin, Milwaukee) Associate Professor of Biology (Worthington Scranton)
- Edward C. Holmes, Ph.D. (Cambridge, UK) Professor of Biology; Eberly College of Science Distinguished Senior Scholar
- Peter Hudson, Ph.D. (Oxford) Willaman Professor of Biology; Director, Huck Institutes of Life Sciences
- Timothy Jegla, Ph.D. (Washington U School of Medicine, St. Louis) Assistant Professor of Biology
- Zhi-Chun Lai, Ph.D. (Albert Einstein College of Medicine) Professor of Biology
- Tracy Langkilde, Ph.D. (Sydney) Assistant Professor of Biology
- Aimin Liu, Ph.D. (NYU Medical Center) Assistant Professor of Biology
- Bernhard Lüscher, Ph.D. (Zürich) Professor of Biology, and Biochemistry and Molecular Biology, and Psychiatry
- Hong Ma, Ph.D. (MIT) Professor of Biology
- Wojciech Makalowski, Ph.D. (Poznan) Associate Professor of Biology
- Kateryna Makova, Ph.D. (Texas Tech) Assistant Professor of Biology
- Yingwei Mao, Ph.D. (Michigan) Assistant Professor of Biology
- James H. Marden, Ph.D. (Vermont) Professor of Biology
- Paula C. McSteen, Ph.D. (East Anglia) Assistant Professor of Biology
- Webb C. Miller, Ph.D. (Washington) Professor of Biology, and Computer Science and Engineering
- Robert B. Mitchell, Ph.D. (Penn State) Professor of Biology
- Masatoshi Nei, Ph.D. (Kyoto) Evan Pugh Professor; Director, Institute of Molecular and Evolutionary Genetics
- Richard W. Ordway, Ph.D. (Mass Medical Inst) Associate Professor of Biology
- George Perry, Ph.D. (Arizona State) Assistant Professor of Anthropology
- Eric S. Post, Ph.D. (Alaska) Assistant Professor of Biology
- Marcel Salthé, Ph.D. (Stanford) Assistant Professor of Biology; Branco Weiss Fellow
- Steven W. Schaeffer, Ph.D. (Georgia) Associate Professor of Biology
- Katriona Shea, Ph.D. (London) Assistant Professor of Biology
- Sharon P. Shriver, Ph.D. (Case Western Reserve) Assistant Professor of Biology
- Andrew G. Stephenson, Ph.D. (Michigan) Professor of Biology
- Graham H. Thomas, Ph.D. (Edinburgh) Associate Professor of Biology, and Biochemistry and Molecular Biology
- Christopher F. Uhl, Ph.D. (Michigan State) Professor of Biology
- Nandini Vasudevan, Ph.D. (Indian Inst Science, Bangalore) Assistant Professor of Biology
- Alan Walker, Ph.D. (London) Evan Pugh Professor of Biology and Anthropology
- Kenneth M. Weiss, Ph.D. (Michigan) Evan Pugh Professor of Anthropology and Genetics
- Matthew Whim, Ph.D. (Cambridge) Assistant Professor of Biology
- James A. Winsor, Ph.D. (Michigan) Professor of Biology (Altoona)

The department directs graduate programs in a broad spectrum of research areas, including bioinformatics, cell biology, developmental biology, ecology, evolution, genetics, neuroscience, phylogenetics, and physiology. The department houses the Institute of Molecular Evolutionary Genetics. The Ph.D. in Biology may be taken with an option in Molecular Evolutionary Biology, Plant Biology, or one of the Integrative Biosciences options adopted by the department (Molecular Medicine, Cell and Developmental Biology, Chemical Biology, Ecological and Molecular Plant Physiology, or Neuroscience). The courses of study are planned individually by the student and an adviser.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Admission is restricted to students who have the baccalaureate degree in a biological science and who present a cumulative undergraduate average of at least 3.00 on a scale of 4.00. Each applicant must provide a personal statement of interests and objectives and letters from three persons verifying the applicant's academic competence.

### Master's Degree Requirements

Students obtaining an M.S. degree in Biology must complete course work as described in the General Information section of this bulletin, with guidance from their academic adviser. A thesis is usually required and must be defended before a faculty committee. The research must represent an original contribution, and the time allotted to it is about one year.

### Doctoral Degree Requirements

The only courses required across the department are Biology 592, Critical Evaluation of Biological Literature, and Biology 590, a colloquium covering the Biology Seminar Series. Course work specific to individual plans of study are decided upon by the student in consultation with their graduate adviser and

Ph.D. committee. All doctoral degree students must pass a written and oral candidacy examination that is usually administered during their third semester of study. After a student has completed all of their course work and made substantial progress on the design and execution of their thesis research, a comprehensive examination is administered by their Ph.D. committee. The Ph.D. thesis must represent a significant original contribution suitable for publication, and will usually require between two and four years of laboratory or field research. When complete the thesis must be defended before the student's graduate committee. The thesis defense is normally immediately preceded by a public presentation of the thesis research by the student.

The department awards Ph.D. degrees in Biology covering the full spectrum of subjects represented by our diverse faculty. If desired, a student may elect to pursue one of the following options as part of his/her program of study.

*Molecular Evolutionary Biology option:* (1) The student must meet the criteria for the M.S. or Ph.D. in Biology. (2) The student's research adviser must be a member of the Biology program and/or a full member of the Institute of Molecular Evolutionary Genetics. Other committee members may be chosen as needed providing that a majority of the committee is associated with the IMEG. (3) In addition to the normal Biology program requirements, the student must take (for both an M.S. or Ph.D. in Biology) 3 credits of course work in BIOL 591; 9 credits from among the following courses (to be selected in consultation with the student's committee): BIOL 405, BIOL 410, BIOL 422, BIOL 427, BIOL 428, BIOL 501, BIOL 504, BIOL 514, BIOL 524, BIOL 533, BIOL 542, BIOL 590. (4) Any other course work or training deemed appropriate by the student's committee.

*Plant Biology option:* (1) The student must meet the criteria for the M.S. or Ph.D. in Biology. (2) The student's research adviser must be a member of the Biology program. Other committee members may be chosen as needed to assure that a well-rounded graduate advisory committee is established. (3) In addition to the normal Biology program requirements, the student must take the required colloquia in the field of specialization and (for both an M.S. or Ph.D. in Biology) a minimum of 6 credits from among the following courses (to be selected in consultation with the student's committee): BIOL 410, BIOL 414, BIOL 422, BIOL 427, BIOL 441, BIOL 448, BIOL 513, BIOL 514, BIOL 515, BIOL 516, BIOL 544, BIOL 591, BIOL 597, B M B 514, HORT 444. (4) Any other course work or training deemed appropriate by the student's committee.

Integrative Biosciences options are available in Molecular Medicine, Cell and Developmental Biology, Ecological and Molecular Plant Physiology, Chemical Biology, and Neuroscience. Requirements for these options that are in addition to the basic criteria for a Ph.D. in Biology are described under Integrative Graduate Program in Biosciences in this bulletin.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BIOLOGY \(BIOL\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Faculty updated: 2/19/13

## Biostatistics (BIOST)

[Program Home Page](#)

VERNON M. CHINCHILLI, Chair of the Department of Public Health Sciences  
College of Medicine, Penn State Milton S. Hershey Medical Center  
Hershey, PA 17033 717-531-7178

**Degree Conferred:** Ph.D.

### The Graduate Faculty

Roger T. Anderson, Ph.D. (Johns Hopkins) Professor of Public Health Sciences and Health Policy and Administration  
Arthur S. Berg, Ph.D. (California, San Diego) Assistant Professor of Public Health Sciences and Statistics  
Francesca Chiaromonte, Ph.D. (Minnesota) Professor of Statistics and Public Health Sciences  
Vernon M. Chinchilli, Ph.D. (North Carolina) Professor of Public Health Sciences and Statistics  
Ping Du, M.D., Ph.D. (SUNY Albany) Assistant Professor of Medicine and Public Health Sciences  
Elena Farace, Ph.D. (Virginia) Associate Professor of Public Health Sciences and Neurosurgery  
Debashis Ghosh, Ph.D. (Washington) Professor of Statistics and Public Health Sciences  
Kevin Gleeson, M.D. (Georgetown) Professor of Medicine and Public Health Sciences  
Marianne Hillemeier, Ph.D. (Michigan) Associate Professor of Health Policy and Administration, Nursing and Public Health Sciences  
Christopher S. Hollenbeak, Ph.D. (Washington) Associate Professor of Surgery and Public Health Sciences  
Wenke Hwang, Ph.D. (Maryland) Associate Professor of Public Health Sciences  
Tonya S. King, Ph.D. (North Carolina) Associate Professor of Public Health Sciences  
Kristen Kjerulff, Ph.D. (Illinois) Professor of Public Health Sciences, Obstetrics and Gynecology, and Health Policy Administration  
Eugene J. Lengacher, V.M.D. (Pennsylvania) Professor of Public Health Sciences, Family and Community Medicine, and Health Policy and Administration  
Douglas L. Leslie, Ph.D. (Yale) Professor of Public Health Sciences  
Runze Li, Ph.D. (North Carolina) Professor of Statistics and Public Health Sciences  
Duanping Liao, Ph.D. (North Carolina) Professor of Public Health Sciences  
Jiangang (Jason) Liao, Ph.D. (Johns Hopkins) Professor of Public Health Sciences  
Thomas A. Lloyd, Ph.D. (Harvard) Professor of Public Health Sciences, Obstetrics and Gynecology, Pharmacology, Nutrition, and Kinesiology  
David T. Mauger, Ph.D. (Michigan) Professor of Public Health Sciences and Statistics  
Joshua Muscat, Ph.D. (NYU) Professor of Public Health Sciences  
Ian M. Paul, M.D., M.Sc. (Penn State) Associate Professor of Pediatrics and Public Health Sciences  
Rosanne M. Pogash, M.P.A. (Penn State) Affiliate Instructor of Public Health Sciences  
Zhengmin Qian, M.D., Ph.D. (Rutgers) Assistant Professor of Public Health Sciences and Homeland Security  
John P. Richie Jr., Ph.D. (Louisville) Professor of Public Health Sciences, Pharmacology  
Christopher N. Sciamanna, M.D., M.P.H. (Johns Hopkins) Professor of Medicine and Public Health Sciences  
Michele L. Shaffer, Ph.D. (Penn State) Associate Professor of Public Health Sciences, Statistics and Pediatrics  
Aleksandra Slavkovic, Ph.D. (Carnegie Mellon) Associate Professor of Statistics and Public Health Sciences  
Carol S. Weisman, Ph.D. (Johns Hopkins) Distinguished Professor of Public Health Sciences, Obstetrics and Gynecology, and Health Policy and Administration  
Robin Taylor Wilson, Ph.D. (Iowa) Assistant Professor of Public Health Sciences  
Li Wang, Ph.D. (Penn State) Assistant Professor of Public Health Sciences  
Chuntao Wu, Ph.D. (SUNY Albany) Assistant Professor of Public Health Sciences  
Rongling Wu, Ph.D. (Washington) Professor of Public Health Sciences and Statistics  
Jeff Yanosky, Sc.D. (Harvard) Assistant Professor of Public Health Sciences  
Junjia (Jay) Zhu, Ph.D. (Penn State) Assistant Professor of Public Health Sciences

Biostatistics is the science that applies statistical theory and mathematical principals to research in medicine, biology, environmental science, public health, and related fields. Biostatisticians working in the area of public health develop and use mathematical and scientific methods to (1) determine risk factors for disease and injuries, and (2) identify health trends within communities. Biostatisticians working in the area of medicine develop and use mathematical and scientific methods to design and analyze (1) clinical trials to investigate new therapies for treating acute and chronic illness, (2) observational studies to understand disease onset and progression, (3) basic science studies to determine the mechanisms of disease, and (4) human genetics studies to investigate the inherited susceptibility to disease. Career opportunities are available in universities, academic medical centers, government, and private industry. The demand for individuals with graduate-level degrees in biostatistics is extremely high.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Applicants must complete prior to admission:

1. A two-semester graduate-level course in applied statistics from a recognized graduate program. The comparable courses offered by the Department of Statistics are Stat 511: Regression Analysis and Modeling (3) and Stat 512: Design and Analysis of Experiments (3).
2. A two-semester graduate-level course in mathematical statistics from a recognized graduate program. The comparable courses offered by the Department of Statistics are Stat 513: Theory of Statistics and Stat 514 (3): Theory of Statistics II (3).

Prospective applicants must demonstrate:

3. For admission to the Graduate School, all applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. International applicants must hold the equivalent of an American four-year baccalaureate degree.

4. Results from one of the following standardized tests taken within the past five (5) years:

- Graduate Record Examination (GRE)
- Graduate Management Admission Test (GMAT)
- Medical College Admission Test (MCAT)
- Law School Admission Test (LSAT)
- (This requirement is waived for applicants who have an advanced degree in a related field beyond the baccalaureate.)

5. Results from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) for applicants whose first language is not English.

- The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test.
- The minimum composite score for the IELTS is 6.5.
- International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

6. Completion of the Graduate School application, which includes three (3) letters of recommendation and a Curriculum Vitae or resume.

7. Payment of the application fee.

### Doctoral Degree Requirements

Each student in the Biostatistics Ph.D. program is expected to acquire knowledge in the disciplines of Biostatistics.

Each student must complete a total of 31 credits of graduate level course work, the majority of which are 500 level courses, specifically:

- 22 credits in required courses
- 6 additional credits in Epidemiology or Health Services Research
- 3 credits in elective courses, plus
- Dissertation

After the completion of the first year of coursework, each candidate is required to take a candidacy examination, based on the coursework in PHS 523, PHS 524, PHS 525, PHS 526 and PHS 527. The decision to admit or not to admit a student to candidacy will be made by a committee of graduate faculty in the Biostatistics program. In addition, a comprehensive examination is administered at the completion of all coursework, followed by the final oral examination in defense of the PhD dissertation.

### Courses

**Prescribed Courses:** 22 credits

PHS 500(1), PHS 523(3), PHS 524(3), PHS 526(3), PHS 527(3), PHS 528(3), PHS 580(3), STAT 553(3)

**Additional Courses:** 6 credits

PHS 535(3), PHS 536(3), PHS 550(3), PHS 551(3), PHS 552(3), PHS 570(3)

**Elective Courses:** 3 credits

Select from PHS 516(3), STAT 561(3), STAT 562(3)

**Common Courses:** Varies

PHS 594(1-9), PHS 596(1-9), PHS 597(1-9), PHS 600(3-6)

[PUBLIC HEALTH \(PHS\) course list](#)

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-102

Review Date: 01/10/2012

Faculty updated: 9/4/12



## Biochemistry, Microbiology, and Molecular Biology (BMMB)

### [Program Home Page](#)

PAUL BABITZKE, *Co-Director of Graduate Studies*  
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DAVID GILMOUR, *Co-Director of Graduate Studies*  
465A North Frear Building  
814-863-8905  
[dsg11@psu.edu](mailto:dsg11@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Sarah E. Ades, Ph.D. (MIT) Associate Professor of Biochemistry and Molecular Biology
- Istvan Albert, Ph.D. (Notre Dame) Research Associate Professor of Biochemistry and Molecular Biology
- Paul Babitzke, Ph.D. (Georgia) Professor of Biochemistry and Molecular Biology
- Lu Bai, Ph.D. (Cornell) Assistant Professor of Biochemistry and Molecular Biology; Assistant Professor of Physics
- J. Martin Bollinger, Ph.D. (MIT) Professor of Biochemistry and Molecular Biology; Professor of Chemistry
- Squire Booker, Ph.D. (MIT) Professor of Biochemistry and Molecular Biology; Professor of Chemistry
- Jean E. Brechley, Ph.D. (California, Davis) Professor of Microbiology and Biotechnology
- Donald A. Bryant, Ph.D. (UCLA) Ernest C. Pollard Professor in Biotechnology; Professor of Biochemistry and Molecular Biology
- Craig E. Cameron, Ph.D. (Case Western) Eberly Chair in Biochemistry and Molecular Biology; Professor of Biochemistry and Molecular Biology
- Franklin L. Dorman, Ph.D. (Vermont) Associate Professor of Biochemistry and Molecular Biology
- James G. Ferry, Ph.D. (Illinois) Stanley Person Professor of Biochemistry and Molecular Biology; Director, Center for Microbial Structural Biology
- Richard J. Frisque, Ph.D. (Wisconsin) Professor of Molecular Virology
- David S. Gilmour, Ph.D. (Cornell) Professor of Molecular and Cell Biology
- Santhosh Girirajan, Ph.D. (Virginia) Assistant Professor of Biochemistry and Molecular Biology; Assistant Professor of Anthropology
- John H. Golbeck, Ph.D. (Indiana) Professor of Biochemistry and Biophysics; Professor of Chemistry
- Ying Gu, Ph.D. (California, Riverside) Assistant Professor of Biochemistry and Molecular Biology
- Wendy Hanna-Rose, Ph.D. (Harvard) Associate Professor of Biochemistry and Molecular Biology
- Ross C. Hardison, Ph.D. (Iowa) T. Ming Chu Professor of Biochemistry and Molecular Biology
- Eric T. Harvill, Ph.D. (California, Los Angeles) Professor of Microbiology and Infectious Disease
- Teh-hui Kao, Ph.D. (Yale) Distinguished Professor of Biochemistry and Molecular Biology
- Kenneth C. Keiler, Ph.D. (MIT) Associate Professor of Biochemistry and Molecular Biology
- Andrey Krasilnikov, Ph.D. (Russian Academy of Science) Associate Professor of Biochemistry and Molecular Biology
- Maria Krasilnikova, Ph.D. (Moscow Inst of Physics and Tech) Research Assistant Professor, Biochemistry and Molecular Biology
- Carsten Krebs, Ph.D. (MPI for Radiation Chem, Germany) Professor of Biochemistry and Molecular Biology; Professor of Chemistry
- Zhi-Chun Lai, Ph.D. (Albert Einstein College of Medicine) Professor of Biology; Professor of Biochemistry and Molecular Biology
- Arthur Lesk, Ph.D. (Princeton) Professor of Biochemistry and Molecular Biology
- Bernhard Luscher, Ph.D. (Zürich) Professor of Biochemistry and Molecular Biology
- Shaun Mahoney, Ph.D. (Ireland) Assistant Professor of Biochemistry and Molecular Biology
- Andrea M. Mastro, Ph.D. (Penn State) Professor of Microbiology and Cell Biology
- Paul Medvedev, Ph.D. (Toronto) Assistant Professor of Computer Science and Engineering
- Katsuhiko Murakami, Ph.D. (National Inst of Genetics, Japan) Associate Professor of Biochemistry and Molecular Biology
- Anton Nekrutenko, Ph.D. (Texas Tech) Associate Professor of Biochemistry and Molecular Biology
- B. Tracy Nixon, Ph.D. (MIT) Professor of Biochemistry and Molecular Biology
- Robert F. Paulson, Ph.D. (California, San Francisco) Professor of Veterinary and Biomedical Sciences
- Gary H. Perdew, Ph.D. (Oregon State) John T. and Paige S. Smith Professor in Agricultural Sciences
- Jeffrey M. Peters, Ph.D. (California, Davis) Distinguished Professor of Molecular Toxicology and Carcinogenesis
- Ronald D. Porter, Ph.D. (Duke) Associate Professor of Microbiology and Molecular Genetics
- Kathleen Postle, Ph.D. (Wisconsin, Madison) Professor of Biochemistry and Molecular Biology
- B. Franklin Pugh, Ph.D. (Wisconsin) Willaman Professor in Molecular Biology; Professor of Biochemistry and Molecular Biology
- Joseph Reese, Ph.D. (Illinois at Urbana-Champaign) Professor of Biochemistry and Molecular Biology
- Marylyn D. Ritchie, Ph.D. (Vanderbilt) Associate Professor of Biochemistry and Molecular Biology; Director, Center for Systems Genomics
- Melissa Rolls, Ph.D. (Harvard) Associate Professor of Biochemistry and Molecular Biology
- Lorraine Santy, Ph.D. (Harvard) Associate Professor of Biochemistry and Molecular Biology
- Stephan Schuster, Ph.D. (Munich [LMU], Germany) Professor of Biochemistry and Molecular Biology
- Scott Selleck, M.D., Ph.D. (Washington U School of Medicine) Professor of Biochemistry and Molecular Biology
- Moriah Szpara, Ph.D. (California) Assistant Professor of Biochemistry and Molecular Biology
- Song Tan, Ph.D. (Univ of Cambridge) Professor of Biochemistry and Molecular Biology
- Graham H. Thomas, Ph.D. (Edinburgh, Scotland) Associate Professor of Biology; Associate Professor of Biochemistry and Molecular Biology
- Ming Tien, Ph.D. (Michigan State) Professor of Biochemistry
- Chen-Pei David Tu, Ph.D. (Cornell) Professor of Biochemistry and Molecular Biology
- Yanming Wang, Ph.D. (Iowa State) Associate Professor of Biochemistry and Molecular Biology
- Thomas K. Wood, Ph.D. (North Carolina State) Endowed Biotechnology Chair; Professor of Chemical Engineering; Professor of Biochemistry and Molecular Biology

The major goal of the program in Biochemistry, Microbiology, and Molecular Biology is to train students for independent research and teaching in the principal areas of those scientific disciplines. Students may enter the program from a variety of backgrounds such as biochemistry, biology, biophysics, cell biology, chemistry, genetics, microbiology, molecular biology, physics, and other related disciplines. The student's research may begin during the first year. Research areas of faculty include bacterial growth regulation and differentiation, biophysics and biochemistry and molecular biology of photosynthesis, calcium metabolism in skeletal tissues, cell cycle regulation, chromosome organization and structure, control of gene expression, DNA-binding proteins, electron paramagnetic resonance spectroscopy, enzyme kinetics and mechanisms of DNA-acting enzymes, functional genomics, membrane structure and function, metallobiochemistry of iron-sulfur proteins, mobile genetic elements, molecular biology of development, molecular biology of xenobiotic metabolism, prokaryotic sensory transduction, regulation of amino acid metabolism, RNA-binding proteins, RNA structure, self-incompatibility in plants, spermatogenesis and spermatozoan maturation, structure and function of enzymes, virology, and X-ray crystallography.

### Admission Requirements

Scores on the Graduate Record Examination (GRE) Aptitude Test (verbal, quantitative, and analytical) are normally required for admission. Only under exceptional circumstances will an applicant be considered without those scores. It is also recommended that applicants take the Subject Test in Biochemistry, Cell and Molecular Biology, or Chemistry or Biology. Entering students should have taken courses in biology, organic chemistry, calculus, general physics, genetics, microbiology, and preferably physical chemistry. Any deficiencies may be made up concurrently with graduate studies. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) of the *Graduate Bulletin*.

Admission to the program is based on prior course records and grades, GRE scores, letters of recommendation and interviews. Virtually all students are

admitted with the intent of obtaining a Ph.D. degree although a master's degree is obtained in some cases on the way to the Ph.D., or as a final degree.

### Master's Degree Requirements

Students must meet the M.S. degree requirements specified by the Graduate School in the *Graduate Bulletin*. In addition, a research thesis must be submitted and defended before a committee of the faculty. In general, the master's program is expected to take about two years beyond a bachelor's degree.

### Doctoral Degree Requirements

Admission to Ph.D. candidacy is decided on the basis of the student's performance in courses, research and teaching. In addition, an oral candidacy examination is taken during the fall semester of the second year. This examination tests the student's ability to utilize what s/he has learned in solving problems based on the scientific method. A comprehensive oral examination is taken before the student's Ph.D. thesis committee within approximately three semesters after the student has been admitted to candidacy. The student is expected to present a written proposal concerning his or her research problem in terms of the relevant current literature, the data that has been gathered and the future directions of the experimentation. Questioning may involve, but is not limited to, that research proposal.

The faculty requires that each student demonstrate the ability to collect, organize and present the results of their research in a professional manner before graduation. This is accomplished by preparing a manuscript based on the Ph.D. thesis research. The manuscript must be written primarily by the student and submitted for publication in a refereed journal. The final Ph.D. thesis defense is taken before the student's thesis committee at the end of the program. The student must also present a public seminar on the thesis research within the two-week period preceding the thesis defense. Generally the Ph.D. degree takes about five years beyond a bachelor's degree.

### Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

### Other Relevant Information

The director of graduate studies is in charge of advising students about academic and related matters until they have chosen a thesis adviser. Beginning students carry out a series of rotation projects in at least three different faculty laboratories before deciding on a research area. Students generally decide on their thesis research adviser at the end of their first fall semester. Each student must take a total of 18 credits in 400- and 500-level courses, required and elective, from a list approved by the program faculty.

Further course work and research are individually planned by the student and the research adviser in consultation with the Ph.D. thesis committee. The thesis committee is established according to the rules of the Graduate School once Ph.D. candidacy has been attained.

All students are required to participate as teaching assistants in undergraduate laboratory courses as part of their training. Students are required to register for BMMB 602 (Supervised Experience in College Teaching) for two semesters.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. Under normal circumstances, all students admitted and continuing in good standing are provided with graduate assistantship support from University sources and research grants.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BIOCHEMISTRY, MICROBIOLOGY, and MOLECULAR BIOLOGY \(BMMB\) course list](#)

[MICROBIOLOGY \(MICRB\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Last Revised by the Department: Fall Semester 2008

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Faculty updated: 5/24/13

## Biomedical Sciences (BMS)

### [Program Home Page](#)

PROFESSOR RALPH KEIL, *Chair, Biomedical Sciences Graduate Program*  
 C1712 College of Medicine, Mail Code H170  
 Hershey, PA 17033  
 1-717-531-1045  
 1-717-531-0786 (FAX)  
 rkeil@psu.edu

### Degrees conferred:

Ph.D., M.D./Ph.D., M.S.

### The Graduate Faculty

Shantu G. Amin, Ph.D. (Stevens Institute of Technology) Professor of Pharmacology  
 Alaa S. Awad, M.D., MSc., FASN (Cairo, Egypt) Assistant Professor of Medicine, and Cellular and Molecular Physiology  
 Alistair J. Barber, Ph.D. (Open University, Milton Keynes, UK) Assistant Professor of Ophthalmology, and Cellular and Molecular Physiology  
 Cheston M. Berlin, Jr., M.D. (Harvard) University Professor of Pediatrics, and Professor of Pharmacology  
 Harold Bell, Ph.D. (University of Toronto) Assistant Professor of Medicine  
 Maria C. Bewley, Ph.D. (U of Leeds, UK) Associate Professor of Biochemistry and Molecular Biology  
 Melvin L. Billingsley, Ph.D. (George Washington) Professor of Pharmacology, and Biotechnology and Entrepreneurship  
 Judith S. Bond, Ph.D. (Rutgers) Evan Pugh Professor and Chair of Biochemistry and Molecular Biology  
 Robert H. Bonneau, Ph.D. (Penn State) Professor of Microbiology and Immunology  
 Sarah K. Bronson, Ph.D. (Washington) Associate Professor of Cellular and Molecular Physiology  
 Kirsteen Browning, Ph.D. (University of Aberdeen, Scotland) Assistant Professor of Neural and Behavioral Science  
 Victor A. Canfield, Ph.D. (California, Berkeley) Assistant Professor of Pharmacology  
 Laura Carrel, Ph.D. (Stanford) Associate Professor of Biochemistry and Molecular Biology  
 Vincent Chau, Ph.D. (Virginia) Professor of Cellular and Molecular Physiology  
 Hua Cheng, M.D., Ph.D. (Shanghai, NYU) Assistant Professor of Medicine, and Microbiology and Immunology  
 Keith C. Cheng, M.D., Ph.D. (NYU; Washington) Professor of Pathology, and Biochemistry and Molecular Biology  
 Hui-Ling Chiang, Ph.D. (Harvard) Professor of Cellular and Molecular Physiology  
 Michael J. Chorney, Ph.D. (Cornell) Professor of Microbiology and Immunology, and Pediatrics  
 Neil D. Christensen, Ph.D. (Auckland, New Zealand) Professor of Pathology, and Microbiology and Immunology  
 Gary A. Clawson, M.D., Ph.D. (Miami; Michigan State) Professor of Pathology, and Biochemistry and Molecular Biology  
 James R. Connor, Ph.D. (California, Berkeley) Distinguished Professor and Vice Chair, Department of Neurosurgery  
 Richard J. Courtney, Ph.D. (Syracuse) Professor and Chair of Microbiology and Immunology  
 Rebecca C. Craven, Ph.D. (Tennessee) Professor of Microbiology and Immunology  
 Arunangshu Das, Ph.D. (Jadavpur, India) Assistant Professor of Biochemistry and Molecular Biology  
 Dhimant Desai, Ph.D. (Bombay) Associate Professor of Pharmacology  
 Henry J. Donahue, Ph.D. (California, Santa Barbara) Professor of Orthopaedics and Rehabilitation, and Cellular and Molecular Physiology; Director, Musculoskeletal Research  
 Kristin A. Eckert, Ph.D. (Wisconsin) Professor of Pathology, and Biochemistry and Molecular Biology  
 Karam El-Bayoumy, Ph.D. (NYU) Professor of Biochemistry and Molecular Biology; Associate Director of Basic Research, Penn State Cancer Institute  
 Wafik S. El-Deiry, M.D., Ph.D. (Miami School of Medicine) Professor of Medicine  
 John Ellis, Ph.D. (Rochester) Associate Professor of Pharmacology, and Psychiatry  
 David J. Feith, Ph.D. (Penn State) Assistant Professor of Cellular and Molecular Physiology  
 Leo Fitzpatrick, Ph.D. (Texas) Associate Professor of Pharmacology  
 John M. Flanagan, Ph.D. (Tennessee) Professor of Biochemistry and Molecular Biology  
 Joanna Floros, Ph.D. (Temple) Evan Pugh Professor of Cellular and Molecular Physiology, Pediatrics, and Obstetrics and Gynecology  
 Willard M. Freeman, Ph.D. (Wake Forest) Associate Professor of Pharmacology  
 Robert A. Frost, Ph.D. (SUNY, Stony Brook) Associate Professor of Cellular and Molecular Physiology  
 Carla J. Gallagher, Ph.D. (Wake Forest School of Medicine) Assistant Professor of Public Health Sciences and Pharmacology  
 Thomas W. Gardner, M.D., Ph.D. (Jefferson/Penn State) Professor of Ophthalmology, and Cellular and Molecular Physiology  
 Ronald R. Gomes, Jr., Ph.D. (Texas) Assistant Professor of Orthopaedics and Rehabilitation  
 D. Channe Gowda, Ph.D. (Mysore, India) Professor of Biochemistry and Molecular Biology  
 Claudia Gragnoli, M.D., Ph.D. (Univ Tor Vergata, Italy) Assistant Professor of Medicine, and Cellular and Molecular Physiology  
 Sergei A. Grigoryev, Ph.D. (Lomonosov, Moscow) Professor of Biochemistry and Molecular Biology  
 Patricia S. Grigson, Ph.D. (Rutgers) Associate Professor of Neural and Behavioral Sciences  
 Edward J. Gunther, Ph.D. (Yale) Assistant Professor of Medicine  
 Susan Hafenstein, Ph.D. (Arizona) Assistant Professor of Medicine, and Microbiology and Immunology  
 Andras Hajnal, M.D., Ph.D. (Pécs U Medical School, Hungary) Assistant Professor of Neural and Behavioral Sciences  
 Philippe A. Haouzi, M.D., Ph.D. (l'Université H. Poincaré, France) Professor of Medicine, Chairman, Penn State Heart and Vascular Institute  
 Gregory M. Holmes, Ph.D. (Connecticut) Associate Professor of Anatomy  
 Jianming Hu, M.D., Ph.D. (Wuhan, China; Penn State) Associate Professor of Microbiology and Immunology  
 Rosalyn B. Irby, Ph.D. (South Florida) Assistant Professor of Medicine  
 Faoud T. Ishmael, M.D., Ph.D. (Penn State) Assistant Professor of Medicine, and Biochemistry and Molecular Biology  
 Harriet C. Isom, Ph.D. (Illinois) Distinguished Professor of Microbiology and Immunology, and Pathology  
 Leonard S. Jefferson, Jr., Ph.D. (Vanderbilt) Evan Pugh Professor and Chair, Cellular and Molecular Physiology  
 Byron C. Jones, Ph.D. (Arizona) Associate Professor of Biobehavioral Health and Pharmacology  
 Sreenivas Kanugula, Ph.D. (Hyderabad, India) Assistant Professor of Cellular and Molecular Physiology  
 Kelly Karpa, Ph.D. (Penn State) Associate Professor of Pharmacology  
 Michael Katzman, M.D. (Columbia) Professor of Medicine, and Microbiology and Immunology  
 Marc P. Kaufman, Ph.D. (Miami) Professor of Medicine  
 Gordon L. Kauffman, M.D. (Michigan) Professor of Surgery, and Cellular and Molecular Physiology  
 Ralph L. Keil, Ph.D. (Cornell) Associate Professor of Biochemistry and Molecular Biology  
 Mark Kester, Ph.D. (SUNY, Buffalo) G. Thomas Passananti Professor of Pharmacology  
 Scot R. Kimball, Ph.D. (Vermont) Professor of Cellular and Molecular Physiology  
 Charles H. Lang, Ph.D. (Hahnemann) Distinguished Professor and Vice Chair of Cellular and Molecular Physiology, and Surgery  
 Edward Lankford, M.D., Ph.D. (Johns Hopkins) Associate Professor of Medicine  
 Kathryn F. LaNoue, Ph.D. (Yale) Distinguished Professor of Cellular and Molecular Physiology  
 Philip Lazarus, Ph.D. (McGill, Canada) Professor of Pharmacology, and Public Health Sciences  
 Sang Lee, Ph.D. (Kyungpook National, Korea) Assistant Professor of Neurosurgery  
 Richard S. Legro, M.D. (Mount Sinai) Professor of Obstetrics and Gynecology  
 Robert G. Levenson, Ph.D. (SUNY, Stony Brook) Professor of Pharmacology  
 David Liu, Ph.D. (CUNY) Assistant Professor of Neural and Behavioral Science  
 Thomas A. Lloyd, Ph.D. (Harvard) Professor of Public Health Sciences, Pharmacology, and Obstetrics and Gynecology  
 Thomas P. Loughran, Jr., M.D. (Hahnemann), Professor of Medicine, Director of Penn State Cancer Institute  
 Kenneth Lucas, M.D. (SUNY, Syracuse) Associate Professor of Pediatrics, and Microbiology and Immunology

Christopher J. Lynch, Ph.D. (Northeastern) Professor of Cellular and Molecular Physiology  
 Richard B. Mailman, Ph.D. (North Carolina) Professor of Pharmacology; Distinguished Senior Scholar in Pharmacology and Neurology  
 Andrea Manni, M.D. (Florence, Italy) Professor of Medicine  
 Gail L. Matters, Ph.D. (North Carolina) Assistant Professor of Biochemistry and Molecular Biology  
 Jan M. McAllister, Ph.D. (California, San Diego) Professor of Cellular and Molecular Physiology  
 Patricia J. McLaughlin, D.Ed. (Penn State) Professor of Neural and Behavioral Sciences  
 Craig Meyers, Ph.D. (California, Los Angeles) Professor of Microbiology and Immunology  
 Barbara A. Miller, M.D. (Penn State) Professor of Pediatrics  
 Kathleen M. Mulder, Ph.D. (SUNY, Buffalo) Professor of Biochemistry and Molecular Biology  
 Joshua Muscat, Ph.D. (NYU) Professor of Public Health Science  
 Christopher Niyibizi, Ph.D. (McGill, Canada) Associate Professor of Orthopaedics and Rehabilitation  
 Christopher C. Norbury, Ph.D. (Dundee, Scotland) Professor of Microbiology and Immunology  
 Ralph Norgren, Ph.D. (Michigan) Professor of Neural and Behavioral Sciences  
 Leslie J. Parent, M.D. (Duke) Professor of Medicine, and Microbiology and Immunology  
 Blaise Peterson, Ph.D. (Washington) Associate Professor of Cellular and Molecular Physiology  
 David S. Phelps, Ph.D. (Temple) Professor of Pediatrics  
 Lisa S. Poritz, M.D. (Northwestern) Assistant Professor of Surgery, and Cellular and Molecular Physiology  
 Bogdan Prokopczyk, Ph.D. (Warsaw, Poland) Associate Professor of Pharmacology  
 Stephen R. Rannels, Ph.D. (Penn State) Associate Professor of Cellular and Molecular Physiology  
 Chester A. Ray, Ph.D. (Georgia) Professor of Medicine, and Cellular and Molecular Physiology  
 W. Brian Reeves (Jefferson) Professor of Medicine  
 John P. Richie, Jr., Ph.D. (Louisville) Professor of Public Health Sciences  
 Gavin P. Robertson, Ph.D. (California, Riverside) Professor of Pharmacology, Dermatology, Pathology, and Surgery  
 Ira J. Ropson, Ph.D. (Johns Hopkins) Associate Professor of Biochemistry and Molecular Biology  
 Gerson Rosenberg, Ph.D. (Penn State) Jane A. Fetter Professor of Surgery and Bioengineering  
 Clare Sample, Ph.D. (South Florida) Professor of Microbiology and Immunology  
 Jeffrey T. Sample, Ph.D. (South Florida) Professor of Microbiology and Immunology  
 Todd D. Schell, Ph.D. (West Virginia) Associate Professor of Microbiology and Immunology  
 Cara-Lynne Schengrund, Ph.D. (Seton Hall) Professor of Biochemistry and Molecular Biology  
 Christopher Siedecki, Ph.D. (Case Western Reserve) Associate Professor of Surgery and Bioengineering  
 Lisa M. Shantz, Ph.D. (Johns Hopkins) Associate Professor of Cellular and Molecular Physiology  
 Arun K. Sharma, Ph.D. (North Eastern Institution, India) Associate Professor of Pharmacology  
 Jeffrey S. Shenberger, M.D. (Penn State) Associate Professor of Pediatrics, and Cellular and Molecular Physiology  
 Yuguang (Roger) Shi, Ph.D. (Australian National University, California, Davis) Associate Professor of Cellular and Molecular Physiology  
 Ian Simpson, Ph.D. (London) Professor of Neural and Behavioral Sciences, and Cellular and Molecular Physiology  
 Raghu Sinha, Ph.D. (Chandigarh, India) Associate Professor of Biochemistry and Molecular Biology  
 Lawrence I. Sinoway, M.D. (Robert Wood Johnson) Professor of Medicine  
 Jianxun (Jim) Song, Ph.D. (Third Military Medical, China) Assistant Professor of Microbiology and Immunology  
 David Soybel, M.D. (Chicago) Professor of Surgery and Cellular and Molecular Physiology  
 David J. Spector, Ph.D. (Pennsylvania) Professor of Microbiology and Immunology  
 Thomas Spratt, Ph.D. (Chicago) Associate Professor of Biochemistry and Molecular Biology  
 Kevin Staveley-O'Carroll, M.D., Ph.D. (Johns Hopkins) Professor of Surgery, and Microbiology and Immunology  
 Sean D. Stocker, Ph.D. (Pittsburgh) Associate Professor of Cellular and Molecular Physiology  
 Jose A. Stoute, M.D. (Miami) Associate Professor of Medicine, and Microbiology and Immunology  
 Diane M. Thiboutot, M.D. (Penn State) Professor of Dermatology  
 Fang Tian, Ph.D. (Florida State) Assistant Professor of Biochemistry and Molecular Biology  
 R. Alberto Travagli, Ph.D. (Georgetown) Professor of Neuroscience  
 Mary Ellen Truckenmiller, Ph.D. (Georgetown, California) Assistant Professor of Microbiology and Immunology  
 Akif Undar, Ph.D. (Texas, Austin) Associate Professor of Pediatrics, Surgery, and Bioengineering  
 Michael F. Verderame, Ph.D. (Columbia) Professor of Medicine, and Microbiology and Immunology; Associate Dean for Graduate Studies  
 Kent E. Vrana, Ph.D. (Louisiana State) Elliot S. Vesell Professor and Chair of Pharmacology  
 Hanspeter Waldner, Ph.D. (Basil, Switzerland) Assistant Professor of Microbiology and Immunology  
 Hong Gang Wang, Ph.D. (Tsukuba, Japan) Lois High Berstler Professor of Pharmacology  
 Facilitator Development Director of Multidiscipline Labs  
 William J. Weiss, Ph.D. (Penn State) Professor of Surgery and Bioengineering  
 John W. Wills, Ph.D. (Tennessee) Distinguished Professor of Microbiology and Immunology  
 Robin Taylor Wilson, Ph.D. (Iowa) Assistant Professor of Public Health Sciences  
 Jin-Ming Yang, M.D., Ph.D. (Medical Center of Fudan, China) Professor of Pharmacology  
 Qing X. Yang, Ph.D. (Georgia Inst of Tech) Professor of Radiology and Neurosurgery  
 Christopher Yengo, Ph.D. (Vermont) Associate Professor of Cellular and Molecular Physiology  
 Gregory S. Yochum, Ph.D. (Utah) Assistant Professor of Biochemistry and Molecular Biology  
 Jong K. Yun, Ph.D. (Case Western Reserve) Associate Professor of Pharmacology  
 Ian S. Zagon, Ph.D. (Colorado) Distinguished Professor of Neural and Behavioral Sciences  
 Samuel Shao-Min Zhang, Ph.D. (Tokyo, Japan) Assistant Professor of Neural and Behavioral Science  
 Jiyue Zhu, Ph.D. (Dartmouth) Associate Professor of Cellular and Molecular Physiology

The Biomedical Sciences (BMS) Graduate Program with its Options in Biochemistry and Molecular Genetics, Translational Therapeutics, and Virology and Immunology provides predoctoral students curricular training with a unique focus on human health and disease and the opportunity to concentrate in one or more disciplinary approaches including biochemistry, biophysics, cell biology, genetics, immunology, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including education, law, journalism, and public policy.

The first-year Fall curriculum provides the student an understanding of basic cellular processes through a common curriculum that includes three parallel and integrated three-credit BMS courses arranged around the theme 'Life Requires': 1) BMS 501 Regulation of Cellular and Systemic Energy Metabolism, 2) BMS 502 Cell and Systems Biology, and 3) BMS 503 Flow of Cellular Information. The Fall curriculum also includes the one-credit Art of Scientific Communication I course that reinforces the 'Life Requires' components and aids students in the transition from textbooks to primary literature as a source of information. The first-year Spring curriculum offers an opportunity to explore one or more curricular paths that lead to entry into one of the Options and/or to utilize Integrative Physiology as a stepping-stone to an individualized curricular pathway within the BMS Graduate Program. The Spring curriculum also includes the one-credit Art of Scientific Communication II course that further develops the student's knowledge acquisition from the primary literature and assists improvement of presentation and writing skills necessary for subsequent journal clubs, literature-based courses, and scientific discourse throughout their career. In addition, during the first year, students complete three research rotations that expose them to the wide range of research interests of The Pennsylvania State University graduate faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a dissertation adviser and doctoral committee.

Curriculum in the second year is determined by the choice to participate in one of the Options, or an individualized curricular pathway designed by the interaction of the student with the dissertation adviser and doctoral committee.

Successful completion of the Program results in conferral of the Ph.D. Degree in Biomedical Sciences.

The BMS Graduate Program is an interdepartmental program that engages faculty from at least seven basic science and eleven clinical science departments. This broad-reaching Program provides students a wide ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

#### ADMISSION REQUIREMENTS

1. Completed official Penn State Graduate School Application for Admission; Master's or Doctoral Degree
2. Graduate Record Examinations (GRE) general test
3. Three letters of recommendation

4. Statement of goals including a) your reasons for applying to the Biomedical Sciences Graduate Program, b) particular areas of research interests if known, and c) long-term career goals
5. All applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. International applicants must hold the equivalent of an American four-year baccalaureate degree.
6. Post-secondary course work must include biochemistry and molecular biology or genetics.
7. **English Proficiency**- The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL114G (American Oral English for Academic Purposes) and/or ESL116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum composite score for the IELTS is 6.5. Graduate programs may have more stringent requirements.

#### Master's Degree Requirements

The Biomedical Sciences Program does not actively recruit students to earn an M.S. degree. To receive an M.S. degree in Biomedical Sciences, at least 36 credits from courses at the 500- or 600-level are required.

1. **Required Core Courses:** BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, BMS 505 Art of Scientific Communication II, BMS 591 Ethics in the Life Sciences, BMS 596 Individual Studies: Research Rotation, and BMS 600 Thesis Research (no more than 6 credits of BMS 600 Thesis Research may be counted toward the 36 credit minimum).
2. **Required Program Courses:** BMS 520 Integrative Physiology, BMS 581 Molecular & Translational Approaches to Human Disease, BMS 590 Colloquium and at least 7 credits of elective courses selected in consultation with the student's thesis adviser and thesis committee.

Students must complete original laboratory research that culminates in a thesis. Additionally, all requirements listed in the University Bulletin for the M.S. degree must be fulfilled.

#### Doctoral Degree Requirements

During the Fall semester of the first year of study, Ph.D. candidates are required to take BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, and BMS 596 Individual Studies: Research Rotation. In the Spring semester, students are required to take BMS 520 Integrative Physiology, BMS 505 Art of Scientific Communication II, BCHEM 596 Individual Studies: Research Rotation and elective courses selected in consultation with the BMS Graduate Program Student Advisory Committee. Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

At the end of the first year, admission to Ph.D. candidacy is determined by performance in course work, laboratory rotations, and the BMS Graduate Program Candidacy examination. Students join their research laboratory by the end of the summer of the first year.

The doctoral committee of a Ph.D. student is formed upon entry into the thesis laboratory. The committee must include at least *two* faculty members in the major field. In addition, an official "outside member" must be appointed as one of the four members. The outside member may not have a budgetary connection or *adjunct appointment or other conflict of interest with the department or academic unit to which the doctoral program belongs, or to the department or academic unit of the chair or dissertation advisor, and cannot serve as either chair or co-chair of the committee.*

During the second year, students take BMS 581 Molecular & Translational Approaches to Human Disease, BMS 590 Colloquium, and elective courses that are selected in consultation with the student's dissertation adviser and doctoral committee.

Ph.D. candidates prepare a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to their doctoral committee.

It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the doctoral examination. A dissertation must be prepared and defended by each Ph.D. candidate.

#### M.D./Ph.D. Admissions Requirements

In addition to the basic college level premedical school requirements for the Penn State College of Medicine (one each year of biology, chemistry, physics, math, and organic chemistry), the MD/PhD program has the following requirements:

- **Academic Achievement**

Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and MCAT scores of 33-34. Applicants are not required to take the GREs.

- **Research Experience**

We are especially interested in candidates with a strong and sustained background in research. Candidates who have spent 1-2 years after graduation conducting research are strongly encouraged to apply.

- **Recommendations**

We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.

- **Goals**

Applicants must be able to clearly articulate the reasons for pursuing the joint degree.

- **International Students**

All qualified candidates are eligible to apply regardless of citizenship. (<http://www.pennstatehershey.org/web/md/admissions/overview/requirements>)

#### OTHER RELEVANT INFORMATION

The BMS Graduate Program Student Advisory Committee, which includes representation from the Program and each Option of the Program, advises students about academic and related matters until the student has a dissertation adviser. First-year students carry out a series of rotation projects in at least three different faculty laboratories before deciding on a research laboratory. If desired, students formally make a decision to join an Option by the end of the Spring semester of their first year and must satisfy all admission requirements of the Option.

Students must have a dissertation adviser by the end of the summer of the first year. The student and dissertation adviser then plan additional course work and develop a research plan in consultation with the doctoral committee.

#### STUDENT AID

Graduate assistantships available to students in this Program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

#### COURSES

Graduate courses carry numbers from 500 to 699 and 800 to 899.

#### Biochemistry and Molecular Genetics (BMG) Option

John M. Flanagan, Ph.D., Option Director  
The Pennsylvania State University College of Medicine  
Hershey, PA 17033  
[cxs8@psu.edu](mailto:cxs8@psu.edu)

The objective of the Option in Biochemistry and Molecular Genetics is to provide students in the Biomedical Sciences (BMS) Graduate Program the opportunity to specialize their graduate curriculum and laboratory training to focus on the principles and application of biochemical and molecular genetic analysis. These approaches play key roles in identifying and characterizing cellular processes and elucidating the structure and function of key macromolecules including DNA, RNA, protein, lipid, and carbohydrates. The Option also stresses the biological intersections of these classes of macromolecules. The

combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying biochemical and molecular genetic analysis to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as epigenetic control of gene expression, structure/function, biomolecular engineering, and systems analysis using genetic and biochemical approaches.

#### ADMISSION REQUIREMENTS

To be admitted to the Option in Biochemistry and Molecular Genetics, Ph.D. candidates must successfully complete 1) the first year of the BMS Graduate Program, 2) three research rotations, at least two with faculty in the Biochemistry and Molecular Genetics Option, and 3) the BMS Graduate Program Candidacy examination.

#### Masters Degree Requirements

The Biochemistry and Molecular Genetics Option does not actively recruit students to earn an M.S. degree. To receive an M.S. degree in The Biochemistry and Molecular Genetics Option at least 36 credits from courses at the 500- or 600-level are required.

- 1. Required Core Courses:** BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, BMS 505 Art of Scientific Communication II, BMS 591 Ethics in the Life Sciences, BMS 596 Individual Studies: Research Rotation, and BMS 600 Thesis Research (no more than 6 credits of BMS 600 Thesis Research may be counted toward the 36 credit limit).
- 2. Required Option Courses:** BCHEM 521 Structure, Function, and Regulation of Biological Molecules, BCHEM 522 Molecular Genetics: Genes to Genomes, BCHEM 590 Colloquium, BCHEM 596 Individual Studies: Research Rotation, and at least 7 credits of elective courses selected in consultation with the student's thesis adviser and thesis committee.

Students must complete original laboratory research that culminates in a thesis. Additionally, all requirements listed in the University Bulletin for the M.S. degree must be fulfilled.

#### Doctoral Degree Requirements

During the Fall semester of the first year of study, Ph.D. candidates take BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, and BMS 596 Individual Studies: Research Rotation. In the Spring semester, students considering joining the Option in Biochemistry and Molecular Genetics take BCHEM 521 Structure, Function, and Regulation of Biological Molecules, BCHEM 522 Molecular Genetics: Genes to Genomes, BMS 505 Art of Scientific Communication II, and BCHEM 596 Individual Studies: Research Rotation. Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing laboratory rotations done during the first year.

At the end of the first year, admission to Ph.D. candidacy and the Option in Biochemistry and Molecular Genetics is determined by performance in course work, laboratory rotations, and the BMS Graduate Program Candidacy examination. Students join their research laboratory by the end of the summer of the first year.

During the second year, students take BCHEM 590 Colloquium and at least 7 credits of 500-level didactic elective courses selected in consultation with the student's dissertation adviser and doctoral committee.

Ph.D. candidates prepare a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to their doctoral committee.

It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the doctoral examination. A dissertation must be prepared and defended by each Ph.D. candidate.

#### Translational Therapeutics Option

Jong Yun, Ph.D., *Option Director*  
The Pennsylvania State University College of Medicine  
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The Option in Translational Therapeutics of the Biomedical Sciences (BMS) Graduate Program is designed to give qualified students a combination of didactic instruction, informal interaction, and laboratory experience that enables them to obtain a firm foundation in the principles, methods, and contributions of pharmacology, defined broadly as the science of the interaction of chemical agents with biological systems. Of primary importance, this Option focuses on identification of disease targets, development of therapeutic strategies, and refinement of drug delivery approaches. With this preparation, graduates of the Translational Therapeutics Option will be capable of designing and executing high-quality independent research, and of assuming positions of responsibility within the therapeutic community.

This Option offers studies in the general areas of drug discovery and development, molecular pathophysiology, drug metabolism, molecular pharmacology, endocrine pharmacology, neuropharmacology, cardiovascular-renal pharmacology, pharmacogenetics, and clinical pharmacology. Primary emphasis is placed on the molecular mechanism by which drugs act in the body and by which the body transforms drugs.

#### ADMISSION REQUIREMENTS

To be admitted to the Option in Translational Therapeutics, Ph.D. candidates must successfully complete 1) the first year of the BMS Graduate Program, 2) three research rotations, at least two with faculty in the Translational Therapeutics Option, and 3) the Candidacy exam.

#### Master's Degree Requirements

The Translational Therapeutics Option does not actively recruit students to earn an M.S. degree. To receive an M.S. degree in The Translational Therapeutics Option at least 36 credits from courses at the 500- or 600-level are required.

- 1. Required Core Courses:** BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, BMS 505 Art of Scientific Communication II, BMS 591 Ethics in the Life Sciences, BMS 596 Individual Studies: Research Rotation, and BMS 600 Thesis Research (no more than 6 credits of BMS 600 Thesis Research may be counted toward the 36 credit minimum).
- 2. Required Option Courses:** PHARM 520 Principles of Drug Action, PHARM 551 Anti-infective Therapeutics, PHARM 552 Integrated Systems Pharmacology, PHARM 553 Gastrointestinal and Immunomodulatory Therapeutics, PHARM 554 Anticancer Therapeutics, PHARM 561 Neuropharmacology, PHARM 562 Endocrine Pharmacology, and at least 7 credits of elective courses selected in consultation with the student's thesis adviser and thesis committee.

Students must complete original laboratory research that culminates in a thesis. Additionally, all requirements listed in the University Bulletin for the M.S. degree must be fulfilled.

#### Doctoral Degree Requirements

During the Fall semester of the first year of study, Ph.D. candidates take BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, and BMS 596 Individual Studies: Research Rotation. In the Spring semester, students considering joining the Option in Translational Therapeutics take PHARM 520 Principles of Drug Action, BMS 505 Art of Scientific Communication II, PHARM 596 Individual Studies: Research Rotation, and elective courses selected in consultation with the BMS Graduate Program Student Advisory Committee. Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing laboratory rotations done during the first year.

At the end of the first year, admission to Ph.D. candidacy and the Option in Translational Therapeutics is determined by performance in course work, laboratory rotations, and the BMS Graduate Program Candidacy examination. Candidates join their research laboratory by the end of the summer of the first year.

During the second year, students take PHARM 551 Anti-infective Therapeutics, PHARM 552 Integrated Systems Pharmacology, PHARM 553 Gastrointestinal and Immunomodulatory Therapeutics, PHARM 554 Anticancer Therapeutics, PHARM 561 Neuropharmacology, PHARM 562 Endocrine Pharmacology, and elective courses selected in consultation with the candidate's dissertation adviser and doctoral committee.

Ph.D. candidates prepare a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to their doctoral committee.

It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the doctoral examination. A dissertation must be prepared and defended by each Ph.D. candidate.

#### **Virology and Immunology Option**

Todd D. Schell, Ph.D., Option Director  
The Pennsylvania State University College of Medicine  
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[rcourtney@psu.edu](mailto:rcourtney@psu.edu)

The objective of the Option in Virology and Immunology is to provide graduate students in the Biomedical Sciences (BMS) Graduate Program the opportunity to focus their graduate-level coursework and laboratory research in areas related to virology and immunology. The areas of research within virology include viral oncology, virus-cell interactions, the structure and assembly of viruses, functional role of viral gene products, the molecular biology of virus replication, and viral induced latency. The areas of research within immunology include adaptive and innate immunity, cellular and humoral immunity, antigen presentation, tumor immunology, vaccine development, and neuroimmunology. The Option in Virology and Immunology allows students to develop an integrative research approach using aspects of biochemistry, molecular and cellular biology, and genetics to approach scientific questions associated with areas of virology and immunology.

This Option is offered only through the BMS Graduate Program at the Penn State College of Medicine in Hershey.

#### **ADMISSION REQUIREMENTS**

To be admitted to the Option in Virology and Immunology, Ph.D. candidates must successfully complete: (1) the first year of the BMS Graduate Program; (2) three research rotations, at least two with faculty members in the Virology and Immunology Option; and (3) the Candidacy examination.

#### **Masters Degree Requirements**

The Virology and Immunology Option does not actively recruit students to earn an M.S. degree. To receive an M.S. degree in The Virology and Immunology Option at least 41 credits from courses at the 500- or 600-level are required.

1. **Required Core Courses:** BMS 501 Regulation of Cellular and Systemic Energy Metabolism, BMS 502 Cell and Systems Biology, BMS 503 Flow of Cellular Information, BMS 504 Art of Scientific Communication I, BMS 505 Art of Scientific Communication II, BMS 591 Ethics in the Life Sciences, BMS 596 Individual Studies: Research Rotation, and BMS 600 Thesis Research (no more than 6 credits of BMS 600 Thesis Research may be counted toward the 41 credit minimum).

2 **Required Option Courses.** MICRO 550 Medical Microbiology: Topics in Molecular Pathogenesis, MICRO 553 Science of Virology, MICRO 560 Concepts in Immunology, MICRO 572 Literature Reports, MICRO 581 Immunology A: Basic Concepts in Innate and Adaptive Immunity, MICRO 582 Immunology B: Adaptive Immunity, MICRO 583 Viral Vectors, MICRO 590 Colloquium, MICRO 596 Individual Studies: Research Rotation, MICRO 602 Supervised Experience in College Teaching, GENET 581 Genetics of Model Organisms A: Bacterial and Viral Pathogenesis, and IBIOS 580 Critical Readings in Immunology.

Students must complete original laboratory research that culminates in a thesis. Additionally, all requirements listed in the University Bulletin for the M.S. degree must be fulfilled.

#### **Doctoral Degree Requirements**

During the fall semester of the first year of study, Ph.D. candidates take BMS 501 (Regulation of Cellular and Systemic Energy Metabolism), BMS 502 (Cell and Systems Biology), BMS 503 (Flow of Cellular Information), BMS 504 (Art of Scientific Communication I), and BMS 596 (Individual Studies: Research Rotation).

In the Spring semester, students who are considering joining the Option in Virology and Immunology should take MICRO 550 (Medical Microbiology-Topics in Molecular Pathogenesis), MICRO 581 (Immunology A: Basic Concepts in Innate and Adaptive Immunity), MICRO 582 (Immunology B: Adaptive Immunity), MICRO 596 (Individual Studies: Research Rotation), MICRO 602 (Supervised Experience in College Teaching) and BMS 505 (Art of Scientific Communication II). Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations that were performed during the first year of the program.

At the end of the first year, admission to Ph.D. candidacy and the Option in Virology and Immunology is determined by successful performance in course work, laboratory rotations, and the BMS Graduate Program Candidacy examination. Students join their research laboratory by the end of the summer of the first year.

During the second year, students take MICRO 553 (Science of Virology), MICRO 560 (Concepts in Immunology), MICRO 602 (Supervised Experience in College Teaching), MICRO 572 (Literature Reports), MICRO 583 (Viral Vectors), MICRO 590 (Colloquium), GENET 581 (Genetics of Model Organisms A: Bacterial and Viral Pathogenesis), and IBIOS 580 (Critical Reading in Immunology).

Ph.D. candidates prepare a written comprehensive examination in the format of a grant application usually prior to the end of the sixth semester of enrollment. As a part of this examination, the candidate also participates in an oral defense of this proposal with the candidate's doctoral committee.

It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the doctoral examination. A dissertation must be prepared and defended for the successful completion of the Ph.D. degree.

#### **M.D./Ph.D. Degree Requirements**

Prospective students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the MD and PhD program. Candidates not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the candidate enters the BMS Graduate Program or one of its three options, each of which may have different credit requirements.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves as the Candidacy Examination for the BMS program and its Options.

#### **Biomedical Sciences Program Requirements**

The doctoral committee of an M.D./Ph.D. student in the BMS program is formed upon entry into the thesis laboratory. The committee must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least two members of the BMS program graduate faculty. At least one member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the 'Outside Field Member.'

M.D./Ph.D. students in the BMS program are required to take BMS 581 Molecular & Translational Approaches to Human Disease. Additional courses are selected in consultation with the student's dissertation adviser and doctoral committee.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

It is expected that the M.D./Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final doctoral examination. A dissertation must be prepared and defended by each MD/PhD candidate.

#### **Biochemistry and Molecular Genetics Option Requirements**

The doctoral committee of a M.D./Ph.D. student in the Biochemistry and Molecular Genetics Option is formed upon entry into the thesis laboratory. The committee must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least two members of the major program graduate faculty and at least two members of the faculty of the

Biochemistry and Molecular Genetics Option. If the dissertation advisor is not a member of this Option, a co-advisor who is a member of the Option must be appointed to the committee. At least one member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the 'Outside Field Member.'

M.D./Ph.D. students in the BMG Option are required to take BCHEM 521 Structure, Function, and Regulation of Biological Molecules and BCHEM 522 Molecular Genetics: Genes to Genomes. Additional courses are selected in consultation with the student's dissertation adviser and doctoral committee.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

It is expected that the MD/PhD candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final doctoral examination. A dissertation must be prepared and defended by each MD/PhD candidate.

#### **Translational Therapeutic Option Requirements**

The doctoral committee of a M.D./Ph.D. student in the Translational Therapeutic Option is formed upon entry into the thesis laboratory. The committee must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least one member of the major program graduate faculty and at least two members who are faculty of the Translational Therapeutics Option. If the dissertation advisor is not a member of this Option, a co-advisor who is a member of the Option must be appointed to the committee. At least one member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the 'Outside Field Member.'

M.D./Ph.D. students in the Translational Therapeutics Option are required to take PHARM 520 Principles of Drug Action. Additionally, the candidate takes elective courses selected in consultation with the candidate's dissertation adviser and doctoral committee.

The candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to the doctoral committee.

It is expected that the M.D./Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final doctoral examination. A dissertation must be prepared and defended by each MD/PhD candidate.

#### **Virology and Immunology Option Requirements**

The doctoral committee of a M.D./Ph.D. student in the Virology and Immunology Option is formed upon entry into the thesis laboratory. The committee must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least two members of the major program graduate faculty. If the dissertation advisor is not a member of this Option, a co-advisor who is a member of the Option must be appointed to the committee. At least one member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the 'Outside Field Member.'

M.D./Ph.D. students in the Virology and Immunology Option are required to take MICRO 553 (Science of Virology), MICRO 560 (Concepts in Immunology), IBIOS 580 (Critical Reading in Immunology), MICRO 572 (Literature Reports), MICRO 590 (Colloquium), MICRO 583 (Viral Vectors), GENET 581 (Genetics of Model Organisms A: Bacterial and Viral Pathogenesis), and MICRO 602 (Supervised Experience in College Teaching).

#### **Comprehensive Examination**

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

#### **Final Doctoral Examination**

It is expected that the M.D./Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final doctoral examination. A dissertation must be prepared and defended by each M.D./Ph.D. candidate.

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-101

Review Date: 01/10/2012

Faculty updated: 10/15/12



## Business Administration (BUSAD)

JAMES A. NEMES, *Interim Director of Academic Affairs*  
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**Degree Conferred:** M.B.A.

### The Graduate Faculty

- John Cameron, J.D. (Widener University) *Assistant Professor of Management and Organization*
- Janice L. Dreachsln, Ph.D. (Wayne State) *Professor of Health Policy and Administration*
- Karen Duhala, Ph.D. (Penn State) *Assistant Professor of Finance and Accounting*
- Daniel C. Indro, Ph.D. (Indiana) *Associate Professor of Finance*
- Pornsit Jiraporn, Ph.D. (Southern Illinois, Carbondale) *Assistant Professor of Finance*
- Barrie E. Litzky, Ph.D. (Drexel) *Associate Professor of Management and Organization*
- Kimberly K. Merriman, Ph.D. (Temple) *Assistant Professor of Management and Organization*
- Simon J. Pak, Ph.D. (California, Berkeley) *Associate Professor of Finance*
- Denise Potosky, Ph.D. (Rutgers) *Associate Professor of Management and Organization*
- Patrick Qiang, Ph.D. (Massachusetts, Amherst) *Assistant Professor of Operations Management*
- Kailasam Satyamurthy, Ph.D. (Clemson) *Senior Lecturer in Engineering and Management*
- Sagnika Sen, Ph.D. (Arizona State) *Assistant Professor of Management Information Systems*
- Manohar Singh, Ph.D. (Southern Illinois, Carbondale) *Associate Professor of Finance*
- John Sosik, Ph.D. (SUNY Binghamton) *Associate Professor of Management and Organization*
- Eric W. Stein, Ph.D. (Pennsylvania) *Associate Professor of Management Science and Information Systems*
- G. Walter Wang, Ph.D. (Louisiana State) *Associate Professor of Marketing*

The Penn State Great Valley M.B.A. is a general degree program emphasizing development of the planning and problem-solving skills crucial in middle and upper management in the public, private, and nonprofit sectors. Nearly all students are working professionals who bring a wealth of experience and knowledge to the classroom. Required research may be conducted in Penn State Great Valley's Library and Computer Center, which provide local research support as well as access to the library and computer resources of the entire Penn State system.

The M.B.A. program is geared toward the needs of part-time students who are employed full-time. Courses in the program, which are offered at Great Valley, are scheduled for the convenience of adult learners, in the evening or on Saturday. Online and blended formats are also available.

### Admission Requirements

Requirements listed here are in addition to the Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Scores from the Graduate Management Admission Test (GMAT) are required for admission. Scores from the Test of English as a Foreign Language (TOEFL) are required of international applicants and must be submitted at the time of application. Exception: The TOEFL is not required of natives of an English-speaking country or applicants who hold a baccalaureate or graduate degree from an institution of an English-speaking country. Applicants should have had at least one year of quantitative analysis or statistics.

Admission decisions are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments, GMAT scores, two recommendations, and a personal statement that provides indications of future academic and professional potential. Application filing dates: Penn State Great Valley's M.B.A. program has a rolling admission policy. New students may start classes in fall, spring, or summer sessions.

### Degree Requirements

Normally 45 credits will be required to complete the M.B.A. degree.

Prior to enrolling in M.B.A. program requirements, students entering the program are expected to meet preprogram requirements that build a foundation for quantitative analysis as described below.

**Quantitative Skills Requirement:** Prior to enrolling in their M.B.A. course work, students must demonstrate competence in quantitative skills. This requirement must be satisfied in one of two ways:

1. Completion of two sequential undergraduate courses in applied statistics or one graduate introductory course in applied statistics at a regionally accredited institution of higher education with a minimum grade of B, within the seven years prior to being enrolled at Penn State Great Valley. Syllabi for such courses must be provided.

**OR**

1. Satisfactory completion of BUSAD 501 (formerly MS&IS 510): Statistical Analysis for Managerial Decision Making at Penn State Great Valley. This requirement must be satisfied by the first semester or summer session of the student's matriculation prior to enrolling in M.B.A. degree courses, and completed with a grade of B or higher. Successful completion of this course will result in 3 graduate credits, but will not count toward the completion of program requirements for the M.B.A. degree.

To facilitate successful fulfillment of preprogram requirements, students needing to take BUSAD 501 will be admitted on a one-year provisional basis.

Exemption from up to 15 credits from the foundation courses may be granted in accordance with the course exemption guidelines for the M.B.A. program. Normally students will need to have completed at least two undergraduate courses with a grade of B or higher, no more than seven years prior to admission to the M.B.A. program, to be eligible for exemption from a single foundation course. At the Management Division Head's discretion, a competency exam may be required to receive certain course exemptions. Course work not meeting the tests of relevancy, quality, or currency must be taken at the graduate level prior to starting advanced coursework. Time limits may be waived by the M.B.A. program on the basis of post-graduate training or current and relevant work experience.

All entering students are required to take MGMT 501.

**Foundation Courses** (18 credits) provide an overview of key business processes and functional areas of organizations. The are: Behavioral Science in Business (MGMT 501), Financial and Managerial Accounting (ACCTG 511), Financial Management (FIN 531), Prices and Markets (BUSAD 523), Marketing Management (MKTG 500), and Operations Management (OPMGT 510).

**Essential Courses** (15 credits) build necessary competencies for effective managerial practice, knowledge of key elements of contemporary business, and ethical decision making. They include one course in each of the following categories: Ethics, Global, Interpersonal Dynamics, Organizational and Industry Contexts, and Managing Technology.

**Elective courses** (9 credits) provide an opportunity for students to pursue their interests and develop distinctive competencies by pursuing advanced courses offered or approved by the Management Division.

All students must complete a Capstone course (3 credits) that provides students with an opportunity to strategically integrate and apply what they have learned in their course work. MGMT 571 (Strategic Management) is the capstone course for the MBA.

### Student Aid

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley.

Most students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options that may be available to you, contact the Great Valley Financial Aid Office, 610-648-3311.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ACCOUNTING \(ACCTG\) course list](#)

[BUSINESS ADMINISTRATION \(B A\) course list](#)

[BUSINESS ADMINISTRATION \(BUSAD\) course list](#)

[BUSINESS LAW \(B LAW\) course list](#)

[FINANCE \(FIN\) course list](#)

[HEALTH POLICY AND ADMINISTRATION \(H P A\) course list](#)

[INTERNATIONAL BUSINESS \(I B\) course list](#)

[LEADERSHIP \(LEAD\) course list](#)

[MANAGEMENT \(MGMT\) course list](#)

[MARKETING \(MKTG\) course list](#)

[SYSTEMS ENGINEERING \(SYSEN\) course list](#)

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Date last updated by Publications: 8/20/09

## Civil Engineering (C E)

[Program Home Page](#)

PEGGY A. JOHNSON, *Head of the Department of Civil and Environmental Engineering*  
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814-863-3084

### Degrees Conferred:

Ph.D., M.S., M.Eng.

### The Graduate Faculty

- Rachel A. Brennan, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Civil Engineering
- William D. Burgos, Ph.D. (Virginia Tech) Associate Professor of Environmental Engineering
- Fred S. Cannon, Ph.D. (Illinois, Urbana-Champaign) P.E. Professor of Environmental Engineering
- Brian A. Dempsey, Ph.D. (North Carolina) Professor of Environmental Engineering
- Eric T. Donnell, Ph.D. (Penn State) Associate Professor of Civil Engineering
- Christopher J. Duffy, Ph.D. (New Mexico Institute of Mining and Technology) P.H. Professor of Civil Engineering
- Michael Gooseff, Ph.D. (Colorado) Associate Professor of Civil Engineering
- Peggy A. Johnson, Ph.D. (Maryland) Head; Professor of Civil Engineering
- Paul P. Jovanis, Ph.D. (California, Berkeley) Professor of Civil Engineering
- Jeffrey A. Laman, Ph.D. (Michigan) P.E. Professor of Civil Engineering
- Daniel G. Linzell, Ph.D. (Georgia Tech) P.E. Associate Professor of Civil Engineering
- Bruce E. Logan, Ph.D. (California, Berkeley) Kappe Professor of Environmental Engineering
- Maria M. Lopez de Murphy, Ph.D. (Michigan) Associate Professor of Civil Engineering
- Martin T. Pietrucha, Ph.D. (Maryland) P.E. Associate Professor of Civil Engineering
- Patrick Reed, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Civil Engineering
- John M. Regan, Ph.D. (Wisconsin, Madison) P.E. Associate Professor of Civil Engineering
- Andrew Scanlon, Ph.D. (Alberta) S.E. Professor of Civil Engineering
- Barry Scheetz, Ph.D. Professor of Civil Engineering
- Venkataraman (Venky) N. Shankar, Ph.D. (U Washington, Seattle) Associate Professor of Civil Engineering
- Shelley M. Stoffels, D.E. (Texas A&M) P.E. Associate Professor of Civil Engineering
- Gordon Warn, Ph.D. Assistant Professor of Civil Engineering

Students may specialize in construction engineering, environmental engineering, hydrosystems engineering, structural engineering, and transportation engineering.

### Admission Requirements

The requirements listed here are in addition to the general requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Candidates should possess a baccalaureate degree from a regionally accredited institution. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

International applicants must submit OFFICIAL transcripts, degree, and diploma certificates in **both English and native language**. These documents must contain the "red stamp" or have the raised notary stamp. Photocopies will NOT be accepted.

All applicants must provide the department with official transcripts of all their previous course work (in duplicate), a statement of objectives, and three letters of recommendation AT THE TIME OF APPLICATION. In addition, all applicants must submit scores from the General Graduate Record Examinations Aptitude Test (verbal, quantitative, and analytical).

All international applicants whose native language is not English must present an acceptable score (560 minimum on the paper-based test; 220 minimum on the computer-based test) on the Test of English as a Foreign Language (TOEFL).

Applicants for fall admission who wish to be considered for financial aid should have COMPLETED applications on file by DECEMBER 1 of the preceding year.

### Degree Requirements

The M.Eng. degree is a nonthesis professional master's degree. The program provides training for advanced professional practice. A minimum of 30 graduate credits (400 level and above) of course work and a writing portfolio are required. It should be noted that 20 credits must be earned at an established graduate campus of the University. At least 15 credits must be earned in graduate courses (500 level). Divisions may require specific core courses. Students are not permitted to count audited credits toward the minimum credits required for the degree.

The M.S. degree program is strongly oriented toward research. A minimum of 30 graduate credits (400-level and above) is required, of which 20 must be earned at an established graduate campus of the University. At least 18 credits in the 500 and 600 levels, combined, must be included in the program. A minimum of 12 credits of course work (400 and 500 level), as contrasted with research, must be completed in the major (courses prefixed C E). Division may require specific core courses. Students are not permitted to count audited credits toward the minimum credits required for the degree. A thesis is required, and at least 6 credits of thesis research (C E 600 or 610) must be included in the candidate's academic course plan.

A candidate for the Ph.D. degree must pass the English proficiency and candidacy examinations, prepare and defend the thesis proposal as part of the oral comprehensive examination, and pass the final oral examination (thesis defense). In addition, a Ph.D. candidate must satisfy the University residency requirement by registering for two consecutive semesters as a full-time student.

Continuous registration is required for all graduate students until the thesis or writing portfolio has been approved. See also Environmental Engineering.

### Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

### Other Relevant Information

Students in this program may elect to participate in the dual-title degree program option in Operations Research for the Ph.D. and M.S. degrees. See also [Environmental Engineering](#).

**Student Aid**

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. International applicants who wish to be considered for a teaching assistantship must present an acceptable score (250-300 or 55-60) on the Test of Spoken English (TSE). The TSE can be taken in many countries, or at Penn State after arrival.

**CECIL M. PEPPERMAN MEMORIAL GRADUATE FELLOWSHIP**

Available to a graduate student in civil or environmental engineering specializing in one of the following fields, listed in order of priority: waste treatment and management, water pollution control, environmental engineering, or related fields.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**[CIVIL ENGINEERING \(C E\) course list](#)**

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/3/04

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185AA

Review Date: 4/14/08

Faculty updated: 12/21/12

## Curriculum and Instruction (C I)

### [Program Home Page](#)

GLENDON W. BLUME, *Director of Graduate Studies in Curriculum and Instruction*  
267 Chambers Building  
814-865-2169  
[bti@psu.edu](mailto:bti@psu.edu)

### Degrees Conferred:

Ph.D., M.S., M.Ed.  
Integrated B.S. in Special Education/M.Ed. in Curriculum and Instruction

### The Graduate Faculty

- E. Frances Arbaugh, Ph.D. (Indiana) Associate Professor of Education
- Bernard J. Badiali, Ph.D. (Penn State) Associate Professor of Education
- Glendon W. Blume, Ph.D. (Wisconsin) Professor of Education
- Gail M. Boldt, Ph.D. (Hawaii) Associate Professor of Education
- William S. Carlsen, Ph.D. (Stanford) Professor of Education
- Kathleen M. Collins, Ph.D. (Michigan) Assistant Professor of Education
- Richard A. Duschl, Ph.D. (Maryland) Waterbury Chair in Secondary Education
- Jacqueline Edmondson, Ph.D. (Penn State) Professor of Education
- Daniel D. Hade, Ph.D. (Ohio State) Associate Professor of Education
- Leigh Ann Haefner, Ph.D. (Penn State) Associate Professor of Education
- M. Kathleen Heid, Ph.D. (Maryland) Professor of Education
- Steven L. Herb, Ph.D. (Penn State) Librarian; Head, Education Library, Affiliate Associate Professor of Education
- Patricia H. Hinchey, Ed.D. (Columbia) Professor of Education
- Elisa Hopkins, Ph.D. (Penn State) Assistant Professor of Education
- James E. Johnson, Ph.D. (Wayne State) Professor of Education
- Gregory J. Kelly, Ph.D. (Cornell) Professor of Education
- Mark Kissling, Ph.D. (Michigan State) Assistant Professor of Education
- Allison Kootsikas, Ph.D. (Penn State) Assistant Professor of Education
- Ravinder Koul, Ph.D. (Penn State) Associate Professor of Education
- Gwendolyn M. Lloyd, Ph.D. (Michigan) Professor of Education
- Andrea V. McCloskey, Ph.D. (Indiana) Assistant Professor of Education
- Scott P. McDonald, Ph.D. (Michigan) Associate Professor of Education
- Scott A. Metzger, Ph.D. (Michigan State) Associate Professor of Education
- Orrin T. Murray, Ph.D. (Michigan) Assistant Professor of Education
- Jamie M. Myers, Ph.D. (Indiana) Professor of Education
- Murry R. Nelson, Ph.D. (Stanford) Professor of Education
- James F. Nolan, Ph.D. (Penn State) Hermanowicz Professor of Education
- Julia Plummer, Ph.D. (Michigan) Associate Professor of Education
- Matthew E. Poehner, Ph.D. (Penn State) Assistant Professor of Education
- Kimberly A. Powell, Ph.D. (Stanford) Associate Professor of Education
- Jacqueline Reid-Walsh, Ph.D. (McGill) Associate Professor of Education
- Peter A. Rubba, Ed.D. (Indiana) Professor of Education
- David W. Saxe, Ph.D. (Illinois) Associate Professor of Education
- Stephanie C. Serriere, Ph.D. (Indiana) Assistant Professor of Education
- Patrick W. Shannon, Ph.D. (Minnesota) Professor of Education
- Kathleen A. Sillman, Ph.D. (Penn State) Assistant Professor of Education
- Deborah C. Smith, Ph.D. (Delaware) Assistant Professor of Education
- Elizabeth Smolicz, Ph.D. (Penn State) Assistant Professor of Education
- Jeanine M. Staples, Ph.D. (Pennsylvania) Assistant Professor of Education
- Iris M. Striedieck, D.Ed. (Penn State) Assistant Professor of Education
- Dana L. Stuchul, Ph.D. (Penn State) Associate Professor of Education
- Kristine E. Sunday, Ph.D. (Penn State) Assistant Professor of Education
- Daniel K. Thompson, Ph.D. (Iowa) Assistant Professor of Education
- Joseph Valente, Ph.D. (Arizona State) Assistant Professor of Education
- Anne E. Whitney, Ph.D. (California) Assistant Professor of Education
- Vivian Yenika-Agbaw, Ph.D. (Penn State) Associate Professor of Education
- Rose Mary Zbiek, Ph.D. (Penn State) Professor of Education
- Carla M. Zembal-Saul, Ph.D. (Michigan) Professor of Education

This program provides advanced professional preparation in the special areas of bilingual education, curriculum and supervision, early childhood education, elementary education, instructional leadership, language and literacy education, science education, social studies education, and mathematics education.

### Admission Requirements

Scores from the Miller Analogies Test (MAT) or the Graduate Record Examinations (GRE) are required for admission. However, applicants for the doctoral degree are strongly encouraged to take the GRE. Moreover, students with excellent academic records who wish to be considered for fellowships, scholarships, and assistantships should take the GRE as a matter of course. At the discretion of an option area, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with appropriate course and professional backgrounds will be considered for admission, subject to the limitation of program facilities. For admission to the professional degree programs leading to the M.Ed. and D.Ed., teaching or equivalent experience and at least 18 credits in education are recommended.

### Master's Degree Requirements

M.Ed. and M.S. candidates are expected to complete the core: EDPSY 421, C I 400, and C I 550, or the equivalent.

Candidates for the M.Ed. degree with a minor in Curriculum and Instruction must take a minimum of 6 course credits approved in advance.

### Doctoral Degree Requirements

The completion of a core of competencies in curriculum, instruction, and supervision is expected of Ph.D. candidates.

To meet residency requirements, the Ph.D. candidate must spend at least two consecutive semesters enrolled as a full-time student at the University Park campus.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate*

*Bulletin.***Integrated B.S. in Special Education/M.Ed. in Curriculum and Instruction**

The Special Education and Curriculum and Instruction with emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) leading to certification as a Reading Specialist.

The Special Education and Curriculum Instruction with Emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) Degree Program consists of integration of required courses for a B.S. in Special Education with courses required for certification as a Reading Specialist and a M.Ed. in Curriculum and Instruction with emphasis in Language and Literacy Education (LLED). The five-year, SE/CI-LLED IUG is an option for highly qualified students seeking certification to teach Special Education in Pennsylvania in grades K-12. Students in this IUG will be taught how to design and deliver appropriate instruction based on individual needs and incorporate a variety of materials and strategies. Students are expected to complete courses required for the graduate level K-12 reading specialist integrated with their undergraduate experiences and coursework in Special Education and will complete a summer practicum in an on-campus reading clinic as well as a capstone Special Education teaching experience in their final semester. Completion of the IUG (along with earning a passing score on PDE required PRAXIS tests) leads to a B.S. in Special Education, certification in special education and as a reading specialist in the state of Pennsylvania, and a M.Ed. in Curriculum and Instruction.

Admission to the SE/CI-LLED IUG Reading Specialist program will be based upon having attained a minimum GPA of 3.5 in Special Education courses, with a grade of B or better in SPLED 412. Admission will be based on a recommendation by the Reading Specialist Program Coordinator in consultation with the Coordinator of Teacher Education in Special Education.

For the B.S./M.Ed. Degree in integrated Special Education B.S. and Curriculum and Instruction M.Ed., a minimum of 150 credits is required. Up to 12 graduate level credits can apply to both undergraduate and graduate degrees; half of these must be at the 500-level. Students can complete the B.S. in Special Education and not advance to the M.Ed. CI degree if they desire.

**Master of Education**

CURRICULUM AND INSTRUCTION M.Ed. (30 credits)

Core Areas (9 credits - choose one course from each area):

Curriculum: C I 550

Research: C I 501 or EDPSY 400

Learning: EDPSY 421, EDPSY 545, or HD FS 429

Emphasis in Language and Literacy Education with Reading Specialist (\* denotes required courses)

EDLDR 563, EDPSY 526, \*LL ED 500, \*LL ED 501, \*LL ED 550, \*LL ED 595A

Note: A Master's paper is required for completion of the M.Ed.

A passing score on the PRAXIS Reading Specialist Exam (qualifying score of 570) is required for Reading Specialist certification.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[CURRICULUM AND INSTRUCTION \(C I\) course list](#)

[CURRICULUM AND SUPERVISION \(C & S\) course list](#)

[EARLY CHILDHOOD EDUCATION \(E C E\) course list](#)

[LANGUAGE AND LITERACY EDUCATION \(LL ED\) course list](#)

[MATHEMATICS EDUCATION \(MTHED\) course list](#)

[SCIENCE EDUCATION \(SCI ED\) course list](#)

[SOCIAL STUDIES EDUCATION \(SS ED\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-017

Review Date: 06/12/2012

Faculty updated: 5/24/13

## Crime, Law, and Justice (C L J)

[Program Home Page](#)

JOHN ICELAND, *Head of the Department of Sociology, and Crime, Law, and Justice*  
211 Oswald Tower  
814-863-8260

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- Duane Alwin, Ph.D. (Wisconsin) McCourtney Professor of Sociology, Demography, and Human Development and Family Studies
- Paul Amato, Ph.D. (James Cook, Australia) Professor of Sociology and Demography
- Roy L. Austin, Ph.D. (Washington) Associate Professor of Sociology and Justice
- Alan A. Block, Ph.D. (California, Los Angeles) Professor of Crime, Law, and Justice, and Jewish Studies
- Lori Burrington, Ph.D. (Ohio State) Assistant Professor of Crime, Law, and Justice
- Frank Clemente, Ph.D. (Tennessee) Professor of Sociology
- Stephen R. Couch, Ph.D. (SUNY) Professor of Sociology
- Gordon F. De Jong, Ph.D. (Kentucky) Distinguished Professor of Sociology and Demography; Director, Graduate Program in Demography
- Francis Doodoo, Ph.D. (Pennsylvania) Professor of Sociology and Demography
- Richard Felson, Ph.D. (Indiana) Professor of Crime, Law, and Justice, and Sociology
- Roger Finke, Ph.D. (Washington) Professor of Sociology and Religious Studies
- Glenn Firebaugh, Ph.D. (Indiana) Professor of Sociology and Demography
- Michelle Frisco, Ph.D. (Texas) Assistant Professor of Sociology and Demography
- Emily Greenman, Ph.D. (Michigan) Assistant Professor of Sociology
- Melissa Hardy, Ph.D. (Indiana) Distinguished Professor of Human Development and Family Studies, Sociology, and Demography
- Michael Hecht, Ph.D. (Illinois) Distinguished Professor of Speech Communication, and Crime, Law, and Justice
- Julie Horney, Ph.D. (California, San Diego) Professor of Crime, Law, and Justice; Graduate Officer
- John Iceland, Ph.D. (Brown) Professor of Sociology and Demography
- David R. Johnson, Ph.D. (Vanderbilt) Professor of Sociology, and Human Development and Family Studies; Director, Survey Research Center
- Kurt Johnson, Ph.D. (Nebraska) Research Associate, Social Science Research Institute
- Valerie King, Ph.D. (Pennsylvania) Associate Professor of Sociology, Demography, and Human Development and Family Studies
- John H. Kramer, Ph.D. (Iowa) Professor of Sociology, and Crime, Law, and Justice
- Derek Kreager, Ph.D. (Washington) Assistant Professor of Crime, Law, and Justice
- Nancy S. Landale, Ph.D. (Washington) Professor of Sociology and Demography
- Barrett A. Lee, Ph.D. (Washington) Professor of Sociology and Demography
- Doris MacKenzie, Ph.D. (Penn State) Professor of Crime, Law, and Justice
- Molly Martin, Ph.D. (Wisconsin) Assistant Professor of Sociology and Demography
- Michael Massoglia, Ph.D. (Minnesota) Assistant Professor of Crime, Law, and Justice
- Jennifer Mastroski, Ph.D. (Penn State) Associate Professor of Administration of Justice
- Stephen Matthews, Ph.D. (Wales) Associate Professor of Sociology, Anthropology, and Demography
- John D. McCarthy, Ph.D. (Oregon) Professor of Sociology
- R. Salvador Oropesa, Ph.D. (Washington) Professor of Sociology and Demography
- D. Wayne Osgood, Ph.D. (Colorado) Professor of Crime, Law, and Justice, and Sociology
- Evelyn Patterson, Ph.D. (Pennsylvania) Assistant Professor of Crime, Law, and Justice, Sociology, and Demography
- Eric Plutzer, Ph.D. (Washington-St. Louis) Associate Professor of Political Science and Sociology
- Suet-Ling Pong, Ph.D. (Chicago) Associate Professor of Education and Sociology
- R. Barry Ruback, Ph.D. (Pittsburgh) Professor of Crime, Law, and Justice, and Sociology
- Eric Silver, Ph.D. (SUNY, Albany) Associate Professor of Crime, Law, and Justice, and Sociology
- Graham B. Spanier, Ph.D. (Northwestern) Professor of Human Development, Sociology, and Family, and Community Medicine
- Jeremy Staff, Ph.D. (Minnesota) Assistant Professor of Crime, Law, and Justice, and Sociology
- Darrell J. Steffensmeier, Ph.D. (Iowa) Professor of Sociology and Crime, Law, and Justice
- C. Shannon Stokes, Ph.D. (Kentucky) Professor of Rural Sociology, Sociology, and Demography
- Marylee C. Taylor, Ph.D. (Harvard) Associate Professor of Sociology
- Kevin J. A. Thomas, Ph.D., (Pennsylvania) Assistant Professor of African and African American Studies, Sociology, and Demography
- Jenny Trinitapoli (Texas) Assistant Professor of Sociology, Demography, and Religious Studies)
- Jeffery T. Ulmer, Ph.D. (Penn State) Associate Professor of Crime, Law, and Justice, and Sociology
- Jennifer Van Hook, Ph.D. (Texas) Associate Professor of Sociology and Demography
- Susan Welch, Ph.D. (Illinois) Professor of Political Science and Crime, Law, and Justice

The graduate program in Crime, Law, and Justice is for students seeking the Ph.D. degree. It offers an advanced education on crime and its control to persons interested in research careers in academia and public service.

The graduate program emphasizes theory and research on crime and justice, research and statistical methodology, and substantive knowledge about crime and its control.

### Admission Requirements

Applications from students with either the B.A. or M.A. degree will be accepted through January 1 for admission in the fall of the following year. Selection is based on transcripts, three letters of recommendation from persons familiar with the applicant's academic performance, a statement of goals, a sample of written work such as a term paper, and Graduate Record Examinations (GRE) verbal and quantitative scores. The best-qualified applicants will be admitted to the program up to the number of spaces available.

### M.A. and Ph.D. Degree Requirements

Students entering the program with the B.A. degree will first earn the M.A. degree. Thirty-seven credits of course work and a master's thesis are required for the M.A. The course work includes a sequence of methods and statistics courses; a crime theory course; a course in the organization and criminal justice system; and additional 500-level substantive Crime, Law, and Justice courses selected in consultation with a student's faculty committee.

A candidacy exam is required of all students seeking the Ph.D., after a master's degree has been earned. This exam will consist of an evaluation by the program's graduate faculty of the student's seminar papers, master's thesis, and overall record of performance. Students admitted with a master's degree will stand for this exam in the second semester of full-time study.

A comprehensive exam must be passed by all students before intensive dissertation research begins.

The program in Crime, Law, and Justice has no formal foreign language or communication requirement. However, students are encouraged to pursue additional training in statistics, computer science, foreign language, technical writing, specialized methods, or specialized theory that will further their dissertation or career plans.

### Student Aid

All students admitted to the program are supported with stipends and tuition waivers for either four years (students entering with a master's degree) or five years (students entering with a bachelor's degree). Support may be in the form of research assistantships or teaching assistantships, with most students

receiving a combination of types of support across their graduate careers.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### **[CRIME, LAW, AND JUSTICE \(C L J\) course list](#)**

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-117

Review Date: 11/13/2012

Last updated by Publications: 2/10/12



## Classics and Ancient Mediterranean Studies (CAMS)

[Program Home Page](#)

PAUL B. HARVEY, Jr., *Department Head*  
101 Weaver Building  
814-863-0061  
[pbh1@psu.edu](mailto:pbh1@psu.edu)

### Degrees Conferred

Students electing this program through participating departments will earn a degree with a dual-title at both the Ph.D. and the master's levels, i.e., Ph.D. in (graduate program name) and Classics and Ancient Mediterranean Studies, or master's degree in (graduate program name) and Classics and Ancient Mediterranean Studies.

The following graduate programs offer dual degrees in Classics and Mediterranean Studies: History.

### The Graduate Faculty

Classics and Ancient Mediterranean Studies-affiliated faculty include individuals with budgeted appointments in Classics and Ancient Mediterranean Studies and individuals with courtesy joint appointments. The following faculty members have budgeted and courtesy joint appointments in Classics and Ancient Mediterranean Studies:

- Christopher Brady, D.Phil. (Oxford) Associate Professor of Classics and Ancient Mediterranean Studies
- Paul C. Dilley, Ph.D. (Yale) Assistant Professor of History, Classics and Ancient Mediterranean Studies, and Jewish Studies
- Garrett G. Fagan, Ph.D. (McMaster) Associate Professor of Classics and Ancient Mediterranean Studies, and History
- Baruch Halpern, Ph.D. (Harvard) Chaiken Family Chair in Jewish Studies; Professor of Ancient History and Religious Studies; Fellow, Institute for the Arts and Humanities Studies
- Paul B. Harvey, Jr., Ph.D. (Pennsylvania) Associate Professor of Classics and Ancient Mediterranean Studies, History, and Religious Studies
- Ann E. Killebrew, Ph.D. (Hebrew University, Jerusalem) Associate Professor of Classics and Ancient Mediterranean Studies, Jewish Studies, and Anthropology
- Gerald (Gary) N. Knoppers, Ph.D. (Harvard) Edwin Erle Sparks Professor of Classics and Ancient Mediterranean Studies, Religious Studies, and Jewish Studies
- Michael Kulikowski, Ph.D. (Toronto) Professor of History, and Classics and Ancient Mediterranean Studies
- Mark Munn, Ph.D. (Pennsylvania) Professor of Ancient Greek History, Greek Archaeology, and Classics and Ancient Mediterranean Studies
- Donald Redford, Ph.D. (Toronto) Professor of Classics and Ancient Mediterranean Studies
- Aaron Rubin, Ph.D. (Harvard) Associate Professor of Classics and Ancient Mediterranean Studies, Jewish Studies, and Linguistics
- Gonzalo Rubio, Ph.D. (Johns Hopkins) Associate Professor of Classics and Ancient Mediterranean Studies, History, and Religious Studies
- Zoe Stamatopoulou, Ph.D. (Virginia) Assistant Professor of Classics and Ancient Mediterranean Studies
- Stephen Wheeler, Ph.D. (Princeton) Associate Professor of Classics

Dual-title degrees grounded both in CAMS and a given discipline will acknowledge and foster interdisciplinary scholarship. This dual-title degree program will increase the intellectual rigor, breadth, and depth of graduate work in a participating program through immersion in the disciplinary fields covered by the Department of Classics and Ancient Mediterranean Studies: the philology and literature of ancient Mediterranean languages; the history and material cultures of those societies.

This dual-title program will thus provide a context in which students will learn how to synthesize knowledge within and across traditional disciplinary boundaries. In addition, this dual-title degree program will provide qualified students opportunities for instructional training encouraging an interdisciplinary approach to teaching.

The primary advantages of this dual-title program include the intellectual and academic advantages and benefits of interdisciplinary study, as well as the enhancement of the reputation of the departments concerned through an innovative program, leading to recruitment of highly qualified graduate students, and an improved placement of doctoral graduates in highly-competitive humanities fields.

This dual-title degree program does not duplicate any other degree program in the University.

### Admission Requirements

Students must first be admitted to a participating program; only after admittance by a participating program, will students be admitted to graduate study in CAMS by an admissions committee of CAMS faculty and the approval of the head of CAMS. CAMS will follow the timetable and admissions requirements of the participating program. Applicants to this dual-title degree program should have a junior/senior cumulative average of at least 3.30 (on a 4.00 scale) and appropriate academic preparation. Preference will be given to those candidates whose undergraduate record demonstrates expertise in ancient Mediterranean studies (history; literature; archaeology) and proficiency to the 12 th credit level in one or more ancient languages. Where applicable, a minimum GPA of 3.5 (on a 4.00) scale is requisite for graduate work previously undertaken. Prospective students seeking admission to this dual-title degree program are required to write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary research in the participating program and the disciplines and fields included in CAMS.

### Degree Requirements

This dual-title degree will have requirements in addition to those for graduate degrees in a participating program. Those requirements include additional course work in ancient languages, additional components to the comprehensive examinations at the doctoral level, and the completion of CAMS-related theses at the master's level (optional; see below) and doctoral levels (compulsory). A CAMS master's, and a doctoral, committee, chaired by faculty closely related to the student's field of interest, will supervise the graduate study of each student accepted into this dual-title program. Students will be expected to attend and participate actively in the CAMS regularly-scheduled colloquia.

### Master's Degree

33 credits, including:  
6 required credits (CAMS 592: CAMS Proseminar; CAMS 593: Research Seminar).  
9 additional credits in 500 or 400-level work in CAMS courses.

Reading knowledge of one ancient language: proficiency to be demonstrated through 400/500 level work in that language as instructed by CAMS language faculty.

Writing requirement: completion and approval of two seminar research papers. Those research papers should be conceived, in terms of length, format, and quality, as suitable for submission to refereed journals for publication. A student has the option of filing one of those research papers with the Graduate School as a master's thesis, in the appropriate format specified by the Graduate School.

Although the Graduate School permits eight years to complete the master's degree, master's-level students who expect to enter the Ph.D. program are strongly encouraged to graduate in either spring or summer at the end of the second year. The culminating experience leading to the master's degree will be evaluated in accord with the procedures and standards of the participating program and of CAMS.

### Ph.D. Degree

6 required credits (CAMS 592: CAMS Proseminar; CAMS 593: Research Seminar).  
9 additional credits in 500 or 400-level work in CAMS courses.  
9 additional credits (a minimum of 6 should be at the 500-level) in CAMS courses or courses relevant to the student's research interests.

Reading knowledge of a second ancient language--proficiency to be demonstrated through 400/500 level work in that language as instructed by CAMS language faculty--or competence, demonstrated in course work or field study, as approved by the student's supervisory committee, in a research technique in a technical field relevant to CAMS: e.g., archaeology, art history, anthropology, historical linguistics, literary studies and analysis.

Dissertation on a CAMS-related topic as approved by the student's committee.

### **Foreign Language and English Competency Requirements**

The student will fulfill the English Competency requirements specified by the participating program. Master's students will fulfill a requirement of reading knowledge of one ancient language: Ph.D. candidates will fulfill a requirement of reading knowledge of two ancient languages or of one ancient language and competence in a research technique. Language proficiency will be demonstrated through 400/500 level work in the languages concerned, as instructed by CAMS faculty.

Students will be expected to acquire and demonstrate reading proficiency in those modern foreign languages (e.g., but not exclusively, French, German, Italian) appropriate to their research interests, as identified in consultation with their CAMS graduate supervisory committee.

### **Dissertation**

A dissertation on a CAMS topic is required of students in this dual-title degree program. The CAMS topic of the dissertation will be approved by the student's committee.

### **Student Aid**

Graduate assistantships are available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

### **Courses**

Graduate courses carry numbers from 500-599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate language requirements when taken by graduate students. Courses below the 400 level do not qualify. A graduate student may register for or audit these lower-level courses in order to make up deficiencies, but not to meet requirements for an advanced (graduate) degree.

[CLASSICS AND ANCIENT MEDITERRANEAN \(CAMS\) course list](#)

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-07-008

Review Date: 6/17/08

Last updated by Publications: 4/5/11

## Cell and Developmental Biology (CDB)

[Program Home Page](#)

ZHI-CHUN LAI, *Chair, Intercollege Graduate Degree Program in Cell and Developmental Biology*

### Degrees Conferred

Ph. D., M.S.

### The Graduate Faculty

- Sarah Ades, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Charles Anderson, Ph.D. (Biology, Eberly College of Science)
- Sarah Assmann, Ph.D. (Biology, Eberly College of Science)
- Avery August, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Michael Axtell, Ph.D. (Biology, Eberly College of Science)
- Lu Bai, Ph.D. (Biochemistry and Molecular Biology, and Physics, Eberly College of Science)
- Craig Baumrucker, Ph.D. (Dairy and Animal Sciences, College of Agricultural Sciences)
- Douglas Cavener, Ph.D. (Biology, Eberly College of Science)
- Gong Chen, Ph.D. (Biology, Eberly College of Science)
- James Conner, Ph.D. (Neurosurgery, College of Medicine)
- Dan Cosgrove, Ph.D. (Biology, Eberly College of Science)
- Diana Cox-Foster, Ph.D. (Entomology, College of Agricultural Sciences)
- Liwang Cui, Ph.D. (Entomology, College of Agricultural Sciences)
- Richard Cyr, Ph.D. (Biology, Eberly College of Science)
- Nina Fedoroff, Ph.D. (Biology, Eberly College of Science)
- Simon Gilroy, Ph.D. (Biology, Eberly College of Science)
- Will Hancock, Ph.D. (Bioengineering, College of Engineering)
- Wendy Hanna-Rose, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Ross Hardison, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Eric Harvill, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Biao He, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Ahmed Heikal, Ph.D. (Bioengineering, College of Engineering)
- Andrew Henderson, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Vandana Kahlia, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Kenneth Keiler, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Kouacou Konan, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Zhi-Chun Lai, Ph.D. (Biology and BMB, Eberly College of Science)
- Aimin Liu, Ph.D. (Biology, Eberly College of Science)
- Bernhard Luscher, Ph.D. (Biology and BMB, Eberly College of Science)
- Hong Ma, Ph.D. (Biology, Eberly College of Science)
- Christian Malone, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Yingwei Mao, Ph.D. (Biology, Eberly College of Science)
- Patricia McLaughlin, Ph.D. (Neural and Behavioral Sciences, College of Medicine)
- Pamela Mitchell, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- B. Tracy Nixon, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Curt Omiecinski, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Richard Ordway, Ph.D. (Biology, Eberly College of Science)
- Randen Paterson, Ph.D. (Biology, Eberly College of Science)
- Robert Paulson, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- B. Franklin Pugh, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Joseph Reese, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Lorraine Santy, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Surojit Sarkar, Ph.D. (Pathobiology, College of Agricultural Sciences)
- Robert A. Schlegel, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Anthony Schmitt, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Erin Sheets, Ph.D. (Chemistry, Eberly College of Science)
- Song Tan, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Graham Thomas, Ph.D. (Biology and BMB, Eberly College of Science)
- Yanming Wang, Ph.D. (Biochemistry and Molecular Biology, Eberly College of Science)
- Kenneth Weiss, Ph.D. (Biology, ECoS; Anthropology, College of Liberal Arts)
- Matthew Whim, Ph.D. (Biology, Eberly College of Science)
- Na Xiong, Ph.D. (Veterinary and Biomedical Sciences, College of Agricultural Sciences)
- Yinong Yang, Ph.D. (Plant Pathology, College of Agricultural Sciences)
- Ian Zagon, Ph.D. (Neural and Behavioral Sciences, College of Medicine)

The Intercollege Graduate Degree Program in Cell and Developmental Biology (IGDP in CDB) prepares graduates for diverse opportunities in academic institutions, pharmaceutical companies, private research foundations, governmental research and regulatory programs. The program includes faculty from 10 departments in the College of Agricultural Sciences, Engineering, Liberal Arts, and Eberly College of Science at the University Park campus and the College of Medicine at the Penn State Milton S. Hershey Medical Center. The IGDP in CDB is also supported by the Huck Institutes of Life Sciences which provides modern telecommunications facilities and sophisticated equipment for state-of-the-art research applications. Doctoral students not only receive education and training new principles and experimental approaches, but also practice communication skills in group discussions and informal seminars and explore various potential career opportunities before graduation. Two unique aspects are (1) optional dual mentors will provide students with an interdisciplinary and multidisciplinary training, stimulate scientific thinking using different perspectives, and prepare for a wide range of future career options; and (2) an optional internship will provide a mechanism for students to obtain practical experience in future professional settings or gain specialized training off campus.

### General Admission Requirements

#### M.S. or Ph.D. degrees

Application deadline is January 10 for priority consideration.

1. Completed official Penn State Graduate School application
2. Paid nonrefundable application fee
3. Two official transcripts from each institution attended
4. Application for a U.S. visa (International applicants only)
5. Graduate Record Examinations (GRE) general test scores
6. Three letters of recommendation
7. Statement of goals that pertains to the life sciences
8. All international applicants whose first language is not English or who have not received baccalaureate or masters degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test, a score of 213 on the

computer-based test, or 80 points on the new Internet-based test with a minimum of 23 points on the new speaking portion is required for admission. The International English Language Testing System (IELTS) module provides an exam to test four mandatory skill areas: listening, reading, writing and speaking. All four modules are equally weighted in the evaluation process. The International English Language Testing System has been approved by the Graduate Council as an alternative exam to the TOEFL for international students applying to Penn State. A minimum composite score of 6.5 on the IELTS test is required for admission.

- Students must have completed a bachelor's degree at an accredited college or university and have a minimum of a 3.0/4.0 junior/senior undergraduate grade-point average.

## Program Requirements

### M.S. or Ph.D. degrees

- Foundation of basic knowledge in cell biology, developmental biology, biochemistry, and molecular biology. The IGDP in CDB requires at least 9 credits in one or more of these disciplines, taken either as an undergraduate or as a part of the graduate curriculum. The following courses serve to fulfill this requirement.
  - IBIOS 590. COLLOQUIUM (2 credits) All students are required to enroll for 4 credits of Colloquium. Students receive A-F quality grades.
  - IBIOS 592. CURRENT RESEARCH SEMINARS (2 credits) Students are required to enroll for 4 credits. Students receive A-F quality grades.
  - BMMB 501 (\*). CORE CONCEPTS IN BIOMOLECULAR SCIENCES (5 credits) Students receive A-F quality grades.
  - IBIOS 572 (\*). BENCHMARK PAPERS (2 credits) Students are required to enroll for 2 credits. Students receive A-F quality grades.
  - BMMB 541 (\*). MOLECULAR BIOLOGY OF ANIMAL DEVELOPMENT (3 credits) Students receive A-F quality grades.
  - \* The paperwork has been filed to seek approval of each of these as a standing course.
- IBIOS 596. INDEPENDENT STUDIES: LABORATORY ROTATIONS (1-3 credits per semester) Students receive an R (satisfactory/passing) or F (unsatisfactory/failing). Only R credits are counted for credit totals.
- IBIOS 595. INTERNSHIP (1 credit, optional) Students receive an R (satisfactory/passing) or U (unsatisfactory/failing). Only R credits are counted for credit totals.
- IBIOS 591. ETHICS IN THE LIFE SCIENCES (1 credit) Students receive A-F quality grades.
- IBIOS 600 THESIS RESEARCH (variable credits)
- IBIOS 601 Ph.D. DISSERTATION FULL-TIME (0 credits)
- IBIOS/VSC 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (optional, 1 credit), one semester is encouraged after the first year in residence. International Fellows must pass an English proficiency exam before teaching.
- The Graduate School requires all graduate students to maintain a 3.0 grade-point average.

### English Requirement for International Students

The English Requirement for International students in IBIOS is that prescribed by the Graduate School. All entering international students, whose first language is not English, will be required to take a Test of Spoken English (TSE) which is administered by the University's Center for English as a Second Language (ESL). Exceptions may be made if the entering applicant received a baccalaureate or Master's from an institution which instructs in English.

Students with teaching responsibilities are required to take the American English Oral Communicative Proficiency Test (AEOCPT) prior to entering the classroom. The AEOCPT is given at the beginning of fall and spring semesters. All international students are required to pre-register for this test. The test scores from the AEOCPT (American English Oral Communicative Proficiency Test) are posted on the University's Administrative Information System (AIS) computer. Below is the course of action or the various TSE (Test of Spoken English) score ranges.

>250 approved for teaching and the ESL (English as a Second Language) requirement will be satisfied.

230-249 required to schedule and pass ESL 118G.

200-229 required to pass ESL 117G\*. These students will not be permitted to teach in a classroom situation, and may instead be assigned to grading and/or proctoring duties.

\* At the end of this course, students are re-tested. Based upon these test results, students are either approved for teaching, placed in a subsequent ESL course, or asked to retake the course.

For students who enroll at the Hershey Medical School who need to take one or more of the above English courses can fulfill the requirements on one of the following ways. First, take the course at UP. If the student needs to commute between the two campuses but does not have a car, the UP-HY shuttle service can potentially be used. Secondly, a student may take a similar course at Hershey or an area college, approved by the CDB program curriculum committee.

Students, who are required to enroll in ESL courses, must complete the ESL requirement by the end of the second semester of residency. Students who fail to satisfy this requirement may be terminated from the IBIOS program, at the discretion of the Co-Chairs.

### M.S. Degree Requirements

For all master's degrees, a minimum of 30 graduate credits and a 3.0 overall GPA are required. At least 18 credits at the 500-level or above, combined, (with at least 6 credits of 500-level in professional master's programs) must be included in the program. If pursuing a Masters thesis option, up to 6 IBIOS 600 credits may be A-F graded and 12 credits need to be in the major at the 500 level (excluding IBIOS 600). IBIOS 595 (Internship) and 596 (Rotations) credits all count toward the 30 credits. All CDB graduate students must successfully complete required courses and/or electives (see below) during the first two years of their graduate education. If all course credits and requirements are met, students do not have to be registered for classes while writing and/or defending his/her work. The student selects a thesis committee (upon consultation with faculty advisor), writes a thesis, and defends his/her work. If pursuing a Masters non-thesis option, the student must have a first authored manuscript (based on his/her research) that has been either accepted and/or published in a peer reviewed journal. The manuscript is given to at least the faculty advisor and the IGDP Chair for evaluation.

Students must present their thesis in accordance with the Penn State guidelines as described in the *THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses*. Current copies may be obtained from website:

<http://www.gradsch.psu.edu/current/thesis/guide.html>

, or from the Thesis Office, 115 Kern Building, University Park, PA 16802; 814-865-5448.

### Ph.D. Degree Requirements

Ph.D. students must have a minimum of 30 credits and a 3.0 overall GPA through out the program. The course requirements are essentially the same as that required for the M.S. degree listed above, with some discretion left to the student and advisor.

**Grade Point Average/Unsatisfactory Scholarship:** Students are required to have a minimum grade-point average of 3.0 through out the course of their training. Furthermore, the student must have a 3.0 to take the doctoral candidacy, the comprehensive and final oral examinations. One or more failing grades or a cumulative grade-point average below 3.0 may be considered evidence of unsatisfactory scholarship and be grounds for dismissal from the program.

**English Competence:** A candidate for Ph.D. in the CDB program is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements. The CDB program has several required courses, all of which train students to develop and improve skills in reading, writing, and speaking in English. Students are required to make oral presentations and complete written assignments. The instructors of these courses will assist in evaluating the competence in using English and those students identified as being deficient in English will be required to take remedial activities, such as additional courses, writing assignments, and tutorials. International students are advised that the submission of minimum requirements for TOEFL does not constitute the fulfillment of the English competence requirement. English competence must be demonstrated before or at the candidacy exam.

Besides coursework, research, and teaching, IGDP in CDB doctoral students participate in the following:

**Candidacy Exam:** This exam should be taken by the end or during the student's third semester in the CDB Program. The student will be assigned one scientific papers from the primary literature to read and analyze for approximately one week. The papers will be selected based upon the students' background and coursework. The analysis should involve exploring the relevant literature as well as the fundamental issues in Cell and Developmental Biology. Following this independent research the student will take an oral exam. The oral exam will be administered by at least three members of the graduate program. The overall goal of the exam is to assure that the student has an intellectual foundation in Cell and Developmental Biology. The exam is

designed to evaluate basic knowledge in Cell and Developmental Biology and related disciplines as well as the students' ability to integrate this understanding to effectively evaluate experimental design, results, and the conclusions drawn. In the event that the student does not pass this exam, the student's committee will make a recommendation as to whether to offer another opportunity or to terminate the student's enrollment in the program.

**Comprehensive Examination:** Evaluation via the Doctoral Committee to determine the feasibility of proposed research and the preparedness of the student. Students must be registered for classes (typically IBIOS 600) the semester they take this exam.

**Doctoral Committee:** Upon successful completion of the Candidacy Examination, the student in consultation with the mentors will, as soon as possible, select a doctoral committee. The committee will consist of three members of the IGDP in CDB and one faculty member who is not a member of the IGDP in CDB. One members of the committee must be from a different department from the home department(s) of the mentor(s). This committee is responsible for supervising the academic program and monitoring the progress of the student towards his/her degree. Doctoral Thesis Committee Composition is based on the Graduate Degree Programs Bulletin ( [http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm?section=degreeReq1](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq1)) published by the Graduate School regarding Doctoral Committees and requires:

- 4 person minimum of approved PSU Graduate Faculty.
- 2 members must be inside the major and 1 member must be outside the major. Note - the outside member must be member of the approved PSU Graduate Faculty. The outside member for intercollege graduate programs may be inside the major but committee membership must have representation from more than one department.
- For students with dual mentors, both mentors may serve on the committee. One of the mentors should be designated as the primary mentor. The outside member must not be in the same department as the primary mentor.
- A person not affiliated with PSU may be added as a special member (beyond the 4 members of the approved PSU Graduate Faculty) upon recommendation of the head of the program and approval of the graduate dean.
- Have committee chair or one of the co-chairs be a member of the approved PSU Graduate Faculty. Typically it's the faculty advisor.
- The doctoral candidate and three committee members must be physically present for the comprehensive exam and defense. No more than one person may be present via telephone. Telephone or video conference arrangements must be approved by the Dean of the Graduate School.
- Need approval of 2/3 of the committee members for passing comprehensive exam and defense dissertation.

**Ph.D. Defense:** Evaluation via the Doctoral Committee of the thesis research.

Students must present their thesis in accordance with the Penn State guidelines as described in the *THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses*. Current copies may be obtained from website:

<http://www.gradsch.psu.edu/current/thesis/guide.html>, or from the Thesis Office, 115 Kern Building, University Park, PA 16802; 814-865-5448.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2007

Blue Sheet Item #: 35-04-247

Review Date: 1/16/07

Faculty updated: 2/19/13

## Community and Economic Development (CEDEV)

[Program Home Page](#)

ANN R. TICKAMYER, *Head of the Department of Agricultural Economics and Rural Sociology*  
103 Armsby Building  
814-865-5461; cedeinfo@psu.edu

### Degree Conferred:

[M.P.S.](#)

### The Graduate Faculty

- Charles W. Abdalla, Ph.D. (Michigan State) Professor of Agricultural and Environmental Economics
- Theodore R. Alter, Ph.D. (Michigan State) Professor of Agricultural, Environmental, and Regional Economics
- David Blandford, Ph.D. (Manchester) Professor of Agricultural Economics
- Kathryn Brasier, Ph.D. (Wisconsin--Maidson) Associate Professor of Rural Sociology
- Mark A. Brennan, Ph.D. (Penn State) Associate Professor of Agricultural and Extension Education
- Ann Dodd, Ph.D. (Penn State) Associate Professor, Agricultural and Extension Education
- Leland I. Glenna, Ph.D. (Missouri) Associate Professor of Rural Sociology and Science, Technology, and Society
- Stephan J. Goetz, Ph.D. (Michigan State) Professor of Agricultural and Regional Economics
- Clare Hinrichs, Ph.D. (Cornell) Associate Professor of Rural Sociology
- Jeffrey Hyde, Ph.D. (Purdue) Professor of Agricultural Economics
- Leif I. Jensen, Ph.D. (Wisconsin) Professor of Rural Sociology, Demography, and Sociology
- Timothy W. Kelsey, Ph.D. (Michigan) Professor of Agricultural Economics
- Janelle B. Larson, Ph.D. (Oxford) Associate Professor of Agricultural Economics
- Mark A. Leach, Ph.D. (University of California) Assistant Professor of Rural Sociology and Demography
- A. E. Luloff, Ph.D. (Penn State) Professor of Rural Sociology
- Diane K. McLaughlin, Ph.D. (Penn State) Associate Professor of Rural Sociology
- Anouk Patel-Campillo, Ph.D. (Cornell) Assistant Professor of Rural Sociology
- Richard C. Ready, Ph.D. (Wisconsin) Professor of Agricultural and Environmental Economics
- Carolyn Sacs, Ph.D. (Kentucky) Professor of Rural Sociology
- John Shingler, Ph.D. (Penn State) Research Associate, Consumer Services Information System(CSIS); Co-Director, Consumer Services Information System Project; Co-Director, State Weatherization Program Evaluation Project
- Stephen M. Smith, Ph.D. (Wisconsin) Professor of Agricultural and Regional Economics
- Ann R. Tickamyer, Ph.D. (North Carolina at Chapel Hill) Professor of Rural Sociology; Head, Department of Agricultural Economics and Rural Sociology
- Fern K. Willits, Ph.D. (Penn State) Professor of Rural Sociology

The Master of Professional Studies in Community and Economic Development (MPS CEDEV) is a 30-credit terminal master's degree program that emphasizes an interdisciplinary approach to community and economic development. The program balances theory and practice. Courses are taught in MPS CEDEV use a blend of Web technology, print, and other media to provide an effective balance of flexibility and interaction. Individuals who currently work with, or are interested in working with communities, community organizations and stakeholders, or on a range of community and economic development issues at the state or national levels would benefit from this program. The MPS CEDEV program requires the completion of seven core courses (21 credits) in which students learn and apply sociological and economic concepts to issues in community and economic development. The courses offer examples and opportunities to apply these concepts to real issues facing communities and rural regions. Two of the core courses (6 credits) emphasize statistical methods and tools and techniques useful to practitioners in community and economic development, or to work toward additional certifications. All students are required to complete a project, paper or internship (3 to 6 credits) that integrates theory and practice.

Instruction in the MPS CEDEV program emphasizes key themes that include economic planning and development; municipal finance, land use and population change; community structure, organization and process; leadership; tools and techniques in community development; community decision-making and capacity building.

Students in Community and Economic Development gain a broad understanding of the dynamics of communities and their social, economic, and political systems. The program emphasizes teaching the theory, skills, and tools that allow practitioners to address the important issues in development practice.

Graduates of the Community and Economic Development program have a wide range of career opportunities, including: local and state government, planning commissions, major corporations, non-governmental organizations, and consulting firms.

### Admission Requirements

Students with a 3.00 average (on a 4.00 scale) for the most recent two years of college/university education, or with an advanced degree, and with appropriate course and experiential backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, experience, abilities, and interests. The best-qualified applicants will be accepted to the graduate program.

Admission requirements include the following:

- Either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution
- Statement of purpose describing professional experiences and education, career goals, and how the MPS program will enable the applicant to meet their objectives
- Current resume
- Three letters of recommendation
- Two sets of official transcripts from educational institutions attended for undergraduate or graduate degree work
- Test of English as a Foreign Language (TORGL) score, if applicable. The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions listed below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Purposes) and attainment of a grade of B or higher. The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

- Non-refundable application fee

To begin your application, please visit <http://www.gradsch.psu.edu/portal/>. On the "Campus, Major, Degree & Semester" page select "WORLD CAMPUS" as the campus and "COMMUNITY AND ECONOMIC DEVELOPMENT" as the major.

Scores from the Graduate Record Examinations (GRE) are not required for admission to the MPS CEDEV program. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Prerequisites for the master's program include 12 credits in rural sociology, sociology, agricultural economics, or other social and behavioral sciences at the discretion of the graduate program. If the entering student does not have these prerequisites, they must be made up at the University during the early part of the master's program.

## Degree Requirements

The professional Master's degree requires 30 credits including a final integrative assessment/experience. All students complete the required MPS CEDEV core program of community and economic development courses, statistics, and methods. The MPS CEDEV courses consist of CEDEV 430, CEDEV 452, CEDEV 500, CEDEV 505, and CEDEV 509. The statistics, methods, and techniques requirement includes STAT 500 (or equivalent) and CEDEV 575. CEDEV 576 is an optional summer institute focusing on applications and practices for community and economic development. An integrative paper, project, or internship is required where the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques and interpretation skills learned in the program to a real problem faced by a community or community organization. Choice of electives will be based on a plan of study worked out between the student and faculty adviser. There is no foreign language requirement for the degree; however, students planning to work in multi-cultural or international settings are encouraged to gain competency in an appropriate language(s). A total of 18 credits must be 500 level or higher, with at least 6 credits of 500-level course work. This Graduate Council requirement is met through the required courses and the project, internship or paper credits.

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COMMUNITY AND ECONOMIC DEVELOPMENT \(CEDEV\) course list](#)

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 39-06-120

Review Date: 04/12/2011

Faculty last updated: 07/26/12

## Chemical Engineering (CH E)

[Program Home Page](#)

ANDREW ZYDNEY, *Head of Chemical Engineering*  
160 Fenske Laboratory  
814-865-2574

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Antonios Armaou, Ph.D. (UCLA) Associate Professor of Chemical Engineering
- Harry Allcock, Ph.D. (Univ of London) Professor of Chemistry and Evan Pugh Professor
- Kyle Bishop, Ph.D. (Northwestern) Assistant Professor of Chemical Engineering
- Ali Borhan, Ph.D. (Stanford) Professor of Chemical Engineering
- Ralph H. Colby, Ph.D. (Northwestern) Professor of Materials Science and Engineering
- Wayne R. Curtis, Ph.D. (Purdue) Professor of Chemical Engineering and Biotechnology
- Ronald P. Danner, Ph.D. (Lehigh) Professor Emeritus of Chemical Engineering
- Kristen Fichthorn, Ph.D. (Michigan) Merrell R. Fenske Professor of Chemical Engineering
- Henry C. Foley, Ph.D. (Penn State) Vice President for Research and Dean of the Graduate School; Professor of Information Sciences and Technology, and Chemical Engineering
- Enrique D. Gomez, Ph.D. (California, Berkeley) Assistant Professor of Chemical Engineering
- Esther Gomez, Ph.D. (California, Berkeley) Assistant Professor of Chemical Engineering
- Tony Huang, Ph.D. (UCLA) Associate Professor of Engineering Science and Mechanics
- Michael Janik, Ph.D. (Virginia) Chair, Brennan Clean Energy Early Career Professorship in Chemical Engineering
- Seong Han Kim, Ph.D. (Northwestern) Associate Professor of Chemical Engineering
- Wallis Lloyd, Ph.D. (Minnesota) Adjunct Professor of Chemical Engineering
- Bruce Logan, Ph.D. (California, Berkeley) Kappe Professor of Environmental Engineering
- Angela Lueking, Ph.D. (Michigan) Associate Professor of Energy and Mineral Engineering, and Chemical Engineering
- Costas D. Maranas, Ph.D. (Princeton) Donald B. Broughton Professor of Chemical Engineering
- Janna Maranas, Ph.D. (Princeton) Associate Professor of Chemical Engineering
- Themis Matsoukas, Ph.D. (Michigan) Professor of Chemical Engineering
- Scott T. Milner, Ph.D. (Harvard) Joyce Chair Professor of Chemical Engineering
- Joseph Perez, Ph.D. (Penn State) Senior Research Scientist
- Joan Redwing, Ph.D. (Wisconsin) Professor of Materials Science and Engineering
- Robert Rioux, Ph.D. (California, Berkeley) Friedrich G. Helfferich Assistant Professor of Chemical Engineering
- Howard M. Salis, Ph.D. (Minnesota) Assistant Professor of Agricultural and Biological Engineering, and Chemical Engineering
- David Snyder, Ph.D. (Carnegie Mellon) Adjunct Professor, Electro-Optics Center
- Chunshan Song, Ph.D. (Osaka) Professor of Fuel Science and Chemical Engineering
- James S. Ultman, Ph.D. (Delaware) Professor Emeritus of Chemical Engineering
- M. Albert Vannice, Ph.D. (Stanford) Professor Emeritus of Chemical Engineering
- Darrell Velegol, Ph.D. (Carnegie Mellon) Professor of Chemical Engineering
- James S. Vrentas, Ph.D. (Delaware) Professor of Chemical Engineering
- Chao-Yang Wang, Ph.D. (Iowa) Distinguished Professor of Mechanical Engineering; Professor of Materials Science and Engineering
- Thomas K. Wood, Ph.D. (North Carolina State) Professor of Chemical Engineering and Biochemistry and Molecular Biology
- Andrew Zydney, Ph.D. (MIT) Walter L. Robb Endowed Family Chair and Professor of Chemical Engineering

Course offerings and research facilities are available in: bioprocessing, protein engineering, energy and alternative energy, catalysis and kinetics, fluid mechanics, nanotechnology, polymer science and engineering, process control, molecular simulation, systems biology and optimization.

### Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

To be admitted, a student should be a graduate of an accredited major in chemical engineering or the equivalent. Graduates of other accredited engineering or physical science majors may be admitted but will be required to make up certain undergraduate deficiencies without graduate credit. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

### Master's Degree Requirements

A minimum of 18 course credits is required and must include at least 12 credits in the 500-series chemical engineering courses. A thesis is required. There is no communication or language requirement.

Continuous registration is required for all graduate students until the thesis is approved.

### Doctoral Degree Requirements

A minimum of 30 graduate course credits is required and must include a minimum of 15 credits of 500-series Chemical Engineering courses taken at the University. There is no communication or language requirement. The comprehensive examination consists of a written research proposal or project defended orally after it has been accepted.

Continuous registration is required for all graduate students until the thesis is approved.

### Other Relevant Information

Programs leading to a minor in Chemical Engineering are available to both M.S. and Ph.D. candidates who wish to complement studies in their major fields with a broader knowledge of chemical thermodynamics, transport phenomena, and reactor design.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[CHEMICAL ENGINEERING \(CH E\) course list](#)



Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-010A

Review Date: 06/21/2011

Faculty last updated: 7/22/12

## Chemistry (CHEM)

[Program Home Page](#)

BARBARA GARRISON, *Head of the Department*  
101 Chemistry Research Building  
814-865-6553

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- David L. Allara, Ph.D. (California, Los Angeles) Professor of Polymer Science and Chemistry
- Harry R. Allcock, Ph.D. (London) Evan Pugh Professor of Chemistry
- James B. Anderson, Ph.D. (Princeton) Evan Pugh Professor of Chemistry
- Anne M. Andrews, Ph.D. (American U) Associate Professor of Molecular Toxicology
- John B. Asbury, Ph.D. (Emory) Assistant Professor of Chemistry
- John V. Badding, Ph.D. (California, Berkeley) Professor of Chemistry
- Alan J. Benesi, Ph.D. (California, Berkeley) Lecturer in Chemistry
- Stephen J. Benkovic, Ph.D. (Cornell) Evan Pugh Professor and Eberly Chair in Chemistry
- Philip C. Bevilacqua, Ph.D. (U of Rochester) Professor of Chemistry
- David D. Boehr, Ph.D. (McMaster) Assistant Professor of Chemistry
- J. Martin Bollinger, Ph.D. (MIT) Professor of Biochemistry and Molecular Biology, and Chemistry
- Squire J. Booker, Ph.D. (MIT) Associate Professor of Biochemistry and Molecular Biology, and Chemistry
- A. Welford Castleman, Ph.D. (Polytechnic Institute of Brooklyn) Evan Pugh Professor of Chemistry
- Gong Chen, Ph.D. (Columbia) Assistant Professor of Chemistry
- Andrew G. Ewing, Ph.D. (Indiana U) J. Lloyd Huck Chair in Natural Sciences and Professor of Chemistry
- Kenneth S. Feldman, Ph.D. (Stanford) Professor of Chemistry
- Raymond L. Funk, Ph.D. (California) Professor of Chemistry
- Barbara J. Garrison, Ph.D. (California, Berkeley) Shapiro Professor of Chemistry
- Michael Green, Ph.D. (Chicago) Associate Professor of Chemistry
- Sharon Hammes-Schiffer, Ph.D. (Stanford) Eberly Professor of Biotechnology and Schaffer Professor of Chemistry
- Lasse Jensen, Ph.D. (Rijksuniversiteit Groningen) Assistant Professor of Chemistry
- Christine Keating, Ph.D. (Penn State) Associate Professor of Chemistry
- Carsten D. Krebs, Ph.D. (Max Planck Institut für Strahlenchemie) Associate Professor of Biochemistry and Molecular Biology, and Chemistry
- Tae-Hee Lee, Ph.D. (Georgia Inst of Tech) Assistant Professor of Chemistry
- Thomas E. Mallouk, Ph.D. (California, Berkeley) DuPont Professor of Materials Chemistry
- Mark Maroncelli, Ph.D. (California, Berkeley) Professor of Chemistry
- Przemyslaw Maslak, Ph.D. (Kentucky) Associate Professor of Chemistry
- Bratoljub H. Milosavljevic, Ph.D. (U of Belgrade) Lecturer in Chemistry
- Karl T. Mueller, Ph.D. (California, Berkeley) Professor of Chemistry
- William G. Noid, Ph.D. (Cornell) Assistant Professor of Chemistry
- Scott Phillips, Ph.D. (California, Berkeley) Assistant Professor of Chemistry
- Raymond E. Schaak, Ph.D. (Penn State) Associate Professor of Chemistry
- Ayusman Sen, Ph.D. (Chicago) Professor of Chemistry
- Scott A. Showalter, Ph.D. (Washington U) Assistant Professor of Chemistry
- Dan G. Sykes, Ph.D. (U of Alberta) Senior Lecturer and Director
- Mauricio Terrones, Ph.D. (Sussex, England) Professor of Physics
- Steven M. Weinreb, Ph.D. (Rochester) Russell and Mildred Marker Professor of Natural Products Chemistry
- Paul S. Weiss, Ph.D. (California, Berkeley) Professor of Chemistry
- Mary Beth Williams, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Chemistry
- Nicholas Winograd, Ph.D. (Case Western Reserve) Evan Pugh Professor of Chemistry

The Ph.D. program in Chemistry provides students with a broad background in chemistry and intensive research experience culminating in the preparation of a formal thesis. The goal of the program is to prepare students for a variety of careers in academia, government, or industry. The exceptionally high quality of our laboratory and computer facilities enables us to provide students with outstanding research opportunities. Distinguished visiting scholars conduct informal discussions each week at a departmental colloquium.

The Chemical Biology option introduces graduate students to training with more active, multidisciplinary, and group learning experience. Students in the option will have the opportunity to participate in the Life Sciences Consortium seminars and will have dual mentorship.

### Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission. In extenuating circumstances, a student may be admitted provisionally for graduate study in the program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission, at least integral calculus plus one year's work in general physics, organic chemistry, physical chemistry, and either analytical or inorganic chemistry are normally required. Students who have appropriate course backgrounds and who present a 2.50 average (on a 4.00 scale) in all undergraduate courses in chemistry, physics, and mathematics will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

The program of the M.S. candidate must include a total of at least 30 graduate-level course credits (CHEM 431W, CHEM 450, CHEM 452, CHEM 457, CHEM 494, and CHEM 500 may not be included in this credit count.)

Additional requirements of the M.S. program are that the candidate must write a thesis and must defend this thesis at an oral examination. The thesis will be accomplished under the sponsorship of a faculty member, and the candidate must schedule at least 6 credits of CHEM 600 (for a thesis) or CHEM 589 (for a research report) to fulfill this requirement. The candidate's attainments under a thesis must be approved by a committee of at least three faculty members, one of whom will be the candidate's sponsor.

Qualifying examinations in analytical, biological, inorganic, organic, and physical chemistry will be given to all new students upon entrance in the fall semester. These exams cover subject matter at the level of the basic courses offered for the B.S. degree in chemistry at Penn State. For certification as an M.S. candidate, proficiency in two areas is required. These must include physical chemistry. Such proficiency may be demonstrated either by (1) passing the area examination upon entrance, or (2) obtaining a grade-point equivalent of 3.0 in at least 3 credits of graduate-level course work in the area. The courses to be used to fulfill this latter option will be designated by the graduate counseling committee. This course work must be completed successfully during the student's first two semesters of residence.

A final oral examination will be administered by a committee consisting of the student's research preceptor and two other faculty members. This examination is scheduled after the M.S. thesis has been completed.

### Doctoral Degree Requirements

Candidates for the Ph.D. degree in Chemistry must meet the following requirements established by the department faculty.

A Ph.D. candidate shall be required to take a minimum of five 3-credit courses in chemistry at the 400-500 level (only CHEM 408, CHEM 430, and CHEM 448 can be used). The candidate's doctoral committee may require additional specific courses.

Qualifying examinations in analytical, biological, inorganic, organic, and physical chemistry will be given to all new students upon entrance in the fall semester. These exams cover subject matter at the level of the basic courses offered for the B.S. degree in chemistry at Penn State. As a part of the requirements for certification as a Ph.D. candidate, each student will be expected to demonstrate proficiency in three areas of chemistry, including physical chemistry. Such proficiency may be demonstrated either by (a) passing the area examination upon entrance, or (b) obtaining a grade-point equivalent of 3.0 in at least 3 credits of graduate-level course work in the area. The courses to be used to fulfill this latter option will be designated by the graduate counseling committee. This course work must be completed successfully during the student's first two semesters of residence.

In order to qualify for the oral comprehensive examination, a Ph.D. candidate must first obtain a grade of 3.0 or better on 3 credits of CHEM 500 (by writing the requisite number of seminar reports, proposals, and presenting in an area seminar).

A Ph.D. candidate shall take the oral comprehensive examination during his or her first two and one-half years of residency.

Every Ph.D. candidate shall present at least one area or department seminar during the course of residency.

A final oral examination based on a defense of the doctoral thesis is required of all candidates. This exam is given as a formal public seminar with a subsequent closed meeting with the doctoral committee.

### **Biogeochemistry Dual-Title Degree Program**

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. Chemistry's existing candidacy procedure is to be augmented by a biogeochemistry examination, the structure and timing of this exam will be determined jointly by the dual-title and major program. A single candidacy result is to be reported to the graduate school once this process is complete. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

Candidacy exams must incorporate a biogeochemistry component; for Chemistry students, an oral exam in biogeochemistry will be administered. See the Biogeochemistry Dual Title listing in the Graduate Degree Programs Bulletin for further details regarding program requirements.

### **Other Relevant Information**

All candidates for advanced degrees must schedule CHEM 602, Supervised Experience in College Teaching, for 1 to 2 credits for at least one semester. This requirement may be waived or modified for students who have attained satisfactory competence in teaching as a result of prior experience.

### **Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. It is important to note that department policy limits financial support from department funds to the first two years of graduate study of an M.S. candidate and to the first five years of graduate study of a Ph.D. candidate. Financial support beyond these periods is permitted from other than department funds, e.g., a research assistantship funded from an individual faculty member's research grant(s).

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[CHEMISTRY \(CHEM\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185A

Review Date: 4/15/08

UCA Revision#1: 11/8/06

Faculty updated: 5/15/13

## Comparative and International Education (CI ED)

[Program Home Page](#)

DAVID P. BAKER, Director of Graduate Studies  
300 Rackley Building  
814-863-0955; [dpb4@psu.edu](mailto:dpb4@psu.edu)

### Degrees Conferred:

Students earn a dual-title degree in this option through participating programs at either the Ph.D. (or D.Ed.) or the M.A., M.S., M.Ed. level. Students receive a degree which lists their major program and Comparative and International Education.

The following graduate programs offer dual degrees in Comparative and International Education: Adult Education, Agricultural and Extension Education, Curriculum and Instruction, Counselor Education, Counseling Psychology, College Student Affairs, Educational Leadership, Educational Psychology, Educational Theory and Policy, Entomology, Human Development and Family Studies, Higher Education, Instructional Systems, School Psychology, Special Education, and Workforce Education and Development.

### The Graduate Faculty

- Clemente Abrokwa, Ph.D. (Alberta) Assistant Professor of African and African American Studies
- Talat Azhar, Ph.D. (Penn State) Outreach Coordinator for the Hubert H. Humphrey Fellowship Program
- David P. Baker, Ph.D. (Johns Hopkins) Professor of Education and Sociology
- Katerina Bodovski, Ph.D. (Penn State) Assistant Professor of Education
- Soo-yong Byun, Ph.D. (Minnesota, Twin Cities) Assistant Professor of Education
- Liza Conyers, Ph.D. (Wisconsin, Madison) Associate Professor of Education
- Edgar Farmer, Ed.D. (Penn State) Professor of Education
- Roger L. Geiger, Ph.D. (Michigan) Distinguished Professor of Education
- Dennis Jett, Ph.D. (Witwatersrand, Johannesburg, South Africa) Professor of International Affairs
- James Johnson, Ph.D. (Wayne State) Professor of Education
- Matt Kaplan, Ph.D. (CUNY) Associate Professor of Agricultural and Extension Education
- Gerald LeTendre, Ph.D. (Stanford) Professor of Education
- Beverly Lindsay, Ph.D. (American) Professor of Education
- Sinfree Makoni, Ph.D. (Edinburgh, Scotland) Associate Professor of Applied Linguistics, and African and African American Studies
- Dana Mitra, Ph.D. (Stanford) Associate Professor of Education
- Kyle L. Peck, Ph.D. (Colorado, Boulder) Professor of Education
- Suet-ling Pong, Ph.D. (Chicago) Professor of Education, Sociology, and Demography
- David Post, Ph.D. (Chicago) Professor of Education
- Madhu Suri Prakash, Ph.D. (Syracuse) Professor of Education
- Esther Prins, Ph.D. (Cornell) Assistant Professor of Education
- Edwin Rajotte, Ph.D. (Rutgers) Professor of Entomology
- William J. Rothwell, Ph.D. (Illinois) Professor of Education
- Kai Schafft, Ph.D. (Cornell) Assistant Professor of Education
- Maryellen Schaub, Ph.D. (Penn State) Assistant Professor of Education
- Ladislaus M. Semali, Ph.D. (California, Los Angeles) Associate Professor of Education
- Roger C. Shouse, Ph.D. (Chicago) Associate Professor of Education
- Joseph M. Valente, Ph.D. (Arizona State) Assistant Professor of Education
- Nicole Webster, Ph.D. (Michigan State) Associate Professor of Agricultural and Extension Education

The Comparative and International Education dual-title degree program option is administered by the Committee on Comparative and International Education. The committee maintains program definition, identifies courses appropriate to the option, develops and administers the program's comprehensive examination, and recommends policy and procedures for the program's operation to the dean of the College of Education and to the dean of the Graduate School. Members of the committee also chair or co-chair the dissertation committees for students electing the dual-title doctoral degree.

The dual-title degree program is offered through participating programs in the College of Education and, where appropriate, other graduate programs in the University. The option enables students from several graduate programs to gain the perspectives, techniques, and methodologies of comparative and international education, while maintaining a close association with program areas of application. Comparative and international education is a field devoted to the systematic analysis of the operation and effects of the world's education systems. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School; (2) one of the participating graduate major programs; and (3) the Committee on Comparative and International Education.

### Admission Requirements

Program candidates will be required to take the Graduate Record Examination, to provide a writing sample, and, where appropriate, a satisfactory TOEFL score, and to submit a written personal statement indicating the career goals they hope to serve by attaining a Comparative and International Education degree.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements of the Comparative and International Education program.

For the M.A., M.S., or M.Ed. dual-title degree in Comparative and International Education, the minimum course requirements are: 3 credits in the required Proseminar in Comparative and International Education; 6 credits in advanced Comparative and International Education courses; and 3 credits in Comparative and International Education content courses. Candidates for the dual-title master's degree in Comparative and International Education will also be required to pass a written comprehensive examination based on a set of core readings established by the committee.

A master's thesis or master's paper is required, depending upon the student's graduate major program, the supervisor of which must be a member of the graduate faculty recommended by the chair of the program granting the degree and approved by the Committee on Comparative and International Education as qualified to supervise work in Comparative and International Education.

The minimum course requirements for the Ph.D. (or D.Ed.) dual-title degree in Comparative and International Education are: 3 credits in the Proseminar in Comparative and International Education; 6 credits in advanced Comparative and International Education courses; 12 credits in Comparative and International Education content courses or courses with comparative or international content; and 6 credits in research methods. Students are expected to be fluent in reading, writing, and speaking English, and must demonstrate competency in reading a language other than English, preferably a language relevant to a country or geographic area they propose to study. (This foreign language requirement can be satisfied by passing the appropriate ETS Language Achievement Test, or by passing the appropriate Penn State foreign language course.) A minimum of 18 credits must be 500-level course, and particular courses may satisfy both the graduate major program requirements and those in the Comparative and International Education program. Candidates for the dual-title doctoral degree in Comparative and International Education will also be required to pass a written comprehensive examination based on a set of core readings established by the committee.

A Ph.D. (or D.Ed.) minor program in Comparative and International Education is available to doctoral students who find it desirable to include the perspectives and methodologies of Comparative and International Education in their programs and have been approved to do so by their doctoral committees. To qualify for a minor in Comparative and International Education, students must satisfy the requirements of their graduate major programs, and meet the following minimum requirements: 3 credits in the Proseminar in Comparative and International Education; 3 credits in a Comparative and International Education course; and 6 credits in Comparative and International Education content courses (or advanced courses) or in courses with comparative or international content offered outside the College of Education.

The doctoral dissertation committee of a Ph.D. (or Ed.D.) dual-title degree student is recommended, in conjunction with the Comparative and International Education committee, by the graduate major program granting the degree. The chair and at least two members of a doctoral committee must be members of the graduate faculty. The chair or co-chair of the dissertation committee must be a member of the Comparative and International Education committee.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### **[COMPARATIVE AND INTERNATIONAL EDUCATION \(CI ED\) course list](#)**

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/29/04

Faculty updated: 3/21/13

## Comparative Literature (CMLIT)

### [Program Home Page](#)

CAROLINE D. ECKHARDT, *Head, In Charge of Graduate Programs in Comparative Literature*  
427 Burrowes Building  
814-863-0589  
[cmlit@psu.edu](mailto:cmlit@psu.edu)

### Degrees Conferred:

- [Ph.D., M.A.](#)
- [Integrated B.A./M.A. Program in Comparative Literature](#)
- Dual-Title Graduate Degree in Asian Studies
- Dual-Title Graduate Degree in African Studies

### The Graduate Faculty

- Jonathan Abel, Ph.D. (Princeton) Assistant Professor of Comparative Literature and Asian Studies
- Andrea Bachner, Ph.D. (Harvard) Assistant Professor of Comparative Literature and Asian Studies
- Mary Barnard, Ph.D. (Michigan) Associate Professor of Spanish and Comparative Literature
- Thomas O. Beebee, Ph.D. (Michigan) Distinguished Professor of Comparative Literature and German
- Kevin J. H. Berland, Ph.D. (McMaster) Associate Professor of English
- Patrick G. Cheney, Ph.D. (Toronto) Distinguished Professor of English and Comparative Literature
- Jonathan P. Eburne, Ph.D. (Penn) Associate Professor of Comparative Literature and English; Josephine Berry Weiss Early Career Professor in the Humanities
- Caroline D. Eckhardt, Ph.D. (Michigan) Professor of Comparative Literature and English
- Robert Edwards, Ph.D. (California, Riverside) Edwin Erle Sparks Professor of English and Comparative Literature
- Nergis Ertürk, Ph.D. (Columbia) Assistant Professor of Comparative Literature
- Charlotte Eubanks, Ph.D. (Colorado) Assistant Professor of Comparative Literature and Asian Studies
- Kathryn M. Grossman, Ph.D. (Yale) Professor of French
- Thomas A. Hale, Ph.D. (Rochester) Edwin Erle Sparks Professor of African, French, and Comparative Literature
- Eric Hayot, Ph.D. (University of Wisconsin-Milwaukee) Professor of Comparative Literature and Asian Studies
- Linda J. Ivanits, Ph.D. (Wisconsin) Professor of Russian and Comparative Literature
- Djelal Kadir, Ph.D. (New Mexico) Edwin Erle Sparks Professor of Comparative Literature
- Sophia A. McClennen, Ph.D. (Duke) Professor of Comparative Literature, Spanish, and Women's Studies; Affiliate Faculty, School of International Affairs
- Philip Mosley, Ph.D. (East Anglia) Professor of English, Communications, and Comparative Literature
- John Ochoa, Ph.D. (Yale) Associate Professor of Spanish and Comparative Literature
- Steven Putzel, Ph.D. (Toronto) Associate Professor of English
- Dennis Schmidt, Ph.D. (Boston College) Liberal Arts Research Professor of Philosophy, Comparative Literature, and German
- Scott Smith, Ph.D. (Notre Dame) Assistant Professor of English and Comparative Literature
- Allan Stoekl, Ph.D. (SUNY) Professor of French and Comparative Literature
- Reiko Tachibana, Ph.D. (Penn State) Associate Professor of Comparative Literature, Japanese, and Asian Studies
- Adrian Wanner, Ph.D. (Columbia) Professor of Russian and Comparative Literature

Graduate programs in Comparative Literature combine a core of comparative literature requirements with courses in selected literatures and further comparative courses, according to each student's interests. For example, programs of study can concentrate on such topics as genres, themes, periods, movements, folktale and oral literature, criticism, and the links between literature and related fields such as theatre or women's studies.

The M.A. is a general humanistic degree that helps prepare students for a variety of situations, including teaching in private high schools or community colleges, or further graduate work. The Ph.D. is a more specialized degree. The Ph.D. in comparative literature can be combined with a minor in a professional field such as teaching English as a second language. Another potential combination is our dual-title Ph.D. in Comparative Literature and Asian Studies.

Only the faculty members and courses officially associated with the Department of Comparative Literature are listed here. Faculty members and courses in other departments are also available to comparative literature students according to their preparation.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Students with a degree from an institution where the language of instruction is English must supply the GRE, all others must supply TOEFL. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from the college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales. Those international students who provide TOEFL scores do not need to provide the GRE. Most students who do graduate work in comparative literature hold a B.A. or M.A. degree in comparative literature or in a particular language and literature. Students completing degrees in such fields are welcome to apply--as are students in other humanistic fields, such as philosophy or history, if they have studied literature.

For admission to the M.A. program, students should be prepared to study at least one foreign literature in its own language. For admission to the Ph.D. program, students should be prepared to study at least two foreign literatures in their own language. Doctorate-seeking students usually complete the M.A. before being formally admitted to the Ph.D. program, but exceptional students may be admitted from the B.A. level directly to the Ph.D. Students are encouraged to plan a unified M.A./Ph.D. program if they take both degrees here; however, Ph.D. applications are welcomed from students holding or completing an M.A. elsewhere.

### Master's Degree Requirements

Requirements for the M.A. in comparative literature include 6 credits of CMLIT 501(1-6), CMLIT 502(3) CMLIT 503(3); 3 further credits in comparative literature courses and other literature courses (18 credits); a master's paper; and proficiency in two foreign languages (one at the level that permits thorough literary analysis of texts, the other at the level of reading proficiency). Students are expected to take coursework in non-Anglophone literatures (at least 6 credits), but the exact number of non-Anglophone courses is to be determined in the plan of study by the Director of Graduate Studies.

### Doctoral Degree Requirements

Requirements for the Ph.D. in comparative literature include (1) CMLIT 501 (6 credits), CMLIT 502 (3 credits), and CMLIT 503 (3 credits)--with substitute courses if these have been used in the M.A. program; (2) at least an additional 21 credits in literature courses, including course work in the three languages that the student selects, with emphasis on the student's primary literature--students should organize their course work, as much as possible, around a unifying principle, such as genre, period, or theme; (3) a candidacy examination; (4) proficiency in two foreign languages; (5) a comprehensive examination; and (6) a written dissertation and final oral defense of the dissertation.

On item (4), the foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

### Other Relevant Information

Students pursuing a graduate degree in comparative literature have individualized programs of study within the requirements specified above. For example,

one student may emphasize film and new media; another, the novel. One student may concentrate on earlier literatures; another, on international modernism. One student may be interested primarily in the European tradition; another, in literatures. In such a program, the relationship between student and adviser is important. Each graduate student works with faculty advisers familiar with comparative studies as a whole and with the student's particular area of interest.

### Student Aid

Teaching assistantships in the Department of Comparative Literature, as well as in related language and literature departments, typically have been available to students taking comparative literature degrees. In recent years, Comparative Literature students have held assistantships in Arabic, Chinese, English, French, German, Hebrew, Italian, Japanese, Russian, Spanish, Swahili, and Women's Studies, as well as in Comparative Literature courses. There also is a graduate assistantship position for an editorial assistant to the journal *Comparative Literature Studies*, which is edited in the department. In addition to the fellowships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

#### SAMUEL P. BAYARD AWARD

Available annually to a graduate student in comparative literature, selected by the graduate committee of the Department of Comparative Literature. Amount varies.

#### EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)

Available to beginning and continuing graduate students in the following graduate programs: Comparative Literature, English, French, German, History, Philosophy, Spanish, and Communication Arts and Sciences.

#### FOLGER INSTITUTE FELLOWSHIPS

Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in Comparative Literature are eligible for Folger Institute Fellowships to study in seminars and workshops at the Folger Library, Washington, D.C.

#### Title VI Center for Global Studies ASSISTANTSHIP

Available to beginning and continuing graduate students in Comparative Literature and other programs.

### Integrated B.A./M.A. Program in Comparative Literature (CMLIT)

The Department of Comparative Literature offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in Comparative Literature within five years of study. The first two years of undergraduate course work include the University General Education and Liberal Arts requirements in addition to language and literature study in the major. In the third year, students are expected to define areas of interest in two primary literatures in different languages. In addition, students in the B.A./M.A. program should begin to undertake work in a second foreign language. The fourth year includes graduate-level work in methodology and the student's selection of primary literatures, which replaces comparable 400-level senior year courses. The fifth and final year of the program typically consists of graduate work in Comparative Literature courses as well as the chosen literatures. The program culminates with an M.A. paper.

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program helps students more clearly define their area of interest and expertise in the otherwise vast field of international literatures. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. The student may also be more competitive in applying for admission to Ph.D. programs as well as for institutional and national grant monies and scholarships.

### Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission is selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the Comparative Literature B.A. program [\[1\]](#).
2. Must have completed 60 credits of the undergraduate degree program. (It is strongly suggested that students apply to the program prior to completing 100 credits.)
3. Must be accepted without reservation into the M.A. program in Comparative Literature.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

A typical sequence of coursework for the integrated program would appear as follows:

<b>Year One:</b>	6 credits:	CMLIT 010 CMLIT 100
<b>Year Two:</b>	6 credits:	Foreign Language (beyond the 12-credit level)
	6 credits:	Courses in Literature
<b>Year Three:</b>	9 credits:	400-level courses in Literature, including CMLIT 400Y
	(variable credits)	Work in foreign language (credits do not count towards the major, but reading proficiency is required for the M.A. degree)
<b>Year Four:</b>	3 credits:	CMLIT 501, 502, and/or 503
	6 credits:	Comparative Literature courses
	6-9 credits:	500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
<b>Year Five:</b>	3 credits:	CMLIT 501, 502, and/or 503
	9-12 credits:	500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
	6 credits:	500-level Comparative Literature Courses M.A. paper

### Dual-Title Graduate Degree in Comparative Literature and Asian Studies

Graduate students with research and educational interests in international education may apply to the Comparative Literature/Asian Studies Degree Program. The goal of the dual-title degree Comparative Literature and Asian Studies is to enable graduate students from Comparative Literature to acquire the knowledge and skills of their major area of specialization in Comparative Literature while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent scholars of literature who are experts in Asian Studies as well. The dual-title degree Comparative Literature and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see <http://asian.la.psu.edu/graduate.shtml>) and the Department of Comparative Literature (<http://complit.la.psu.edu/graduate.shtml>).

#### Admission Requirements

For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to the Comparative Literature graduate program. Once accepted into the Comparative Literature program, the student can apply to the Admissions Committee of the Asian Studies. The Asian Studies admissions committee reviews applications forwarded by Comparative Literature, and recommends students for admission to the Asian Studies program to the Graduate School. Students already in their first and second years of the Comparative Literature graduate program may also apply to the dual-title program if their applications are forwarded by Comparative Literature.

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Scores from the Graduate Record Examination (GRE) are required for admission.

There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and Comparative Literature, though applicants interested in the program should also make their interest in the dual-degree program known clearly on their applications and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

General Graduate School requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

#### Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the Comparative Literature program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the students, their Asian Studies advisor, and their Comparative Literature program advisor.

Upon a student's acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic advisor in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their advisor. The student and advisor will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Comparative Literature department and the Asian Studies program.

#### Requirements for the Comparative Literature/Asian Studies Ph.D.

The doctoral degree in Comparative Literature and Asian Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and Asian Studies are as follows:

- Comparative Literature 501, 502, and 503
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Comparative Literature, as approved by the student's doctoral advisor and the ASP director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Comparative Literature.
- An additional 21 credits in literature or theory-related courses, including graduate course work in the three languages that the student selects, with emphasis on the student's primary literature

Particular courses may satisfy both the Comparative Literature requirements and those of the Asian Studies program. Within this framework, final course selection is determined by the students, their Asian Studies advisor, and their Comparative Literature program advisor.

### Dual-Title Graduate Degree in Comparative Literature and African Studies

Comparative Literature doctoral students who have research and educational interests in African Studies may apply to the Dual-Title Doctoral Degree Program in African Studies. The goal of the program is to enable doctoral students from Comparative Literature to complement their knowledge and skills in their primary discipline with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual-Title Doctoral Degree Program will provide interested Comparative Literature doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African Studies. It will, thereby, add value to their Comparative Literature degree and should increase their competitiveness in the job market. The well-rounded specialist who graduates from the program may be employed in an international setting and have enhanced opportunities for U.S. academic and non-academic positions as well.

#### Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must have the approval of the Comparative Literature department and then submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Comparative Literature.

General Graduate Council requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

#### Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Comparative Literature doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, course selection is determined by the student with the approval of the Comparative Literature and African Studies academic advisors.

Upon acceptance by the African Studies admissions committee, the African Studies director will assign the student an African Studies academic advisor in consultation with the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies advisor from the one assigned by the African Studies admissions committee. The student and the Comparative Literature and African Studies academic advisors will establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Comparative Literature graduate program, and the African Studies Program.



### Requirements for the Comparative Literature-African Studies Ph.D.

The Ph.D. in Comparative Literature and African Studies is awarded to students who are admitted to the Comparative Literature doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and African Studies are as follows:

- A minimum of 60 postbaccalaureate credits. Course work accepted for the M.A. in Comparative Literature will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Comparative Literature.
- AFR 501 (3)
- 15 credits of African-related coursework at the 400 or 500-level; a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- Up to 6 of the 15 credits may come from Comparative Literature, as approved by the student's Comparative Literature and African Studies Program academic advisors.
- The remaining credits can be taken in AFR or in any department other than Comparative Literature.
- Of the 15 credits, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.

The choice of courses in African Studies is to be proposed by the student subject to approval by the Comparative Literature and African Studies academic advisors. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and that is complementary to the student's specialty in Comparative Literature.

### Language Requirement

Fulfillment of communication and foreign language requirements will be determined by the student with approval of the Comparative Literature and African Studies program advisors and will meet the existing Comparative Literature requirements. The Ph.D. in Comparative Literature requires proficiency in two foreign languages. The foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

### Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Comparative Literature graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Comparative Literature graduate program. There will be a single candidacy examination, containing elements of both the major discipline and African Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Comparative Literature and must include a graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Comparative Literature if that person holds a formal affiliation with the African Studies program.

### Doctoral Committee Composition

The doctoral committee of a dual-title doctoral degree student must include a minimum of four Graduate Faculty members, i.e., the chair and at least three additional members. The committee must include at least one member of the African Studies graduate faculty.

If the chair of the committee representing Comparative Literature is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies should be appointed as co-chair.

### Comprehensive Exam

After completing most course work, doctoral candidates for the dual-title doctoral degree in Comparative Literature and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's examination fields according to the current Comparative Literature exam structure, and on African Studies. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national or regional area(s) of interest and specialization in African Studies.

### Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and African Studies.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [COMPARATIVE LITERATURE \(CMLIT\) course list](#)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-016

Review Date: 06/12/2012

Faculty last updated: 3/12/12

## Counselor Education (CN ED)

[Program Home Page](#)

RICHARD HAZLER, *Program Coordinator*  
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### Degrees Conferred:

Ph.D., D.Ed., M.Ed.

### The Graduate Faculty

- Kathleen J. Bieschke, Ph.D. (Michigan State) *Professor of Counseling Psychology*
- JoLynn V. Carney, Ph.D. (Ohio) *Associate Professor of Counselor Education*
- Liza M. Conyers, Ph.D. (Wisconsin-Madison) *Associate Professor of Rehabilitation and Human Services*
- Catharina (Tineke) J. Cuning, Ph.D. (Penn State), *Affiliate Assistant Professor of Counselor Education*
- Lois A. Ehrmann, Ph.D. (Penn State) *Adjunct Assistant Professor of Counselor Education*
- Jeffrey W. Garis, Ph.D. (Penn State) *Affiliate Professor of Counselor Education*
- Jeffrey A. Hayes, Ph.D. (Maryland) *Professor of Counseling Psychology*
- Richard J. Hazler, Ph.D. (Idaho) *Professor of Counselor Education*
- James T. Herbert, Ph.D. (Wisconsin-Madison) *Professor of Rehabilitation and Human Services*
- Brandon Hunt, Ph.D. (Virginia) *Professor of Rehabilitation and Human Services*
- W. Terrell Jones, D.Ed. (Penn State) *Affiliate Associate Professor of Counselor Education*
- Margaret Lorah, D.Ed. (Penn State) *Affiliate Assistant Professor of Counselor Education*
- Elizabeth A. Mellin, Ph.D. (Ohio) *Associate Professor of Counselor Education*
- Spencer G. Niles, D.Ed. (Penn State) *Distinguished Professor of Counselor Education*
- Deirdre O'Sullivan, Ph.D. (Illinois, Urbana-Champaign) *Assistant Professor of Rehabilitation and Human Services*
- Robert M. Orndorff, Ph.D. (Penn State) *Affiliate Assistant of Counselor Education*
- Aaron L. Pincus, Ph.D. (British Columbia) *Associate Professor of Psychology*
- Jack R. Rayman, Ph.D. (Iowa) *Affiliate Professor of Education and Counseling Psychology*
- Jerry Trusty, Ph.D. (Mississippi State) *Professor of Counselor Education*
- Eric White, Ed.D. (Pennsylvania) *Affiliate Assistant Professor of Education*

Professional preparation is offered at the master's level for school counselors (elementary and secondary) and rehabilitation counselors. Credits required by different master's options vary from 51 to 54. Specifically, program specializations at the master's level include elementary school counseling (54 credit hours), secondary school counseling (54 credit hours), and rehabilitation counseling (51 credit hours).

The Ph.D. program prepares candidates for positions as counselor education faculty members and consists of a minimum of four academic years of graduate level preparation (including master's-level preparation), defined as eight semesters, with a minimum of 96 graduate-level credits required of all students in the program. The D.Ed. program helps students prepare to become supervisors of counseling services and requires 61 credit hours beyond the master's degree in counselor education.

### Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission to the Ph.D. program. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with a 2.50 junior/senior average (on a scale of 4.00) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 grade-point average may be made for students with special backgrounds, abilities, and interests. All doctoral applicants should present at least a 3.33 average in all graduate study completed prior to admission.

All doctoral applicants must have completed a master's degree in counselor education prior to admission into the Ph.D. or D.Ed. program. The master's degree must be comprised of 48 credit hours as specified by the Council for the Accreditation of Counseling and Related Educational Programs (CACREP). Post-master's counseling experience is required for admission to the D.Ed. program.

### Degree Requirements

All candidates are expected to exhibit, in addition to academic competence, effectiveness in interpersonal relations and in both written and oral communication. They also must provide evidence support of professional counseling activities and involvement in professional organizations. All degree options require students to participate in extensive practicum or fieldwork experience under supervision.

The Ph.D. program includes 76 credit hours beyond the master's degree in counselor education. The master's degree must be comprised of 48 credit hours as specified by CACREP. Ph.D. students must satisfy advanced degree requirements in the CACREP counselor education core areas (31 credit hours including a counseling and teaching internship), a minor field of study (15 credit hours), and empirical foundations (15 credit hours). Students in the Ph.D. program are expected to complete a dissertation involving independent and original research. Students are expected to use theoretical models of counseling to investigate problems of importance to the field. The additional credits in the Ph.D. program incorporate advanced coursework in research design, statistics, and counseling theory to prepare students for their subsequent roles as faculty members in counselor education programs.

The D.Ed. Program includes 61 credit hours beyond the master's degree in counselor education. Students in the D.Ed. program in Counselor Education must satisfy degree requirements in core counselor education courses (19 credit hours), empirical foundations (12 credit hours), and a counseling specialty area (15 credit hours) such as : career guidance, administration, planning, and management in service delivery settings. D.Ed. students must complete a dissertation (15 dissertation credit hours) that is of practical significance to the delivery or administration of counseling services.

### Candidacy Examination

All Ph.D./D.Ed. students are required to have a master's degree in counselor education prior to admission. After completion of 12 credits of doctoral study, which may allow the student to take the candidacy examination as early as the second semester in their doctoral program, Ph.D. and D.Ed. students may take a candidacy examination. Given the requirement that doctoral students will have a master's degree in counselor education thereby demonstrating their ability to complete graduate work successfully, the nature of the candidacy examination will include a review of the following by the student's candidacy committee: (1) the student's professional resume, (2) a statement regarding the general direction of the student's research interests and possible areas of dissertation inquiry, (3) grades from completed graduate courses, (4) proposed course of study for subsequent semesters, (5) selected graduate papers written by the student, and (6) a statement regarding the student's professional goals. In the candidacy examination, the student's candidacy committee determines the student's ability to continue in the program and to conduct doctoral research.

### Comprehensive Examination

Both Ph.D. and D.Ed. candidates are required to take a written and oral comprehensive examination once their course work is completed (or when they are in their final semester of required coursework) and prior to the dissertation. The examination, prepared by the student's doctoral committee, covers all areas of the student's doctoral work. The comprehensive examination for Ph.D. students must include an assessment of the student's competence related to conducting independent and original research.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

## Courses

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### CORE COURSES for Counselor Education Ph.D Program:

#### COUNSELOR EDUCATION (CN ED)

502. Advanced Counseling Theory (3)  
554. Cross-Cultural Counseling (3)  
555. Career Counseling (3)  
580. Foundations of Counselor Education Seminar (3)  
581. Professional Issues Seminar (3)  
582. Advanced Group Psychotherapy (3)  
589. Seminar on Counseling Supervision (1)  
595D. Supervision of Counselors (3)  
595I. Teaching Internship(3)  
595K. Doctoral Counseling Internship (3)  
595P. Counselor Education Doctoral Practicum (3)

### CORE COURSES for Counselor Education D.Ed. Program:

#### COUNSELOR EDUCATION (CN ED)

554. Multicultural Counseling (3)  
580. Foundations: History and Trends in Counselor Education (3)  
581. Professional Issues in Counselor Education (3)  
589. Seminar on Counseling Supervision (1)  
595D. Supervision of Counselors (3)  
595P. Counselor Education Doctoral Counseling Practicum (3)  
595K. Counselor Education Doctoral Counseling Internship (3)

#### [COUNSELOR EDUCATION \(CN ED\) course list](#)

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-116

Review Date: 11/13/2012

Faculty updated: 2/19/13

## Communications (COMCL)

Peter Kareithi, Professor of Humanities and Communications, *Program Coordinator*  
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 777 West Harrisburg Pike, Middletown, PA 17057  
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**Degree Conferred: M.A.**

### The Graduate Faculty

- **Carl Patrick Burrowes, Ph. D.** (Temple) Associate Professor of Communications and Humanities
- **Peter Kareithi, Ph.D.** (Massachusetts) Associate Professor of Humanities and Communications
- **Catherine Rios, MFA** (Columbia) Associate Professor of Humanities and Communications
- **Yu Shi, Ph.D.** (Iowa) Assistant Professor of Speech Communication and Humanities
- **Samuel Winch, Ph.D.** (Indiana) Associate Professor of Humanities and Communications
- **Craig Welsh, MFA.** (Marywood University) Assistant Professor of Humanities and Communications

The Master of Arts in Communications prepares students for doctoral study and leadership positions in areas of public information such as journalism, education, public relations and advertising. The program places an emphasis on cultivating an interdisciplinary and intercultural perspective for media educators and practitioners who may serve publics in a variety of fields, including business, government agencies, non-profit organizations, and community and political action groups. Because our program is broad-based and research-oriented, students will work with their academic advisers to develop their thesis projects to address critical issues in the above areas, rather than acquiring a specific and narrowly defined skill set.

The program balances research and creative production by integrating national and international perspectives on history, culture, and society in all instruction in theory and production practice.

Because of the program's location in the Pennsylvania state capital region and its close proximity to prominent public and private institutions and other resources, students in the program will have opportunities for internships and field experiences that provide valuable context for the development of their thesis projects. This integrated approach between theory and practice positions the program to provide a strong foundation for the pursuit of doctoral studies in communications.

Students admitted to the Master of Arts in Communications Program at Penn State Harrisburg must complete 36 credits, 21 of which must be at the 500 level in order to be granted the degree. Each student must complete and submit either a master's project or thesis. The master's project option (COMMS 580 Master's Project in Communications, 3-6 credits) consists of a creative production with an accompanying scholarly essay. The thesis option (COMMS 600 Thesis Research or COMMS 610 Thesis Research Off Campus, 6 credits) consists of an original research paper that follows the guidelines established by the Graduate School Thesis Office (see <http://www.gradsch.psu.edu/current/thesis.htm>). The subject of the master's project or thesis must be defined in conjunction with a faculty member, and evaluated by a committee of at least two faculty members, supplemented by outside consultants where appropriate. To register for the master's thesis or project, a student must have completed COMMS 500 and COMMS 503 and must have earned at least 27 credits towards the Masters in Communications.

### Grade-Point Average and Time Limit

A 3.00 grade-point average will be required for successful completion of the degree.

A full-time student can expect to complete the program in four semesters, a part-time student in six or more semesters. All requirements for a master's degree for the Master of Arts in Communications (including acceptance of the master's thesis or project) must be met within eight years of admission to degree status. Extensions may be granted by the Graduate School in appropriate circumstances.

The 36-credit program is distributed over two groups of courses:

#### Prescribed Courses - 21-24 Credits

##### Take a minimum of 9-12 credits from the following:

COMMS 500 Seminar in Communications and Cultural Theory (3 cr.)  
 COMMS 503 Research Methods in Communications (3 cr.)  
 COMMS 580 Master's Project in Communications (3-6 cr.)  
 COMMS 600 or 610 Thesis Research (6 cr.)

[COMMS 500 and COMMS 503 to be taken within the first 12 credits after enrollment in the program. Students elect EITHER COMMS 580 or COMMS 600. **A minimum of 12 credits in prescribed courses are required if selecting the thesis option, COMMS 600**]

##### Choose 6 credits from ONE of the following:

COMMS 525 Advanced Writers' Seminar (3-9 cr.)  
 COMMS 568 Media Production Workshop (3-9 cr.)

##### Choose 6 credits from the following:

COMMS 519 Communications Technology and Culture in History (3 cr.)  
 COMMS 555 **Media Discourse Analysis (3 cr.)**  
 COMMS 560 Seminar in **Global Culture and Communications** (3 cr.)

#### Additional Courses - 15 Credits

Take 15 credits in additional courses at the 400- and 500-levels, which can come from either Communications or other fields, including: American Studies, Business Administration, Community Psychology and Social Change, Criminal Justice, Education, Health Administration, Health Education, Humanities, Information Systems, Management, Marketing, Public Administration, Training and Development.

The following 400- and 500-level Communications courses are approved selections:

COMM 414 MEDIA MANAGEMENT (3)  
 COMM 415 ADVANCED PHOTOGRAPHY (3)  
 COMM 421W ADVERTISING CREATIVE STRATEGIES (3)  
 COMM 430 MASS MEDIA AND POLITICS (3)  
 COMM 441 ADVANCED GRAPHIC DESIGN (3)  
 COMM 456 MEDIA CRITICISM AND THEORY (3)  
 COMM 457 MEDIA AUDIENCES AND CONTEXTS (3)  
 COMM 458 MEDIA LAW AND ETHICS (3)  
 COMM 459 CULTURAL EFFECTS OF INTERACTIVE AND ONLINE MEDIA (3)  
 COMM 462 FEATURE WRITING (3)  
 COMM 471 PUBLIC RELATIONS MEDIA AND METHODS (3)  
 COMM 474 DEPTH REPORTING (3)  
 COMM 482 ADVANCED COMMUNICATIONS WORKSHOP (4)  
 COMM 488 WRITERS' SEMINAR (3 per semester, maximum of 9)  
 COMM 594 RESEARCH TOPICS (1 -15)  
 COMM 595 INTERNSHIP (1 -18)  
 COMM 596 INDIVIDUAL STUDIES (1 - 9)  
 COMM 597 SPECIAL TOPICS (1 - 9)

**NOTE:** The following 400-level Communications courses may **not** be taken to fulfill the requirements of this degree: COMM 495, COMM 495A, COMM 496 and COMM 497.

- **Admission Requirements**

Applicants must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution and have earned at least a 3.0 grade-point average in their junior and senior years.

Exceptions may be made for those with special backgrounds or abilities who are committed to advanced interdisciplinary study in communications. All application materials should be submitted before February 15 for the fall semester and November 1 for the spring semester.

Applicants must submit the following:

- an online Graduate School application with the application fee;
- two copies of official transcripts from each college or university previously attended (with the exception of Penn State University).
- a personal statement of 500 to 1000 words outlining educational goals and career objectives;
- two letters of reference attesting to the applicant's suitability for the program (preferably from previous professors or others who are familiar with the applicant's intellectual/creative work or interests);
- a writing sample or other creative production (e.g. short film, photo essay, advertisement or PR campaign sample, multimedia art, etc).

Application materials are available on the web at: <http://gradsch.psu.edu/portal/>

### Transfer of Credits

Transfer credits are limited to 9 equivalent graduate Communications credits with a grade of B or better taken within the last 5 years from an accredited institution. It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg. Credit will not be given for any course used to complete a previous degree.

### International Students

International applicants must hold the equivalent of an American four-year baccalaureate degree. They must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, with remedial course work. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States and Wales.

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 39-04-587

Review Date: 01/11/2011

## Computer Science (COMP)

[Program Home Page](#)

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E-mail: [lnull@psu.edu](mailto:lnull@psu.edu)

### Degree Conferred:

M.S.

### The Graduate Faculty

- Jeremy J. Blum, D.Sc. (George Washington) *Assistant Professor of Computer Science*
- Thang N. Bui, Ph.D. (MIT) *Associate Professor of Computer Science and Mathematical Sciences*
- Sukmoon Chang, Ph.D. (Rutgers) *Associate Professor of Computer Science*
- Linda M. Null, Ph.D. (Iowa State) *Associate Professor of Computer Science*
- Clifford H. Wagner, Ph.D. (SUNY, Albany) *Associate Professor of Mathematics and Computer Science*
- Seth Wolpert, Ph.D. (Rutgers) *Associate Professor of Electrical Engineering*

The program is professionally oriented and designed to prepare students for employment in industry or government. Courses emphasize practical concerns as well as the relevant theoretical background. The program will provide appropriate background for diverse tasks such as developing scientific and engineering applications, developing system software, developing safety or security critical systems, solving computationally hard problems, and developing distributed applications. While not intended as preparation for subsequent entrance to a Ph.D. program, this goal is not precluded. Once the specific course requirements are met, appropriate selection of electives will enable individual interests to be met within the program. Anticipated areas of interest include software engineering, systems programming, and artificial intelligence.

### Admission Requirements

In addition to the general Graduate School requirements, applicants must present a baccalaureate degree in Computer Science or a related field from a regionally accredited institution. A minimum GPA of 2.75 (on a 4.0 scale) is required. While a bachelor's degree in Computer Science is not required, admission without deficiency requires that an applicant has completed courses in analysis of algorithms, operating systems, database, and linear algebra. If these courses are not taken before admission to the program, they may be taken at Penn State Harrisburg, but the student will receive at most 3 credits toward the MS degree for these courses.

At the discretion of the program, applicants may be required to provide scores from the Graduate Record Examinations (GRE) and/or the GRE subject test in computer science. In addition, applicants must provide three letters of reference, at least one of which is from an academic source, and a letter outlining significant work experience and academic and career objectives.

### Degree Requirements

A total of 30 graduate credits (400 level or above) is required for the degree of master of science in Computer Science. Students are required to take the following courses: COMP 505 and COMP 511, COMP 512, and COMP 519. Additionally, students are required to complete either a thesis or a paper according to one of the two options described below. Students who believe that they have completed a course substantially similar to one of the specific course requirements may apply to have their previous work evaluated for the purpose of exemption to that requirement. If the exemption is granted, another approved course shall be taken in place of that required course. The remaining 18 credits must be completed according to one of the following options:

1. *Thesis Option: Research into a specific computer science problem, development of a scholarly written paper, and an oral defense.*  
This option requires: 6 credits of COMP 600, 3 additional credits from approved 500-level electives in computer science, mathematics, engineering, and information systems courses and 9 credits from approved 400- and 500-level electives in computer science, mathematics, engineering, and information systems courses.
2. *Paper Option: In-depth study of specific computer science problems, development of a written paper or project, and an oral defense.*  
This option requires: 3 credits of COMP 594, 9 credits from approved 500-level electives in computer science, mathematics, engineering, and information systems courses and 6 credits from approved 400- and 500-level electives in computer science, mathematics, engineering, and information systems courses.

A maximum of 9 transfer credits will be allowed for course work completed as a graduate student at another institution.

### Suggested Tracks

For students with interests in the areas of software engineering, systems programming, and artificial intelligence, the program suggests the following course work. These tracks are only advisory--there is no requirement that a student follow any track, and tracks will not be noted on diplomas or transcripts.

*Track in Software Engineering:* Students following the track in software engineering will be provided with the conceptual tools needed for designing and managing large software systems. In addition to the required core, the track in software engineering consists of the following courses: COMP 513, COMP 516, INFSY 570. In addition to these courses, CMPSC 470 is highly recommended, as compiler development is an ideal environment for gaining practical experience with software engineering techniques and tools.

*Track in Systems Programming:* Students following the track in systems programming will receive instruction in both the conceptual foundation of systems software and the implementation of such systems. In addition to the required core, the track in systems programming consists of the following courses: CMPSC 436, COMP 517, COMP 545.

*Track in Artificial Intelligence:* Students following the track in artificial intelligence are expected to gain an understanding in the theory and applications of AI methods as well as evolutionary methods for solving a variety of problems. In addition to the required core, the track in artificial intelligence consists of the following courses: COMP 520, COMP 524, COMP 556.

### Additional Information

For further information, see: <http://cs.hbg.psu.edu>

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COMPUTER SCIENCE \(COMP\) course list](#)

### Integrated B.S./M.S. Program in Computer Science

The Computer Science program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Computer Science. The ability to coordinate as well as

concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 6 credits proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. The third and fourth years of the IUG program differ from those of the Bachelor of Science program due to the courses that count toward the Master of Science degree requirements. Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 100 to 105 credits, which is at the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a 3.5 GPA in their Math and Computer Science courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year. As part of the review in the senior year, students will be advised about the paper option and thesis option in the graduate program. Students intending to pursue the thesis option would be advised to do so only if they have been doing very well in the program and are in no danger of not being able to continue into the fifth year. A minimum grade point average of 3.5 must be earned in all math and computer science course work that is applied toward the graduate degree. This includes any courses that count toward both the undergraduate and graduate degrees, as well as all courses taken during the fifth year. Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. Note that students who are awarded a graduate assistantship must elect to receive the B.S. degree at the end of the fourth year. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

### **Admission Requirements**

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Computer Science Application Form, a transcript, and a faculty recommendation, in addition to applying for admission to the Graduate School. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 45 credits. A typical student would apply after completing between 45 to 60 credits, that is, after the fourth semester and before the end of the fifth semester. For consideration for acceptance into the program, students must have completed and earned a minimum grade point average of 3.0 in the following Computer Science and Mathematics courses: MATH 140, MATH 141, MATH 220, CMPSC 121, CMPSC 122, and CMPSC 360. Student applications will be evaluated based on their overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Computer Science.

### **Degree Requirements**

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. The minimum of 6 credits double-counted must be at the 500 level. Thesis credits may not be double counted.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-074

Review Date: 02/21/2012

UCA Revision #2: 7/30/07

Last updated by Publications: 5/23/11

## Community Psychology and Social Change (CP&SC)

[Program Home Page](#)

HOLLY ANGELIQUE, *Coordinator*  
W-157 Olmsted Building  
Penn State Harrisburg  
777 W. Harrisburg Pike  
Middletown, PA 17057-4898

### Degrees Conferred:

Master of Arts in Community Psychology and Social Change

### The Graduate Faculty

- Holly Angelique, Ph.D. (Michigan State) *Associate Professor of Community Psychology*
- Ken Cunningham, Ph.D. (CUNY) *Associate Professor of Sociology*
- Kamini Maraj Grahame, Ph.D. (Toronto) *Associate Professor of Community Psychology and Social Change*
- Senel Poyrazli, Ph.D. (Houston) *Associate Professor of Counseling Psychology*
- Chiara Sabina, Ph.D. (Loyola, Chicago) *Assistant Professor of Social Sciences*

The graduate program in Community Psychology leads to a master of arts degree in Community Psychology and Social Change with concentration in Children, Youth, and Family; Environmental Issues; and Individualized Studies. The nontraditional program emphasizes planned social change, and is based on both sociology and psychology. The program equips students with skills useful in coping with the multifaceted problems facing communities. Students learn (a) to assess problems at the level of communities or organizations, (b) to plan and implement possible solutions to these problems, and (c) to evaluate the effectiveness of the solutions. Learning takes place both in courses and in a master's project that entails fieldwork and the writing of a master's paper.

To act as a change agent, the student must be aware of contemporary community needs, along with the impact of the community structure upon its individual members and the techniques best suited to initiate productive changes. After completing this interdisciplinary program, the graduate should be able to approach problems with a more integrated point of view and work cooperatively with community individuals and agencies toward practical solutions. Problems related to crime, education, child and family development, employment, the lack of effective social power, and other factors affecting psychological well being are approached from bases in community service agencies or informal community groups. The majority of students work full-time in agencies or governmental units. To accommodate these working students, 500-level graduate courses are scheduled in the evening.

### Admission Requirements

Requirements listed below are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission to the program, a student must have a baccalaureate degree from an accredited academic institution, earned under residence and credit conditions equivalent to those required by Penn State. The minimum grade-point average (GPA) in the junior and senior years must be 3.00 or higher (on a 4.00 scale). Students with experience in carrying out planned social change are particularly encouraged to apply. Most applicants hold degrees in psychology, sociology, or related disciplines. Ideally, applicants will have taken courses in developmental, personality, and social psychology, along with work in social change, social problems, and social conflict. Students from diverse other backgrounds are welcome to apply, particularly if they have had work or other experience effecting change in community settings. Applicants will be asked to take additional course work without graduate credit, chosen after consultation with an adviser, if they have had no psychology or sociology courses beyond the introductory level. Applicants must have received a C or better in an introductory statistics course covering parametric and non-parametric inferential statistics; they will be requested to make up any deficiency without graduate credit.

Off-campus and transfer credits from accredited institutions will be evaluated by the Program Coordinator for recency and appropriateness to the student's course of study. Approval for up to 10 transfer credits may be given. Documented applications for credit for work experience will be evaluated by students' masters committees, made up of members of the graduate faculty. Approval for up to 6 credits may be given. If granted, approval for this credit can take the place of the fieldwork usually undertaken in CMPSY 522, Practicum. The student must register for the number of credits approved, either in CMPSY 522, or, if the student prefers, after having asked for a waiver of the CMPSY 522 requirement, in additional elective course work, chosen with help from an adviser.

Courses in the program are sequenced on the assumption that students will be entering in the fall semester. Students may apply for admission for the spring (but not the summer) semester, but they may not start taking 500-level required courses until the following fall.

Admission to the Community Psychology program is based on clear suitability for the program as evidenced by the application as a whole; it is limited to the number of spaces available for masters project supervision.

Applicants must submit the following:

1. A completed application form and application fee.
2. Two copies of official transcripts from colleges or universities previously attended (including Penn State)
3. Admission Essay: We are interested in learning something about your writing and analytical abilities, and about you as a person. Please take two to six double-spaced pages to answer the following question.

C. Wright Mills wrote: "The sociological imagination enables its possessor to understand the larger historical scene in terms of its meaning for the inner life and the external career of a variety of individuals....The sociological imagination enables us to grasp history and biography and the relations between the two within society. That is its task and its promise. To recognize this task and this promise is the mark of the classic social analyst ..."

Discuss the intersection of your biography with history and society. How have the society and the times in which you live helped to shape who you are? What do you hope to accomplish in life? How do you think our graduate program will help you to reach your goals?

- A letter of about 500 words outlining significant community or work experience, along with career and academic objectives.
- Three professional letters of recommendation, special forms provided. Please include at least two essays from academic sources.

### Program Requirements

An important part of this degree is a master's project, made up a total of 9 credits, comprising from 3 to 6 credits of Practicum (CMPSY 522), and from 3 to 6 credits of Research (CMPSY 594). The project is planned in the context of the course Roles and Methods in Community Psychology (CMPSY 521); it is supervised by a master's committee of graduate faculty. The particular mix of practicum and research is worked out by the student in consultation with the faculty. The variable mix of practicum and of research credits results in the student's being able to choose course work that emphasizes study in the area in which she or he needs most skill-development. In the usual case, a student with a strong background in fieldwork would be asked to emphasize research in her or his master's project, and a student with a strong research background, but with limited fieldwork, would be asked to emphasize the practicum. The output of CMPSY 522 is a practicum; the output of the research course CMPSY 594 is a required master's paper of at least 3 credits. The master's paper may be based on the field experience. Students often choose to structure their master's paper around a specific community research problem. Again, students can apply for Practicum (522) credit, or, at their choice, ask for a waiver of the requirement, on the basis of documented prior experience. Decisions about such applications are made by the student's master's committee.

Part-time students who are able to take two courses at a time can complete the degree in seven to eight semesters. Since the processes of designing a master's project and of writing a master's paper are labor-intensive and frequently take more time than the student expects, even full-time students will often take six or more semesters to complete the degree.

The program offers three concentrations, each including all the required Community Psychology courses. The Children, Youth, and Families Concentration



uses as its electives 9 approved credits from courses in psychology, education, and sociology. The Environmental Issues Concentration uses electives approved by an adviser and drawn from special courses in environmental issues and from various other programs. The Individualized Concentration uses as its elective courses chosen to meet individual needs, with the approval of an adviser.

## Graduation Requirements

To qualify for the degree, 36 credits are needed, 24 of which must be at the 500 level. There is a sequence of substantive courses, starting with Theories and Issues in Community Psychology (CMPSY 500).

### Required Courses (27 credits)

#### COMMUNITY PSYCHOLOGY (CMPSY)

- 500. Theories and Issues in Community Psychology (3)
- 510. Change Processes (3)
- 511. Social Impacts on Psychological Functioning (3)
- 519. Research Methods I (3)
- 520. Research Methods II (3)
- 521. Roles and Methods in Community Psychology (3)
- 522. Practicum (3-6)
- 594. Master's Paper (3-6)

### Elective Courses (9 credits)

## Concentrations

In addition to the core curriculum, students will complete the requirements of one of the three concentrations described below:

### Children, Youth, and Families Concentration

Students working toward a Master of Arts degree in Community Psychology and Social Change with this concentration must complete three of the following courses. Students should check for prerequisites when deciding on which courses to take.

#### EDUCATION (EDUC)

- 404. Young Children's Behavior: Observation and Evaluation (3)
- 410. The Child and Social Institution. (3)

#### PSYCHOLOGY (PSYC)

- 405. DEVELOPMENTAL PSYCHOLOGY (3)

#### SOCIOLOGY (SOCIO)

- 462. Perspectives on Aging (3)
- 463. The Family (3)

### Environmental Issues Concentration

Students working toward a Master of Arts degree in Community Psychology and Social Change with this concentration must complete three of the following courses. Students should check for prerequisites when deciding on which courses to take.

#### CIVIL ENGINEERING (C E)

- 471. Environmental Sanitation (3)
- 497. The Human Environment (1-9)

#### ENVIRONMENTAL ENGINEERING (ENVE)

- 487. Environmental Law (3)

#### PUBLIC ADMINISTRATION (P ADM)

- 531. Environmental Policy (3)

#### SOCIOLOGY (SOCIO)

- 470. Environmental Sociology (3)
- 471. Environmental Movements (3)
- 472. Justice and the Environment (3)

### Individual Concentration

Students choose electives from a wide variety of courses offered by the Behavioral Science and other faculties. The object is to support a special interest or mix of interests, in, for instance, environmental issues, adult education, criminal justice, urban sociology, women's studies, or issues of class-ism, racism, or sexism. Students work with faculty advisers in gaining approval of electives and in choosing topics for master's projects.

## Student Aid

A number of scholarships, fellowships, and graduate assistantships are available. Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[CIVIL ENGINEERING \(C E\) course list](#)

[COMMUNITY PSYCHOLOGY \(CMPSY\) course list](#)

[EDUCATION \(EDUC\) course list](#)

[ENVIRONMENTAL ENGINEERING \(ENVE\) course list](#)

[PSYCHOLOGY \(PSYC\) course list](#)

[PUBLIC ADMINISTRATION \(P ADM\) course list](#)

[SOCIOLOGY \(SOCIO\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

DATE LAST REVIEWED BY PUBLICATIONS: 10/13/11

## Criminal Justice (CRIMJ)

### [Program Home Page](#)

JAMES M. RUIZ, *Program Chair*  
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777 W. Harrisburg Pike  
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717-948-6322 (administrative assistant)  
717-948-6484 (fax)

### Degree Conferred:

M.A.

### The Graduate Faculty

- Shaun L. Gabbidon, Ph.D. (Indiana U of Pa.) *Distinguished Professor of Criminal Justice*
- Don Hummer, Ph.D. (Michigan State) *Associate Professor of Criminal Justice*
- Philip Kavanaugh, Ph.D. (Delaware) *Assistant Professor of Criminal Justice*
- Joongyeup Lee, Ph.D. (Sam Houston State) *Assistant Professor of Criminal Justice*
- James M. Ruiz, Ph.D. (Sam Houston State) *Associate Professor of Criminal Justice*

The program reflects the numerous complexities of the discipline. It provides academic leadership for students to work within corrections, institutionalized and non-institutionalized settings, victim services, adult and juvenile services, policing and law enforcement, private security, courts, and other human service organizations serving the clients of these institutions. It also helps develop research acumen for those students who may wish to consider doctoral studies.

Strong ties developed in state, local, and federal level law enforcement, corrections, drug treatment, victimization, and crime control policy organizations provide research and learning opportunities for interested students.

The degree may be earned by full or part-time study. Most courses will be offered in the evening, although some will be offered during the day or on weekends.

### Admission Requirements

- A completed application form with the application fee.
- Two official transcripts of all colleges and universities attended.
- Graduation from a regionally accredited college or university.
- Three letters of recommendation.
- A brief (two-page) statement of purpose or a writing sample.
- Minimum GPA of a 3.0 for the last 60 credits of undergraduate study. Satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admissions Test (GMAT), or Law School Admissions Test (LSAT) are required if the GPA is less than 3.0. *Note: All students who seek funding must take one of these standardized tests, preferably the GRE.*
- The language of instruction at Penn State is English. All international applicants whose first language is not English or who have not received a baccalaureate or master's degree from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test, a score of 213 on the computer-based test, or 80 points on the new Internet-based test with a minimum of 20 points on the speaking portion; or the IELTS module with a minimum composite score of 6/5 is required for admission.
- Some foundational course work may be required for those students who did not major in criminal justice as an undergraduate. This decision will be made by the MACJ Program Coordinator after a close review of the undergraduate transcript.
- In exceptional cases, the program may also approve admission by reason of special backgrounds, abilities, and interests.
- Students must submit admission materials for fall by February 15.

### Degree Requirements

1. The thesis track requires 36 credits. Six of the credits will be for the thesis.
2. The non-thesis track will require 36 credits plus successful completion of the comprehensive essays, for which a student will register for one credit of CRIMJ 594.
3. These credits must be at the 400 level or above with a minimum of 30 credits at the 500 level or above.
4. A minimum grade-point average of a 3.0 must be earned for course work taken as a graduate student.
5. Students are required to take the following courses: CRIMJ 500, CRIMJ 501, CRIMJ 502, CRIMJ 503, and CRIMJ 504. CRIMJ 501 and CRIMJ 503 are to be taken concurrently.
6. Students who believe they have completed a course substantially similar to one of the specific course requirements may apply to have their previous work evaluated for the purposes of exemption to that requirement. If approved, another course will be taken in place of that requirement.
7. A maximum of 6 credits of completed graduate work may be transferred in from another accredited institution.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [CRIMINAL JUSTICE \(CRIMJ\) course list](#)

Last Revised by the Department: Spring Semester 2009

Blue Sheet Item #: 37-03-043

Review Date: 11/18/08

Faculty updated: 11/27/12

## College Student Affairs (CSA)

David Baker, Director of Graduate Studies  
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[psu-csa@psu.edu](mailto:psu-csa@psu.edu)

### Degree Conferred:

M.Ed.

### The Graduate Faculty

- Robert Hendrickson, Ed.D. (Indiana) Professor of Education
- Margaret A. Lorah, D.Ed. (Penn State) Affiliate Assistant Professor of Counselor Education
- Eric White, Ed.D. (Pennsylvania) Affiliate Assistant Professor of Education

The College Student Affairs program provides graduate instruction for students preparing to enter the student affairs profession on college and university campuses. Course work includes foundational studies as well as professional studies in the areas of student development theory; student characteristics and effects of college on students, individual and group interventions, organization and administration; and assessment, evaluation, and research. Both emphasis areas provide intentional opportunities for students to enhance their professional skills through internships in student affairs administrative and/or college counseling offices on and off campus.

### Admission Requirements

Graduate Record Examinations (GRE) combined verbal and quantitative scores or Miller Analogies Test (MAT) score are required, as are TOEFL scores, if applicable. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the Graduate Bulletin.

An applicant must have received, from a regionally accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. The individual's junior-senior grade-point average must be at least 3.0 on a 4.0 system. The individual's overall grade-point average must be at least 2.75 on a 4.0 system. Individuals who do not meet this requirement may request special consideration by submitting a letter indicating why they feel they deserve consideration.

If an individual has completed graduate course work prior to application, his or her grade-point average for this course work must be a 3.0 on a 4.0 system.

Two recommendation letters and a personal statement are also required as part of the application process. Please see [www.ed.psu.edu/educ/csa](http://www.ed.psu.edu/educ/csa) to apply for specific program application guidelines.

### Degree Requirements

The College Student Affairs degree requires 42 credits, including two 150-hour internships and the completion of a capstone project.

## Joint Degree Program between The Pennsylvania State University Dickinson School of Law (J.D.) and the College Student Affairs Program (M.Ed.)

**Joint Degree Program:** The Dickinson School of Law (DSL) and the College Student Affairs Program (CSA) are offering a joint degree program leading to a Juris Doctor (J.D.), and Master of Education (M.Ed.), in College Student Affairs.

### Admission Requirements

The number of openings in the joint degree J.D./M.Ed. program will be limited to students with an outstanding academic record who have successfully completed two semesters at the Dickinson School of Law.

Applicants to the joint degree program:

1. must have been admitted to the Dickinson School of Law
2. should have successfully completed two semesters of course work at the Dickinson School of Law with a grade-point average of 3.0
3. must submit two letters of recommendation from the Dickinson School of Law faculty
4. must submit a career statement

Note: Students are eligible to start taking courses in the CSA program after successfully completing two semesters of law school work.

### College-Specific Admission Requirements

**DSL:** A bachelor's or equivalent degree from an accredited college is a prerequisite for admission; however, there is no standard prescribed undergraduate curriculum. An applicant should have acquired significant oral and written communication skills before entering law school. The following are required of applicants: a completed application form for DSL; submission of the results of the law school admission test (LSAT); completion of an LSDAS report; a one-page personal statement; employment records since high school; and two letters of recommendation.

**CSA:** The following are required of all applicants: a completed Graduate School application; submission of the results of the Graduate Record Examination (GRE), Miller Analogies Test (MAT), or LSAT; an official undergraduate transcript or transcripts; a personal statement; employment records since high school; and two letters of recommendation.

All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the Test of English as a Second Language (TOEFL) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test or a score of 213 on the computer-based test, or 80 points on the new Internet-based test with a minimum of 23 points on the new speaking portion; or the International English Language Testing System (IELTS) with a minimum composite score of 6.5 is required for admission.

An applicant must have received from a regionally accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. The individual's junior-senior grade-point-average (GPA) must be at least 3.0 on a 4.0 system. The individual's overall GPA must be at least 2.75 on a 4.0 system. Individuals who do not meet this requirement may request special consideration by submitting a letter indicating why they feel they deserve consideration.

If an individual has completed graduate course work prior to applying to the CSA program, his or her grade-point-average for this course work must be at least a 3.0 on a 4.0 system.

**Residency:** Students will normally spend four semesters in residence at DSL and as many additional semesters in residence as needed to complete the M.Ed. requirements for the CSA degree.

**Liaisons:** The department and faculty liaisons for DSL shall be the Associate Dean for Academic Affairs and the student advisor shall be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for CSA shall be the Professor-in-Charge (PIC) or such faculty member(s) as may be designated by the PIC.

**PRESCRIBED COURSES**

**DSL:** All students in the J.D. program are required to take the first-year curriculum in DSL. In the second or third year, students must take CORE 934 (Professional Responsibility).

*The fall curriculum for the first year consists of the following courses:*

**CORE COURSES (CORE)**

- 900. Civil Procedure (4)
- 910. Criminal Law (3)
- 912. Legal Analysis, Research & Writing I (3)
- 925. Torts (4)

*The spring curriculum of the first year consists of the following courses:*

**One 3-credit Elective****CORE COURSES (CORE)**

- 903. Constitutional Law I (3)
- 905. Contracts (4)
- 914. Legal Analysis, Research & Writing II (3)
- 920. Property (4)

**CSA:** All students in the CSA program must take the following courses:

**COLLEGE STUDENT AFFAIRS (CSA)**

- 501. Introduction to Student Affairs (3)
- 502. Organization and Administration in Student Affairs (3)
- 503. Student Development in College Environments (3)
- 504. Research and Assessment in Student Affairs (3)
- 505. Capstone Seminar (2)
- 506. Campus Environments
- 507. Social Justice
- 595. Internship (student must take two 3-credit internships) (1-9)
- 596. Culminating Experience, Learning Portfolio (1-9)

**COUNSELOR EDUCATION (CN ED)**

- 501. Counseling Theory and Methods (3)
- 506. Helping Skills for CSA Professions (3)

**HIGHER EDUCATION (HI ED)**

- 545. Higher Education in the U.S. (3)
- 556. Higher Education Students (3)

**Two 3-credit Electives****INTERPROGRAM TRANSFER OF CREDITS**

**DSL:** A maximum of twelve credits of CSA course work may be transferred for credit toward the J.D. degree at DSL. Students must obtain a grade satisfactory to DSL for the course work to be credited toward the J.D. degree. The following courses offered by CSA may qualify for credit in DSL: (1) CSA 501 (Introduction to College Student Affairs); (2) CSA 502 (Organization and Administration in College Affairs); (3) CSA 503 (Student Development in College Environments); and (4) CSA 504 (Research and Assessment in Student Affairs).

**CSA:** What courses may be credited will be determined by the student's degree program. Normally a maximum of nine credits of DSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the Professor-in-Charge.

**Sequence:** The sequence of courses will be determined by the students and their advisors.

**Recommended Program of Study and Advising:** All students in the program will have two advisors, one from DSL and one from CSA. Periodic interaction between the two advisors will be encouraged. A program of study will be developed for each student, taking into account the fact that some courses are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisors will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the CSA programs.

**Tuition:** Students will be charged the applicable DSL tuition to cover the J.D. program and the applicable graduate tuition to cover the CSA degree program. DSL tuition will be paid for the semesters in which the student is registered for DSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

**Financial Aid and Assistantships:** Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

**Fulfillment of Degree Requirements and Graduation:** All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the interprogram transfer of credits. With respect to CSA program requirements for a learning portfolio, work done while at DSL under the supervision of a DSL faculty member may be appropriate for incorporation into the learning portfolio with the approval of the CSA degree program committee (in such cases, the committee should consider whether the credits afforded such work will be subject to the twelve credit maximum for interprogram transfers). A DSL faculty member must be a member of the committee.

If for some reason the student cannot complete the requirements of the J.D. degree, the student will still be allowed to count DSL courses already taken toward the M.Ed. in CSA, even if he or she is no longer in the joint degree program.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COLLEGE STUDENT AFFAIRS \(CSA\) course list](#)

[COUNSELOR EDUCATION \(CN ED\) course list](#)

[HIGHER EDUCATION \(HI ED\) course list](#)

Blue Sheet Item #: 35-07-430

Review Date: 6/12/07

Faculty updated: 3/1/13

## Communication Sciences and Disorders (CSD)

### [Program Home Page](#)

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[cw2@psu.edu](mailto:cw2@psu.edu)

### Degrees Conferred:

Ph.D., M.S.  
Dual-Title Ph.D. in Communication Sciences and Disorders and Language Science

### The Graduate Faculty

- Gordon W. Blood, Ph.D. (Bowling Green) *Professor of Communication Sciences and Disorders*
- Ingrid M. Blood, Ph.D. (Bowling Green) *Professor of Communication Sciences and Disorders*
- Kathryn D. R. Drager, Ph.D. (Minnesota) *Associate Professor of Communication Sciences and Disorders*
- Janice C. Light, Ph.D. (Toronto) *Distinguished Professor of Communication Sciences and Disorders*
- Elina Mainela-Arnold, Ph.D. (Wisconsin) *Assistant Professor of Communication Sciences and Disorders*
- Carol Miller, Ph.D. (Pennsylvania) *Associate Professor of Communication Sciences and Disorders*
- Maya Misra, Ph.D. (Tufts) *Assistant Professor of Communication Sciences and Disorders*
- Robert A. Prosek, Ph.D. (Purdue) *Professor of Communication Sciences and Disorders*
- Krista Wilkinson, Ph.D. (Georgia State) *Professor of Communication Sciences and Disorders*

The goals of the program in Communication Sciences and Disorders are to train professionals to conduct research and be consumers of research in communication sciences and disorders and to prepare competent professionals to habilitate and rehabilitate individuals who have speech, language, and/or hearing problems. The program also serves to provide students in other curricula at Penn State with orientation toward and information about communication sciences and disorders.

Facilities for student training and research include in-house clinical therapy and diagnostic services, laboratories in speech science and audiology, and affiliated schools and clinics. The program enjoys academic, research, and clinical relationships with a number of related programs at Penn State and draws upon academic work from related areas as part of the graduate training in communication sciences and disorders. Preparation is given for school and professional certifications and licensure. The CSD academic program is accredited by the Council of Academic Affairs of the American Speech-Language-Hearing Association. Master's-level graduate study requires a full-time externship experience, ordinarily occurring during the final semester of study.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Approximately 35 credits are required for admission, distributed among speech pathology, audiology, speech science, education, and psychology, and including a course in statistics. Students entering without an undergraduate degree in CSD will be required to take additional make-up work.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Usually students earn a master's degree in communication sciences and disorders prior to being considered for doctoral study, although persons with master's degrees in other fields will be considered for a doctoral program.

### Master's Degree Requirements

The master's degrees require a minimum of 50 graduate credits beyond admission standards. Students usually earn 55 to 65 credits to complete a degree, over four semesters and a summer of study.

There is a non thesis option for the Master of Science degree, requiring a paper and additional course credits in lieu of a thesis. The master's program of study provides course work and practicum for advanced and/or professional-level licensure.

### Doctoral Degree Requirements

The Doctor of Philosophy degree normally requires a master's degree in communication sciences and disorders or a related field, plus a minimum of two years of advanced study, and presentation and oral defense of a research-based dissertation.

The communication and foreign language requirement is a minimum of 6 credits of statistics beyond the first course, plus 9 credits selected from among statistics, technical writing, computer science, research design, or a foreign language.

Two research exercises, one of which is used for doctoral candidacy evaluation early in the doctoral program, are required prior to the dissertation. Comprehensive written examinations in the areas of a student's interest and an optional minor field examination, plus an oral examination prior to dissertation, are required.

Details of a student's doctoral program are determined by the doctoral committee.

### Dual-Title Ph.D. Degree in Communication Sciences and Disorders and Language Science

Graduate students with research and educational interests in language science may apply to the Communication Sciences and Disorders and Language Science Degree Program. The goal of the dual-title degree in Communication Sciences and Disorders and Language Science is to enable graduate students from Communication Sciences and Disorders to acquire the knowledge and skills of their major area of specialization in Communication Sciences and Disorders, while at the same time gaining the perspective of the various disciplines contributing to the study of language science.

### Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Communication Sciences and Disorders graduate program and the Graduate School. Students considered for admission to the doctoral program have a Masters program GPA above 3.0/4.0, outstanding letters of recommendation, a written statement of scholarly interests and goals, and have completed the GRE. New graduate students in Communication Sciences and Disorders will receive information about the Language Science dual-title program, and may discuss their interest with one or more Language Science faculty in the Department of Communication Sciences and Disorders, in order to obtain a recommendation for admission to the Language Science program. Once accepted into the Communication Sciences and Disorders program, and with a recommendation from a Language Science program faculty member in that department, the student may apply to the dual-title Ph.D. program in Communication Sciences and Disorders and Language Science by submitting a letter describing the student's interest in the program. The student's letter will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science. The admission requirements of the Language Science dual-title Ph.D. program are that the student must meet the admission requirements of the Graduate School and the major department. The admission requirements of the doctoral program in Communication Sciences and Disorders listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

## Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Communication Sciences and Disorders program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Language Sciences program committee. Within this framework, final course selection is determined by the student and their Communication Sciences and Disorders program advisor.

The doctoral degree in Communication Sciences and Disorders and Language Sciences is awarded only to students who are admitted to the Communication Sciences and Disorders doctoral program and admitted to the dual-title degree in Language Science. The minimum requirements for the dual-title Ph.D. degree in Communication Sciences and Disorders and Language, in addition to the Communication Sciences and Disorders requirements are as follows:

Course Work: 21 credits of 500-level courses

6 credits:

LING 521 Proseminar in the Language Science of Bilingualism  
LING 522 Proseminar in Professional Issues in Language Science

3 credits Research Methods/Statistics in Language Science:  
LING 525 Experimental Research Methods in Psycholinguistics  
PSY 507 Analysis of Psychological Data I  
PSY 508 Analysis of Psychological Data II

3 credits in Theoretical Linguistics  
LING 500 Syntax II  
LING 504 Phonology II

3 credits in Cognitive Neuroscience or Psycholinguistics  
LING 520 Seminar in Psycholinguistics  
PSY 511 Seminar in Contemporary Psychology  
PSY 520 Seminar in Psycholinguistics

6 credits in Research Internships

These internships will provide experience in the conduct of research; at least one internship must be with a mentor other than the student's dissertation advisor. (Students will choose one course among the following CSD 596, GER 596, LING 596, PSY 596, SPAN 596).

Particular courses may satisfy both the Communication Sciences and Disorders requirements and those in the Language Science dual-title program. Final course selection is determined by the student in consultation with their doctoral advisor and committee. In most cases, the number of total credits earned by a dual-title student will be from 6-12 more than those normally earned by a student in Communication Sciences and Disorders. Some courses which meet Language Science requirements (e.g., theoretical linguistics, neuroscience, psycholinguistics) may also fulfill the Communication Sciences and Disorders requirements for a related area outside the department; however, dual-title students are not required to count any particular Language Science requirement as their outside area. Dual-title students who choose an outside content area not related to Language Science will require more time to complete their program.

Students are expected to participate in weekly Language Science Research meeting each semester in residence.

## Student Aid

Student Aid Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [COMMUNICATION SCIENCES AND DISORDERS \(CSD\) course list](#)

Last Revised by the Department: Spring Semester 2010

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## Computer Science and Engineering (CSE)

RAJ ACHARYA, *Head of the Department*  
111 Information Sciences and Technology Building  
814-865-9505

### Degrees Conferred:

Ph.D., M.S., M.Eng.

### The Graduate Faculty

- Raj Acharya, Ph.D. (Minnesota/Mayo School of Medicine) Professor of Computer Science and Engineering; Department Head
- Jesse Barlow, Ph.D. (Northwestern) Professor of Computer Science and Engineering
- Piotr Berman, Ph.D. (MIT) Associate Professor of Computer Science and Engineering
- Guoray Cai, Ph.D. (Pittsburgh) Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering
- Octavia I. Camps, Ph.D. (Washington) Adjunct Associate Professor of Electrical and Computer Engineering, Northeastern
- Guohong Cao, Ph.D. (Ohio) Professor of Computer Science and Engineering
- David Capel, Ph.D. Assistant Professor of Computer Science and Engineering
- Swarat Chaudhuri, Ph.D. (Pennsylvania) Assistant Professor of Computer Science and Engineering
- Kyusun Choi, Ph.D. (Penn State) Assistant Professor of Computer Science and Engineering
- Robert Collins, Ph.D. (Massachusetts) Associate Professor of Computer Science and Engineering
- Lee D. Coraor, Ph.D. (Iowa) Associate Professor of Computer Science and Engineering
- Chitaranjan R. Das, Ph.D. (Louisiana) Professor of Computer Science and Engineering
- Frederico Torres Fonseca, Ph.D. (Maine) Associate Professor of Information Sciences and Technology
- Dennis F. Dunn, Ph.D. (Penn State) Associate Professor and Director of Academic Affairs, Computer Science and Engineering
- Martin Fürer, Dr.Sc.Math. (ETH-Zürich) Professor of Computer Science and Engineering
- C. Lee Giles, Ph.D. (Arizona) David Reese Professor of Information Sciences and Technology; Professor of Computer Science and Engineering
- Sean Hallgren, Ph.D. Associate Professor of Computer Science and Engineering
- John Hannan, Ph.D. (Pennsylvania) Associate Professor of Computer Science and Engineering
- William E. Higgins, Ph.D. (Illinois) Professor of Electrical Engineering
- Mary Jane Irwin, Ph.D. (Illinois) Evan Pugh Professor, A. Robert Noll Chair of Engineering, Department of Computer Science and Engineering
- Trent Jaeger, Ph.D. (Michigan) Associate Professor of Computer Science and Engineering
- Mahmut Kandemir, Ph.D. (Syracuse) Associate Professor of Computer Science and Engineering
- George Kesidis, Ph.D. (California, Berkeley) Professor of Computer Science and Engineering; Electrical Engineering
- Daniel Kifer, Ph.D. Assistant Professor of Computer Science and Engineering
- Thomas F. La Porta, Ph.D. (Columbia) Professor of Computer Science and Engineering
- Dongwon Lee, Ph.D. (UCLA) Associate Professor of Information Sciences and Technology; Computer Science and Engineering
- Wang-Chien Lee, Ph.D. (Ohio) Associate Professor of Computer Science and Engineering
- Jia Li, Ph.D. (Stanford) Associate Professor of Statistics
- Peng Liu, Ph.D. (George Mason) Associate Professor of Information Sciences and Technology; Computer Science and Engineering
- Yanxi Liu, Ph.D. (Massachusetts) Associate Professor of Computer Science and Engineering; Electrical Engineering
- Patrick McDaniel, Ph.D. (Michigan) Associate Professor of Computer Science and Engineering
- Paul Medvedev, Ph.D. (Toronto) Assistant Professor of Computer Science and Engineering
- John J. Metzner, Eng.Sc.D. (New York) Professor of Computer Science and Engineering
- Webb Miller, Ph.D. (Washington) Professor of Biology; Computer Science and Engineering
- Prasenjit Mitra, Ph.D. (Stanford) Assistant Professor of Information Sciences and Technology; Computer Science and Engineering
- Vijaykrishnan Narayanan, Ph.D. (South Florida) Professor of Computer Science and Engineering
- Padma Raghavan, Ph.D. (Penn State) Professor of Computer Science and Engineering
- Sofya Raskhodnikova, Ph.D. (MIT) Associate Professor of Computer Science and Engineering
- Frank E. Ritter, Ph.D. (Carnegie Mellon) Associate Professor of Information Sciences and Technology; Psychology
- Suzanne Shontz, Ph.D. (Cornell) Assistant Professor of Computer Science and Engineering
- Rajeev Sharma, Ph.D. (Maryland) Associate Professor of Computer Science and Engineering
- Sunil Sinha, Ph.D. (Waterloo) Assistant Professor of Civil and Environmental Engineering
- Anand Sivasubramaniam, Ph.D. (Georgia Tech) Professor of Computer Science and Engineering
- Adam Smith, Ph.D. (MIT) Associate Professor of Computer Science and Engineering
- Soundar R. Tirupatikumara (Kumara), Ph.D. (Purdue) Allen E. Pearce/Allen M. Pearce Professor of Industrial and Manufacturing Engineering; Professor of Computer Science and Engineering, and Information Sciences and Technology
- Bhuvan Urganekar, Ph.D. (Massachusetts) Assistant Professor of Computer Science and Engineering
- James Z. Wang, Ph.D. (Stanford) Associate Professor of Information Sciences and Technology; Computer Science and Engineering
- Yuan Xie, Ph.D. (Princeton) Professor of Computer Science and Engineering
- John Yen, Ph.D. (California, Berkeley) University Professor of Information Sciences and Technology; Professor of Computer Science and Engineering, and Bioengineering
- Sencun Zhu, Ph.D. (George Mason) Associate Professor of Computer Science and Engineering, and Information Sciences and Technology

The department offers courses and is prepared to direct research in a variety of subfields of computer science and engineering, including VLSI, computer architecture, parallel/distributed processors and processing, multiprocessors, interconnection networks, pattern recognition and image processing, performance evaluation, reliability, fault tolerance, theory of computation, computer systems, numerical analysis and optimization, programming methodology, and analysis of algorithms. Research and instruction are supported by extensive computing facilities within the University's Information Technology Services and by the computer laboratories operated by the department.

For information about areas of specialization, laboratory and research facilities, fellowships assistantships, and other sources of financial assistance, please refer to our Web site: [www.cse.psu.edu](http://www.cse.psu.edu).

### Admission Requirements

All applicants must provide a one-page statement of purpose and scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, and analytical). A subject test in the GRE is not required, but the subject test in Computer Science is recommended. Those students seeking an assistantship in Computer Science and Engineering ARE REQUIRED to submit a Test of Spoken English (TSE) or the TOEFL iBT. A score of 26 on the speaking section of the TOEFL iBT is equivalent to passing the TSE. A lower score would require remedial English as a Second Language courses. For score reporting for TOEFL and TSE, our institution code is 2660 and our department code is 78.

English Proficiency--The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Specific graduate programs may require all international applicants to submit a TOEFL or IELTS score, regardless of their academic background and country of origin.

Information about the TOEFL can be obtained by writing to the Educational Testing Service, Box 6155, Princeton, NJ 08541-6155 or visiting its Web site at [www.toefl.org](http://www.toefl.org). Local administration at University Park campus of the TOEFL is handled by the IECF. Information about the IELTS can be obtained by

contacting IELTS International, 100 East Corson Street, Suite 200, Pasadena, CA 91103 or visiting its Web site at [www.ielts.org](http://www.ielts.org).

## Master's Degree Requirements

Candidates for the master's degree must satisfactorily complete the requirements of the Graduate School. In addition, all students are expected to have completed appropriate courses in computer architecture and machine organization, data structures and analysis of algorithms, programming languages, operating systems, and logical design/switching theory or theory of automata. Students who do not meet background requirements will be required to take the appropriate 400-level courses to prepare them for the 500-level courses. At most, 3 credits of background course work can be used to satisfy the degree requirements. Students admitted to the M.S. program will not be permitted to switch to the M. Eng. program at a later time, except under extenuating circumstances.

Master of Science students must take 15 credits of courses numbered CSE 500 through 589, including a minimum of 9 credits of breadth courses taken from the department's Graduate Handbook in Computer Science and Engineering. An additional 9 credits of 400-level courses and above (excluding independent studies courses and ENGR 588) are required (see Handbook). This must include at least 1, and at most 2, credits of CSE 590 (Colloquium). Students must complete and defend an M.S. thesis (6 credits of CSE 600). The total degree requirement is 30 credits.

Master of Engineering students must take 18 credits of 500-level courses with at least 15 of the credits being associated with courses that have CSE designations and numbered 500-589 (including a minimum of 9 credits of breadth courses referenced above and at least 3 credits of a depth course from the department list. Students must also take 12 additional credits of 400-level courses and above, excluding independent studies courses and ENGR 588 (See Handbook). This must include at least 1, and at most 2, credits of CSE 590 (colloquium). Students are required to complete and defend a 1-credit technical paper (CSE 594). The total degree requirement is 30 credits.

## Doctoral Degree Requirements

The doctoral degree requirements include the general requirements of the Graduate School as listed under Doctoral Degree Requirements. Furthermore, students applying for and gaining admittance to the Ph.D. program will not be permitted to switch to the master's program at a later date, except under extenuating circumstances. To qualify for a Ph.D. degree, each student must take 27 credits of courses with numbers CSE 500-589 or CSE 598, and 21 additional credits of 400-level and above courses. The 21 additional credits must include at least 3 credits of CSE 590 (colloquium), with a maximum of 3 credits of CSE 590 being counted toward the total of 48 minimum credits. A maximum of 3 credits of X96 may also be counted. A student must pass the Ph.D. candidacy examination by the third regular semester after entering the program (see Handbook). Students must pass the Ph.D. comprehensive examination after completion of most of the course work, and the English competency and communication requirements. A thesis must be completed under the direction of a Ph.D. committee and the results must be successfully defended in the thesis defense examination.

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COMPUTER SCIENCE AND ENGINEERING \(CSE\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/3/04

Faculty updated by Publications: 3/21/13

## Demography (DEMOG)

[Program Home Page](#)

GORDON F. De JONG, *In Charge*  
601 Oswald Tower  
814-865-0486  
[demography@pop.psu.edu](mailto:demography@pop.psu.edu)

### Degrees Conferred:

Students electing this option through participating programs will earn a degree with a dual title at both the Ph.D. and M.A. levels, i.e., Ph.D. in (graduate program name) and Demography, or M.A. or M.S. in (graduate program name) and Demography.

The following graduate programs offer dual degrees in Demography: M.A. and Ph.D. in Sociology and Demography; M.A. and Ph.D. in Economics and Demography; M.A. and Ph.D. in Anthropology and Demography; M.S. and Ph.D. in Rural Sociology and Demography; M.S. and Ph.D. in Human Development and Family Studies, and Demography; M.S. and Ph.D. in Agricultural, Environmental, and Regional Economics, and Demography; M.S. and Ph.D. in Health Policy and Administration.

### The Graduate Faculty

- David G. Abler, Ph.D. (Chicago) Professor of Agricultural, Environmental, and Regional Economics and Demography
- Duane F. Alwin, Ph.D. (Wisconsin) McCourtney Professor of Sociology, Demography, and Human Development and Family Studies
- Paul R. Amato, Ph.D. (James Cook University) Hoffman Professor of Sociology and Demography
- Alan Booth, Ph.D. (Nebraska) Distinguished Professor of Sociology, Human Development, and Demography
- Gordon F. De Jong, Ph.D. (Kentucky) Distinguished Professor of Sociology and Demography
- Francis Doodoo, Ph.D. (Pennsylvania) Liberal Arts Research Professor of Sociology and Demography
- David J. Eggebeen, Ph.D. (North Carolina) Associate Professor of Human Development
- Jill L. Findeis, Ph.D. (Washington State) Distinguished Professor of Agricultural, Environmental, and Regional Economics, and Demography
- Glenn Firebaugh Ph.D. (Indiana) Distinguished Professor of Sociology and Demography
- Michelle Frisco, Ph.D. (Texas, Austin) Assistant Professor of Sociology and Demography
- Stephan J. Goetz, Ph.D. (Michigan State) Professor of Agricultural and Regional Economics
- Deborah Roempke Graefe, Ph.D. (Penn state) Research Associate, Population Research Institute
- Emily Greenman, Ph.D. (Michigan) Assistant Professor of Sociology and Demography
- Melissa A. Hardy, Ph.D. (Indiana) Distinguished Professor of Human Development and Family Studies, Sociology, and Demography
- Marianne Hillemeier, Ph.D. (Michigan) Associate Professor of Health Policy Administration and Demography
- Kathryn Hynes, Ph.D. (Cornell) Assistant Professor of Human Development and Family Studies, and Demography
- John Iceland, Ph.D. (Brown) Professor of Sociology and Demography
- Rukmalie Jayakody, Ph.D. (Michigan) Associate Professor of Human Development and Family Studies, and Demography
- Leif I. Jensen, Ph.D. (Wisconsin) Professor of Rural Sociology and Demography
- David R. Johnson, Ph.D. (Vanderbilt) Professor of Sociology, Human Development and Family Studies, and Demography
- Patricia L. Johnson, Ph.D. (Michigan) Associate Professor of Anthropology, Demography, and Women's Studies
- Peter Kemper, Ph.D. (Yale) Professor of Health Policy and Administration, and Demography
- Valerie King, Ph.D. (Pennsylvania) Professor of Sociology, Demography, and Human Development and Family Studies
- Nancy S. Landale, Ph.D. (Washington) Professor of Sociology and Demography
- Mark A. Leach, Ph.D. (California, Irving) Assistant Professor of Rural Sociology and Demography
- Barrett A. Lee, Ph.D. (Washington) Professor of Sociology and Demography
- Molly Martin, Ph.D. (Wisconsin--Madison) Assistant Professor of Sociology and Demography
- Stephen A. Matthews, Ph.D. (Wales College of Cardiff) Associate Professor of Sociology, Anthropology, and Demography
- Diane K. McLaughlin, Ph.D. (Penn State) Professor of Rural Sociology and Demography
- Salvador R. Oropesa, Ph.D. (Washington) Professor of Sociology and Demography
- Suet-ling Pong, Ph.D. (Chicago) Professor of Education, Sociology, and Demography
- Warren C. Robinson, Ph.D. (Princeton) Professor Emeritus of Economics
- Robert Schoen, Ph.D. (California, Berkeley) Distinguished Senior Scholar of Sociology and Demography
- David Shapiro, Ph.D. (Princeton) Professor of Economics, Demography, and Women's Studies
- Pamela Farley Short, Ph.D. (Yale) Professor of Health Policy Administration
- Graham B. Spanier, Ph.D. (Northwestern) Professor of Human Development, Sociology, and Demography
- C. Shannon Stokes, Ph.D. (Kentucky) Professor Emeritus of Rural Sociology and Demography
- Kevin J. A. Thomas, Ph.D. (Penn State) Assistant Professor of African and African American Studies, Sociology, and Demography
- Jenny Trinitapoli, Ph.D. (Texas) Assistant Professor of Sociology and Demography
- Jennifer Van Hook, Ph.D. (Texas, Austin) Professor of Sociology and Demography
- James W. Wood, Ph.D. (Michigan) Professor of Anthropology and Demography
- Wilbur Zelinsky, Ph.D. (California, Berkeley) Professor Emeritus of Geography

The Demography dual-title degree program option is administered by the Demography Program Committee, which is responsible for management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the option, and recommends policies and procedures for its operation to the dean of the Graduate School. This dual-title degree program is offered as an option to graduate major programs in three colleges: Agricultural Sciences, Health and Human Development, and the Liberal Arts. The option enables students from diverse graduate programs to attain and be identified with the content, techniques, methodology, and policy implications of demography, while maintaining a close association with areas of application. Through demography, students study (1) the size, composition, and distribution of the population; (2) changes in these characteristics; (3) the processes that determine these changes--fertility, migration, and mortality; and (4) their social, economic, and cultural causes and consequences. To pursue a dual-title degree under this program option, the student must apply to the Graduate School and be admitted to one of the following graduate programs: Agricultural Economics, Health Policy and Administration, Anthropology, Economics, Human Development and Family Studies, Rural Sociology, or Sociology.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Primary admission requirements for the dual-degree M.A., M.S., or Ph.D. program are established by the participating graduate program and a positive recommendation by a Demography faculty member in that graduate program.

All application materials should be submitted by January 2. Applicants should have a junior/senior cumulative grade-point average of well above 3.00 (on a 4.00 scale) and appropriate courses in statistics and in the social science department to which they are applying. The application should include three letters of reference and a statement describing and explaining the applicant's interest in demography and goals during and after graduate study. TOEFL scores are required of all students for whom English is a second language.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the graduate program in which they are enrolled, including the communication/foreign language requirements, if any. In addition, they must satisfy the minimum requirements in the Demography option described here, as established by the Demography Program Committee. Within this framework, final course selection is determined by students and their degree committees. All dual-title degree candidates who are in residence must enroll in DEMOG 590 for 1 credit each year in residence.

*Master's Degree:* For the M.A. and M.S. degree with the Demography option, 12 course credits are required in addition to the colloquium credit or credits. A

minimum of 3 credits is required in each of the following areas: (1) disciplinary perspective courses; (2) demographic methods courses (SOC 573 is required of all candidates); (3) seminars in demographic processes; (4) seminars in population studies. See a complete course list on the [program home page](#).

Particular courses may satisfy both the graduate major program requirements and those of the Demography option. The thesis supervisor must be a member of the graduate faculty recommended by the chair or the graduate officer of the program granting the degree and a member of the Demography faculty.

*Ph.D. Degree:* For the Ph.D. degree with the Demography option, a minimum of 24 credits is required in addition to the colloquium credits. For students entering with a master's degree from another institution, equivalent course credits may be accepted. The following minimum number of credits is required in each curriculum category: 3 credits of disciplinary perspective courses; 6 credits of demographic methods courses; SOC 573 is required of all candidates; 6 credits of seminars in demographic processes; 3 credits of seminars in population studies; and 6 credits of electives. Final course selection is determined in consultation with the doctoral committee.

The doctoral committee is recommended by the graduate major program granting the degree. A four-member committee is required for a dual-title degree program. The chair and at least one additional member of the doctoral committee must be members of the graduate faculty in Demography. The Demography faculty members on the student's committee are responsible for administering an examination in demography that constitutes a portion of the comprehensive examination of the doctoral student in the program option. A dissertation on a demographic-related topic is required of students in the dual-title degree program.

### Other Relevant Information

A Ph.D. minor in Demography is available for doctoral students in graduate programs other than the dual-title participating programs who find it advantageous to include demographic content, methods, and policy analysis in their program of study. The student's doctoral committee must approve the choice of this minor, and one member of the doctoral committee must be from the Demography faculty.

To qualify for a minor in Demography, students must satisfy the requirements of their graduate major program and take at least 15 credits in demography in addition to colloquium credits. A minimum of at least 3 credits each in (1) disciplinary perspective, (2) demographic methods courses (SOC 573 is required of all candidates), (3) seminars in demographic processes, and (4) seminars in population studies is required. Students must enroll in DEMOG 590 for 1 credit during each year enrolled in the program and in residence.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically has been available to graduate students in this program:

**Affiliated departments and The Population Research Institute Assistantships, and the NICHD Traineeship awards**

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[DEMOGRAPHY \(DEMOG\) course list](#)

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/24/04

Faculty last updated: 2/10/12

## Electrical Engineering (E E)

[Program Home Page](#)

KULTEGIN AYDIN, *Head*  
129 Electrical Engineering East  
814-863-2788  
[grad\\_info\\_ee@enqr.psu.edu](mailto:grad_info_ee@enqr.psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Osama O. Awadelkarim, Ph.D. (Reading, England) Professor of Engineering Science and Mechanics
- KulteGIN Aydin, Ph.D. (METU, Ankara) Professor of Electrical Engineering
- Sven G. Bilén, Ph.D. (U Michigan) Associate Professor of Electrical Engineering
- James K. Breakall, Ph.D. (Case Western Reserve) Professor of Electrical Engineering
- Lee D. Coraor, Ph.D. (U Iowa) Associate Professor of Electrical Engineering, and Computer Science and Engineering
- Chitaranjan Das, Ph.D. (U Louisiana) Distinguished Professor of Computer Science and Electrical Engineering
- Suman Datta, Ph.D. (Cincinnati) Professor of Electrical Engineering
- John F. Doherty, Ph.D. (Rutgers) Professor of Electrical Engineering
- Noel C. Giebink, Ph.D. (Princeton) Assistant Professor of Electrical Engineering
- Ruyan Guo, Ph.D. (Penn State) Adjunct Professor of Electrical Engineering and Materials
- David L. Hall, Ph.D. (Penn State) Dean, College of Information Sciences and Technology; Professor of Information Sciences and Technology, and Electrical Engineering
- William E. Higgins, Ph.D. (U Illinois) Distinguished Professor of Electrical Engineering
- Mary Jane Irwin, Ph.D. (Illinois) A. Robert Noll Professor of Computer Science and Engineering, and Electrical Engineering
- Thomas N. Jackson, Ph.D. (U Michigan) Robert E. Kirby Chair; Professor of Electrical Engineering
- W. Kenneth Jenkins, Ph.D. (Purdue) Professor of Electrical Engineering
- Timothy J. Kane, Ph.D. (Illinois) Professor of Electrical Engineering
- Mohsen Kavehrad, Ph.D. (Polytechnic U) William L. Weiss Chair; Professor of Electrical Engineering
- George Kesidis, Ph.D. (California, Berkeley) Professor of Electrical Engineering, and Computer Science and Engineering
- Iam-Choon Khoo, Ph.D. (Rochester) William E. Leonhard Professor of Electrical Engineering
- Constantino M. Lagoa, Ph.D. (Wisconsin, Madison) Professor of Electrical Engineering
- Thomas F. LaPorta, Ph.D. (Columbia) William E. Leonhard Professor of Computer Science and Engineering
- Ji-Woong Lee, Ph.D. (U Michigan) Assistant Professor of Electrical Engineering
- Kwang Y. Lee, Ph.D. (Michigan State) Adjunct Professor of Electrical Engineering
- Yanxi Liu, Ph.D. (Massachusetts, Amherst) Associate Professor of Electrical Engineering, and Computer Science and Engineering
- Zhiwen Liu, Ph.D. (Caltech) Associate Professor of Electrical Engineering
- John D. Mathews, Ph.D. (Case Western Reserve) Professor of Electrical Engineering
- Jeffrey S. Mayer, Ph.D. (Purdue) Associate Professor of Electrical Engineering
- Theresa S. Mayer, Ph.D. (Purdue) Distinguished Professor of Electrical Engineering
- David D. Meisel, Ph.D. (SUNY Geneseo) Adjunct Professor of Electrical Engineering
- John J. Metzner, Eng.Sc.D. (New York) Professor of Computer Science and Engineering, and Electrical Engineering
- David J. Miller, Ph.D. (California, Santa Barbara) Professor of Electrical Engineering
- John D. Mitchell, Ph.D. (Penn State) Professor of Electrical Engineering
- Raj Mittra, Ph.D. (U Toronto) Professor of Electrical Engineering
- Suzanne Mohney, Ph.D. (Wisconsin, Madison) Professor of Materials and Science Engineering, and Electrical Engineering
- Vishal Monga, Ph.D. (U Texas, Austin) Monkowski Assistant Professor of Electrical Engineering
- Ram Narayanan, Ph.D. (Massachusetts, Amherst) Professor of Electrical Engineering
- Vijay Krishnan Narayanan, Ph.D. (South Florida, Tampa) Professor of Computer Science and Engineering, and Electrical Engineering
- Robert Nickel, Ph.D. (U Michigan) Adjunct Professor of Electrical Engineering
- Victor P. Pasko, Ph.D. (Stanford) Professor of Electrical Engineering
- Michael Piovoso, Ph.D. (Delaware) P.E. Associate Professor of Electrical Engineering (Penn State Great Valley)
- Asok Ray, Ph.D. (Northeastern) Distinguished Professor of Mechanical Engineering
- Joan M. Redwing, Ph.D. (Wisconsin, Madison) Professor of Materials Science and Engineering, and Electrical Engineering
- David W. Russell, Ph.D. (CNA, London) Professor of Electrical Engineering (Penn State Great Valley)
- Jerzy Ruzyllo, Ph.D. (Warsaw UT) Distinguished Professor of Electrical Engineering
- Jeffrey L. Schiano, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Electrical Engineering
- Srinivas Tadigadapa, Ph.D. (Cambridge) Professor of Electrical Engineering
- Richard L. Tutwiler, Ph.D. (Penn State) Senior Research Associate
- Kenji Uchino, Ph.D. (Tokyo IT) Professor of Electrical Engineering
- Julio V. Urbina, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Electrical Engineering
- Douglas H. Werner, Ph.D. (Penn State) John L. and Genevieve H. McCain Chair Professor of Electrical Engineering
- Pingjuan L. Werner, Ph.D. (Penn State) Associate Professor of Electrical Engineering
- Aylin Yener, Ph.D. (Rutgers) Professor of Electrical Engineering
- Shizhuo (Stuart) Yin, Ph.D. (Penn State) Professor of Electrical Engineering
- Randy Young, Ph.D. (Penn State) Senior Research Associate
- Qiming Zhang, Ph.D. (Penn State) Distinguished Professor of Electrical Engineering

The general areas of graduate research in Electrical Engineering are electromagnetics and optics; electronics and photonics; communications, computers, networking, and signal processing; and control and power systems. Specializations available within these areas include microwaves, antennas, and propagation; electro-optics and nonlinear optics; remote sensing and space systems; materials and devices; circuits and networks; VLSI; communications; networking; signal and image processing; computer vision and pattern recognition; control systems; and power systems.

For information about areas of specialization, laboratory and research facilities, fellowships, assistantships, and other sources of financial assistance, write directly to the Graduate Program Coordinator, Department of Electrical Engineering, 121 Electrical Engineering East, University Park, PA 16802-2705, or review the Web pages at [www.ee.psu.edu](http://www.ee.psu.edu).

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Applicants are required to submit scores from the general portions of the Graduate Record Examinations, three letters of reference, and a personal statement of relevant experience and goals, a resume, undergraduate transcripts, and a supplemental application.

### Master of Science Degree Requirements

The Master of Science requirements include the general requirements of the Graduate School as listed under Master's Degree Requirements in the *Graduate Bulletin*.

Specific course requirements: (1) Thesis option--24 course credits, including a broad selection of 500-level courses, 2 colloquium credits, 6 thesis credits, and a satisfactory thesis; (2) Paper option--30 course credits, including a broad selection of 500-level courses, 2 colloquium credits, 2 paper credits, and a satisfactory paper.

## Doctoral Degree Requirements

The Doctor of Philosophy requirements include the general requirements of the Graduate School as listed under Doctoral Degree Requirements in the *Graduate Bulletin*.

Specific requirements: The communication requirement is met by adequacy in both spoken and written English. The candidacy examination consists of both written and oral parts; the oral comprehensive examination is preceded by the writing of a thesis proposal. The program requires a minimum of 39 course credits and 2 colloquium credits beyond the B.S. degree.

## Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

PAUL F. ANDERSON GRADUATE FELLOWSHIP  
MELVIN P. BLOOM MEMORIAL GRADUATE FELLOWSHIP  
LUTHER B. AND PATRICIA A. BROWN GRADUATE FELLOWSHIP  
JOSEPH R. AND JANICE M. MONKOWSKI GRADUATE FELLOWSHIP  
JAMES R. AND BARBARA R. PALMER FELLOWSHIP  
PONTANO FAMILY SCHOLARSHIP IN ELECTRICAL ENGINEERING  
SOCIETY OF PENN STATE ELECTRICAL ENGINEERS (SPSEE) GRADUATE FELLOWSHIP  
FRED C. AND M. JOAN THOMPSON GRADUATE FELLOWSHIP  
BESS L. AND MYLAN R. WATKINS GRADUATE FELLOWSHIP

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [ELECTRICAL ENGINEERING \(E E\) course list](#)

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-06-136

Review Date: 04/13/2010

Faculty updated: 6/7/13

## Electrical Engineering

### [Home Page](#)

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 717-948-6109  
[meee@psu.edu](mailto:meee@psu.edu)

### Degrees Conferred:

M.Eng., M.S.

### The Graduate Faculty

- Sedig S. Agili, Ph.D. (Marquette) *Associate Professor of Electrical Engineering*
- Omid Ansary, Ph.D. (Akron) *Interim Senior Associate Dean for Academic Affairs; Professor of Engineering*
- Kerwin Foster, Ph.D. (Florida State); Ph.D. (UNC) *Assistant Professor of Physics*
- Robert Gray, Ph.D. (Ohio) *Associate Professor of Electrical Engineering*
- Peter Idowu, Ph.D. (Toledo) *Associate Professor of Electrical Engineering*
- Hossein Jula, Ph.D. (Southern California) *Associate Professor of Electrical Engineering*
- Aldo W. Morales, Ph.D. (SUNY) *Professor of Electrical Engineering*
- Jerry F. Shoup, Ph.D. (Penn State) *Interim Director, School of Science, Engineering, and Technology; Associate Professor of Engineering*
- Mohammad-Reza Tofghi, Ph.D. (Drexel) *Associate Professor of Electrical Engineering*
- Seth Wolpert, Ph.D. (Rutgers) *Associate Professor of Electrical and Computer Engineering*

### M.Eng. (E E)

#### Admission Requirements

A prospective graduate student in Electrical Engineering at Penn State Harrisburg must fulfill the admission requirements as set forth by the Graduate School, and have a bachelor of science degree in electrical engineering or its equivalent from an institution that is accredited by the Accreditation Board of Engineering and Technology (ABET). An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale is required for admission. Exceptions to this will be based on professional experience and other factors such as GRE scores. In addition, a student who does not meet the overall 3.0 grade-point average may be considered for admission if the student has a 3.0 junior/senior grade-point average. Up to 15 credits earned in three semesters or fewer, as a special nondegree student, may be applied toward the master's degree. Those applying for admission as a master of engineering candidate without an electrical engineering degree may be admitted with the stipulation that deficiencies in background, if any, will be remedied early in the program and that these courses will be in addition to the required number of credits for the degree.

Applicants should submit the following:

- a graduate **online** application with the application fee;
- official copies of undergraduate transcripts;
- test scores from the Graduate Record Examinations (GRE) (preferable, but not required);
- three (3) letters of reference, especially those from faculty who can evaluate academic potential;
- a personal statement of technical interest, goals, and experience.

**Test scores from the Graduate Record Examination (GRE) are required ONLY for those applicants indicating interest in an assistantship.**

#### Degree Requirements

A total of 33 credits is required for a Master of Engineering degree, of which at least 24 must be taken through Penn State Harrisburg engineering graduate programs. Up to 9 credits of graduate work may be transferred from other institutions provided (a) credits are suitable for the particular engineering discipline, and (b) students have earned a grade of B or better. At least 18 credits must be at the 500 level, which includes 3 credits of ENGR 594.

Generally, students enrolled in the program for the Master of Engineering degree in Electrical Engineering must earn 12 credits in the required core courses (i.e., courses with the E E prefix).

**Master of Engineering Paper:** A candidate for the master of engineering degree in Electrical Engineering must write a scholarly report or engineering paper and defend it before three faculty members. The paper is intended to be a relatively short document compared with a thesis. A published paper may be used to meet this requirement. The paper should be written according to the standards set for an IEEE publication.

The engineering paper may be initiated by taking the 1-credit ENGR 594 course. This should be done approximately halfway through the program. Once the proposal is approved and the work well under way, the student should register for ENGR 594 with his/her paper adviser. Work will proceed as planned under the direction of the paper adviser, though changes may be made with the consent of the master's paper committee.

Up to 9 credits of graduate work may be transferred from other institutions provided (a) credits are suitable for the particular engineering discipline, and (b) students have earned a grade of B or better.

Students must have a 3.00 grade-point average in both prescribed and supporting courses approved by the program to graduate. Students pursue the program on a part-time basis. A student can complete the program within two years, based on completion of two courses a semester.

### M.S. (E ENG)

#### Admission Requirements

Admission into the Master of Science (M.S.) Electrical Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies.

Applicants should have undergraduate degrees in engineering or technology-related fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate School. An applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants should submit the following:

- a completed Graduate School online application with the application fee;
- official copies of undergraduate transcripts;
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential;
- a personal statement of technical interest, goals, and experience;
- test scores from the Graduate Record Examination (GRE); and
- statement of interest in graduate assistantship, if desired.

## Degree Requirements

All graduate students in Electrical Engineering are required to adhere to the requirements of the Graduate School, as found in the Graduate Degree Programs Bulletin. The requirements of the Graduate School, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the MS in Electrical Engineering degree. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements are satisfied.

The MSEE program at Penn State Harrisburg is structured into two areas of concentration to fully take advantage of the specialty areas represented in the E E graduate faculty. The areas are Electronics- Electromagnetics-Optics (EEO) and Systems. The program requires 31- credits, including 24 course credits with at least 15 credits at the 500 level, one colloquium credit, and 6 thesis credits (600-level). All students are required to take a 500-level analysis course (EMCH 524A) in addition to prescribed courses in one of the two concentration areas. The prescribed courses are intended to establish the fundamentals of the technical areas. To incorporate some breadth into the program, students are required to take at least one course in the second concentration area. A maximum of three 400-level courses (9 credits) may be taken for the MSEE degree

Original research, usually requiring at least two semesters of work (nominal 6 credits), is expected for a thesis. The work should be an in-depth investigation intended to extend the state of knowledge in some specialty area.

The E E program has established a six-year time limit for completion of the M.S. degree. Any extension beyond six years requires the approval of the E E program Graduate Faculty.

The student must maintain a minimum grade point average (GPA) of 3.00 or better on a 4.00 scale in 500- and 400-level courses listed on his/her Plan of Study.

Penn State Harrisburg's MSEE program is distinct and independent of the MSEE program offered at the University Park campus.

**English Proficiency**— The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Completed International Application material must be submitted by the following deadlines: May 31 for the fall semester; September 30 for the spring semester; February 28 for the summer session. Applications received after these deadlines will be processed for the following semester.

PLEASE NOTE: Each graduate program reserves the right to set earlier deadlines than those noted above.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

For course information specific to the Electrical Engineering M.S. and M.Eng. programs at Penn State Harrisburg, refer to the [program home page](#).

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-05-149

Review Date: 02/23/2010

Faculty updated: 4/2/12



## **Business Administration, Executive Master of (exMBA)**

The Executive MBA program is a cohort program with a class of approximately forty students moving in lockstep through the program. Classes are taught primarily on the weekends in the Philadelphia area, complemented with several residence weeks on the University Park campus. The time required to complete the program is twenty-two months.

### **Admission Requirements**

Please refer to the requirements listed in the *Admission Requirements* section of the full-time MBA program at University Park. Applicants to the Executive MBA program should have considerable work experience, typically ten years or more.

### **Master's Degree Requirements**

Please refer to the requirements listed in the *Master's Degree Requirements* section of the full-time MBA program at University Park.

## Engineering Management (E M)

### [Home Page](#)

SEDIG S. AGILI, *Program Coordinator*  
 Penn State Harrisburg  
 School of Science, Engineering, and Technology  
 777 W. Harrisburg Pike  
 W211 Olmsted Building  
 Middletown, PA 17057-4898  
 717-948-6109  
[www.hbg.psu.edu](http://www.hbg.psu.edu)

### Degree Conferred:

M.P.S.

### The Graduate Faculty

#### School of Science, Engineering, and Technology

Ma'moun Abu-Ayyad, Ph.D. (New Brunswick) Assistant Professor of Mechanical Engineering  
 Issam Abu-Mahfouz, Ph.D. (Case Western Reserve) Associate Professor of Engineering  
 Sedig S. Agili, Ph.D. (Marquette) Associate Professor of Electrical Engineering  
 Jennifer A. Albert, Ph.D. (West Virginia) Assistant Professor of Civil Engineering  
 Omid Ansary, Ph.D. (Akron) Interim Senior Associate Dean for Academic Affairs; Professor of Engineering  
 Ganesh P. Bal, Ph.D. (Virginia Tech) Assistant Professor of Engineering  
 Amit Banerjee, Ph.D. (New Jersey Institute of Technology) Assistant Professor of Mechanical Engineering  
 Joseph J. Cecere, Ph.D. (North Texas State) Associate Professor of Engineering  
 Yen-Chih Chen, Ph.D. (Purdue) Assistant Professor of Environmental Engineering  
 Y. Frank Chen, Ph.D. (Minnesota) Professor of Engineering  
 Richard Ciocci, Ph.D. (Maryland) Associate Professor of Mechanical Engineering  
 Shirley E. Clark, Ph.D. (Alabama) Associate Professor of Environmental Engineering  
 Ram P. Goel, Ph.D. (Michigan State) Assistant Professor of Mechanical Engineering  
 Robert Gray, Ph.D. (Ohio) Associate Professor of Electrical Engineering  
 Peter Idowu, Ph.D. (Toledo) Associate Professor of Engineering  
 Harris Imadojemu, Ph.D. (North Carolina State) Associate Professor of Engineering  
 Hossein Jula, Ph.D. (Southern California) Associate Professor of Electrical Engineering  
 Sai Kakuturu, Ph.D. (Kansas State) Assistant Professor of Civil Engineering  
 Jubum Kim, Ph.D. (Washington) Assistant Professor of Civil Engineering  
 Seroj Mackertich, Ph.D. (Penn State) Associate Professor of Engineering  
 Shashi Marikunte, Ph.D. (Michigan State) Assistant Professor of Civil Engineering  
 Aldo Morales, Ph.D. (SUNY) Professor of Electrical Engineering  
 Gautam Ray, Ph.D. (Penn State) Professor of Engineering  
 Jerry F. Shoup, Ph.D. (Penn State) Interim Director, School of Science, Engineering, and Technology; Associate Professor of Electrical Engineering  
 Mohammad Tofighi, Ph.D. (Drexel) Associate Professor of Electrical Engineering  
 Sofia Vidalis, Ph.D. (Florida) Assistant Professor of Civil Engineering  
 Seth Wolpert, Ph.D. (Rutgers) Associate Professor of Engineering  
 Yuefeng Xie, Ph.D. (Tshinghua) Professor of Environmental Engineering

#### School of Business Administration

Thomas Amlie, Ph.D. (Maryland) Assistant Professor of Accounting  
 Nihal Bayraktar, Ph.D. (Maryland) Associate Professor of Economics  
 Melvin Blumberg, Ph.D. (Penn State) Professor of Management  
 Terence A. Brown, D.B.A. (Maryland) Associate Professor of Transportation and Marketing  
 Qiang Bu, Ph.D. (Massachusetts) Assistant Professor of Finance  
 Thomas Buttross, Ph.D. (Mississippi) Associate Professor of Professional Accountancy  
 Refik Culpun, Ph.D. (NYU) Professor of Management and International Business  
 Patrick Cusatis, Ph.D. (Penn State) Associate Professor of Finance  
 Raymond Gibney, Ph.D. (Pittsburgh) Assistant Professor of Management  
 Jean E. Harris, Ph.D. (Virginia Tech) Associate Professor of Accounting  
 Rhoda Joseph, Ph.D. (Baruch) Assistant Professor of Information Systems  
 Erdener Kaynak, Ph.D. (Cranfield, Bedford, England) Professor of Marketing  
 Mukund S. Kulkarni, Ph.D. (Kentucky) Chancellor, Penn State Harrisburg; Professor of Finance  
 Roderick Lee, Ph.D. (Penn State) Assistant Professor of Information Systems  
 David A. Morand, Ph.D. (Cornell) Professor of Management  
 Dinesh R. Pai, Ph.D. (Rutgers) Associate Professor of Supply Chain Management  
 Parag C. Pendharkar, D.B.A. (Southern Illinois) Professor of Information Systems  
 Robert D. Russell, Ph.D. (Pittsburgh) Assistant Professor of Management  
 Stephen P. Schappe, Ph.D. (Ohio State) Director, School of Business Administration; Associate Professor of Management  
 Girish Subramanian, Ph.D. (Temple) Professor of Information Systems  
 Peter Swan, Ph.D. (Michigan) Assistant Professor of Logistics and Operations Management  
 Oranee Tawatnuntachai, Ph.D. (New Orleans) Associate Professor of Finance  
 Premal P. Vora, Ph.D. (Penn State) Associate Professor of Finance  
 Gayle J. Yaverbaum, Ph.D. (Temple) Professor Emerita of Information Systems  
 Ji Wu, Ph.D. (Drexel) Assistant Professor of Economics  
 Richard Young, Ph.D. (Penn State) Professor of Supply Chain Management  
 Ugur Yucelt, Ph.D. (New School) Associate Professor of Marketing

The Master of Professional Studies (M.P.S.) Engineering Management degree program is a graduate professional degree program that integrates engineering with business and management principles. The program provides engineers with business and management perspectives and enhances their capabilities in the management of major projects, business initiatives, policies, and other activities in both the public and private sectors. Furthermore, it highlights the importance of technology strategy and intellectual properties management, and offers an environment for personal and professional networking that could hold significant future dividend.

The program is offered at Penn State Harrisburg as a partnership between the School of Science, Engineering, and Technology and the School of Business Administration, which is accredited at the undergraduate and graduate levels by AACSB International---the Association to Advance Collegiate Schools of Business International.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Admission into the Master of Professional Studies program will be granted only to candidates who demonstrate high potential for success in graduate studies.

Applicants should have undergraduate degrees in engineering or technology from an accredited university and are expected to have completed undergraduate course work in calculus and economics.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the Graduate Management Admission Test (GMAT) are required for admission. Students demonstrating high potential but failing to meet the minimum GMAT score requirements may be considered on the basis of professional accomplishments and other criteria that may predict success in the program.

Applicants should submit the following:

- a graduate online application with the application fee
- official copies of undergraduate transcripts
- three (3) letters of reference, especially from faculty who can evaluate academic potential
- a personal statement of technical interest, goals, and experience
- test scores from the Graduate Management Admission Test (GMAT)
- test scores from the Graduate Record Examination (GRE) are required for those indicating interest in an assistantship

**English Proficiency**—The language of instruction at Penn State is English. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. Departments and programs may have more stringent requirements and may require all international applicants to submit a TOEFL or IELTS score regardless of their academic background. A TOEFL score of at least 550 (paper-based test), 213 (computer-based test) or a total score of 80 on the Internet-based test (iBT), with a minimum of 19 points on the speaking section, is required for admission. Graduate programs may require a higher score. The International English Language Testing System (IELTS) module provides an exam to test four mandatory skill areas: listening, reading, writing and speaking. All four modules are equally weighted in the evaluation process. The International English Language Testing System has been approved by the Graduate Council as an alternative exam to the TOEFL for international students applying to Penn State. A minimum composite score of 6.5 on the IELTS test is required for admission.

## Degree Requirements

All graduate students in Engineering Management are required to adhere to the requirements of the Graduate School, as listed in the Graduate Degree Programs Bulletin. The requirements of the Graduate School, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduates students pursuing the M.P.S. degree in Engineering Management. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements listed are satisfied.

The M.P.S. in Engineering Management is a 34-credit graduate program that integrates engineering with business and management principles. The multidisciplinary, broadly based M.P.S. program provides engineers with business and management perspectives to enhance capabilities in management of large projects.

All M.P.S. students are required to take eight core courses (21 credits) focusing on economic analysis, communication and teamwork, management processes, corporate finance, energy and the environment, and engineering analysis.

The curriculum requires the completion of two free electives (6 credits) in any of the engineering disciplines, and a culminating experience through a three-course sequence (7 credits) on strategic management of new ventures and innovations. Of the 34 credits required for the degree, 31 must be earned in 500-level graduate courses.

## Courses

Please refer to the [graduate program home page](#) for a complete list of available courses.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Faculty updated: 4/2/12

## Environmental Pollution Control (E P C)

[Program Home Page](#)

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TL177 Science and Technology Building  
Penn State Harrisburg  
717-948-6358

### Degrees Conferred:

M.S., M.E.P.C. (Penn State Harrisburg, Penn State University Park)

### The Graduate Faculty--Penn State Harrisburg

- Katherine H. Baker, Ph.D. (Delaware) *Associate Professor of Environmental Microbiology*
- Melvin Blumberg, Ph.D. (Penn State) *Professor of Management*
- Yen-Chih (David) Chen, Ph.D. (Purdue) *Assistant Professor of Environmental Engineering*
- Balwant Chohan, Ph.D. (Massachusetts) *Assistant Professor of Chemistry*
- Beverly A. Cigler, Ph.D. (Penn State) *Professor of Public Administration and Public Policy*
- Shirley Clark, Ph.D. (Alabama, Birmingham) *Associate Professor of Environmental Engineering*
- Thomas H. Eberlein, Ph.D. (Wisconsin) *Associate Professor of Chemistry*
- Robert F. Munzenrider, Ph.D. (Georgia) *Associate Professor of Public Administration*
- Sairam Rudrabhatla (Osmania, India) *Assistant Professor of Biology*
- Howard G. Sachs, Ph.D. (Clark) *Professor of Biology*
- Clifford H. Wagner, Ph.D. (SUNY Albany) *Associate Professor of Computer Science and Mathematical Sciences*
- Yuefeng Xie, Ph.D. (Tsinghua) *Professor of Environmental Engineering*

### The Graduate Faculty--Penn State University Park

- David G. Abler, Ph.D. (Chicago) *Professor of Agricultural Economics and Demography*
- Michael A. Adewumi, Ph.D. (Illinois Institute of Tech) *Professor of Petroleum and Natural Gas Engineering*
- Christopher J. Bise, Ph.D. (Penn State) *Centennial Professor of Mining Engineering*
- Andre L. Boehman, Ph.D. (Stanford) *Associate Professor of Fuel Science*
- William H. Brune, Ph.D. (Johns Hopkins) *Professor of Meteorology*
- Fred S. Cannon, Ph.D. (Illinois, Urbana-Champaign) *Associate Professor of Civil and Environmental Engineering*
- Hunter Carrick, Ph.D. (Michigan) *Assistant Professor of Aquatic Ecology*
- Rick L. Day, Ph.D. (Penn State) *Assistant Professor of Soil Science and Environmental Information Systems*
- Jerzy Dec, Ph.D. (Inst of Organic Industry, Poland) *Research Associate in Soil Biochemistry*
- Brian A. Dempsey, Ph.D. (North Carolina) *Professor of Environmental Engineering*
- David R. DeWalle, Ph.D. (Colorado State) *Professor of Forest Hydrology*
- Herschel A. Elliott, Ph.D. (Delaware) *P.E. Professor of Agricultural Engineering*
- Derek Elsworth, Ph.D. (California, Berkeley) *Professor of Geo-Environmental Engineering*
- Ann N. Fisher, Ph.D. (Connecticut) *Professor of Agricultural and Environmental Economics*
- Richard L. Gordon, Ph.D. (MIT) *Professor of Mineral Economics*
- William A. Groves, Ph.D. (Michigan) *Assistant Professor of Industrial Health and Safety*
- Michael W. Grutzeck, Ph.D. (Penn State) *Senior Research Associate and Associate Professor of Materials*
- James M. Hamlett, Ph.D. (Iowa State) *Associate Professor of Agricultural Engineering*
- Albert R. Jarrett, Ph.D. (Penn State) *P.E. Professor of Agricultural Engineering*
- Dennis Lamb, Ph.D. (Washington) *Professor of Meteorology*
- Hangsheng Lin, Ph.D. (Texas A&M) *Assistant Professor of Hydropedology/Soil Hydrology*
- James A. Lynch, Ph.D. (Penn State) *Professor of Forest Hydrology*
- Jack V. Matson, Ph.D. (Rice) *P.E. Professor of Civil Engineering*
- Arthur C. Miller, Ph.D. (Colorado State) *P.E., P.L.S. Professor of Civil Engineering*
- Dennis J. Murphy, Ph.D. (Penn State) *C.S.P. Professor of Agricultural Engineering*
- Richard R. Parizek, Ph.D. (Illinois) *Professor of Geology*
- Gary W. Petersen, Ph.D. (Wisconsin) *Distinguished Professor of Soil and Land Resources*
- Sarma V. Pisupati, Ph.D. (Penn State) *Assistant Professor of Fuel Science*
- Raymond W. Regan, Sr., Ph.D. (Kansas) *P.E. Professor of Environmental Engineering*
- Paul D. Robillard, Ph.D. (Cornell) *Associate Professor of Agricultural Engineering*
- Adam Z. Rose, Ph.D. (Cornell) *Professor of Energy, Environmental, and Mineral Economics*
- Barry F. Scheetz, Ph.D. (Penn State) *Senior Scientist and Professor of Materials*
- Robert D. Shannon, Ph.D. (Indiana) *Associate Professor of Agricultural Engineering*
- William E. Sharpe, Ph.D. (West Virginia) *Professor of Forest Hydrology*
- James Shortle, Ph.D. (Iowa State) *Professor of Agricultural Economics*
- John M. Skelly, Ph.D. (Penn State) *Professor of Plant Pathology*
- Dennis W. Thomson, Ph.D. (Wisconsin) *Professor of Meteorology*
- David G. Wagner, Ph.D. (Colorado State) *Assistant Professor and Extension Specialist for Precision Agriculture*
- Grace A. Wang, Ph.D. (Minnesota) *Assistant Professor of Natural Resource Policy*
- John C. Wyngaard, Ph.D. (Penn State) *Professor of Meteorology*

This intercollege master's degree program, available at Penn State Harrisburg and Penn State University Park, deals with the various aspects of air, land, and water pollution control. Graduate instruction is under the direction of an interdisciplinary faculty committee and the departments participating in the program. The EPC faculty have teaching and research interests in the area of environmental pollution control, and where projects are being funded, support opportunities may be available. Currently, faculty from sixteen departments in four colleges are participating in the program at University Park and faculty from four graduate programs participate at Penn State Harrisburg. A student is affiliated with one of these departments on the basis of his/her specific area of interest and is advised by an EPC faculty member in that department. Maximum flexibility is maintained by the program in an effort to meet both the needs of the individual student and the pollution control activity in which he/she wants to participate.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The EPC program is designed for students with backgrounds in science or engineering. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Normal admission requirements include mathematics through integral calculus plus two courses each in both general chemistry and physics.

Students with a 3.00 junior/senior average and with appropriate backgrounds in mathematics and science will be considered for admission. The best-qualified applicants will be admitted up to the number of places that are available for new students. Applicants to the Environmental Pollution Control program are required to provide a statement of objectives, three letters of recommendation, and scores from the Graduate Record Examination (GRE) Aptitude Test (verbal, quantitative, analytical) to complete the admission process. Entering graduate students for whom English is not their first language are required to have a score of at least 560 on the TOEFL (Test of English as a Foreign Language) examination. There is no foreign language requirement.

### Degree Requirements

All candidates are required to take a core course in each of four environmental areas--air, water, solid waste, hazardous waste management, and policy/risk--and 1 credit of the E P C 590 seminar for a minimum core requirement of 12 credits. All but 6 of the total 30 credits required must be selected from a recommended course list. If the option to prepare a thesis is selected (M.S. only), students must schedule at least 12 credits at the 500 level, take at least 6 credits of 600-level thesis research in their thesis adviser's academic department, and write a thesis on an area concerned with environmental pollution. Only 6 credits of 600-level course work may count toward the 30-credit minimum degree requirement. Students who select the nonthesis option must schedule at least 18 credits at the 500 level, which may include 1 credit of E P C 590 and a maximum of 3 paper-writing credits. The M.E.P.C. E P C degree require submission of a scholarly master's paper.

### Watershed Stewardship Option

The Graduate Option in Watershed Stewardship is a graduate option intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program within Environmental Pollution Control at the University Park campus. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at natural resources conservation and environmental problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate coursework: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and FOR 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2). Breadth courses will consist of three graduate credits of coursework from each of four subject matter areas: 1) water resources science, 2) social science, public policy and economics, 3) humanities, and 4) communications and design. In the watershed stewardship practicum courses students work in teams with community, government and business leaders to analyze and understand natural resources and environmental pollution problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A representative pattern of scheduling for the Graduate Option in Watershed Stewardship in addition to a student's other degree requirements might be:

#### First Year:

Fall Semester  
Breadth electives?6 credits  
FOR 591A or LARCH 510.2  
Watershed Stewardship Issues  
Colloquium, 1 credit

Spring Semester  
Breadth electives?6 credits  
FOR 591B or LARCH 510.2  
Watershed Stewardship  
Planning Colloquium, 1 credit

#### Second Year:

Fall Semester  
FOR 570 or LARCH 540.2?3 credits  
Keystone Project

Spring Semester  
FOR 571 or LARCH 550.2?5 credits  
Keystone Project

A list of acceptable breadth courses from each category is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other EPC degree requirements with concurrence of their adviser and graduate committee and only if such courses are approved EPC core requirements or are on the currently approved list of additional 400- and 500-level course for the EPC major. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.E.P.C. or M.S. degree program within Environmental Pollution Control may apply to participate in the Graduate Option in Watershed Stewardship. EPC students may prepare their thesis or paper on a topic related to their watershed management plan, but the thesis or paper must reflect independent thought and scholarly effort above and beyond the requirements of FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### ENVIRONMENTAL POLLUTION CONTROL (E P C) 590. COLLOQUIUM (1)

#### EPC Concurrent degree offering with the Penn State Dickinson School of Law

Penn State Harrisburg School of Science, Engineering, and Technology  
Penn State Dickinson School of Law

### Degrees Conferred:

J.D. (Dickinson) M.E.P.C., M.S. (Penn State Harrisburg)

### Degrees

The Penn State Dickinson School of Law and the Intercollege Graduate Program in Environmental Pollution Control (EPC) offer a coordinated program leading to the degrees of Juris Doctor (J.D.) and Master of Environmental Pollution Control (M.E.P.C.), or Master of Science in EPC (M.S.).

The EPC programs are interdisciplinary, dealing with all aspects of controlling air, water, and solid waste pollution and disposal. The master of engineering degree is designed for those with an undergraduate degree in engineering, while the master of environmental pollution control degree is for those with science or nontechnical backgrounds. The master of science degree is intended for those students who wish to intensively pursue a research area as part of their master's degree work.

### Admission to the Program

In order to be admitted to the program, students must first be admitted to Dickinson under its regular admission procedures. Students are admitted to begin classes in the fall only. Dickinson will screen potential program candidates, and need not forward applications of all Dickinson admittees who have expressed an interest in the EPC programs. Dickinson can withhold support for some admittees until they have demonstrated proficiency in their legal studies and a capacity for dual-degree study. The EPC program at Penn State Harrisburg will make an independent admission decision as to all dual-degree applicants.

### Admission Requirements

#### Dickinson

A bachelor's or equivalent degree from an accredited college is a prerequisite for admission. However, there is no standard prescribed undergraduate curriculum. An applicant should have acquired significant oral and written communication skills before entering law school. The following are required of applicants: complete application form for Dickinson; taking of the Law School Admission Test (LSAT); completion of an LSDAS report; a one-page personal

statement; employment record since high school; two recommendations.

### **EPC**

A bachelor's degree in engineering from an accredited program is required for the Master of Engineering degree program. For the Environmental Pollution Control program, a bachelor's degree is required, including courses in mathematics through integral calculus and two courses each in both general physics and chemistry. If the applicant has not had experience with aspects of environmental engineering or science, completion of ENVE 397 Introduction to Environmental Engineering and Science or C E 297B Water Pollution Control is strongly suggested prior to the start of the graduate course work in the program. A completed Graduate School application form also is required.

### **Sequence**

Students complete the first year of the J.D. program before beginning the EPC program. (While students might take courses in the EPC program prior to enrollment at Dickinson, credit for those courses may not count toward the J.D. degree.) Thereafter, students may concurrently enroll in courses in the J.D. and the EPC programs provided that they abide by the requirements of each program.

### **Interprogram Transfer of Credits**

#### **J.D.**

A maximum of 12 credits for EPC course work may be transferred for credit toward the J.D. degree at Dickinson. Courses for which such credit may be applied shall be subject to approval by the Dickinson faculty. Students must obtain a grade satisfactory to Dickinson for the course work to be credited toward the J.D. degree.

#### **M.E.P.C.**

A maximum of 12 credits of Dickinson course work may be counted for credit toward this degree, subject to EPC approval based on the relevance to the MEPC degree program. No course work at Dickinson may be used to satisfy the master's paper requirement of the MEPC degree program. However, a member of the Penn State graduate faculty from Dickinson may be designated as a reader for the master's project.

#### **M.S. in EPC**

A maximum of 8 credits of Dickinson course work may be counted for credit toward this degree, subject to EPC approval based on relevance to the degree program. No course work at Dickinson may be used to satisfy the master's paper requirement of the M.Eng. degree program or the thesis requirement of the M.S. degree. However, a member of Penn State graduate faculty from Dickinson may be designated as a reader for the master's project.

### **Recommended Program of Study and Advising**

All students in the program have two advisers, one from Dickinson and one from EPC (Penn State Harrisburg). Periodic interaction between the two advisers is encouraged. A program of study is developed for each student, taking into account the fact that some courses at both locations are offered on a rotating basis. Many courses are offered every year, but some are offered every two or three years. Advisers will have available a list of projected relevant offerings in order to work with the student on an individualized program of study.

### **Tuition**

Students will be charged the applicable Dickinson tuition to cover the J.D. program and graduate tuition on a per credit (in-state) rate of the EPC courses.

### **Graduation**

A student in the program may complete the requirements for one of the degrees, and be awarded that degree, prior to completing all the requirements for the other degree. All courses in one program that will count toward meeting the requirements of the other program must be completed before awarding the first degree.

Last Revised by the Department: Summer Session 2005

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## Engineering Science and Mechanics (E SC; E MCH)

### [Program Home Page](#)

JUDITH A. TODD, *Department Head*  
*P. B. Breneman Chair and Professor of Engineering Science and Mechanics*  
 212 Earth-Engineering Sciences Building  
 814-863-4586

ALBERT E. SEGALL, *Graduate Officer*  
 212 Earth-Engineering Sciences Building  
 814-865-7829

### Degrees Conferred:

- Ph.D. in Engineering Science and Mechanics
- M.S. in Engineering Science and Mechanics
- M.Eng. in Engineering Mechanics
- Integrated Undergraduate/Graduate Study - B.S. in Engineering Science - M.S. in Engineering Science and Mechanics
- Joint M.D./Ph.D. in Engineering Science and Mechanics

### The Graduate Faculty

- Dinesh Agrawal, Ph.D. (Penn State) Director, Microwave Processing and Engineering Center; Professor of Engineering Science and Materials
- S. Ashok, Ph.D. (Rensselaer) Professor of Engineering Science
- Osama O. Awadelkarim, Ph.D. (Reading, England) Professor of Engineering Science and Mechanics
- Charles Bakis, Ph.D. (Virginia Tech) Distinguished Professor of Engineering Science and Mechanics
- Francesco Costanzo, Ph.D. (Texas A&M) Professor of Engineering Science and Mechanics
- Joseph P. Cusumano, Ph.D. (Cornell) Professor of Engineering Science and Mechanics
- Melik C. Demirel, Ph.D. (Carnegie Mellon) Associate Professor of Engineering Science and Mechanics, and Bioengineering
- Cheng Dong, Ph.D. (Columbia) Distinguished Professor of Bioengineering
- Corina Drapaca, Ph.D. (Waterloo, Canada) Assistant Professor of Engineering Science and Mechanics
- Patrick Drew, Ph.D. (Brandeis) Assistant Professor of Engineering Science and Mechanics
- Renata S. Engel, Ph.D. (South Florida) Associate Dean for Academic Programs, College of Engineering; Professor of Engineering Design, and Engineering Science and Mechanics
- Stephen J. Fonash, Ph.D. (Pennsylvania) Director, Center for Nanotechnology Education and Utilization; Bayard D. Kunkle Chair in Engineering
- Bruce J. Gluckman, Ph.D. (Pennsylvania) Associate Professor of Engineering Science and Mechanics, and Neurosurgery
- Venkatraman Gopalan, Ph.D. (Cornell) Professor of Materials Science and Engineering, and Engineering Science and Mechanics
- Gary L. Gray, Ph.D. (Wisconsin, Madison) Associate Professor of Engineering Science and Mechanics
- Reginald Hamilton, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Engineering Science and Mechanics
- Robert E. Harbaugh, M.D. (Penn State) Chair, Department of Neurosurgery; Professor of Engineering Science and Mechanics
- Donald F. Heaney Jr., Ph.D. (Penn State) Director, Center for Innovative Sintered Products; Associate Professor of Engineering Science and Mechanics
- Mark W. Horn, Ph.D. (Penn State) Professor of Engineering Science and Mechanics
- Jun (Tony) Huang, Ph.D. (UCLA) Associate Professor of Engineering Science and Mechanics
- Mst Kamrunnahar (Alberta, Canada) Research Associate, Center for Neural Engineering
- Kevin L. Koudela, Ph.D. (Penn State) Head, Composites Materials Division, Applied Research Lab
- Akhlesh Lakhtakia, D.Sc. (Banaras Hindu U) Charles Godfrey Binder Professor of Engineering Science and Mechanics
- Michael T. Lanagan, Ph.D. (Penn State) Associate Director, Materials Research Institute; Professor of Engineering Science and Mechanics, and Materials Science and Engineering
- Patrick M. Lenahan, Ph.D. (Illinois) Distinguished Professor of Engineering Science and Mechanics
- Herbert H. Lipowsky, Ph.D. (California, San Diego) Chair and Professor of Bioengineering
- Clifford J. Lissenden, Ph.D. (Virginia) Professor of Engineering Science and Mechanics
- Sheereen Majd, Ph.D. (Michigan) Assistant Professor of Bioengineering
- Christine B. Masters, Ph.D. (Penn State) Associate Professor of Engineering Science and Mechanics
- Robert N. Pangborn, Ph.D. (Rutgers) Acting Executive Vice President and Provost; Professor of Engineering Mechanics
- Jean Landa Pytel, Ph.D. (Penn State) Assistant Dean for Student Services, College of Engineering; Associate Professor of Engineering Mechanics
- Joseph L. Rose, Ph.D. (Drexel) Paul Morrow Professor of Engineering Science and Mechanics in Design and Manufacturing
- Steven J. Schiff, M.D., Ph.D. (Duke School of Medicine) Brush Chair Professor of Engineering in the Department of Engineering Science and Mechanics; Professor of Neurosurgery and Physics; Director, Center for Neural Engineering
- Albert E. Segall (Penn State) Professor of Engineering Science and Mechanics
- Vladimir V. Semak, Ph.D. (Moscow Inst of Physics and Tech) Senior Research Associate; Associate Professor of Engineering Science and Mechanics
- Barbara A. Shaw, Ph.D. (Johns Hopkins) Professor of Engineering Science and Mechanics
- Elzbieta Sikora, Ph.D. (Polish Academy of Science) Research Associate
- Ivica Smid, Ph.D. (U Vienna) Associate Professor of Engineering Science and Mechanics
- Samia A. Suliman, Ph.D. (Penn State) Assistant Professor of Engineering Science and Mechanics
- Bernhard R. Tittmann, Ph.D. (California, Los Angeles) Schell Professor of Engineering Science and Mechanics
- Judith A. Todd, Ph.D. (Cambridge) Department Head; P. B. Breneman Chair and Professor of Engineering Science and Mechanics
- Mirna Urquidi-Macdonald, Ph.D. (U Paris, Sud) Professor of Engineering Science and Mechanics
- Douglas E. Wolfe, Ph.D. (Penn State) Associate Professor of Engineering Science and Mechanics
- Jian Xu, Ph.D. (Michigan) Associate Professor of Engineering Science and Mechanics; Adjunct Professor of Electrical Engineering
- Sam Y. Zamrik, Ph.D. (Penn State) Professor Emeritus of Engineering Mechanics
- Sulin Zhang, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Engineering Science and Mechanics

Opportunity for graduate studies are available in interdisciplinary and multidisciplinary research areas including: biomechanics; composite materials; continuum mechanics; electrical, magnetic, electromagnetic, optical, thermal, and mechanical properties of thin films; experimental mechanics; lithography; MEMS and MOEMS; micromechanics; molecular beam epitaxy; numerical methods; photovoltaic materials and devices; nanotechnology and nanobiotechnology; properties of materials; shock, vibration acoustics and nonlinear dynamics; structural health monitoring; structural mechanics; wave-material interaction; non-destructive evaluation and testing; and failure analysis.

### Admission Requirements

For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Graduates in engineering, the sciences, mathematics, engineering science, and materials who present a 3.00 grade-point average, will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission pending receipt of acceptable GRE scores.

International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). The minimum composite score for the IELTS is 6.5. The minimum score accepted for the paper-based TOEFL is 550; 80 (total) for the internet-based test (iBT), with a 19 on the speaking section. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency and, if necessary, remedial course work.

International applicants who have received a baccalaureate or a graduate degree from a college/university/institution in the following countries are exempt from the TOEFL/IELTS requirement: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland,

Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### **M. Eng. (E MCH) Degree Requirements**

At least 30 graduate credits must be earned, of which 22 must be from lecture/laboratory courses approved by the department. Fifteen credits must be earned from E SC or E MCH courses as follows: 3 credits are required in the area of Analysis; 3 credits in the area of Fields; 3 credits in the area of Motion; 3 credits in the areas of Materials Performance/Reliability or Materials Processing/Structure/Characterization; and 3 credits from any one of the four categories. Additionally, 1 credit of graduate seminar (E SC 514 or E MCH 514) must be earned. A scholarly written report on a developmental study involving at least one area represented in the course work must be written, for which 3 credits of E SC 596 or E MCH 596 can be granted. This report must be comparable in the level of work and quality to a master's thesis. A 3.0 minimum grade-point average is required to maintain good academic standing and for graduation.

### **M.S. (ESMCH) Degree Requirements**

At least 32 graduate credits must be earned, of which 24 credits must be from 400- and 500-level lecture/laboratory courses approved by the department. No more than 6 credits may be earned from 400-level courses. Three credits are required in the area of Mathematical Methods in Engineering (E MCH 524A, or an equivalent or more advanced course); 3 credits in the area of Mechanics; 3 credits in the area of Materials; and, 3 credits in the area of Engineering Science. In addition, 2 credits of graduate seminar (E MCH 514 or E SC 514) must be earned. A thesis is required and at least 6 credits of thesis research (E MCH 600/610 or E SC 600/ 610) must be included in the student's program of study. The thesis must be a well-organized account of research undertaken by the student and must show initiative and originality. A 3.0 minimum grade-point average is required to maintain good academic standing and for graduation.

### **Ph.D. (ESMCH) Degree Requirements**

Students may enter the Ph.D. program after completing an M.S. degree or directly from the B.S. degree. The student must have completed an appropriate baccalaureate or master's degree prior to admission. In addition: 1) at least 18 graduate credits must be earned in 400- and 500-level lecture/laboratory courses approved by the department; and, 2) 3 credits of a graduate seminar (E MCH 514 or E SC 514) must be earned beyond the master's degree requirements. The student must demonstrate English proficiency, pass a candidacy examination, a comprehensive examination, and a final oral examination. A doctoral thesis on an appropriate topic is required. It must be a well-organized account of research undertaken by the student and show initiative and originality. A minimum grade-point average of 3.00 for work done at the University is required to maintain good academic standing and is required for doctoral candidacy, admission to the comprehensive examination, the final oral examination, and for graduation. It should be noted that passage of the final oral examination is necessary but is not sufficient for award of the degree; the dissertation must be accepted, as the ultimate step.

## **Integrated Undergraduate/Graduate Study - B.S. in Engineering Science - M.S. in Engineering Science and Mechanics**

### **Introduction**

The flexibility and strength in fundamentals of the Engineering Science curriculum provides an opportunity for Engineering Science undergraduate students to participate in the ESM Integrated Undergraduate Graduate (IUG) program. Application for IUG status may be made in the fifth or subsequent semesters.

The IUG program promotes the interchange of ideas across all branches of the scientific and engineering disciplines from both a theoretical and experimental perspective. Students in the composite degree program are expected to pursue interdisciplinary studies in areas that encompass nano- and bionanotechnology, advanced materials, electromagnetic, mechanics, microelectronics, nanoelectronics and bioelectronics, neural engineering, photonics and photovoltaics (among others) and they are expected to embrace multidisciplinary perspectives across departmental, College, and University boundaries.

## **Joint M.D./Ph.D. Program in Engineering Science and Mechanics (M.D./Ph.D., ESMCH)**

### **Admission Requirements**

All students must process an application via the American Medical College Application Service and be accepted for admission by the M.D./Ph.D. admissions committee. Admission to the program requires a minimum GPA of 3.5 and a Medical College Admission Test (MCAT) score of 32. Exceptions to the minimum requirements may be made for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students. Students must successfully complete Years M1 and M2 and Step 1 of the United States Medical Licensing Examination (USMLE) before entering the graduate degree program. All requirements for the Ph.D. degree must be completed prior to Year M3 of medical studies.

Students must apply to the Graduate School for admission to the graduate program. For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. International applicants must hold the equivalent of an American four-year baccalaureate degree. Graduates in engineering, the mathematical sciences, mathematics, engineering science, and materials science and engineering who present a 3.5 grade-point average, will be considered for admission. Exceptions to the minimum 3.5 grade-point average may be made for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission pending receipt of acceptable GRE scores.

International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or IELTS (International English Language Testing System). The minimum composite score for the IELTS is 6.5. The minimum score accepted for the internet-based test (iBT) is 80 (total), with a 19 on the speaking section. Applicants with an iBT speaking score between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency and, if necessary, remedial course work.

International applicants who have received a baccalaureate or a graduate degree from a college/university/institution in the following countries are exempt from the TOEFL/IELTS requirement: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

All program-specific documents for admission (e.g., transcripts, letters of recommendation, etc.) must be submitted by all applicants.

### **Degree Requirements**

The Joint M.D./Ph.D. Program in Engineering Science and Mechanics (M.D./Ph.D., ESMCH) will form the basis for an interdisciplinary, transformational program that will educate a new generation of Physician Engineering Scientists, working at the frontiers of clinical and translational research. This Joint Degree Program responds to the national call to expedite the incorporation of clinical and translational research into improved healthcare.

Students in the Joint M.D./Ph.D. Program in Engineering Science and Mechanics will complete 4 years of medical studies (designated years M1 through M4) in the Medical School, College of Medicine, and 3 or more years of Graduate Study (designated years G1 through G3 or GX) in the Engineering Science and Mechanics (ESM) Department.

After successful completion of the first 2 years of medical school, including all required rotations and Step 1 of the United States Medical Licensing Examination (USMLE), the candidate will apply for admission to the Ph.D. program in Engineering Science and Mechanics.

Students will complete all requirements for the Ph.D. Degree in Engineering Science and Mechanics, including SARI (Scholarship and Research Integrity) training for the Responsible Conduct of Research (RCR) that must be met by students admitted to the program with either a baccalaureate or a master's degree, with the following exceptions:

- students admitted to the program with a baccalaureate degree will be allowed to double count 14 professional credits (24% of the total graduate credits) toward graduate course credit for the Ph.D. degree; and,
- students admitted to the program with a master's degree will be allowed to double count 7 professional credits (21% of the total graduate credits) toward graduate course credit for the Ph.D. degree.

A minimum grade-point average of 3.00 for work done at the University is required for doctoral candidacy, admission to the Comprehensive Examination, the Final Oral Examination, and for graduation. It should be noted that passage of the Final Oral Examination is necessary but it is not sufficient for award of



the degree; the dissertation must be accepted, as the ultimate step.

Students will complete all requirements for the M.D. Degree that must be met by students admitted to the program with either a baccalaureate or master's degree, with the following exceptions:

- baccalaureate degree holders will be allowed to double count 10 research credits (E SC 600/E MCH 610) toward professional credits for the M.D. degree; and,
- master's degree holders will be allowed to double count 5 research credits (E SC 600/E MCH 610) applied to the Ph.D. ESMCH degree toward professional credits for the M.D. degree.

Students may take the Candidacy Examination after completing 18 credits of approved graduate course work.

- master's degree holders accepted into the Joint M.D./Ph.D. program may take the Candidacy Examination in the Spring Semester of Year G1, but no later than the Fall Semester of G2.
- baccalaureate degree holders accepted into the Joint M.D./Ph.D. program may take the Candidacy Examination within 3 semesters of entry into the Ph.D. program (expected to be the Fall Semester of G2).

Upon successfully completing the Candidacy Examination, students should appoint their doctoral committee.

The Comprehensive Examination may be taken in a semester following the Candidacy Examination. The Comprehensive Examination must be completed at least one semester prior to submission of the dissertation.

Students must prepare and submit a scholarly dissertation that demonstrates comprehensive and in-depth knowledge of a topic in Engineering Science and Mechanics. The contents and conclusions of the dissertation must be defended at the time of the Final Oral Examination. The scholarly research should be suitable for submission for publication in a refereed journal as approved by the student's advisor(s). Normally, the Final Oral Examination may not be scheduled until at least three months after the Comprehensive Examination.

Following completion of the Ph.D. dissertation, students will return to medical school to complete Years M3 and M4 of the professional M.D. degree.

### Other Relevant Information

Continuous registration is required for all students until the thesis or engineering report is approved.

### Student Aid

Research and Teaching Assistantships (half time) are granted to a majority of graduate students in good academic standing. Financial supported is ordinarily limited to three semesters for full-time master's degree students, and six semesters for full-time Ph.D. students.

In addition to the fellowships, traineeships, graduate assistantships, or other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program.

THEODORE HOLDEN THOMAS, Jr., MEMORIAL SCHOLARSHIP-Available to undergraduate or graduate students who display outstanding ability and have enrolled in the Department of Engineering Science and Mechanics. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

SABIH AND GÜLER HAYEK GRADUATE SCHOLARSHIP IN ENGINEERING SCIENCE AND MECHANICS-Provides recognition and financial assistance to outstanding graduate students enrolled or planning to enroll in the Department of Engineering Science and Mechanics. Apply to the Department of Engineering Science and Mechanics, 211 Earth-Engineering Sciences Building. Deadline is February 1.

DR. RICHARD LLORENS GRADUATE AWARD IN ENGINEERING SCIENCE AND MECHANICS - Provides recognition and financial assistance to graduate students pursuing a degree in Engineering Science and Mechanics who have achieved academic excellence. Apply to the Department of Engineering Science and Mechanics, 211 Earth-Engineering Sciences Building. Deadline is February 1.

RICHARD P. MCNITT SCHOLARSHIP IN ENGINEERING SCIENCE AND MECHANICS - Available to undergraduate or graduate students enrolled in the Department of Engineering Science and Mechanics who have achieved superior academic records or who manifest promise of outstanding academic success. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ENGINEERING MECHANICS \(E MCH\) course list](#)

[ENGINEERING SCIENCE \(E SC\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-019

Review Date: 06/12/2012

Faculty updated: 5/24/13

## Engineering Science (E SC)

### [Home Page](#)

SEDIG S. AGILI, *Program Coordinator*  
 Penn State Harrisburg  
 School of Science, Engineering, and Technology  
 777 W. Harrisburg Pike  
 W211 Olmsted Building  
 Middletown, PA 17057-4898  
 717-948-6109

[www.hbg.psu.edu](http://www.hbg.psu.edu)

[MEESC@PSU.EDU](mailto:MEESC@PSU.EDU)

### Degree Conferred:

M.Eng.

### The Graduate Faculty, Penn State Harrisburg

- Ma'moun Abu-Ayyad, Ph.D. (New Brunswick) Assistant Professor of Mechanical Engineering
- Issam Abu-Mahfouz, Ph.D. (Case Western Reserve) Associate Professor of Engineering
- Sedig S. Agili, Ph.D. (Marquette) Associate Professor of Electrical Engineering
- Jennifer A. Albert, Ph.D. (West Virginia) Assistant Professor of Civil Engineering
- Omid Ansary, Ph.D. (Akron) Interim Senior Associate Dean for Academic Affairs; Professor of Engineering
- Katherine Baker, Ph.D. (Delaware) Associate Professor of Environmental Microbiology
- Ganesh P. Bal, Ph.D. (Virginia Tech) Assistant Professor of Engineering
- Amit Banerjee, Ph.D. (New Jersey Institute of Technology) Assistant Professor of Mechanical Engineering
- Jeremy Blum, Ph.D. (George Washington) Assistant Professor of Computer Science
- Eugene Boman, Ph.D. (Connecticut) Associate Professor of Mathematics
- Thang N. Bui, Ph.D. (MIT) Associate Professor of Engineering
- Joseph J. Cecere, Ph.D. (North Texas State) Associate Professor of Engineering
- Sukmoon Chang, Ph.D. (Rutgers) Associate Professor of Computer Science
- Yen-Chih Chen, Ph.D. (Purdue) Assistant Professor of Environmental Engineering
- Yohchia Frank Chen, Ph.D. (Minnesota) Professor of Engineering
- Balwant Chohan, Ph.D. (UMass Amherst) Assistant Professor of Chemistry
- Richard Ciocci, Ph.D. (Maryland) Associate Professor of Mechanical Engineering
- Shirley E. Clark, Ph.D. (Alabama) Associate Professor of Environmental Engineering
- Thomas Eberlein, Ph.D. (Wisconsin—Madison) Associate Professor of Chemistry
- Kerwin Foster, Ph.D. (Florida State); Ph.D. (UNC) Assistant Professor of Physics
- Ram P. Goel, Ph.D. (Michigan State) Assistant Professor of Mechanical Engineering
- Robert Gray, Ph.D. (Ohio) Associate Professor of Electrical Engineering
- Peter Idowu, Ph.D. (Toledo) Associate Professor of Engineering
- Harris Imadojemu, Ph.D. (North Carolina State) Associate Professor of Engineering
- Hossein Julia, Ph.D. (Southern California) Associate Professor of Electrical Engineering
- Sai Kakuturu, Ph.D. (Kansas State) Assistant Professor of Civil Engineering
- Jubum Kim, Ph.D. (Washington) Assistant Professor of Civil Engineering
- Seroj Mackertich, Ph.D. (Penn State) Associate Professor of Engineering
- Anita Mareno, Ph.D. (Cornell) Assistant Professor of Mathematics
- Aldo Morales, Ph.D. (SUNY) Professor of Electrical Engineering
- Shashi Marikunte, Ph.D. (Michigan State) Assistant Professor of Civil Engineering
- Linda M. Null, Ph.D. (Iowa State) Associate Professor of Computer Science
- Gautam Ray, Ph.D. (Penn State) Professor of Engineering
- Sairam Rudrabhatla, Ph.D. (Osmania) Assistant Professor of Biology
- Jerry F. Shoup, Ph.D. (Penn State) Interim Director, School of Science, Engineering, and Technology; Associate Professor of Electrical Engineering
- Ilya Shvartsman, Ph.D. (Wayne State) Assistant Professor of Mathematics
- Mohammad-Reza (Soheil) Tofighi, Ph.D. (Drexel) Associate Professor of Electrical Engineering
- Sofia Vidalis, Ph.D. (Florida) Assistant Professor of Civil Engineering
- Clifford Wagner, Ph.D. (New York, Albany) Associate Professor of Math & Computer Science
- Ronald Walker, Ph.D. (Michigan) Assistant Professor of Mathematics
- Seth Wolpert, Ph.D. (Rutgers) Associate Professor of Engineering
- Yuefeng Xie, Ph.D. (Tsinghua) Professor of Environmental Engineering

A program leading to the degree of Master of Engineering with a major in Engineering Science is offered at Penn State Harrisburg. The program is designed to provide a broad, advanced education in the engineering sciences with some specialization permitted in the area of the student's major interest. It is offered specifically to permit practicing engineers to pursue advanced studies through evening classes while in full-time employment in industry in the area. Courses offered for the program are all established and authorized by the resident departments at the University Park campus.

### Admission Requirements

Scores from the graduate Record Examinations (GRE) are not required for students holding baccalaureate degrees from accredited U.S. educational institutions. At the discretion of a graduate program, students may be admitted for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements state in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students may be admitted to the program from a wide variety of disciplines. Students applying for admission are expected to have completed the following core courses: (1) physics through modern physics; (2) mathematics through differential equations; (3) one course in engineering thermodynamics; (4) one course in electrical circuits; (5) basic courses in engineering statics, dynamics, and strength of materials; and (6) computer programming. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

**English Proficiency**—The language of instruction at Penn State is English. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. Departments and programs may have more stringent requirements and may require all international applicants to submit a TOEFL or IELTS score regardless of their academic background. A TOEFL score of at least 550 (paper-based test), 213 (computer-based test) or a total score of 80 on the Internet-based test (iBT), with a minimum of 19 points on the speaking section, is required for admission. Graduate programs may require a higher score. The International English Language Testing System (IELTS) module provides an exam to test four mandatory skill areas: listening, reading, writing and speaking. All four modules are equally weighted in the evaluation process. The International English Language Testing System has been approved by the Graduate Council as an alternative exam to the TOEFL for international students applying to Penn State. A minimum composite score of 6.5 on the IELTS test is required for admission.

Completed International Application material must be submitted by the following deadlines: May 31 for the fall semester; September 30 for the spring

semester; February 28 for the summer session. Applications received after these deadlines will be processed for the following semester.

Applicants should submit the following:

- A graduate **online** application with the application fee;
- Official copies of undergraduate transcripts;
- Three (3) letters of reference, especially those from faculty who can evaluate academic potential;
- A personal statement of technical interest, goals, and experience.

**NOTE: Test scores from the Graduate Record Examination (GRE) are required ONLY for those applicants indicating interest in an assistantship.**

### **Degree Requirements**

The credit requirements in this major will be satisfied by an appropriate combination of core courses and elective courses. The core courses include offerings in mathematics and in several branches of engineering that have been selected because of their general character and breadth of applicability to all fields of engineering. A minimum of 30 credits is required, of which at least 18 must be at the 500 level. Of the 30 credits, 6 credits of mathematics and a scholarly written report (3 credits) must be completed.

This program should be distinguished from the graduate program in Engineering Science at University Park campus, which offers the M.S. degree.

### **Other Relevant Information**

More details regarding admission requirements are available from the directors of the graduate centers offering the program.

### **Student Aid**

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

SCR 30-07-186

Faculty updated: 4/2/12

## Enterprise Architecture (EA)

MICHAEL McNEESE, Associate Dean for Research and Graduate Programs  
College of Information Sciences and Technology  
The Pennsylvania State University  
332G Information Sciences and Technology Building  
University Park, PA, 16803  
814-863-3450; mmcneese@ist.psu.edu

**Degree Conferred:** M.P.S.

### The Graduate Faculty

John W. Bagby, J.D. (Tulsa) Professor of Information Sciences and Technology  
Guoray Cai, Ph.D. (Pittsburgh) Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering  
Brian Cameron, Ph.D. (Penn State) Executive Director, Center for Enterprise Architecture, Senior Lecturer in Information Sciences and Technology  
John Carroll, Ph.D. (Columbia) Edward M. Frymoyer Chair Professor of Information Sciences and Technology  
Chao-Hsien Chu, Ph.D. (Penn State) Professor of Information Sciences and Technology; Director, Professional Master's Degrees; Affiliate Professor, Management Science and Information Systems, Smeal College of Business  
Shawn Clark, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology  
Henry C. "Hank" Foley, Ph.D. (Penn State) Vice President for Research and Dean of the Graduate School; Professor of Information Sciences and Technology, and Chemical Engineering  
Frederico T. Fonseca, Ph.D. (Maine) Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering  
Peter K. Forster, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology  
C. Lee Giles, Ph.D. (Arizona) David Reese Professor of Information Sciences and Technology; Professor of Computer Science and Engineering  
Edward J. Glantz, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology  
Jens Grossklags, Ph.D. (California, Berkeley) Assistant Professor of Information Sciences and Technology  
David L. Hall, Ph.D. (Penn State) Dean; Professor of Information Sciences and Technology, and Electrical Engineering  
John Harwood, Ph.D. (Nebraska) Senior Director, Teaching and Learning with Technology; Associate Professor of Information Sciences and Technology; Associate Professor of English  
Steven R. Haynes, Ph.D. (London School of Economics) Senior Lecturer in Information Sciences and Technology  
John Horgan, Ph.D. (Univ College, Cork, Republic of Ireland) Associate Professor of Information Sciences and Technology; Associate Professor of Science, Technology, and Society; Director, International Center for the Study of Terrorism  
Bernard James Jansen, Ph.D. (Texas A&M) Associate Professor of Information Sciences and Technology  
Lynette Kvasny, Ph.D. (Georgia State) Associate Professor of Information Sciences and Technology  
Dongwon Lee, Ph.D. (UCLA) Associate Professor of Information Sciences and Technology; Affiliate Associate Professor of Computer Science and Engineering  
Peng Liu, Ph.D. (George Mason) Professor of Information Sciences and Technology; Affiliate Professor of Computer Science and Engineering, and Information Systems and Supply Chains  
Carleen Maitland, Ph.D. (Delft University of Technology) Associate Professor of Information Sciences and Technology  
William McGill, Ph.D. (Maryland), Assistant Professor of Information Sciences and Technology  
Michael D. McNeese, Ph.D. (Vanderbilt) Associate Dean of Research and Graduate Programs; Professor of Information Sciences and Technology, and Psychology  
Prasenjit Mitra, Ph.D. (Stanford) Associate Professor of Information Sciences and Technology  
David Mudgett, Ph.D. (Yale) Senior Lecturer in Information Sciences and Technology  
Rosalie Ocker, Ph.D. (Rutgers) Senior Lecturer in Information Sciences and Technology  
Irene Petrick, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology  
Erika Poole, Ph.D. (Georgia Tech) Assistant Professor of Information Sciences and Technology  
Sandeep Puroo, Ph.D. (Wisconsin--Milwaukee) Professor of Information Sciences and Technology  
Madhu Reddy, Ph.D. (California, Irvine) Faculty Council Chair; Associate Professor of Information Sciences and Technology  
Frank E. Ritter, Ph.D. (Carnegie Mellon) Professor of Information Sciences and Technology, Computer Science and Engineering, and Psychology  
Mary Beth Rosson, Ph.D. (Texas at Austin) Associate Dean for Undergraduate Education; Professor of Information Sciences and Technology  
Timothy Ryan, Ph.D. (Texas at Austin) Assistant Professor of Biological Anthropology and Geosciences; Assistant Professor of Information Sciences and Technology  
Gerald M. Santoro, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology  
Donald Shemanski, J.D. (Georgetown) Professor of Practice in Information Sciences and Technology  
Anna Squicciarini, Ph.D. (University of Milan, Italy) Assistant Professor of Information Sciences and Technology  
Andrea Tapia, Ph.D. (New Mexico) Associate Professor of Information Sciences and Technology  
Eileen M. Trauth, Ph.D. (Pittsburgh) Professor of Information Sciences and Technology; Affiliate Professor of Women's Studies, International Affairs, Labor Studies and Employee Relations, Management and Organization  
James Z. Wang, Ph.D. (Stanford) Professor of Information Sciences and Technology, and Computer Science and Engineering  
Dinghao Wu, Ph.D. (Princeton) Assistant Professor and Research Scientist in Information Sciences and Technology  
Heng Xu, Ph.D. (National Singapore) Associate Professor of Information Sciences and Technology  
John Yen, Ph.D. (California, Berkeley) Director, Strategic Research Initiatives; Professor of Information Sciences and Technology; Affiliate Professor of Computer Science and Engineering  
Xiaolong (Luke) Zhang, Ph.D. (Michigan) Associate Professor of Information Sciences and Technology  
Sencun Zhu, Ph.D. (George Mason) Associate Professor of Information Sciences and Technology, and Computer Science and Engineering

### Master of Professional Studies in Enterprise Architecture Program Description

The Master of Professional Studies Program in Enterprise Architecture (MPS/EA) is a unique program designed for professionals aspiring to advance to roles with enterprise wide scope and authority, such as that embodied by an enterprise architect. The MPS/EA provides a comprehensive educational experience in the principles and practice of Enterprise Architecture (EA) and integrates both business and enterprise technical knowledge. The program includes courses in project management, enterprise architecture, cost and value management, organizations, business and project strategy, enterprise modeling, the layers of the enterprise information technology architecture, enterprise architecture case studies, scholarship in enterprise architecture, and leadership, governance and change for enterprise architecture.

### Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in which it operates.

Since the program is multidisciplinary in nature, students from many disciplines may be acceptable for entry into the program. The most qualified applicants will be accepted in the program until all available spaces for new students are filled.

Consideration for admission into the program will be granted to individuals who meet one of the following sets of criteria:

- An approved baccalaureate degree with a minimum grade point average of 2.75 or above, (on a 4.0 scale) a minimum of five years of relevant work experience, three letters of reference, and a one-three page personal statement of relevant experience and goals.
- An approved baccalaureate degree with a minimum of a 3.00 (on a 4.00 scale) grade point average, a minimum of two years of relevant work experience, three letters of reference, and a one-three page personal statement of relevant experience and goals.
- A graduate degree, a minimum of one year of relevant work experience, three letters of reference, and a one-three page personal statement of relevant experience and goals.
- An approved baccalaureate degree, successful completion of three courses in the program with a minimum of a 3.50 (on a 4.00 scale) grade point

average as a non-degree graduate student, at least two years of relevant work experience, and a one-three page personal statement of relevant experience and goals.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### **MPS/EA Degree Requirements**

The Master of Professional Studies in Enterprise Architecture (MPS/EA) program requires a minimum of 36 credits. At least 18 credits must be courses at the 500-level and above (with at least 6 credits of 500-level). A student will take 28 credits of required courses. The remaining 6 course credits of electives are selected from a list of approved courses. The courses will be delivered online through the World Campus.

#### **Required Courses** (30 credits)

EA 870(3), EA 871(3), EA 872(3), EA 873(3), EA 874(3), EA 875(3), MANGT 510(3), MANGT 515(3), MANGT 531(3), MANGT 540(3)

#### **Elective Courses** (6 credits)

Elective courses are available in

Supply Chain - MIS 404(3), SCM 800(4), SCM 810(4), SCM 820(4)  
Enterprise Integration - IST 402(3), IST 420(3), IST 421(3)  
Security - IN SC 561(3), IST 454(3), IST 554(3)  
Project Management - MANGT 520(3), MANGT 535(3)  
Independent Studies - IST 596(1-3)

*Language and Communication.* All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work.

### **Pattern of Course Scheduling for MPS/EA program**

The program is highly flexible and is designed to meet the different needs of students and organizations. The courses will be delivered online through the World Campus. With online delivery, the professional master program can easily fit into the work schedule of professionals from around the globe.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-05-161

Review Date: 02/19/2013

## Earth Sciences (EARTH)

### [Program Home Page](#)

CHRIS J. MARONE, Associate Head for Graduate Programs and Research  
536 Deike Building  
University Park, PA 16802  
814-865-7964  
[cjm38@psu.edu](mailto:cjm38@psu.edu)

### Degree Conferred:

M.Ed.

### The Graduate Faculty

- Eliza Richardson, Ph.D. (MIT) Assistant Professor of Geosciences, Program Manager
- Richard Alley, Ph.D. (UW Madison) Evan Pugh Professor of Geosciences
- Sridhar Anandakrishnan, Ph.D. (UW Madison) Associate Professor of Geosciences
- Charles Ammon, Ph.D. (Penn State) Associate Professor of Geosciences
- Michael Arthur, Ph.D. (Princeton) Professor of Geosciences
- David Babb, Ph.D. (Penn State) Assistant Professor of Meteorology
- Timothy Bralower, Ph.D., (UC San Diego) Professor and Head, Department of Geosciences
- Roger Downs, Ph.D. (Bristol) Professor of Geography
- Kevin P. Furlong, Ph.D. (Utah) Professor of Geosciences and Director, EMS Environment Institute Natural Hazards Center
- Tanya Furman, Ph.D. (MIT) Associate Professor of Geosciences
- Russell W. Graham, Ph.D. (UT Austin) Associate Professor of Geosciences and Director, EMS Museum
- Peter J. Heaney, Ph.D. (Johns Hopkins) Associate Professor of Geosciences
- Paul Howell, Ph.D. (Cambridge) Professor of Materials Science and Engineering
- James F. Kasting, Ph.D. (Michigan) Professor of Geosciences
- R. Allen Kimel, Ph.D. (Penn State), Assistant Professor of Materials Science and Engineering
- Eric Kirby, Ph.D. (MIT), Assistant Professor of Geosciences
- Lee Kump, Ph.D. (South Florida) Professor of Geosciences
- Chris J. Marone, Ph.D. (Columbia) Professor of Geosciences
- Jonathan Mathews, Ph.D. (Penn State) Assistant Professor of Energy and Mineral Engineering
- Scott P. McDonald, Ph.D. (Michigan) Associate Professor of Science Education
- Andrew A. Nyblade, Ph.D. (Michigan) Associate Professor of Geosciences
- Christopher Palma, Ph.D. (Virginia) Senior Lecturer, Astronomy
- Demian M. Saffer, Ph.D. (UC Santa Cruz) Assistant Professor of Geosciences
- Kamini Singha, Ph.D. (Stanford) Assistant Professor of Geosciences
- Timothy White, Ph.D. (Penn State) P.G., Senior Research Associate, EMS Earth and Environmental Systems Institute

The M.Ed. in Earth Sciences program is designed for secondary science teachers who seek to enrich their knowledge and practice through rigorous courses and individual projects supervised by Penn State faculty members. Combining graduate courses from academic departments in Penn State's College of Earth and Mineral Sciences, College of Education, and Eberly College of Science, the curriculum will prepare teachers to help students in grades 7 through 12 master educational objectives related to Earth and space science, as specified in National Science Education Standards (National Academy of Sciences, 1996). To accommodate working teachers who are only able to study part-time and at a distance, courses will be offered online through Penn State's World Campus. Fall, Spring, and Summer semester offerings will be available. Students will be granted licenses to use the courseware modules developed for the M.Ed. in Earth Sciences program in their secondary classrooms.

### Admission Requirements

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a masters degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British west Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, The United States, and Wales.

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students may initially enroll in M.Ed. in Earth Sciences classes as non-degree graduate students. Up to 15 credits earned in non-degree status may be counted toward the M.Ed. in Earth Sciences degree.

### Master's Degree Requirements

The M.Ed. in Earth Sciences degree is conferred upon students who earn a minimum of 30 credits while maintaining an average grade of 3.0 or better in all course work, including at least 18 credits at the 500 level or above (with at least 6 credits at the 500 level), and who complete a quality culminating individual project in consultation with a graduate adviser. Students will have the opportunity to participate in face-to-face field experiences or workshops at University Park or other locations during Summer sessions.

### Student Aid

Graduate assistantships are not available. Financial aid opportunities for part-time students who participate through the World Campus are discussed at [http://worldcampus.psu.edu/StudentServices\\_Paying.shtml](http://worldcampus.psu.edu/StudentServices_Paying.shtml).

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [EARTH SCIENCES \(EARTH\) course list](#)

Last Revised by the Department: Summer Session 2008

Blue Sheet Item #: 36-06-187

Review Date: 4/15/08

Faculty updated: 7/3/13



## Ecology (ECLGY)

[Program Home Page](#)

DAVID EISSENSTAT, *Chair, Intercollege Graduate Degree Program in Ecology*  
101 Life Sciences Building  
Phone: 814-863-3371

Fax: 814-867-1769

E-mail: [dme9@psu.edu](mailto:dme9@psu.edu), [jep32@psu.edu](mailto:jep32@psu.edu), [mwr1@psu.edu](mailto:mwr1@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- § Marc D. Abrams, Ph.D. (Michigan State) *Professor of Forest Ecology and Physiology*
- Mary Barbercheck, Ph.D. (California, Davis) *Professor of Entomology*
- Paul Bartell, Ph.D. (Virginia) *Assistant Professor of Avian Biology*
- Iliana Baums, Ph.D. (Miami) *Assistant Professor of Biology*
- Ottar Bjornstad, Ph.D. (Oslo) *Assistant Professor of Entomology*
- Victoria Braithwaite-Read, D.Phil. (Oxford, UK) *Professor of Fisheries and Biology*
- § Margaret C. Brittingham, Ph.D. (Wisconsin) *Associate Professor of Wildlife Resources*
- § Robert P. Brooks, Ph.D. (Massachusetts) *Professor of Wildlife and Wetlands*
- # Mary Ann Bruns, Ph.D. (Michigan State) *Assistant Professor of Agronomy/Soil Microbial Ecology*
- Tomas Carlo-Joglar, Ph.D. (Colorado) *Assistant Professor of Biology*
- Hunter Carrick, Ph.D. (Michigan) *Assistant Professor of Forest Resources*
- Charles Andrew Cole, Ph.D. (Southern Illinois) *Assistant Professor of Landscape Architecture and Ecology*
- William S. Curran, Ph.D. (Illinois) *Professor of Weed Science*
- Rick Day, Ph.D. (Penn State) *Associate Professor of Soil Science and Environmental Information Systems*
- Dennis Decoteau, Ph.D. (Massachusetts) *Professor of Horticulture and Plant Ecosystem Health*
- Consuelo M. DeMoraes, Ph.D. (Georgia) *Assistant Professor of Entomology*
- Claude dePamphilis, Ph.D. (Georgia) *Associate Professor of Biology and Life Sciences Consortium*
- Duane Diefenbach, Ph.D. (Georgia) *Adjunct Assistant Professor of Wildlife Ecology*
- Patrick Drohan, Ph.D. (Penn State) *Assistant Professor of Pedology*
- David M. Eissenstat, Ph.D. (Utah State) *Professor of Woody Plant Physiology; Coordinator, Physiological Ecology Option*
- Matthew Ferrari, Ph.D. *Assistant Professor of Biology*
- § C. Paola Ferreri, Ph.D. (Michigan State) *Assistant Professor of Fisheries Management*
- James Finley, Ph.D. (Penn State) *Associate Professor of Forest Resources*
- Charles R. Fisher, Jr., Ph.D. (California, Santa Barbara) *Professor of Biology*
- \* Shelby J. Fleischer, Ph.D. (Auburn) *Associate Professor of Entomology*
- Robert Gallagher, Ph.D. (Ohio State) *Associate Professor of Cropping Systems*
- § Michael R. Gannon, Ph.D. (Texas Tech) *Associate Professor of Biology*
- Bryan T. Grenfell, Ph.D. (Sheffield, UK) *Professor of Biology*
- § Lauraine K. Hawkins, Ph.D. (New Mexico) *Assistant Professor of Biology*
- § S. Blair Hedges, Ph.D. (Maryland) *Associate Professor of Biology*
- Dale Holen, Ph.D. (Wisconsin, Milwaukee) *Associate Professor of Biology*
- Peter Hudson, Ph.D. (Oxford, UK) *Williaman Professor of Biology*
- David P. Hughes, D.Phil. (Oxford) *Assistant Professor of Entomology and Biology*
- Scott Isard, Ph.D. (Indiana) *Professor of Aerobiology*
- § Heather D. Karsten, Ph.D. (Cornell) *Assistant Professor of Crop Production/Ecology*
- Jason P. Kaye, Ph.D. (Colorado) *Assistant Professor of Soil Biogeochemistry*
- Margot Kaye, Ph.D. (Colorado State) *Assistant Professor of Forest Ecology*
- \*§ K. C. Kim, Ph.D. (Minnesota) *Professor of Entomology*
- Roger Koide, Ph.D. (California, Berkeley) *Professor of Horticulture Ecology*
- Todd C. LaJeunesse, Ph.D. *Assistant Professor of Biology*
- Tracy Langkilde, Ph.D. (Sydney) *Assistant Professor of Biology*
- Henry Lin, Ph.D. (Texas A&M) *Assistant Professor of Crop and Soil Science*
- Jonathan P. Lynch, Ph.D. (California, Davis) *Associate Professor of Plant Nutrition*
- Jennifer Macalady, Ph.D. (California, Davis) *Assistant Professor of Geosciences*
- Carolyn G. Mahan, Ph.D. *Associate Professor of Biology; Co-coordinator, Environmental Studies Program, Penn State Altoona*
- James H. Marden, Ph.D. (Vermont) *Associate Professor of Biology*
- Mark Mescher, Ph.D. (Georgia) *Assistant Professor of Entomology*
- David A. Mortensen (North Carolina State) *Associate Professor of Crop and Soil Sciences*
- Susan Parks, Ph.D. (MIT/Woods Hole Oceanographic Inst) *Research Associate*
- \* Ganapati P. Patil, Ph.D. (Michigan) *Distinguished Professor of Mathematical Statistics*
- Eric Post, Ph.D. (Alaska) *Assistant Professor of Biology*
- Andrew Read, D.Phil. (Oxford, UK) *Professor of Biology and Entomology*
- §\* Michael C. Saunders, Ph.D. (Georgia) *Associate Professor of Entomology*
- Beth Shapiro, D.Phil. (Oxford, UK) *Schaffer Career Development Assistant Professor of Biology*
- William E. Sharpe, Ph.D. (West Virginia) *Professor of Forest Hydrology*
- Katrina Shea, Ph.D. (London) *Assistant Professor of Theoretical Applied Ecology, Life Sciences Consortium*
- Erica Smithwick, Ph.D. (Oregon State) *Assistant Professor of Geography*
- § Jay R. Stauffer, Jr., Ph.D. (Virginia Tech) *Professor of Ichthyology; Coordinator, Conservation Biology Option*
- § Kim C. Steiner, Ph.D. (Michigan State) *Professor of Forest Biology*
- § Andrew G. Stephenson, Ph.D. (Michigan) *Professor of Biology*
- Kenneth R. Tamminga, M.P. (Queens, Canada) *Associate Professor of Landscape Architecture*
- § Alan H. Taylor, Ph.D. (Colorado) *Associate Professor of Geography*
- John Tooker, Ph.D. (Illinois, Urbana-Champaign) *Assistant Professor of Entomology*
- James Tumlinson, Ph.D. (Mississippi) *Ralph O. Mumma Professor of Entomology*
- § Christopher F. Uhl, Ph.D. (Michigan State) *Professor of Biology; Chair, IGDP in Ecology*
- Tyler Wagner, Ph.D. (Michigan State) *Adjunct Assistant Professor of Fisheries Ecology*
- Denice Wardrop, Ph.D. (Penn State) *Assistant Director, Penn State Cooperative Wetlands Center*
- Peter Wilf, Ph.D. (Pennsylvania) *Associate Professor of Geosciences; John T. Ryan Jr. Faculty Fellow*
- Eric Zenner, Ph.D. (Oregon State) *Associate Professor of Silviculture*

Note: Quantitative Ecology option faculty are designated by (\*), Microbial Ecology option faculty by (#), Conservation Biology option faculty by (§), and Physiological Ecology option faculty by ( ). See text for further explanation.

This intercollege program emphasizes the properties of ecosystems by focusing attention on interactions of single organisms, populations, and communities with their environment. It is designed to give students a basic understanding of ecological theory and hypothesis testing and is complementary to other environmental programs that emphasize the human role in ecosystems.

The program is administered by a committee drawn from faculty members in several departments and colleges of the University. This committee and its chair



are appointed by the dean of the Graduate School. The instructional staff is composed of participating faculty in those departments offering graduate courses in fields closely allied to ecology.

The advisory committee is selected by the candidate and his/her adviser and approved by the Graduate School. The committee has the responsibility for determining the course program and research acceptable in satisfying degree requirements.

Four options for specialization are offered: Quantitative Ecology, Microbial Ecology, Conservation Biology and Physiological Ecology. Students are not required to select an option. The quantitative ecology option includes mathematical and statistical modeling and applications of statistics to experimental design and data analysis. The microbial ecology option includes basic aquatic and soil microbial ecology and applications to recycling of materials and release of genetically engineered organisms. The conservation biology option is concerned with problems of maintaining the rapidly disappearing diversity of organisms and their habitats, and the global reservoir of genetic diversity that these organisms represent. The physiological ecology option is concerned primarily with the function and performance of organisms in their environment. Each option entails extra course requirements plus a thesis directed by an ecology faculty member in the option. Additional information can be obtained from the option coordinators.

### Admission Requirements

Scores from the Grade Record Examination (GRE), including verbal, quantitative, and advanced biology test, are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Candidates should have a strong science background, including chemistry through organic chemistry, mathematics through calculus, physics, and biology. A limited number of such courses can be made up while the student is pursuing graduate student.

Students with a background in another discipline that has potential value to original ecological work will be seriously considered. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) is required.

Students are strongly urged to choose their research interests and initiate communication with the relevant faculty member(s) before applying for admission. A student will not be admitted without the commitment of a faculty member to serve as the student's research adviser. Teaching and research assistantships are available only through the student's faculty adviser.

The top sheet (white copy) of the application and application fee are to be sent to the Graduate School. The applicant should forward the following directly to the program chair: (1) pink copy of the application; (2) three or more letters of recommendation regarding the student's academic and professional promise; (3) a concise one-page statement describing the student's goals both within the program and in professional life; and (4) GRE scores (general test and the subject test in biology). Specific inquiries about the Ecology Program may be directed to the program chair. Applications should be submitted by February 1 for summer or fall semester admission.

### Master's Degree Requirements

In addition to Graduate School requirements, the instructional program includes two graduate core courses in ecology (one each in two of the three core areas: population ecology, community/ecosystem ecology, and physiological ecology), an advanced 3-credit statistic course, two credits of colloquium, a minimum of six thesis credits, breadth courses selected by the student in consultation with the research adviser and research committee, and a thesis research project directed by the student's adviser. A nonthesis option is available for the M.S. degree, at the adviser's discretion.

### Doctoral Degree Requirements

In addition to Graduate School requirements, the instructional program includes three graduate core courses in ecology (one each of three core areas: population ecology, community/ecosystem ecology, and physiological ecology), two advanced 3-credit statistics courses, 4 credits of colloquium, breadth courses selected by the student in consultation with the research adviser and research committee, a minimum of 15 thesis credits, and a thesis research project directed by the student's adviser.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by strong performance in two semesters of one foreign language or the equivalent. Both the candidacy and comprehensive examinations will be written and oral.

### Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

### Watershed Stewardship Option

The Graduate Option in Watershed Stewardship is intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in the Intercollegiate Graduate Degree Program in Ecology at the University Park campus. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at natural resources conservation and environmental problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and FOR 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2). Breadth courses will consist of three graduate credits of course work from each of four subject matter areas: (1) water resources science, (2) social science, public policy and economics, (3) humanities, and (4) communications and design. In the watershed stewardship practicum courses, students work in teams with community, government, and business leaders to analyze and understand natural resources and ecological issues and creatively synthesize appropriate solutions in the form of a written watershed management plan.

### Other Relevant Information

Detailed descriptions of courses now available for students majoring in ecology may be found under the offerings of several ecologically oriented departments.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/24/04

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185B

Review Date: 4/15/08

Updated by Publications: 12/22/11



## Economics (ECON)

[Program Home Page](#)

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### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- Saroj Bhattarai, Ph.D. (Princeton) Assistant Professor of Economics
- Kalyan Chatterjee, D.B.A. (Harvard) Distinguished Professor of Management Science and Economics
- Russell W. Cooper, Ph.D. (Pennsylvania) Professor of Economics
- N. Edward Coulson, Ph.D. (California, San Diego) Professor of Economics
- Jonathan Eaton, Ph.D. (Yale) Professor of Economics
- Emmanouil Galenianos (Manolis) Ph.D. (Pennsylvania) Assistant Professor of Economics
- Edward J. Green, Ph.D. (Carnegie Mellon) Professor of Economics
- Paul Grieco, Ph.D. (Northwestern) Professor of Economics
- Barry Ickes, Ph.D. (California, Berkeley) Professor of Economics
- James S. Jordan, Ph.D. (Northwestern) Professor of Economics
- Sung Jae Jun, Ph.D. (Brown) Assistant Professor of Economics
- Thomas A. Knapp, Ph.D. (Colorado, Boulder) Associate Professor of Economics
- Kala Krishna, Ph.D. (Princeton) Professor of Economics
- Vijay Krishna, Ph.D. (Princeton) Distinguished Professor of Economics
- Jenny Li, Ph.D. (Cornell) Associate Professor of Economics and Mathematics
- Raymond E. Lombra, Ph.D. (Penn State) Professor of Economics
- Robert C. Marshall, Ph.D. (California, San Diego) Professor of Economics
- Alexander Monge-Naranjo, Ph.D. (Chicago) Assistant Professor of Economics
- Rajen Mookerjee, Ph.D. (Northwestern) Associate Professor of Economics
- Theodore Papageorgiou, Ph.D. (Yale) Assistant Professor of Economics
- Coenraad A. Pinkse (Joris), Ph.D. (London School of Economics) Associate Professor of Economics
- Bee-Yan Roberts, Ph.D. (Wisconsin) Professor of Economics
- Mark J. Roberts, Ph.D. (Wisconsin) Professor of Economics
- David Shapiro, Ph.D. (Princeton) Professor of Economics
- James Tybout, Ph.D. (Wisconsin) Professor of Economics
- Neil Wallace, Ph.D. (Chicago) Distinguished Professor of Economics
- Stephen Yeaple, Ph.D. (Wisconsin) Associate Professor of Economics
- Ruijin Zhou, Ph.D. (Pittsburgh) Associate Professor of Economics

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the General Information section of the Graduate Bulletin.

Graduate study in Economics relies heavily on abstract mathematics. It is recommended that, at a minimum, applicants should have taken mathematics up through multivariate calculus.

We require that applicants take the 3-part general aptitude GRE. In judging applicants, we try to take into account that different applicants expend different amounts of effort in preparing for the GRE and that there are systematic differences among applicants from different countries. We require that the GRE be taken within 3 years prior to applying to our Ph.D. program. (Institution Code: 2660; Department Code: 1801)

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (IBT). Applicants with IBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. (Institution code: 2660; Department code: 84)

International applicants who have received a bachelor's or a graduate degree from a college/university in any of the following countries are exempt from the TOEFL/IELTS requirement: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

We place considerable weight on, and require three (3) letters of recommendation. Letters should be from people who know you well and who are familiar with graduate programs in Economics at leading universities. The most valuable letters are from people who can credibly compare you to others who have succeeded in such programs.

Highly successful Ph.D. students in Economics display a wide variety of research skills, including creativity. The questions we ask on the application are intended to elicit information about those skills. Also, if you have completed a paper that displays such skills, upload it via the GRADS online application system.

### Requirements for Graduate Degrees

**The Ph.D.** - The Ph.D. program has 3 main parts taken in sequence: the core, subfields (of specialization), and the dissertation. Most students take 5 years to complete the program. Occasionally, but rarely, a student finishes in 4 years.

**The Core** - The core consists of 2 semesters of coursework: a 2-semester sequence in microeconomic theory, a 2-semester sequence in econometrics, and a course in mathematics for economists followed by an intensive single-semester in macroeconomic theory. At the beginning of the third semester, students are required to take two 3-hour candidacy exams: one in microeconomics and one in macroeconomics. Students who fail an exam on their first attempt are allowed to take the exam a second time. Competence in econometrics must be demonstrated through satisfactory completion of the coursework. Students with prior graduate training may, however, obtain permission to skip some of the coursework in the core and take the candidacy exams earlier than the 3rd semester.

**Subfields** - Students must demonstrate competence in 3 subfields. Competence in a subfield is usually demonstrated by completing 6 credits in the subfield with no grade lower than a B.

The department offers the following subfields: development economics, econometrics, game theory, industrial organization, international economics, and macroeconomics.

With the permission of the student's advisor and the Director of Graduate Studies, a student may take a subfield in another department. For instance, students have taken subfield courses in Demography, Political Science, and Statistics.

Ph.D. Program

Fall 1st Year	Spring 1st Year	Fall Candidacy Exams	Fall 2nd Year	Spring Candidacy Exams (if needed)	Spring 2nd year
Micro I (ECON 502)	Micro II (ECON 521)		Field 1.1		Field 1.2
Econometrics I (ECON 501)	Econometrics II (ECON 510)		Field 2.1		Field 2.2
Math for Econ (ECON 500)	Macro I & II (ECON 503 & 522)		Field 3.1		Field 3.2
			Empirical Methods I (ECON 512A)		Empirical Methods II (ECON 512B)

- 3rd-year paper requirement must be completed before spring semester of 3rd year
- Comprehensive exam (dissertation proposal defense) must be completed before fall semester of 4th year

**Empirical Methods Course I & II** -- (ECON 512A & ECON 512B) In their **second year**, all students must enroll in ECON 512A Empirical Methods in Economics I (1 credit offered in the fall.) This course introduces students to computational methods used to numerically solve and simulate economic models and program econometric estimators. Also, all students in their second year must enroll in ECON 512B Empirical Methods in Economics II (2credits offered in the spring semester.) This course is a continuation of ECON 512A covering the modern computational methods used in both theoretical and empirical research in economics. Students will be required to work on a small project involving data analysis.

**3rd-Year Paper** - Students must complete a paper by the end of their 5th semester, the fall semester of their 3rd year. The paper must be approved by a 3-person faculty committee. The paper must contain original research and must be written in a form suitable for submission to a journal.

**Dissertation Research** - Most dissertations consist of several essays, each of which has the substance and quality of a journal article. However, a dissertation which has the substance and quality of a single major article in a leading journal is also acceptable. The comprehensive exam (dissertation proposal defense) must be completed before fall semester of 4th year. The student will spend the 4th year and the beginning of the 5th year completing the dissertation and will use the summer after the 4th year and the beginning of the 5th year in preparation for the job market.

**Dual-Title Graduate Degree Programs** - Occasionally students construct a dual-title graduate degree program. One such program is Economics and Demography. Another is Economics and Operations Research. Details may be obtained by clicking the links above or from the Graduate Director.

**Good Standing.** A student must remain in "good standing" while in the program. This means following the course sequence outlined above, maintaining a GPA of at least 3.0 and completing the candidacy, third-year paper and comprehensive exam requirements on time.

**The M.A.**

The M.A. degree in economics may be earned by (a) satisfactorily completing at least 24 credits of appropriate graduate course work, together with a master's dissertation for which 6 credits is granted, and passing a final oral examination; or (b) by satisfactorily completing 30 credits of appropriate course work, presenting a master's essay for which no graduate credit may be granted, and passing a final oral examination. The master's essay option, which most students elect, includes preparation of a paper which is written under the supervision of a faculty member. Under either option, at least 18 credit hours must be in approved graduate courses.

The department does not admit students who seek an M.A. as a terminal degree.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ECONOMICS \(ECON\) course list](#)

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-118

Review Date: 11/13/2012

Faculty updated: 10/12/12

## Educational Leadership (EDLDR)

[Program Home Page](#)

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Department e-mail: [EDLDR@psu.edu](mailto:EDLDR@psu.edu)

### Degrees Conferred:

Ph.D., D.Ed., M.S., M.Ed.

Graduate work in the Educational Leadership program encompasses two major strands or paths. The first strand focuses on those who want to engage in a wide variety of leadership roles within and directly affecting schools and districts. These roles include, but are not limited to teacher leadership, instructional leadership, principal leadership, and district-level leadership. This strand may also lead to certification and/or letters of endorsement in supervision, the principalship or the superintendency. The second strand focuses on those who want to exercise leadership roles in educational policy arenas and/or engage in educational research. Possible roles include: intermediate unit officials, state and federal agency administrators and staff, professors of educational administration, and research and development personnel. The principalship certification is also available at Penn State Great Valley and Penn State Harrisburg.

The M.Ed. in Educational Leadership with an option in Teacher Leadership is designed for students who wish to pursue leadership positions in educational organizations other than those that are formally designated, e.g., the principalship. The option is focused most particularly toward teachers who wish to expand their skills, knowledge, and dispositions to improve instructional practice, teacher performance, curriculum, and staff development efforts within their own school contexts. The on-line option in teacher leadership is designed specifically for working professionals whose participation in a residence program may be limited by time and distance constraints.

### Admission Requirements

Scores from the Miller Analogies Test (MAT) are required for admission to the doctoral programs in Educational Leadership. When the MAT is not available (e.g., some overseas locations), Graduate Record Examinations (GRE) scores or Graduate Management Admissions Test (GMAT), may be substituted. At the discretion of a graduate program, a student may be admitted provisionally. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants to the M.Ed. and M.S. degree programs must present evidence of at least a 2.60 grade-point average in the last two years of undergraduate work. A grade-point average of 3.50 in prior graduate work is required of those desiring admission to enter a doctoral program. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may allow for conditional admission to those not meeting stated criteria.

More details concerning the degree and certification programs are presented in a prospectus that is available upon request.

Students interested in pursuing the on-line M.Ed. in Educational Leadership with an option in Teacher Leadership must first be admitted to Penn State's Graduate School. The requirements listed below are in addition to general Graduate School requirements as stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Scores from the Miller Analogies Test (MAT), the Graduate Record Examinations (GRE), or some other pertinent standardized test are not required for admission to professional degree programs in Educational Leadership, and this includes the online M.Ed in Educational Leadership with an option in Teacher Leadership.

We anticipate that the M.Ed. in Educational Leadership with an option in Teacher Leadership will attract a small number of international students as well as those in the United States. In accordance with the requirements noted in the Graduate Bulletin, "The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with exceptions noted below.

The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5."

Complete details concerning the TOEFL/IELTS requirements are available at the Master's Degree Requirements section of the Graduate Bulletin.

The Educational Leadership Program requires all graduate program applicants to submit three reference letters, official copies of undergraduate and graduate transcripts, a short review of a professional journal article of the applicant's choosing (along with a copy of the actual article), a brief personal statement of intent, and a current resume or CV. Applicants must present evidence of at least a 3.0 grade-point average in the last two years of undergraduate work. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may allow for provisional admission to those not meeting all of the above criteria.

The Teacher Leadership Admission Committee on a rolling basis will review all applications to the M.Ed. in Educational Leadership with an option in Teacher Leadership. Admission decisions (admit, reject, or admit provisionally) are made using all of these data.

### Master's Degree and Certification Requirements

All candidates for the M.Ed. and M.S. degrees will complete a minimum of 30 graduate credits. Certification for various public school administrative positions requires additional graduate work beyond the master's degree and such requirements as specified in the program prospectus.

M.Ed. students must submit a master's paper. M.S. degree students are expected to submit a thesis.

The M.Ed. in Educational Leadership with an Option in Teacher Leadership via World Campus and in residence at Penn State University Park is a 30-credit M.Ed. program with 2 designated "core" courses and 6 required courses for a total of 24 credits. The two designated "core" courses for this M.Ed. option are: (1) EDLDR 560 Principles of Instructional Supervision and (2) EDLDR 559 School Improvement. Six other courses are required and include EDLDR 563, EDLDR 802, C I 501, EDLDR 551, EDPSY 421 or ADTED 498, and EDLDR 894A. Six additional credits (2 courses) from outside of the Educational Leadership Program are considered electives in the proposed Teacher Leadership option.

The resident M.Ed. in Educational Leadership (non-option) requires 30 credits, including the 2 "core" courses noted above and 6 required courses for a total of 24 credits. The two designated "core" courses for the M.Ed. non-option are: (1) EDLDR 560 Principles of Instructional Supervision and (2) EDLDR 559 School Improvement. The six required courses are drawn from several "strands" or areas of concentration offered, including School Leadership, Professional Development, Curriculum, School Policy, & Change and an "Open" area. Determination of the specific courses is dependent on: (1) the "strand" or area of concentration selected by the student and (2) advisement and guidance from the assigned academic advisor.

Credits toward a M.Ed. in Educational Leadership will be at the 400-level or above with a minimum of 18 credits earned from courses at or above the 500-level. At least six (6) credits must be completed outside of the EDLDR Program area. An additional Program requirement states that all master's degrees (either the M.S. or the M.Ed.) must contain a total of at least 18 credits of EDLDR course work.

Each student will complete the M.Ed. in Educational Leadership with an option in Teacher Leadership via World Campus in conjunction with a designated EDLDR faculty member and in connection with the EDLDR 894A course work. This is the culminating course of the program and focuses on an application of course information in the form of an action research project. This project will be planned in cooperation with the EDLDR faculty member who serves as the student's project advisor and must reflect an appropriate degree of graduate-level scholarship, as determined by the advisor.

The master's project is a completed piece of work representing the culmination of academic work toward the M.Ed. degree.

**Doctoral Degree Requirements**

Candidates for the D.Ed. degree are required to spend at least one semester and one summer session consecutively in full-time residence during a twelve-month period. Ph.D. candidates are strongly encouraged to spend two academic years in residence, but must spend at least two consecutive semesters in residence. D.Ed. candidates may satisfy the residence requirement in another manner consistent with Graduate School policy, including attendance at the day-long seminars offered weekly every other academic year. Candidates for all degrees are required to combine work in the social sciences and humanities with the specialization in Educational Leadership.

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the thesis. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

After the doctoral student has been admitted to a doctoral program and has completed forty to forty-five hours beyond the bachelor's degree, his or her name is usually submitted for candidacy. After a student is admitted to candidacy for the doctoral degree, he or she takes the comprehensive written and oral examinations. After those are successfully completed, the student presents a thesis problem on a significant, researchable topic, evidenced by a prospectus to the doctoral committee for review.

**Other Relevant Information**

American Indian students participate in a special administrator preparation program. Foreign students can work on research topics in their home nations.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-013

Review Date: 06/21/2011

## Educational Psychology (EDPSY)

[Program Home Page](#)

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### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- David S. Bender, Ph.D. (Cornell) Associate Professor of Educational Psychology
- Robert L. Hale, Ph.D. (Nebraska) Professor of Education
- Stephanie L. Knight, Ed.D. (Houston) Professor of Education
- Jonna M. Kulikowich, Ph.D. (Texas A&M) Professor of Education
- Pui-Wa Lei, Ph.D. (Iowa) Associate Professor of Education
- Bonnie J. F. Meyer, Ph.D. (Cornell) Professor of Educational Psychology
- P. Karen Murphy, Ph.D. (Maryland) Professor of Education
- Rayne A. Sperling, Ph.D. (Nebraska) Associate Professor of Education
- Robert J. Stevens, Ph.D. (Illinois) Professor of Educational Psychology
- Hoi K. Suen, Ed.D. (Northern Illinois) Distinguished Professor of Educational Psychology
- Peggy Van Meter, Ph.D. (Maryland) Associate Professor of Education
- Sarah E. Zappe, Ph.D. (Penn State) Affiliate--Research Associate/Director of Assessment and Instructional Support

The graduate program in Educational Psychology focuses on the study of learning, instruction, and measurement across the life span. The learning and instruction emphasis applies the study of cognitive psychology to research on learning and instruction in applied settings like schools. The course of study provides a strong foundation in psychological theory, principles related to instructional applications, and quantitative methodology. The measurement emphasis applies cognitive psychology and theories of measurement to test design, instrument construction, scale analysis, and measurement theory. The Educational Psychology program emphasizes the use of rigorous quantitative methodology in the scientific study of learning, instruction, and measurement in applied settings. Typically this program prepares individuals for professions in universities, research institutions, government agencies, and industry. Individuals interested in more clinical applications of psychology, such as counseling psychology or school psychology should contact those specific graduate programs in the University.

### Admission Requirements

Applicants are required to submit scores from the Graduate Record Examinations (GRE) verbal, quantitative, and analytic writing. Typically applicants have at least a 3.0 junior/senior grade-point average (on a 4.0 point scale) and broad undergraduate background including college level mathematics. Exceptions may be made for students with special backgrounds, abilities, and interests. Applicants with a master's degree will be required to show strong performance in their graduate program. Applicants will also supply letters of reference and a written statement of their professional goals. The requirements specified here are in addition to the Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

### Master's Degree Requirements

Students in the master's degree program are required to take 30 credits, including core courses EDPSY 406, 421, 450, and 475. Students will also take at least one foundational course in educational theory, philosophy, or individual differences. The remaining credits will be taken in a way to develop the student's area of specialization, in consultation with the student's adviser. The program offers two options, M.S. with a thesis, and an M.S. without a thesis. Students wishing to go on to the Ph.D. are required to complete the M.S. with thesis option.

### Doctoral Degree Requirements

Students in the doctoral degree program will select a major emphasis in either learning and instruction or measurement. Students in the doctoral program must complete the core courses as listed in the master's program. All students must also have at least one advanced-level course in learning and measurement. Students will also have three courses spread across the foundational areas of educational theory and history, philosophy, and individual differences. Students must pass a candidacy examination to enter into the doctoral program, assessing their mastery of the content in the core courses. Students must also pass a comprehensive examination assessing their areas of specialization near the end of their doctoral studies. Students are also expected to develop and defend a theoretically based scholarly research proposal that will become their dissertation project. The doctoral program culminates in the production of and defense of the student's dissertation that is expected to be a publishable quality independent research study. All of these requirements are specified in more detail in the student handbook.

### Doctoral Minor

At the doctoral level, a minor is also possible in EDPSY. Like all University minors, it requires at least 15 credits of work within the program, including the courses EDPSY 406, 421, and 450, plus at least two other courses in EDPSY, in consultation with the minor adviser. The minor adviser should be a member of the Graduate Faculty and on the doctoral committee. The minor adviser should be appointed as early as possible. Anyone interested in this option should talk to a faculty member in EDPSY. If you would like to apply to enter the minor in Educational Psychology, see the program staff assistant in 125D CEDAR Building.

### Student Aid

All applicants are considered for Graduate Assistantships that are available in the program. Typically these assistantships provide tuition waiver plus a stipend.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[EDUCATIONAL PSYCHOLOGY \(EDPSY\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 04/12/04

Faculty updated: 11/27/12

## Educational Theory and Policy (EDTHP)

[Program Home Page](#)

DAVID BAKER, *Director of Graduate Studies*  
300 Rackley Building  
814-865-1488  
[EDTHP@psu.edu](mailto:EDTHP@psu.edu)

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- David P. Baker, Ph.D. (Johns Hopkins) Professor of Education and Sociology
- Katerina Bodovski, Ph.D. (Penn State) Assistant Professor of Education
- Soo-yong Byun, Ph.D. (Minnesota, Twin Cities) Assistant Professor of Education
- David Gamson, Ph.D. (Stanford) Associate Professor of Education
- Mindy L. Kornhaber, Ed.D. (Harvard) Associate Professor of Education
- Gerald K. LeTendre, Ph.D. (Stanford) Professor of Education and International Affairs; Head, Education Policy Studies
- Dana Mitra, Ph.D. (Stanford) Associate Professor of Education
- Suet-Ling Pong, Ph.D. (Chicago) Professor of Education, Sociology, and Demography
- David Post, Ph.D. (Chicago) Professor of Education, and Human Development and Family Studies
- Madhu S. Prakash, Ph.D. (Syracuse) Professor of Education
- Maryellen Schaub (Penn State) Assistant Professor of Education

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Students with a 2.75 grade-point average will be considered for admission to the master's program, and with a 3.00 grade-point average at the master's level for the Ph.D. program. Exceptions to the minimum grade-point average may be made for students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

Candidates who seek an M.A. in Educational Theory and Policy shall complete programs that will include studies in social theory, policy, and planning or in the social sciences or humanities. A thesis is required.

### Doctoral Degree Requirements

Candidates who seek a Ph.D. in Educational Theory and Policy shall complete programs that will include studies in social theory, policy, and planning, or in the social sciences or humanities.

All doctoral students must pass a written candidacy examination after nine to eighteen hours of study.

Candidates for the Ph.D. degree are required to complete a minimum of two consecutive semesters in residence during an academic year.

The communication and foreign language requirements for the Ph.D. degree may be satisfied by options selected from foreign languages, statistics, computer science, logic, or other research methodologies deemed acceptable by the candidate's doctoral committee.

At the end of the program of study, each student must take a written and oral comprehensive examination that will cover the student's major areas of study.

### Other Relevant Information

Upon admission, each student will be assigned to a faculty adviser whose specialization best coincides with the student's background or academic interest. For the master's degree, the adviser and student together will plan the program of study. For doctoral students, the adviser and student will plan the early aspects of study, but an interdisciplinary committee will be formed, soon after the student is admitted to candidacy, to supervise completion of a program of study.

### Student Aid

Graduate assistantships available to doctoral students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Joint Degree Program between The Pennsylvania State University Dickinson School of Law (J.D.) and the Educational Theory And Policy Program (M.A., & Ph.D.)

**Joint Degree Program:** The Pennsylvania State University Dickinson School of Law (DSL) and the Educational Theory and Policy (EDTHP) Program are offering a joint degree program leading to a Juris Doctor (J.D.); and a Master of Arts (M.A.), or a Doctor of Philosophy (Ph.D) in Educational Theory and Policy.

### Admission Requirements

The number of openings in the joint degree J.D./M.A. or Ph.D. program will be limited to students with an outstanding academic record who have successfully completed two semesters at the Dickinson School of Law.

Applicants to the joint degree program:

1. must have been admitted to the Dickinson School of Law
2. should have successfully completed two semesters of course work at the Dickinson School of Law with a grade-point average of 3.0
3. must submit two letters of recommendation from the Dickinson School of Law faculty
4. must submit a career statement

Note: Students are eligible to start taking courses in the EDTHP program after successfully completing two semesters of law school work.

### College-Specific Admission Requirements

**DSL:** A bachelor's or equivalent degree from an accredited college is a prerequisite for admission; however, there is no standard prescribed undergraduate curriculum. An applicant should have acquired significant oral and written communication skills before entering law school. The following are required of applicants: a completed application form for DSL; submission of the results of the law school admission test (LSAT); completion of an LSDAS report; a one-page personal statement; employment records since high school; and two letters of recommendation.

**EDTHP:** The following are required of all applicants: a completed application form to EDTHP; submission of the results of the Graduate Record Examination



(GRE), or LSAT; an official undergraduate transcript or transcripts; a personal statement; employment records since high school; and three letters of recommendation.

The best qualified students will be accepted for admission into the doctoral programs up to the number of spaces available. Students with a 2.75 grade-point-average (GPA) will be considered to the master's program, and with a 3.0 GPA at the master's level for the Ph.D. program. Exceptions to the minimum GPA may be made for students with special backgrounds, abilities, and interests.

All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the Test of English as a Second Language (TOEFL) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test or a score of 213 on the computer-based test, or 80 points on the new Internet-based test with a minimum of 23 points on the new speaking portion; or the International English Language Testing System (IELTS) with a minimum composite score of 6.5 is required for admission.

**Residency:** Students will normally spend four semesters in residence at DSL and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDTHP degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDLDR program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period. D.Ed.

**Liaisons:** The department and faculty liaisons for DSL shall be the Associate Dean for Academic Affairs and the student advisor shall be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for EDTHP shall be the Professor-in-Charge (PIC) or such faculty member(s) as may be designated by the PIC.

## PREScribed COURSES

**DSL:** All students are required to take the first-year curriculum in DSL. In the second or third year, students must take CORE 934 (Professional Responsibility). The fall curriculum for the first year consists of the following courses:

### CORE COURSES (CORE)

- 900. Civil Procedure (4)
- 910. Criminal Law (3)
- 912. Legal Analysis, Research & Writing I (3)
- 925. Torts (4)

*The spring curriculum of the first year consists of the following courses:*

### One 3-credit Elective

### CORE COURSES (CORE)

- 903. Constitutional Law (3)
- 905. Contracts (4)
- 914. Legal Analysis, Research & Writing II (3)
- 920. Property (4)

**EDTHP:** A minimum of 36 credits is required for the M.A. in EDTHP. At least 27 credits must be at the 500 level or above; at least 18 credits must be in EDTHP. At least 6 credits of thesis research (EDTHP 600 or 610) must be taken to fulfill the Graduate School's requirements. Only 3 credits of EDTHP 596 (Independent Study) may be counted toward the M.A. requirements. Students who wish to transfer credits from other programs must receive prior approval from the EDTHP faculty. The required course is EDTHP 500 (Proseminar).

## Ph.D. requirements

Introduction to the EDTHP Program (3 credits)

EDTHP 500 Proseminar

Research Methods (12 credits)

EDTHP/EDLDR/ED 585: Research Design

EDTHP/EDLDR/ED 586: Qualitative Methods

Two quantitative methods courses.

**Research Courses:** 6 credits

These are research method courses specifically related to the student's thesis.

**Theory Foundations:** 12 credits\*

Four theory-based 500-level EDTHP courses are required. At least one course must be a 500-level EDTHP course in the area of history or philosophy of education (e.g., EDTHP 533, 536, 540, or 541), and another must be a 500-level EDTHP course in the area of sociology or demography of education (e.g., EDTHP 516, 557, or 597 classes such as Sociology of Education or Sociology of Adolescence). After a student has consulted with his or her advisor, one 400-level course may be substituted for EITHER one 500-level Theory course OR one 500-level Policy course, depending on the nature of the 400-level course. Students who take advantage of this option will need to do additional work beyond the 400-level requirements and should make arrangements with the instructor ahead of time.

**Policy Foundations:** 12 credits\*

EDTHP/EDLDR/ED 587: Policy and Politics

In addition, three 500-level EDTHP courses in educational policy (e.g., EDTHP 516, 518, 520, 527, or 597 classes such as Comparative Analysis of Education Policy) are required. After a student has consulted with his or her advisor, one 400-level course may be substituted for EITHER one 500-level Theory course OR one 500-level Policy course, depending on the nature of the 400-level course. Students who take advantage of this option will need to do additional work beyond the 400-level requirements and should make arrangements with the instructor ahead of time.

\*Note: Some EDTHP courses may be counted as either a Theory course or a Policy course, but they may not be double-counted.

**Other:** 21 credits

These include credits for minor or dual-title requirements, electives, and thesis research. A maximum of 9 professional credits and 15 academic transfer credits may be counted.

EDTHP independent study courses (EDTHP 596) will be counted only as electives unless the student consults with his or her advisor and then petitions the EDTHP faculty.

## INTERPROGRAM TRANSFER OF CREDITS

**DSL:** A maximum of twelve credits for EDTHP course work may be transferred for credit toward the J.D. degree at DSL. Students must obtain a grade satisfactory to DSL for the course work to be credited toward the J.D. degree. The following EDTHP courses may qualify for credit in DSL: (1) EDTHP 518 (Analysis of U.S. Educational Policy); EDTHP 520 (Theoretical Perspectives on School Reform); (3) EDTHP 533 (Social History and Educational Policy); (4) EDTHP 541 (Contemporary Philosophies of Education); and (5) EDTHP 587 (Education Policy and Politics).

**EDTHP:** What courses may be credited will be determined by the student's degree program. Normally a maximum of twelve credits of DSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee. Normally, a maximum of 30 credits from a master's degree program will be counted for credit for the minimum requirements for a Ph.D. degree.

**Sequence:** The sequence of courses will be determined by the students and their advisors.

**Recommended Program of Study and Advising:** All students in the program will have two advisors, one from DSL and one from EDTHP. Periodic interaction between the two advisors will be encouraged. A program of study will be developed for each student, taking into account the fact that some courses are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisors will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the EDTHP programs.

**Tuition:** Students will be charged the applicable DSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDLDR degree program. DSL tuition will be paid for the semesters in which the student is registered for DSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered in if he or she wishes to take additional course work pursuant to that program during the semester.

**Financial Aid and Assistantships:** Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

**Fulfillment of Degree Requirements and Graduation:** All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the interprogram transfer of credits. With respect to EDTHP program requirements for a thesis or paper, work done while at DSL under the supervision of a DSL faculty member may be appropriate for incorporation into the thesis or paper with the approval of the EDTHP degree program committee (in such cases, the committee should consider whether the credits afforded such work will be subject to the twelve credit maximum for interprogram transfers). A DSL faculty member must be a member of the committee).

If for some reason the student cannot complete the requirements of the J.D., the student will still be allowed to count DSL courses already taken toward the pertinent EDTHP degree, even if he or she is no longer in the joint degree program.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[EDUCATIONAL LEADERSHIP PROGRAM \(EDLDR\) course list](#)

[EDUCATIONAL THEORY AND POLICY \(EDTHP\) course list](#)

[HIGHER EDUCATION \(HI ED\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 04/12/04

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-431

Review Date: 6/12/07

Faculty updated: 3/1/13

## Energy and Mineral Engineering (EME)

### [Program Home Page](#)

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[www.eme.psu.edu](http://www.eme.psu.edu)

### Degrees Conferred:

Ph.D., M.S. (with or without options in Petroleum and Natural Gas Engineering; Mining and Mineral Process Engineering; Environmental Health and Safety Engineering; Fuel Science; and Energy Management and Policy)

### The Graduate Faculty

- Michael A. Adewumi, Ph.D. (IIT) Professor of Petroleum and Natural Gas Engineering
- Luis Ayala, Ph.D. (Penn State), Associate Professor of Petroleum and Natural Gas Engineering
- Seth Blumsack, Ph.D. (Carnegie Mellon), Assistant Professor of Energy Policy and Economics
- R. J. Briggs, Ph.D. (Texas, Austin) Assistant Professor of Energy and Environmental Economics
- Jeffrey Brownson, Ph.D. (Wisconsin), Assistant Professor of Energy and Mineral Engineering
- Yongsheng Chen, Ph.D. (Lehigh), Assistant Professor of Energy and Mineral Engineering
- Caroline B. Clifford, Ph.D. (Penn State), Senior Research Associate, Energy Institute
- Derek Elsworth, Ph.D. (California, Berkeley) Professor of Energy Geo-Environmental Engineering
- Turgay Ertekin, Ph.D. (Penn State) Professor of Petroleum and Natural Gas Engineering
- Semih Eser, Ph.D. (Penn State) Professor of Energy and Geo-Environmental Engineering
- R. Larry Grayson, Ph.D. (West Virginia), Professor of Energy and Mineral Engineering
- William A. Groves, Ph.D. (Michigan) Associate Professor of Industrial Health and Safety
- M. Thaddeus Ityokumbul, Ph.D. (Univ. of Western Ontario) Associate Professor of Mineral Processing and Geo-Environmental Engineering
- Russell T. Johns, Ph.D. (Stanford) Professor of Petroleum and Natural Gas Engineering
- Zuleima Karpyn, Ph.D. (Penn State), Associate Professor of Petroleum and Natural Gas Engineering
- Andrew Kleit, Ph.D. (Yale), Professor of Energy and Environmental Economics
- Mark S. Klima, Ph.D. (Penn State) Associate Professor of Mineral Processing and Geo-Environmental Engineering
- Zhen Lei, Ph.D. (California, Berkeley) Assistant Professor of Energy and Environmental Economics
- Li Li, Ph.D. (Princeton) Assistant Professor of Petroleum and Natural Gas Engineering
- Shimin Liu, Ph.D. (Southern Illinois) Assistant Professor of Energy and Mineral Engineering
- Angela D. Lueking, Ph.D. (Michigan) Associate Professor of Energy and Geo-Environmental Engineering
- Serguei Lvov, Ph.D. (St. Petersburg) Professor of Energy and Mineral Engineering
- Jonathan Mathews, Ph.D. (Penn State) Assistant Professor of Energy and Mineral Engineering
- Sharon Falcon Miller, Ph.D. (Penn State) Senior Research Assistant, Energy Institute
- Antonio Nieto, Ph.D. (Colorado Schools of Mines) Associate Professor of Mining Engineering
- Kwadwo A. Osseo-Asare, Ph.D. (California, Berkeley) Distinguished Professor of Metallurgy and Energy and Mineral Engineering
- Sarma Pisupati, Ph.D. (Penn State) Associate Professor of Energy and Mineral Engineering
- Ljubisa R. Radovic, Ph.D. (Penn State) Professor of Energy and Mineral Engineering
- Jamal Rostami, Ph.D. (Colorado School of Mines), Assistant Professor of Energy and Mineral Engineering
- Anastasia V. Shcherbakova, Ph.D. (Chicago) Assistant Professor of Energy Economics, Risk and Policy
- Chunshan Song, Ph.D. (Osaka) Distinguished Professor of Fuel Science
- Randy L. Vander Wal, Ph.D. (Wisconsin) Professor of Energy and Mineral Engineering
- John Yilin Wang, Ph.D. (Texas A & M) Assistant Professor of Petroleum and Natural Gas Engineering

The John and Willie Leone Family Department of Energy and Mineral Engineering provides a vertically integrated approach to research and education in all aspects of the energy and mineral industries, including scientific and engineering issues, health and safety and maintenance of high environmental standards. The Department's mission is to forge an intellectual and scientific cohesiveness in energy and mineral resource technology. This objective is achieved by exploiting the natural synergy between the exploration, extraction, processing and utilization of energy and mineral resources so as to cater to the emerging needs of society.

The Department offers advanced degrees in Energy and Mineral Engineering (M.S. and Ph.D.) The Department has overall requirements for the M.S., and Ph.D. degrees with specific requirements associated with each program. The Department also offers integrated undergraduate-graduate (IUG) degree programs that combine the M.S. in Energy and Mineral Engineering with each of the five B.S. degree programs: Energy Business and Finance; Energy Engineering; Environmental Systems Engineering; Mining Engineering; and Petroleum and Natural Gas Engineering.

### Energy and Mineral Engineering Program

The Energy and Mineral Engineering (EME) program is a single graduate program with a focus on the production of energy and minerals in an economic, safe and efficient manner. The program provides flexible education of students in energy and mineral sciences and engineering, with focus on both non-renewable and renewable resource and energy industries. The program is designed to resolve the sometimes competing goals of flexible education of requisite breadth while still providing in-depth study; students are required to follow a focused curriculum that combines the requisite rigor with flexibility in a rapidly changing field of endeavor. Participating students take core program and required option courses and additional courses from a broad array of courses to meet the total credit requirements. Students are not required to choose an option. However, a student who desires disciplinary identity may choose from among the five available options: petroleum and natural gas engineering, mining and mineral process engineering, environmental health and safety engineering, fuel science, and energy management and policy.

### Admission Requirements

Scores for the Graduate Record Examinations (GRE) are required for admission, though this may be waived at the discretion of the Energy and Mineral Engineering graduate program. The best-qualified applicants will be accepted by the Energy and Mineral Engineering graduate program up to the number of spaces available for new students. At the discretion of the Energy and Mineral Engineering graduate program, a student may be granted provisional admission. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Admission to the Energy and Mineral Engineering graduate program in the John and Willie Leone Family Department of Energy and Mineral Engineering is competitive. Entering students must hold a bachelor's degree in a science or engineering discipline unless they are on the Integrated Undergraduate-Graduate (IUG) program. Students with 3.00 or better (out of 4.00) junior/senior cumulative grade-point averages and appropriate course backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing, minimum grade-point average of 3.3, and excellent faculty recommendations may be admitted for a five-year B.S./M.S. integrated undergraduate-graduate (IUG) degrees.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, The United States, and Wales.

Letters of recommendation and an applicant's statement of purpose are also required.

### Master's Degree Requirements

The M.S. degree program in Energy and Mineral Engineering is designed for students to gain advanced knowledge for research, analysis, and design in Energy and Mineral Engineering. Students pursuing an M.S. degree will be required to complete 24 course credits and submit a thesis (6 credits) to the Graduate Council. Prescribed courses are EME 500(3), EME 580(3), EME 590(1), and EME 600(6); an additional 17 credits of electives are required (for options, 12 of these elective credits are prescribed). Graduate committees in the Energy and Mineral Engineering graduate program play an important role in formulating individual course and research schedules. At least 18 of the total course credits must be at the 500 level or above.

### Doctoral Degree Requirements

The Ph.D. program in Energy and Mineral Engineering emphasizes scholarly research and help students prepare for research and related careers in industry, government and academe. Acceptance into the Ph.D. degree program in Energy and Mineral Engineering is based on the student's performance on the Ph.D. candidacy examination administered by the faculty of the EME graduate program. A comprehensive examination is required of all Ph.D. candidates and should be taken after substantial completion of course work. The comprehensive examination is the responsibility of the candidate's doctoral committee and administered according to the rules specified by the Graduate Council. The Ph.D. program in Energy and Mineral Engineering is quite flexible, with minimum formal requirements. A minimum of 12 post M.S. course credits and 12 research credits are required. At least 18 course credits for the graduate program must be at the 500 level or above. For students entering the program with an M.S. degree, 500-level or above courses already taken either at Penn State or other institutions may be accepted in partial fulfillment of the 18 credits of 500-level or above course requirements if they are found to be appropriate. Students meet the general communication requirement for all Ph.D. candidates through the candidacy examination where a candidate is required to submit a written research paper or proposal of less than 15 double-spaced pages and make a formal public presentation and defense of the research proposal. The candidate is assessed by the exam committee on both technical and communication proficiency. Although encouraged, competency in a foreign language is not required for the Ph.D. degree. However, each Ph.D. candidate is expected to demonstrate competency in communication and language by successfully completing EME 581(3) (Research and Geostatistics Methods) which teaches students methods for the conduct, analysis and effective communication of scientific research and spatial characterization.

The general requirements for graduation are outlined in the GENERAL INFORMATION section of the Graduate Bulletin.

### Integrated Undergraduate-Graduate (IUG) Degree Requirements

#### Integrated B.S. in Energy Business and Finance and M.S. in Energy and Mineral Engineering

The integrated undergraduate-graduate (IUG) program between the Energy Business and Finance undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused EBF undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

#### Integrated B.S. in Energy Engineering and M.S. in Energy and Mineral Engineering

The integrated undergraduate-graduate (IUG) program between the Energy Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENENG undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

#### Integrated B.S. in Environmental Systems Engineering and M.S. in Energy and Mineral Engineering

The integrated undergraduate-graduate (IUG) program between the Environmental Systems Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENVSE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

#### Integrated B.S. in Mining Engineering and M.S. in Energy and Mineral Engineering

The integrated undergraduate-graduate (IUG) program between the Mining Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused MNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

#### Integrated B.S. in Petroleum and Natural Gas Engineering and M.S. in Energy and Mineral Engineering

The integrated undergraduate-graduate (IUG) program between the Petroleum and Natural Gas Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused PNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

The John and Willie Leone Family Department of Energy and Mineral Engineering offers integrated B.S./M.S. programs that are designed to allow academically superior and research-focused undergraduate students in any of our five B.S. degree programs—Energy Business and Finance (EBF); Energy Engineering (ENENG); Environmental Systems Engineering (ENVSE); Mining Engineering (MNG E); and Petroleum and Natural Gas Engineering (PNG E)—also to obtain an M.S. degree in Energy and Mineral Engineering (EME) within five years of study. Students interested in the five-year Integrated Undergraduate-Graduate (IUG) program must apply for admission to The Graduate School and be admitted into the EME IUG program by the end of their junior year.

In the first three years IUG students will follow the course scheduling of the undergraduate major in the department (see Undergraduate Degree Program Bulletin). Students interested in the IUG program will, however, be encouraged to take upper-level classes, whenever appropriate. An admitted student will begin the senior year working towards the B.S./M.S. with an M.S. Advising Committee. The student will follow the course scheduling of the B.S. major while also taking 500-level courses, whenever appropriate, to satisfy the M.S. requirements. The student will also start work on a thesis designed to meet the requirements of the M.S. thesis. In the fifth year the student will continue to work towards satisfying all degree requirements for the B.S. and M.S. degrees including the M.S. thesis. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, an assistantship requiring the payment of graduate tuition.

### Admission Requirements

Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The plan should be presented in person to the undergraduate and graduate program officers prior to being admitted into the program. Graduate Record Examination (GRE) scores may be submitted by IUG applicants but are not required. The application will be reviewed by the Admissions Committee of the EME Graduate program and acted upon by the EME Graduate Program Officer.

### Degree Requirements

The degree requirements will be in accordance with the approved requirements of the respective undergraduate degree program (i.e. energy business and finance, energy engineering, environmental systems engineering, mining engineering or petroleum and natural gas engineering) and the energy and mineral engineering graduate program. However, 12 of the 500-level credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

**Requirements**

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.

As many as 12 of the credits required for the master's degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. The table below shows which course credits will be double-counted as substitutes for both the B.S. and M.S. as applicable. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

**Other Relevant Information**

All graduate students are expected to attend general Department seminars. Graduate students may be asked to contribute to the instructional programs of the Department by assisting with undergraduate laboratory and lecture courses.

Students in Energy and Mineral Engineering may elect to apply for the dual-title degree program in Operations Research for the Ph.D. and M.S. degrees. (See also [Operations Research](#) [Student Aid](#))

Graduate students are supported by a variety of government and industry fellowships, and research and teaching assistantships. Stipends vary depending on the source. Please see the [STUDENT AID](#) section of the *Graduate Bulletin* to learn other forms of the student aid.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ENERGY AND MINERAL ENGINEERING \(EME\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-06-251

Review Date: 04/10/2012

Faculty last updated: 4/23/13

## English (ENGL)

[Program Home Page](#)

GARRETT SULLIVAN, *Director of Graduate Studies*  
136 Burrowes Building  
814-863-3069; Fax: 814-863-7285

### Degrees Conferred:

Ph.D., M.A., M.F.A.

### The Graduate Faculty

- Michael Anesko, Ph.D. (Harvard) *Associate Professor of English and American Studies*
- Robin Becker, M.A. (Boston) *Professor of English and Women's Studies*
- Bernard W. Bell, Ph.D. (Massachusetts) *Professor of English*
- Kevin J. H. Berland, Ph.D. (McMaster) *Associate Professor of English*
- Michael Berube, Ph.D. (Virginia) *Paterno Family Professor of Literature*
- Hester Blum, Ph.D. (University of Pennsylvania) *Assistant Professor of English*
- Robert E. Burkholder, Ph.D. (South Carolina) *Associate Professor of English*
- Athelstan Suresh Canagarajah, Ph.D. (University of Texas at Austin) *Kirby Professor of Language Learning*
- Barbara Cantalupo, A.B. (Rochester) *Associate Professor of English*
- Charles Cantalupo, Ph.D. (Rutgers) *Professor of English, Comparative Literature, and African Studies*
- Robert L. Caserio, Ph.D. (Yale) *Professor of English*
- Christopher Castiglia, Ph.D. (Columbia University) *Professor of English*
- Patrick G. Cheney, Ph.D. (Toronto) *Professor of English*
- Margaret Christian, Ph.D. (California, Los Angeles) *Associate Professor of English*
- William J. Cobb, Ph.D. (Houston) *Associate Professor of English*
- Phyllis B. Cole, Ph.D. (Harvard) *Professor of English*
- Claire M. Colebrook, Ph.D. (University of Edinburgh) *Edwin Erle Sparks Professor of English*
- Mary G. DeJong, Ph.D. (South Carolina) *Associate Professor of English and Women's Studies*
- Richard M. Doyle, Ph.D. (California, Berkeley) *Associate Professor of English*
- Jonathan P. Eburne, Ph.D. (University of Pennsylvania) *Assistant Professor of English*
- Caroline D. Eckhardt, Ph.D. (Michigan) *Professor of English and Comparative Literature; Head, Comparative Literature*
- Robert R. Edwards, Ph.D. (California, Riverside) *Distinguished Professor of English*
- William Ellis, Ph.D. (Ohio State) *Associate Professor of English*
- Richard C. Frushell, Ph.D. (Duquesne) *Professor of English and Comparative Literature*
- Keith Gilyard, Ph.D. (NYU) *Professor of English*
- Cheryl Glenn, Ph.D. (Ohio State) *Associate Professor of English*
- Sean Goudie, Ph.D. (University of California, Berkeley) *Associate Professor of English and Asian Studies*
- Caroline K. B. Hall, Ph.D. (Brown) *Associate Professor of English and American Studies*
- Emily Harrington, Ph.D. (University of Michigan) *Assistant Professor of English*
- John T. Harwood, Ph.D. (Nebraska) *Associate Professor of English; Senior Director of Teaching and Learning with Technology, Information Technology Services*
- Clement Hawes, Ph.D. (Yale) *Associate Professor of English*
- Charlotte Holmes, M.F.A. (Columbia) *Associate Professor of English*
- Evelyn Hovanec, Ph.D. (Pittsburgh) *Associate Professor of English*
- Kathryn Hume, Ph.D. (Pennsylvania) *Distinguished Professor of English*
- Robert D. Hume, Ph.D. (Pennsylvania) *Evan Pugh Professor of English*
- Nicholas A. Joukovsky, D.Phil. (Oxford) *Professor of English*
- Julia Kasdorf, Ph.D. (NYU) *Associate Professor of English*
- Michael Kiernan, Ph.D. (Harvard) *Associate Professor of English*
- Lovalerie King, Ph.D. (University of North Carolina, Chapel Hill) *Assistant Professor of English*
- Laura L. Knoppers, Ph.D. (Harvard) *Professor of English*
- Jeanne E. Krochalis, Ph.D. (Harvard) *Associate Professor of English*
- Brian Lennon, Ph.D. (Columbia University) *Assistant Professor of English and Comparative Literature*
- Robert E. Lougy, Ph.D. (California, Davis) *Associate Professor of English*
- Janet Lyon, Ph.D. (Virginia) *Associate Professor of English*
- Ian Marshall, Ph.D. (Delaware) *Associate Professor of English*
- James E. May, Ph.D. (Maryland) *Associate Professor of English*
- William B. McCarthy, Ph.D. (Indiana) *Professor of English*
- Linda Patterson Miller, Ph.D. (Delaware) *Professor of English*
- Shirley Moody, Ph.D. (University of Maryland) *Assistant Professor of English*
- Mark Morrisson, Ph.D. (Chicago) *Associate Professor of English*
- J. Philip Mosley, Ph.D. (East Anglia) *Associate Professor of English and Comparative Literature*
- Carla J. Mulford, Ph.D. (Delaware) *Associate Professor of English*
- Leonard Mustazza, Ph.D. (SUNY) *Professor of English*
- Jeffrey Nealon, Ph.D. (Loyola) *Professor of English*
- Aldon Nielsen, Ph.D. (George Washington) *George and Barbara Kelly Professor of English*
- Marcy North, Ph.D. (University of Michigan) *Associate Professor of English*
- Josip Novakovich, M.A. (Texas at Austin) *Associate Professor of English*
- Jon Olson, Ph.D. (USC) *Assistant Professor of Writing*
- Paul Orlov, Ph.D. (Toronto) *Associate Professor of English*
- Iyunolu F. Osagie, Ph.D. (Cornell) *Associate Professor of English*
- Beverly Peterson, Ph.D. (William and Mary) *Assistant Professor of English*
- R. Alan Price, Ph.D. (Rochester) *Associate Professor of English*
- Steven D. Putzel, Ph.D. (Toronto) *Associate Professor of English*
- Christopher Reed, Ph.D. (Yale University) *Associate Professor of English and Visual Culture*
- Mike Riley, Ph.D. (Ohio) *Associate Professor of English*
- Benjamin Schreier, Ph.D. (Brandeis University) *Assistant Professor English and Jewish Studies*
- Sanford Schwartz, Ph.D. (Princeton) *Associate Professor of English*
- Stuart Selber, Ph.D. (Michigan Tech U) *Associate Professor of English*
- John L. Selzer, Ph.D. (Miami) *Professor of English*
- Linda Selzer, Ph.D. (The Pennsylvania State University) *Assistant Professor of English and American Studies*
- Gayle L. Smith, Ph.D. (Massachusetts) *Associate Professor of English*
- James F. Smith, Ph.D. (Penn State) *Professor of English*
- Scott Smith, Ph.D. (University of Notre Dame) *Assistant Professor of English and Comparative Literature*
- Thomas Smith, Ph.D. (Rutgers) *Assistant Professor of English*
- Adam J. Sorkin, Ph.D. (North Carolina) *Distinguished Professor of English*
- Sandra Spanier, Ph.D. (Penn State) *Professor of English and Women's Studies*
- Susan Squier, Ph.D. (Stanford) *Julia Gregg Brill Professor of English and Women's Studies*
- Ryan Stark, Ph.D. (Texas Christian University) *Assistant Professor of English*
- Lisa Sternlieb, Ph.D. (Princeton University) *Associate Professor of English*
- Suzanne Stutman, Ph.D. (Temple) *Professor of English*

- Garrett Sullivan, Ph.D. (Brown) *Associate Professor of English*
- Toby Thompson, M.A. (Virginia) *Associate Professor of English*
- Tramble Turner, Ph.D. (North Carolina) *Associate Professor of English*
- Anthony Vallone, M.F.A. (Indiana) *Associate Professor of English*
- James L. W. West III, Ph.D. (South Carolina) *Edwin Erle Sparks Professor of English*
- Linda Woodbridge, Ph.D. (UCLA) *Distinguished Professor of English*
- Xiaoye You, Ph.D. (Purdue University) *Assistant Professor of English and Asian Studies*
- Paul Youngquist, Ph.D. (Virginia) *Professor of English*

Candidates for the M.A., M.F.A., and Ph.D. in English may choose from a variety of courses in English literature and language, rhetoric and composition, and theory/cultural studies. The M.F.A. in English helps prepare candidates for professional careers as writers of fiction, poetry, or nonfiction, or for careers in academia.

The department offers a strong college-level teacher-training program, and most graduate students in English have the opportunity to serve as teaching assistants. Students usually begin by teaching basic composition courses, but there are opportunities for advanced students to teach courses in business writing, technical writing, fiction writing, poetry writing, literature, and humanities, and to serve as tutors in the Writing Center.

## Admission Requirements

Requirements listed in this section are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

English Proficiency--The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test; or a minimum composite score of 6.5 on the IELTS.

Applicants should have a junior/senior grade-point average of 3.50 (on a 4.00 scale), although exceptions may be made for students with special backgrounds, abilities, and interests. Scores from the Graduate Record Examinations (GRE) Aptitude Tests (verbal and quantitative) are required for admission. Applicants must also submit three letters of recommendation, a writing sample indicating their ability to do analytical or original work, and a statement of their professional goals.

For admission, M.A. students should have strong backgrounds in English courses: 18 credits beyond freshman composition are a minimum, but the department prefers at least 24 credits.

For admission into the M.F.A. program, students must have a baccalaureate degree (with substantial work in English), a portfolio of publishable student writing, and the intention to pursue a career as a professional writer.

To be considered for the doctoral program, students must have completed an M.A. in English, M.F.A. or its equivalent. The records of potential students should indicate promise of superior work in doctoral study.

## Master's Degree Requirements

Candidates for the M.A. take at least 30 credits of course work. M.A. candidates must fulfill the language requirement in one foreign language. All master's candidates are required to take ENGL 501, one course in literary or rhetorical theory, two courses in periods prior to 1800, and two courses in periods after 1800. Students are also required to complete a Writing Project that will demonstrate mastery of the field.

For admission into the M.F.A. program, students must have a baccalaureate degree (with substantial work in English), a portfolio of publishable student writing, and the intention to pursue a career as a professional writer.

M.F.A. candidates are required to take 42 credits, distributed as follows:

- 3 credits ENGL 501
- 12 credits in ENGL 512, ENGL 513, or ENGL 515, at least 9 of which must be in the student's area of specialization (ENGL 512, 513, and 515 can be repeated for credit)
- 12 credits in ENGL 596 for the final project, or at least 6 credits of ENGL 596 and 6 credits of English Department graduate seminars
- 3 credits in electives (400 or 500-level courses)
- 12 credits in literature at the 500 level
- Candidates will complete a book-length manuscript of publishable quality in their area of specialization.

## Doctoral Degree Requirements

The Ph.D. degree does not require a specific number of credits although all candidates are required to have completed English 501 (or the equivalent), one course in rhetoric or theory, two courses in periods before 1800, and two in periods after 1800. With the help of departmental graduate advisers, students select a program of seminars or reading courses. To complete their programs, students must show reading proficiency in one foreign language, pass written comprehensive examinations, and write and defend a doctoral dissertation.

## Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

### EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)

Available to beginning and continuing graduate students in one of the following graduate programs: Comparative Literature, English, French, German, History, Linguistics, Philosophy, Spanish, and Speech Communication; stipend \$12,560 plus waiver of tuition. Apply to department before February 1.

### KATEY LEHMAN FELLOWSHIP

Provides approximately \$13,000 plus tuition for a year's study in poetry or fiction writing leading toward an M.F.A. in English. The Lehman Fellow will teach one course during the fellowship year. Fellowship holders are eligible for graduate assistantships with a similar stipend and tuition grant during the second year of study.

### WILMA EBBITT AWARD

Funding to support research in rhetoric. Number and amount of awards to be determined.

### BEN EUWEMA MEMORIAL SCHOLARSHIP

Travel funding for graduate degree candidates; consideration will be given to all currently enrolled graduate students in English. Preference will be given to students at the Ph.D. thesis stage, particularly those who need to travel to complete their research; number of awards and amount of each will be determined each year.

### FOLGER INSTITUTE FELLOWSHIPS

Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in English are eligible for Folger Institute Fellowship to study in seminars and workshops at the Folger Library, Washington, D.C.

### PHILIP YOUNG MEMORIAL AWARD

Funding to support research in American Literature. Number and amount of awards will be determined.

### **Courses**

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ENGLISH \(ENGL\) course list](#)

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item #: 37-07-030

Review Date: 06/16/2009

Faculty updated: 8/21/12



## Engineering Management (ENGMT)

JAMES A. NEMES, Academic Division Head, Engineering  
School of Graduate Professional Studies  
Penn State Great Valley  
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Malvern, PA 19355-1443  
610-725-5365; [www.sgps.psu.edu/mem](http://www.sgps.psu.edu/mem)

### Degree Conferred:

M.E.M.

### The Graduate Faculty

Adrian Barb, M.B.A., Ph.D. (Missouri, Columbia) *Assistant Professor in Information Science*  
Joanna Defranco, Ph.D. (NJIT) *Senior Lecturer in Information Science*  
Kathryn W. Jablolkow, Ph.D. (Ohio State) *Associate Professor of Mechanical Engineering and STS*  
Phillip A. Laplante, M.B.A., Ph.D. (Stevens Institute of Tech) *Distinguished Professor of Systems Engineering*  
John I. McCool, Ph.D. (Temple) *Distinguished Professor of Systems Engineering*  
Colin J. Neill, Ph.D. (Wales) *Associate Professor of Software Engineering*  
James A. Nemes, D.Sc. (George Washington) *Professor of Mechanical Engineering*  
Michael J. Piovoso, Ph.D. (Delaware) *Professor of Electrical Engineering*  
Robin G. Qiu, Ph.D. (Penn State) *Associate Professor of Information Science*  
David W. Russell, Ph.D. (CNAAN, London) *Professor of Electrical Engineering*  
Raghvinder Sangwan, Ph.D. (Temple) *Assistant Professor of Information Science*  
Kailasam Satyamurthy, M.B.A., Ph.D., (Clemson) *Senior Lecturer of Engineering and Management*

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. The Master of Engineering Management is developed for students with a background in engineering or science. Applicants with a four year undergraduate degree in engineering, mathematics, physics, computer science, or a related discipline will be considered. Test scores from the GMAT or GRE exams are not required, but will be considered by the admissions committee if submitted. Jr/Sr GPA of 3.0 or better on a 4.0 scale is required. Students must have three years or more work experience in an engineering or engineering-related position. Applicants must submit a letter of reference, and a one page personal statement of relevant experience and goals.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 19 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or master's degree from a college /university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Degree Requirements

All students in the Master of Engineering Management program must complete a minimum of 33 credits.  
The courses must include the required core courses of 18 credits:

ENGMT 501: Engineering Management Science (3)  
ENGMT 510: Economics and Financial Studies for Engineers (3)  
SYSEN 505: Technical Project Management (3)  
SYSEN 536: Decision and Risk Analysis in Engineering (3)  
SYSEN 550: Creativity and Problem Solving I (3)  
SYSEN 552: Creativity and Problem Solving II (3)

as well as the capstone course:

ENGMT 539: Engineering Management Strategy (3)

### Student Aid

Graduate Assistantships available to students in the program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item #: 38-02-029

Review Date: 10/6/09

## Entomology (ENT)

[Program Home Page](#)

GARY W. FELTON, *Head of the Department*  
501 Agricultural Sciences and Industries Building  
814-863-7789

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Tom Baker, Ph.D. (Michigan State) Professor of Entomology
- Mary E. Barbercheck, Ph.D. (California, Davis) Professor of Entomology
- Ottar N. Bjornstad, Ph.D. (Oslo) Associate Professor of Entomology
- Diana Cox-Foster, Ph.D. (Illinois) Professor of Entomology
- Liwang Cui, Ph.D. (Kentucky) Professor of Entomology
- Consuelo M. De Moraes, Ph.D. (Georgia) Assistant Professor of Entomology
- Gary W. Felton, Ph.D. (California, Davis) Professor of Entomology
- Shelby J. Fleischer, Ph.D. (Auburn) Professor of Entomology
- James L. Frazier, Ph.D. (Ohio) Professor of Entomology
- Christina Grozinger, Ph.D. (Harvard) Associate Professor of Entomology
- Kelli Hoover, Ph.D. (California, Davis) Associate Professor of Entomology
- David Hughes, Ph.D. (U of Glasgow) Assistant Professor of Entomology and Biology
- Grzegorz Krawczyk, Ph.D. (Michigan State) Senior Research Associate of Entomology
- Bruce A. McPheron, Ph.D. (Illinois) Professor of Entomology
- Mark Mescher, Ph.D. (U of Georgia) Assistant Professor of Entomology
- Christopher A. Mullin, Ph.D. (Cornell) Professor of Entomology
- Nancy Ostiguy, Ph.D. (Cornell) Associate Professor of Entomology
- Edwin G. Rajotte, Ph.D. (Rutgers) Professor of Entomology
- Jason Rasgon, Ph.D. (California, Davis) Associate Professor of Entomology
- Andrew Read, Ph.D. (Oxford, UK) Professor of Biology and Entomology, Eberly College of Science Distinguished Senior Scholar
- Michael C. Saunders, Ph.D. (Georgia) Professor of Entomology
- Matthew Thomas, Ph.D. (U of Southampton, UK) Professor of Entomology
- John Tooker, Ph.D. (Illinois) Assistant Professor of Entomology
- Jim Tumlinson, Ph.D. (Mississippi State) Professor of Entomology, Ralph O. Mumma Endowed Professor of Chemical Ecology

Students in Entomology represent a range of experiences and interests, with varied backgrounds from biology, chemistry, zoology, entomology, meteorology, ecology and botany programs to name a few. You will find an exceptional faculty that offer an unequalled range of research expertise and breadth within our focus areas. The strength of our research resides in four main program themes: Chemical Ecology, Ecological Applications, Disease Biology and Ecology and Pollinator Biology and Ecology. Many opportunities are available for study abroad experiences from which students return with a new perspective that enhances their studies and research. The Entomology Department participates in a number of dual-degree programs including Comparative and International Education (CI ED), Human Dimensions of Natural Resources and the Environment (HDNRE), International Agriculture and Development (INTAD) and Operations Research (OR). Additional specialization is available to students conducting research with insects in intercollege degree programs in ecology, genetics and plant biology.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission a student should have a strong background in biological sciences. Courses in chemistry through organic, physics, mathematics through calculus, statistics, and computer application are recommended.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

### Master's Degree Requirements

The Master of Science degree in Entomology is an intermediate degree leading toward the development of special knowledge in entomology. It provides training for prospective doctoral candidates. A minimum of 30 credits (400 and 500 level) are required, with at least 20 credits earned in residence. At least 18 credits in the 500 and 600 series must be included in the program. A minimum of 12 credits in coursework (400 and 500) must be completed in the major program.

The program requires all students to take ENT 518, ENT 520, ENT 522, ENT 530 (2 credits), and 3 credits statistics (i.e., STAT 501, 502, 541, AG 400, or equivalent). An insect collection is required at the end of the first year of courses. Additional courses may be selected by the student in consultation with his/her graduate committee. Each Master's student is expected to serve as a teaching assistant for 3 credits. Each student must present the results of thesis research at a departmental seminar, and the student may register for 1 credit of ENT 590 that semester. A thesis equivalent to 6 credits (ENT 600) is required. A final oral examination covering the general field of entomology, with emphasis in the student's area of specialization, is required by the department. This is to be administered by the student's committee. A favorable vote of a two-thirds majority is necessary for passing.

Committees for master's degree candidates should be formed during the first semester, and are suggested jointly by the student and advisor, with approval by the Department Head. Masters committees have a minimum of three members. One of these should be from another degree program, particularly if the student plans to minor in that area. Adjunct faculty members cannot constitute a majority of the committee. The student and committee shall meet early in the process to plan the student's program and approve a thesis project.

The Thesis Guide is available electronically, visit [www.etsd.psu.edu](http://www.etsd.psu.edu).

### Doctoral Degree Requirements

The degree of doctor of philosophy signifies high scholastic achievement and demonstrated capability in independent research. Although there is no formal credit requirement at the Ph.D. level, five academic years of full time graduate work beyond the bachelor's degree are normally required. Some of the work may be completed off campus or on a part-time basis, but between the time of acceptance as a candidate and completing the degree requirements the student must spend two academic sessions in residence within a twelve-month period. The program requires all students to take ENT 518, ENT 520, ENT 522, and ENT 530 (4 credits). An insect collection is required at the end of the first year of courses. Other course requirements are dependent on the student's program of study. Each Ph.D. student is expected to serve as a teaching assistant for 6 credits. The results of the dissertation research must be presented at a departmental seminar. In addition, students must take and pass a comprehensive and final oral examination. Students commencing a doctoral program may have a provisional committee appointed as soon as the advisor is selected. Students are not formally admitted to the doctoral candidacy until they have passed a candidacy examination. A favorable vote by two-thirds of the Candidacy Committee members is necessary for acceptance of a candidate.

The official doctoral committee is approved by the Department Head and is appointed by the Graduate Dean through the office of Graduate Enrollment

Services after the student has passed the candidacy exam. Doctoral committees for students in the entomology program include at least three members from the department, at least one member from a related field outside Entomology, and a total of no fewer than four members; five members are recommended. Typically, committee members are chosen in consultation with the advisor. If the student has a formal minor, a representative of the minor field must be on the committee.

The student and committee should meet early in the degree process to plan the student's Ph.D. program and approve a thesis project. A student may change advisor or committee members without prejudice. The doctoral committee guides and monitors the student's progress, administers the comprehensive and final oral examinations, and evaluates the dissertation.

A candidate for the degree of Doctor of Philosophy is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the Ph.D. Entomology assesses and works to improve competence of both domestic and international students. Assessments to evaluate competency prior to the candidacy exam include pieces of original writing required as part of ENT 522 (Professional Development). Oral communication competency is evaluated during the candidacy examination. Students needing assistance are directed to appropriate remedial activities. (International students should note that passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.)

There is no foreign language requirement for the Ph.D. degree. However, depending on the nature of the thesis research and with the advice and consent of the Doctoral Committee, competency in a foreign language may be required as a part of the doctoral studies of certain students.

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

## Dual-Title Graduate Degree in Entomology (ENT) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the Entomology/INTAD Dual-Title Degree Program. The goal of the dual-title degree Entomology and INTAD graduate program is to enable graduate students from Entomology to acquire the knowledge and skills of their primary area of specialization in Entomology, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions. This dual-title graduate degree program does not duplicate any other degree program at the University.

## Admission Requirements

For admission to the dual-title doctoral degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. The application consists of a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title ENT/INTAD degree. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

For admission a student should have a strong background in biological sciences. Courses in chemistry through organic, physics, mathematics through calculus, statistics, and computer application are recommended. The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

## Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, determined by the student, their INTAD advisor, and their Entomology program advisor.

### Degree Requirements for ENT/INTAD Dual-Title M.S.

The master's in Entomology and INTAD is a dual-title degree awarded only to students who are admitted to the Entomology master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the Entomology degree, dual-title degree students must:

### Course Requirements

Complete a minimum of 12 INTAD course credits (400, 500 or 800 level) as follows:

9 credits from the core curriculum:

- Program Design and Delivery (AEE 450, 3 credits)
- Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
- International Agricultural Development Seminar (INTAD 820, 3 credits)

3 credits of internship or applied courses/ independent studies with international development content

### Thesis

Write a master's thesis on a topic that reflects both the graduate program in entomology and the dual-title offering in INTAD. Thesis research credits (SUBJ 600) must be taken in the major program.

All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Candidates for the dual-title master's degree in Entomology and INTAD will also be required to pass a final oral examination covering the general field of entomology and INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the students in consultation with their INTAD advisors and their Entomology program advisors. Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. Students and advisors should maintain the INTAD Master's Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

## Degree Requirements for ENT/INTAD Dual-Title Ph.D.

The doctoral degree in Entomology and INTAD is a dual-title degree awarded only to students who are admitted to the Entomology doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in ENT/INTAD, in addition to the Entomology requirements, are as follows.

### Course Requirements

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

9 credits from the core curriculum

International Agricultural Development Seminar (INTAD 820, 3 credits)  
International Rural Social Change (R SOC 517, 3 credits)  
Sociology of Agriculture (R SOC 508, 3 credits) or Human Dimensions of Natural Resources (R SOC 555, 3 credits)

9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. Particular courses may satisfy both the Entomology Department requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisors and their Entomology program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

### Candidacy

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student's advisor in consultation with the INTAD program coordinators.

### Committee Composition

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

### Comprehensive Exam

At the end of the coursework, candidates for the dual-title doctoral degree in Entomology and INTAD will be required to pass an oral comprehensive examination based on their thesis proposal and area of specialization in entomology, while reflecting their dual-title curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the exam and the INTAD representative on the student's doctoral committee must have input into the development of and participation in the evaluation of the comprehensive examination.

### Dissertation and Dissertation Defense

Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both Entomology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required.

## Dual-Title Graduate Degree in Entomology (ENT) and Comparative and International Education (CI ED)

Graduate student with research and educational interests in international education may apply to the Entomology/CI ED Dual-Title Degree Program. The goal of the dual-title degree Entomology and CI ED graduate program is to enable graduate students from Entomology to acquire the knowledge and skill of their primary area of specialization in Entomology, while at the same time gaining the perspective and methods of comparative and international education. Graduate Dual-Title degree program in Entomology and CI ED study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development, presentations, publication of research articles, and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

This dual-title graduate degree program does not duplicate any other degree program at the University.

### Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can apply to the Admissions Committee on the Comparative and International Education program. The CI ED admissions committee reviews applications and recommends students for admission to the dual-title degree program to the Graduate School. Scores from the Graduate Records Examinations (GRE) are required for admission. In addition, students are to provide a written personal statement indicating the career goals they hope to accomplish by earning a dual-title Entomology/CI ED degree. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the CI ED program committee. Within this framework, final course selection is determined by the student, their CI ED adviser, and their Entomology program adviser.

Upon a student's acceptance by the CI ED admissions committee, the student will be assigned a CI ED academic adviser in consultation with the CI ED program chair. As students develop specific scholarly interests, they may request that a different CI ED faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Entomology program and the CI ED program.

### Requirements for Entomology/CI ED Dual-Title M.S.

The master's in Entomology and CI ED is a dual-title degree awarded only to students who are admitted to the Entomology master's program and admitted to the dual-title degree in CI ED. In addition to the requirements for the Entomology degree, dual-title students must:

Complete a minimum of 12 CI ED credits with study in the following curriculum categories:  
3 credits, CI ED Proseminar (CI ED 500)

6 credits, advanced comparative and international education content courses

3 credits, advanced or focused comparative and international education content courses

Write a master's thesis on a topic that reflects both the graduate program in Entomology and the dual-title offering in Comparative and International Education.

The thesis committee for the dual-title M.S. degree will consist of two graduate faculty members from Entomology and one graduate faculty member from CI ED.

Candidates for the dual-title master's degree in Entomology and CI ED will also be required to pass a final oral examination covering the general field of Entomology and CI ED, with emphasis on the student's area of specialization. The oral exam (thesis defense) is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate primary program requirements and those of the CI ED program. Final course selection is determined by the students in consultation with their CI ED advisers and their major program advisers. Students and advisers should maintain the CI ED Master's Degree Plan of Study, which must be submitted to the CI ED program office two months before the student files the "Intent to Graduate" via eLion.

### Requirements for the Entomology/CI ED Dual-Title Ph.D.

The doctoral degree in Entomology and CI ED is a dual-title degree awarded only to students who are admitted to the Entomology doctoral program and admitted to the dual-title degree in CI ED. The minimum course requirements for the dual-title Ph.D. degree in Entomology and CI ED, in addition to the Entomology Department requirements, are as follows:

Complete a minimum of 27 graduate credits

3 credits of Proseminar in Comparative and International Education (CI ED 500);

6 credits in advanced-Comparative and International Education courses;

12 credits in Comparative and International Education content courses or courses with comparative or international content;

6 credits in research methods.

A minimum of 18 of the 27 credits must be taken at the 500-level, and particular courses may satisfy both the Entomology Department requirements and those in the Comparative and International Education program. Final course selection is determined by the student in consultation with their CI ED advisers and their major program advisers. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

### Ph.D. Minor in CI ED

A Ph.D. (or D.Ed.) minor program in Comparative and International Education is available to doctoral students who find it desirable to include the perspectives and methodologies of Comparative and International Education in the Entomology program and have been approved to do so by their doctoral committees. To qualify for a minor in Comparative and International Education, students must satisfy the requirements of the Entomology Department, and meet the following minimum requirements:

3 credits in the Proseminar in Comparative and International Educations (CI ED 500);

3 credits in a Comparative and International Education course;

9 credits in Comparative and International Education content courses (or advanced courses) or in courses with comparative or international content outside the College of Education.

### Dual-Title Graduate Degree in Entomology (ENT) and Operations Research (O R)

Graduate students with research and educational interests in operations research may apply to the Entomology/O R Dual-Title Degree Program. The goal of the dual-title degree Entomology and O R graduate program is to enable graduate students from Entomology to acquire the knowledge and skill of their primary area of specialization in Entomology, while at the same time attain and be identified with the tools, techniques, and methodology of operations research. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency. Graduate Dual-Title degree program in Entomology and O R study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development, presentations, publication of research articles, and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of operations research. Thus, the dual-title will allow students to master their field of specialization from an operations research perspective.

This dual-title graduate degree program does not duplicate any other degree program at the University.

### Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can apply to the Admissions Committee of the Operations Research program. The O R admissions committee reviews applications and recommends students for admission to the dual-title degree program to the Graduate School. Scores from the Graduate Records Examinations (GRE) are required for admission. For the M.S. dual-title degree in Entomology-Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 140, MATH 141, MATH 220; CMPSC 101; and 3 credits of probability and statistics. For the Ph.D. dual-title degree in Entomology-Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 401, MATH 436; CMPSC 101; and 3 credits of probability and statistics. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the O R program. Within this framework, final course selection is determined by the student, their O R adviser, and their Entomology program adviser.

Requirements for Entomology/O R Dual-Title M.S.

For the M.S. dual-title degree in Operations Research, the minimum requirements are:

6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;

6 credits in optimization, including a minimum of 3 credits in linear programming;

3 credits in computational methods;

3 credits in applications/specialization

Students must enroll in O R 590 Colloquium for at least 1 credit in each year enrolled in the program and in residence. A minimum of 9 credits must be in the 500 series.

Particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.

A thesis may be required, the supervisor of which must be a member of the graduate faculty recommended by the chair of the program granting the degree and approved by the Operations Research committee as qualified to supervise thesis work in operations research. A paper or report may be written in lieu of the M.S. or M.A. thesis upon approval of the student's graduate major program. It is the prerogative of the graduate major program to assign these credits to one or more of the following categories: stochastic/statistical methods, optimization, computational methods, or applications.

### Requirements for the Entomology/O R Dual-Title Ph.D.

For the Ph.D. dual-title degree in Operations Research, the minimum requirements are:

9 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;  
9 credits in optimization, including a minimum of 3 credits in linear programming;  
6 credits in computational methods, including a minimum of 3 credits in simulation;  
12 credits in applications/specialization

Students must enroll in O R 590 Colloquium for at least 1 credit in each year enrolled in the program and in residence. A minimum of 18 credits must be in the 500 series.

The doctoral committee for an Entomology-Operations Research Ph.D. dual-title degree student is recommended by the Entomology program. The chair and at least two members of a doctoral committee must be members of the graduate faculty and approved by the Operations Research committee as qualified to supervise doctoral theses in operations research. The Operations Research committee is responsible for administering an examination in operations research that constitutes a portion of the comprehensive examination administered to the doctoral students in the program option, as well as to the candidate who chooses operations research as a minor field.

### **Ph.D. Minor in O R**

A Ph.D. minor program in Operations Research is available for doctoral students who find it advantageous to include advanced quantitative methods of systems analysis in their programs of study and have been approved to do so by their doctoral committees. To qualify for a minor in Operations Research, students must satisfy the requirements of their graduate major programs, meet the same prerequisites as the M.S. dual-title degree, and meet the following minimum requirements:

6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;  
6 credits in optimization  
3 credits in computational methods

A minimum of 6 credits must be taken at the 500 level.

The doctoral committee for an Entomology-Operations Research Ph.D. dual-title degree student is recommended by the Entomology program. The chair and at least two members of a doctoral committee must be members of the graduate faculty and approved by the Operations Research committee as qualified to supervise doctoral theses in operations research. The Operations Research committee is responsible for administering an examination in operations research that constitutes a portion of the comprehensive examination administered to the doctoral students in the program option, as well as to the candidate who chooses operations research as a minor field.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### **[ENTOMOLOGY \(ENT\) course list](#)**

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-077

Review Date: 02/21/2012

Last updated by Publications: 10/27/06

## Environmental Engineering (ENV E)

[Program Home Page](#)

PEGGY JOHNSON, *Professor and Head of the Department of Civil and Environmental Engineering*  
212 Sackett Building  
814-863-3085

### Degrees Conferred:

Ph.D., M.S., M.Eng.

### The Graduate Faculty

- Rachel A. Brennan, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Civil Engineering
- William D. Burgos, Ph.D. (Virginia Tech) Associate Professor of Environmental Engineering
- Fred S. Cannon, Ph.D. (Illinois, Urbana-Champaign) P.E. Associate Professor of Environmental Engineering
- Brian A. Dempsey, Ph.D. (North Carolina) Professor of Environmental Engineering
- Christopher J. Duffy, Ph.D. (New Mexico Institute of Mining and Technology) P.H. Professor of Civil Engineering
- Peggy A. Johnson, Ph.D. (Maryland) Professor of Civil Engineering
- Bruce E. Logan, Ph.D. (California, Berkeley) Kappe Professor of Environmental Engineering

This specialty prepares students for careers in the design of treatment facilities, environmental monitoring, process development for water quality control, industrial waste treatment, management of hazardous and toxic substances, monitoring and management of environmental quality, air pollution control, and water resource systems.

### Admission Requirements

The requirements listed here are in addition to the general requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Candidates should possess a baccalaureate degree from a regionally accredited institution. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

International applicants must submit OFFICIAL transcripts, degree, and diploma certificates in both English and their native language. These documents must contain the "red stamp" or have the raised notary stamp. Photocopies will NOT be accepted. Applicants must provide the department with official transcripts of all of their previous course work (in duplicate), a statement of objectives, and three letters of recommendation AT THE TIME OF APPLICATION. Résumés are encouraged, but not required. In addition, all applicants must submit scores from the General Graduate Record Examination Aptitude Test (verbal, quantitative, and analytical).

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a masters degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British west Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, The United States, and Wales.

Applicants for fall admission who wish to be considered for financial aid should have COMPLETED applications on file by DECEMBER 1 of the preceding year.

### Degree Requirements

The M.Eng. degree is a nonthesis professional master's degree. The program provides training for advanced professional practice. A minimum of 30 graduate credits (400 level and above) of course work and a writing portfolio are required. It should be noted that 20 credits must be earned at an established graduate campus of the University. At least 15 credits must be earned in graduate courses (500 level). Students are not permitted to count audited credits toward the minimum credits required for the degree. The writing portfolio may consist of the following types of writing samples: a semester paper, a report that documents a semester design project, an applied research paper, or professional papers. The writing sample must demonstrate in-depth knowledge of an engineering topic presented in a format typical of professional practice.

The M.S. degree program is strongly oriented toward research. A minimum of 30 graduate credits (400 level and above) is required, of which 20 must be earned at an established graduate campus of the University. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits of course work (400 and 500 level), as contrasted with research, must be completed in the major (courses prefixed C E). Students are not permitted to count audited credits toward the minimum credits required for the degree. A thesis is required, and at least 6 credits of thesis research (C E 600 or 610) must be included in the candidate's academic course plan.

A minimum of 24 credits of graduate course work (400 level and above) is required beyond the master's degree. A candidate for the Ph.D. degree must pass the English proficiency and candidacy examinations, prepare and defend the thesis proposal as part of the oral comprehensive examination, and pass the final oral examination (thesis defense). In addition, Ph.D. candidates must satisfy the University residency requirement by registering for two consecutive semesters as a full-time student.

Continuous registration is required for all graduate students until the thesis or writing portfolio has been approved.

### Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

### Other Relevant Information

The following courses offered by the Department of Civil and Environmental Engineering are appropriate for students majoring in Environmental Engineering (course descriptions are given under Civil Engineering); C E 462, 465W, 472W, 475, 476, 479, 496, 497, 551, 555, 556, 561, 564, 566, 567, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 596, 597, and 598. Appropriate courses offered by other departments include, but are not limited to: B M B 401, 402; CHEM 406; GEOSC 452; M E 405, 470, 521; METEO 454; MICRB 400; NUC E 420.

### Student Aid

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. International applicants who wish to be considered for a teaching assistantship must present an acceptable score (250-300 or 55-60) on the Test of Spoken English (TSE). The TSE can be taken in many countries, or at Penn State after arrival.

CECIL M. PEPPERMAN MEMORIAL GRADUATE FELLOWSHIP

Available to a graduate student in civil or environmental engineering specializing in one of the following fields, listed in order of priority: waste treatment and management, water pollution control, environmental engineering, or related fields.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/3/04

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185C

Review Date: 4/15/08

UCA Revision #1: 8/4/06

Faculty updated: 12/21/12



## Environmental Engineering (ENVE)

### [Program Home Page](#)

THOMAS H. EBERLEIN, *Coordinator, Environmental Programs*  
 Penn State Harrisburg  
 TL 177 Science and Technology Building  
 777 W. Harrisburg Pike  
 Middletown, PA 17057-4898

### Degree Conferred:

M.Eng.

### The Graduate Faculty:

- Katherine A. Baker, Ph.D. (Delaware) Associate Professor of Environmental Microbiology
- Yen-Chih (David) Chen, Ph.D. (Purdue) Assistant Professor of Environmental Engineering
- Balwant Chohan, Ph.D. (Massachusetts) Assistant Professor of Chemistry
- Shirley Clark, Ph.D. (Alabama, Birmingham) Associate Professor of Environmental Engineering
- Thomas H. Eberlein, Ph.D. (Wisconsin) Associate Professor of Chemistry
- Sairam Rudrabhatla, Ph.D. (Osmania, India) Assistant Professor of Biology
- Howard G. Sachs, Ph.D. (Clark) Professor of Biology
- Yuefeng Xie, Ph.D. (Tsinghua) Professor of Environmental Engineering

This program, offered at the Harrisburg campus, is intended for the engineer who desires a part-time graduate environmental engineering program. Prospective students who do not have an undergraduate engineering degree, but rather hold a baccalaureate degree in a related scientific field (such as chemistry, microbiology, environmental science) may be admitted to the program but may need to take some prerequisite undergraduate engineering courses. This degree program complements the Environmental Pollution Control graduate programs (M.E.P.C. and M.S. in EPC) offered by the same faculty.

A variety of civil and environmental engineering courses are regularly offered, as well as specialty courses in environmental policy, other engineering areas, computer science, and other policy-related areas.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants are strongly encouraged to present an undergraduate degree in engineering from an accredited program. However, those who possess an undergraduate degree in a related scientific field may be considered for admission; those students will need to take additional engineering courses in order to be adequately prepared.

All students are expected to have an undergraduate junior/senior grade-point average of 3.0 on a 4.0-point system. Exceptions to this minimum may be made for students with special backgrounds or abilities, or other qualifications.

All applicants must provide two copies of all official transcripts of all their previous course work. In addition, applicants must supply a statement of objectives and three letters of recommendation.

For those students for whom English is not their native language, scores on the Test of English as a Foreign Language (TOEFL) are required; an acceptable score of 560 on the paper-based version or 220 on the computer-based test is required.

International applicants should be aware that processing of transcripts and other application-related information may take considerable time. Applicants must ensure that materials arrive at least three months prior to the start of the semester they first intend to begin studies.

### Degree Requirements

A minimum of 30 credits is required for the degree. All candidates are required to take a core course in each of the four environmental areas: air, water, solid waste management, and policy/risk. The program suggests that students take the following courses to meet the first three area requirements:

#### MECHANICAL ENGINEERING (M E)

- M E 433 Air Pollution Control (3)

#### CIVIL ENGINEERING (C E)

- CE 472 Water Pollution Control (3)
- CE 476 Solid Waste Management (3)

The college regularly offers several courses that meet the policy/risk area requirement, including: ENVE 487 Environmental Law, ENVE 569 Environmental Risk Assessment, and P ADM 531 Environmental Policy.

Courses in the degree program may be taken at the 400 or 500 level, but a minimum of 18 credits must be at the 500 level. All students must take at least 1 credit of EPC 590 Seminar and complete a scholarly master's paper. The seminar and the paper count toward the 500-level requirement. All students must complete a total of 30 credits in order to earn the degree.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [CIVIL ENGINEERING \(C E\) course list](#)

#### [CIVIL ENGINEERING \(C ENG\) course list](#)

#### [ENVIRONMENTAL ENGINEERING \(ENVE\) course list](#)

#### [MECHANICAL ENGINEERING \(M E\) course list](#)

Last Revised by the Department: Summer Session 2003

Blue Sheet Item #: 31-04-132

Review Date: 1/14/03

UCA Revision #2: 7/30/07



## Food Science (FD SC)

[Program Home Page](#)

JOHN D. FLOROS, *Head of the Department*  
202 Food Science Building  
814-865-5444  
[foodsci@psu.edu](mailto:foodsci@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Ramaswamy C. Anantheswaran, Ph.D. (Cornell) Professor of Food Science
- Robert B. Beelman, Ph.D. (Ohio State) Professor of Food Science
- J. Lynne Brown, Ph.D. (MIT) Associate Professor of Food Science
- John N. Coupland, Ph.D. (Leeds) Associate Professor of Food Science
- Catherine N. Cutter, Ph.D. (Clemson) Associate Professor of Food Science
- Stephanie Doores, Ph.D. (Maryland) Associate Professor of Food Science
- Edward Dudley, Ph.D. (Wisconsin-Madison) Assistant Professor of Food Science
- Ryan J. Elias, Ph.D. (Massachusetts) Assistant Professor of Food Science
- John D. Floros, Ph.D. (Georgia) Professor of Food Science
- Hassan Gourama, Ph.D. (Nebraska) Associate Professor of Food Science
- John E. Hayes, Ph.D. (Connecticut) Assistant Professor of Food Science
- Kathleen L. Keller, Ph.D. (Rutgers) Assistant Professor of Nutritional Sciences and Food Science
- Stephen J. Knabel, Ph.D. (Iowa State) Professor of Food Science
- Luke F. LaBorde, Ph.D. (Wisconsin-Madison) Associate Professor of Food Science
- Joshua D. Lambert, Ph.D. (Arizona) Assistant Professor of Food Science
- Robert F. Roberts, Ph.D. (Minnesota) Associate Professor of Food Science
- Robert D. Steele, Ph.D. (Wisconsin-Madison) Professor of Food Science
- Donald B. Thompson, Ph.D. (Illinois) Professor of Food Science
- Gregory R. Ziegler, Ph. D. (Cornell) Professor of Food Science

Graduate work leading to the M.S. and Ph.D. degrees in Food Science is directed toward a multidisciplinary and integrated approach to teaching and research relevant to processing and manufacture of value-added foods from agricultural commodities. Through integration of the disciplines of chemistry, microbiology, engineering, and nutrition, students learn to ensure that consumers can make healthful choices from an abundant supply of affordable, safe, nutritious, and appealing foods.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission to the program. Exceptions may be made for students with special backgrounds, abilities, and interests.

Best preparation for graduate work would be the completion of an undergraduate degree in food science, biochemistry, microbiology, or other related areas. The undergraduate program must include calculus, organic chemistry, microbiology, and general physics. Students may be admitted with deficiencies but are required to make them up without degree credit.

Students are generally admitted directly to a master's program unless they have previously earned an M.S. degree in food science or an appropriate related area; in such cases, admission can be made directly to the doctoral program by approval of the graduate program committee.

### Master's Degree Requirements

The requirements for the M.S. program are detailed in the Department of Food Science's "Graduate Program Handbook." Minimum course requirements for the M.S. degree are as follows:

Fundamentals of Food Science (FD SC 500), 4 credits; Research Methods in Food Science (FD SC 501), 2 credits; Supervised Experience in College Teaching (FD SC 602), 1 credit; Statistics (STAT 500 or equivalent), Biochemistry (B M B 401 or equivalent); research (FD SC 600), 6 credits.

### Doctoral Degree Requirements

The requirements for the Ph.D. program are detailed in the Department of Food Science's "Graduate Program Handbook." Minimum course requirements for the Ph.D. degree are as follows: FD SC 500 Fundamentals of Food Science, 4 credits; FD SC 501 Research Methods in Food Science, 2 credits; FD SC 602 Supervised Experience in College Teaching, 2 credits; STAT 500 or equivalent, B M B 401 or equivalent.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[FOOD SCIENCE \(FD SC\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/30/04

Faculty updated: 4/2/12

## Finance (FINAN)

DANIEL C. INDRO, *Academic Division Head*  
 School of Graduate Professional Studies  
 Penn State Great Valley  
 30 East Swedesford Road  
 Malvern, PA 19355-1443  
 610-648-3229  
[www.sgps.psu.edu](http://www.sgps.psu.edu)

### Degree Conferred:

Master of Finance (M.Fin.)

### The Graduate Faculty

- Karen Duhala, Ph.D. (Penn State) Assistant Professor of Finance and Accounting
- Andrew J. Felo, Ph.D., CMA, CRM (SUNY, Binghamton) Associate Professor of Accounting
- Daniel Indro, Ph.D. (Indiana University) Associate Professor of Finance
- Pornsit Jiraporn, Ph.D. (Southern Illinois, Carbondale) Assistant Professor of Finance
- John Mason, Ph.D. (Michigan State) Associate Professor of Management and Organization
- Bo Ouyang, Ph.D. (Texas, Arlington) Assistant Professor of Accounting
- Patrick Qiang, Ph.D. (Massachusetts, Amherst) Assistant Professor of Finance
- Simon J. Pak, Ph.D. (California, Berkeley) Associate Professor of Finance
- Manohar Singh, Ph.D. (Southern Illinois, Carbondale) Associate Professor of Finance

The Master of Finance (M.Fin.) program offered by the School of Graduate Professionals at Penn State Great Valley is a graduate degree program designed for intensive and focused study in finance. As part of the School's Management Division, the program is included under the specialized professional accreditation received from the Association to Advance Collegiate Schools of Business International (AACSB). Students enroll in the program as a cohort and proceed through courses together in a prescribed sequence. Classes are taught in a schedule convenient for working professionals who have demanding time commitments. The time required to complete the program is fifteen months.

The program provides an advanced and specialized graduate education in finance for individuals with career interests as finance professionals in financial management, or investment management. The curriculum reflects a balanced combination of advanced financial theory and practical business applications. Major emerging concepts and practices in the finance field are introduced and discussed throughout the program. The program is designed to help graduates to become proficient in technical and analytical skills in finance and to develop expertise in financial problem solving and financial decision-making preparing them to advance their finance careers in organizations such as investment and commercial banking firms, mutual funds, other financial firms, non-financial businesses, consulting firms, government agencies and non-profit organizations. In addition, students will find a substantial number of courses in the M.Fin. program to be helpful in preparing for tests required for various professional certifications in finance, such as the Chartered Financial Analyst (CFA).

### Admission Requirements

Requirements listed here are in addition to the Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales. For admission to the Graduate School, U.S. applicants must have received, from a regionally accredited institution, a bachelor's degree with requirements substantially equivalent to those at Penn State. (Penn State is accredited by the Middle States Association of Colleges and Schools.) International applicants must have a tertiary (postsecondary) degree that is deemed comparable to a four-year U.S. bachelor's degree to apply for admission. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Applicants should:

1. Have a 3.0 or better (on a 4.0 scale) junior/senior grade-point average.
2. Submit a completed online application.
3. Submit a GMAT or GRE score. Applicants holding an MBA, JD, Ph.D., CPA, or CFA or doctoral degree are not required to submit standardized test scores.
4. Submit a statement of intent or career path objective (one page).
5. Submit two confidential evaluation form letters.
6. Submit two official transcripts from all post-secondary institutions attended. International applicants must submit official university records (transcripts/marksheets and diploma if date conferred does not appear on transcripts/marksheets), with attested English translations if the record is not in English. Notarized copies are not sufficient.
7. Submit a current resume.
8. Submit a visa application document if they are in the U.S. on a student or work visa.
9. Complete an admissions interview (by telephone or in person).

Admission decisions are based on the quality of the applicant's credentials and an interview in relation to those of other applicants who meet the requirements for admission outlined above.

Application Filing Dates: Applications to the Penn State Great Valley's Master of Finance program are reviewed on a rolling basis. New students are admitted to a cohort and begin their studies in early January.

### Pre-Program Requirements:

Applicants are expected to have a working knowledge of a spreadsheet program, financial management, statistics and microeconomics. These pre-program requirements may be satisfied with academic work prior to matriculation in the M.Fin. program through college-level course credits in the following areas:

1. Financial Management/Corporate Finance: Topics include time value of money, basic theories of bond and stock valuation, capital budgeting, capital asset pricing model, market efficiency, and capital structure
2. Introductory Business Statistics: Topics include probability theory, sampling, inference, quality assurance, regression, forecasting, and simulation
3. Microeconomics: Topics include allocation of resources and distribution of income with in various market structures

The professor-in-charge of the Master of Finance program will examine academic transcripts of each applicant to determine if and how pre-program requirements are met. If a requirement is not met, the deficiency must be corrected through earned credit.

### Degree Requirements:

Thirty (30) credits are required to complete the M.Fin. degree. The course work includes six required core courses (18 credit hours) which provide a body of knowledge in finance; three elective courses (9 credit hours) designed to help students develop additional expertise in corporate finance or investments; and a capstone course (3 credit hours) which provides a culminating experience for students.

The required courses provide a quantitative and analytical foundation in finance. They include:

**CORE COURSES:**

- ACCTG 512 Financial Accounting Theory and Reporting Problems
- BUSAD 525 Quantitative Methods in Finance
- BUSAD 526 Current Issues in Corporate Finance
- FIN 505 Multinational Managerial Finance
- FIN 508 Analysis of Financial Markets
- FIN 513 Speculative Markets

The required capstone course, BUSAD 585 Research in Security Valuation, provides a culminating experience for students to develop their analytical ability, their synthesis of material, and their ability to identify strategies that enhance value creation, building upon their knowledge acquired from the core courses.

The electives allow students to focus in a selected field of finance such as corporate financial management or investment management. The exact elective courses to be offered for a cohort will be determined by the professor-in-charge based on polls taken from each cohort class and on consultation with the faculty who are teaching elective courses.

Students may enroll in the Master of Finance program at the Great Valley Campus, taking courses in a face-to-face and blended format. Or students may enroll in the online Master of Finance program. A one-week residency at Great Valley is required as part of the online program.

**Student Aid**

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley via email at [studentaid@gv.psu.edu](mailto:studentaid@gv.psu.edu) or visit the website at [http://www.sgps.psu.edu/prospective/tuition/financial\\_aid/default.ashx](http://www.sgps.psu.edu/prospective/tuition/financial_aid/default.ashx).

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[ACCOUNTING \(ACCTG\) course list](#)

[BUSINESS ADMINISTRATION \(BUSAD\) course list](#)

[FINANCE \(FIN\) course list](#)

Last Revised by the Department: Summer Session 2006

Blue Sheet Item #: 34-06-360

Review Date: 12/15/06

Date last updated by Publications: 8/21/09

## Science/Business, Integrated Five-Year Program

### Degree Conferred:

B.S./M.B.A. Degrees

This special program is a cooperative effort between the Eberly College of Science and the Smeal College of Business. The program will provide an opportunity for students to combine and accelerate an undergraduate program in the basic sciences with a graduate program in business administration. Students admitted to this program will have the opportunity to earn a B.S. degree in General Science from the Eberly College of Science and an M.B.A. in Business Administration from the Smeal College in a total of five years. The first three years of study will include courses that satisfy the undergraduate science and General Education components of the program, and the last two years will satisfy the graduate business components of the program.

Initial program admission decisions are made jointly by the Eberly College of Science and the Smeal College of Business. The decision to extend an invitation to join the program as an undergraduate is reached through a multi-step process. First, applicants meeting all program criteria will be initially reviewed. Then a limited number of top candidates will be selected for on campus interviews by representatives of the Eberly College of Science and the Smeal College of Business. Successful interviewees will be offered admission to the accelerated program.

During the third year of the program, students formally apply to the MBA program in the Smeal College of Business. Applications are reviewed against the same criteria used for all MBA applicants, including undergraduate record, GMAT scores and related work experience. Successful candidates will gain admission into the MBA program for their fourth year of study. Students will then earn their B.S. degree during the first year of M.B.A. course work, and earn their M.B.A. degree at the end of their second year of graduate study. In addition to the regular fall and spring semester course work, program students are expected to earn credit during summer session through Cooperative Education experiences and participate in the MBA internship program.

This program seeks to combine an undergraduate program with graduate study in a professional school, and it proposes to attract and select excellent students with defined career goals. It is important to note that students in this program will have completed at least 112 undergraduate credits before entering the MBA component of the program. They will satisfy all of Penn State's undergraduate General Education requirements and will complete the science course requirements that a General Science student with the General option does. The main elements that are different for students in the accelerated program as compared with regular four-year General Science major (General option) are that in the accelerated program students use elective credits for summer Co-op experiences and for 12 transfer credits from their first year of MBA studies. These 12 credits will be "double counted" on both the undergraduate and graduate transcripts. Accelerated students also will have an opportunity to take special "bridge" courses including 1- and 2-credit seminar classes that will focus on traversing the boundaries among science, technology, and business.

DATE LAST REVIEWED: 3/18/03

## Forest Resources (FOR R)

[Program Home Page](#)

MICHAEL G. MESSINA, *Director of the School of Forest Resources and Professor of Forest Resources*  
121 Forest Resources Building  
814-863-7093

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Marc D. Abrams, Ph.D. (Michigan State) Professor of Forest Ecology and Physiology
- Paul Blankenhorn, Ph.D. (Penn State) Professor of Wood Technology
- Elizabeth Boyer, Ph.D. (Virginia) Associate Professor of Water Resources
- Nicole Brown, Ph.D. (Virginia Tech) Assistant Professor of Wood Chemistry
- John E. Carlson, Ph.D. (Illinois) Associate Professor of Molecular Genetics
- Patrick J. Drohan, Ph.D. (Penn State) Assistant Professor of Pedology
- William F. Elmendorf, Ph.D. (Penn State) Assistant Professor of Urban and Community Forestry
- James C. Finley, Ph.D. (Penn State) Professor of Forest Resources
- Matthew Hurteau, Ph.D. (California, Davis) Assistant Professor of Forest Resources
- Michael G. Jacobson, Ph.D. (North Carolina State) Assistant Professor of Forest Resources
- John Janowiak, Ph.D. (Washington State) Professor of Wood Products Engineering
- Margot Kaye, Ph.D. (Colorado State) Assistant Professor of Forest Ecology
- Marc E. McDill, Ph.D. (Virginia Tech) Associate Professor of Forest Resource Management
- Michael G. Messina, Ph.D. (North Carolina State) Director, School of Forest Resources; Professor of Forest Resources
- Judd Michael, Ph.D. (Penn State) Associate Professor of Wood Products Business Management
- Charles Ray, Ph.D. (Texas A&M) Assistant Professor of Wood Products Operations
- Paul M. Smith, Ph.D. (Virginia Tech) Professor of Forest Products Marketing
- Sanford Smith, Ph.D. (Penn State) Lecturer in Forest Resources
- Kim C. Steiner, Ph.D. (Michigan State) Professor of Forest Biology
- Eric Zenner, Ph.D. (Oregon State) Associate Professor of Silviculture

The Doctor of Philosophy and the Master of Science degree programs are oriented toward research, education, and scientific technology in the professions of forest products and forestry.

Faculty expertise, laboratories, and outdoor facilities are available to support specialization in a variety of fields. Possibilities for specialization are indicated in part by the courses listed under wood products, forestry, and wildlife and fisheries, and by related courses in agricultural economics, agronomy, animal nutrition, biology business administration, chemical engineering, computer science, ecology, economics, entomology, environmental pollution control, environmental resource management, genetics, horticulture, industrial engineering, landscape architecture, meteorology, physiology, plant pathology, polymer sciences, recreation and parks, regional planning, or statistics.

Students in this program may elect the dual-degree program option in Operations Research for the Ph.D. and M.S. degrees. (See also [Operations Research](#).)

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. A student may be admitted provisionally without GRE scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Application materials should be submitted before February by those who want to begin in summer or fall. For admission, an applicant should have at least a 2.75 grade-point average, a 3.00 junior/senior average (on a 4.00 scale), and courses that are basic to the individual's field of specialization. Ordinarily, these include 12 credits in communication; 12 credits in social sciences and humanities; 10 credits in quantification, including calculus and statistics; 8 credits in chemistry and/or physics; 8 credits in biological sciences; and 18 credits in forest products, forestry, fish, wildlife, or related courses. Three reference letters and a brief statement describing the applicant's academic goals, career interests, and special qualifications are required. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

Admission to the Ph.D. program in Forest Resources requires a master's degree in Forest Resources or a closely related field, or a bachelor's degree with a minimum grade-point average of 3.30 and demonstrated research ability.

### Master's Degree Requirements

**M.S.:** In addition to Graduate School requirements, 6 credits of statistics and 2 credits of colloquium are required.

### Doctoral Degree Requirements

An international communications or cultural requirement is required for the Ph.D. degree. This requirement may be satisfied by demonstrating competence in one foreign language equivalent to passing two or three college-level courses. It also may be met by two courses in one or two contemporary foreign cultures. With approval of the doctoral committee, a student may petition the graduate faculty of the school for waiver of the international communications or culture requirement.

Postbaccalaureate course work will include courses specified for the M.S. degree plus 2 credits of colloquium. The entire program of courses tailored to the student's objectives is subject to approval of the student's committee.

The comprehensive examination will consist of an oral and written portion, the written coming first. Copies of the student's thesis research proposal should be provided to the committee before the comprehensive examination.

### WATERSHED STEWARDSHIP OPTION

The Graduate Option in Watershed Stewardship is a graduate option intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program within Forest Resources. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at water resources problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and FOR 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571, or LARCH 540.2 and LARCH 550.2). Breadth courses will consist of 3 graduate credits of course work from each of four subject matter areas: (1) water resources science, (2) social science, public policy and economics, (3) humanities, and (4) communications and design. In the watershed stewardship practicum course students work in teams with community, government, and business leaders to analyze and understand natural resources problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A representative pattern of scheduling for the Graduate Option in Watershed Stewardship in addition to a student's other degree requirements is:

**First Year:**

**Second Year:**

**Fall Semester**

Breadth electives--6 credits

FOR 591A or LARCH 510.2, Watershed Stewardship Issues  
Colloquium--1 credit**Spring Semester**

Breadth electives--6 credits

FOR 591B or LARCH 510.2, Watershed Stewardship Planning  
Colloquium--1 credit**Fall Semester**

FOR 570 or LARCH 540.2--3 credits

Keystone Project

**Spring Semester**

FOR 571 or LARCH 550.2--5 credits

Keystone Project

A list of acceptable breadth courses from each category is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other equivalent (400- or 500-level) degree requirements with concurrence of adviser and graduate committee. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.S., or Ph.D. degree programs within the School of Forest Resources and other participating programs may apply to participate in the Graduate Option in Watershed Stewardship.

**Other Relevant Information**

Each entering student receives individual guidance from an adviser, and later from his or her committee, in designing a program of studies and research based on his or her own interests. The student is responsible for conforming to all requirements summarized in the "Graduate Studies Handbook" of the School of Forest Resources, and for completing the degree program within a reasonable time, i.e., two years for a master's degree or three years for a Ph.D.

**Student Aid**

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following award typically has been available to graduate students in this program:

**FOREST RESOURCES: JESSE ROSSITER RAPP MEMORIAL SCHOLARSHIP**

--Available to graduate students. Apply to the School of Forest Resources' Scholarships, Loans, and Awards Committee.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**[FORESTRY \(FOR\) course list](#)**

See also [Wildlife and Fisheries Science](#).

**[WOOD PRODUCTS \(W P\) course list](#)****Joint Degree Programs between The Pennsylvania State University Dickinson School of Law (J.D.) and the School of Forest Resources (M.S., Ph.D.)**

**Joint Degree Program.** The Pennsylvania State University Dickinson School of Law (DSL) and the School of Forest Resources (SFR) will offer coordinated programs of studies leading to the degrees of Juris Doctor (J.D.) and a Master of Science (M.S.), or a Doctor of Philosophy (Ph.D.) in Forest Resources or Wildlife and Fisheries Sciences. The SFR programs are interdisciplinary.

**Admissions.** In order to be admitted to the program, students may a) first be admitted and enrolled in either SFR or DSL, and be subsequently admitted to the other program, or b) be admitted to the joint degree program prior to commencing studies at Pennsylvania State University. Credits earned in the SFR program before admission to DSL cannot, however, be credited to the J.D. degree. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates. Applications for transfer into the joint degree program from another law school or forestry/natural resources program at another University will be considered on a case-by-case basis.

**Admission Requirements**

**DSL.** A bachelor's or equivalent degree from an accredited college is a prerequisite for admission. However, there is no standard prescribed undergraduate curriculum. An applicant should have acquired significant oral, and written communications skills before entering law school. The following are required of applicants: a completed application form for DSL; taking of the Law School Admissions Test (LSAT); completion of an LSDAS report; a one-page personal statement; employment record since high school; and two recommendations.

**School of Forest Resources:** A Bachelor's or equivalent degree from a regionally accredited college is a prerequisite for admission to a master's degree program, with a cumulative grade point average of 2.75 and junior-senior average of 3.0, based on a maximum 4.0 system. The following are also required of applicants to the joint degree program: taking of the Graduate Record Examination (GRE) or the LSAT; an official undergraduate transcript or transcripts; a personal statement; employment record since high school; and three recommendations. There is no prescribed undergraduate curriculum, and, because of the diversity of programs in the School, professional preparation may vary considerably. As a guide, SFR suggests having 8 credit hours in chemistry and/or physics; 12 in calculus, statistics, and/or computer science; 8 in biology, botany, and/or zoology; 12 in writing and speaking; 12 in economics, social sciences, and/or humanities; and 18 in forest science, wildlife and fisheries science, and/or wood products. Completed applications showing that a candidate is qualified for admission will be forwarded to potential faculty advisers in SFR, and admission of otherwise qualified candidates will depend upon the willingness of a faculty member to act as an adviser. Applicants are advised to contact potential advisers before applying and should contact the SFR liaison (the Goddard Chair), as well as the SFR Assistant Director of Graduate Studies, to identify potential advisers.

Admission to the Ph.D. program requires evidence of research ability, e.g., a master's degree thesis, paper, or equivalent publication and a grade point average of 3.3 or higher in graduate studies work, exclusive of thesis and special problem courses. Baccalaureate degree students graduating from an honors program with a required thesis, or who have authored a refereed publication, may be considered for admittance without a master's degree.

**Residency:** For master's programs, 5 semesters' residence is required at the Law School and 3 semesters' residence at the SFR at University Park, although additional time may be required to complete the M.S. thesis requirements. For Ph.D. programs, the same minimum number of semesters will be required, as well as the additional time as required to complete additional course work and a dissertation. In addition, Ph.D. candidates must arrange the sequence of semesters such that they are in residence at University Park as a full time student for at least two semesters in a single 12-month period. Although a student will normally take all courses at the campus where the student is in residence, a student may take up to one course (three credit hours) per semester at the campus where the student is not in residence. A Ph.D. joint degree student in residence at DSL will be considered to be "registered" at University Park for the purpose of satisfying any requirement of continuous registration and/or benchmarking in the Ph.D. program.

**Liaisons:** The respective liaisons for DSL and SFR shall be as follows: The Department and Faculty liaison for DSL shall be the Associate Dean for Academic Affairs and the student adviser will be the Director of the Agricultural Law Center or such other faculty member(s) as may be designated by the Dean. The



liaison for SFR for the Joint Degree Program and the student contact for inquiries regarding the Joint Degree Program shall be the then current holder of the Maurice K. Goddard Chair in Forestry and Environmental Resources Conservation, or the Director of SFR when there is no current appointee to the Goddard Chair.

### Interprogram Transfer of Credits

**J.D.** A maximum of 12 credits for SFR course work may be transferred for credit toward the J.D. degree at DSL. Students must obtain a grade satisfactory to DSL for the course work to be credited toward the J.D. degree. What courses may qualify for credit shall be determined by the DSL liaison. Because of the interdisciplinary nature of many SFR degrees, courses from other Departments and Colleges are credited towards an SFR degree with the approval of the SFR committee (e.g. courses in Economics, Agricultural Economics, Agricultural and Extension, Agronomy, Entomology, Geosciences, Landscape Architecture, Leisure Studies, Meteorology, Plant Pathology, Soil Science, EPC) and credits of these courses will be treated as SFR courses (i.e. may be credited to the DSL program with DSL approval, subject to the 12-credit limit).

**SFR Degrees:** The SFR programs are interdisciplinary programs and typically credits from other Departments and Colleges may be credited. What courses may be credited will be determined by the student's SFR committee. Normally, a maximum of 12 credits of DSL course work will be counted for credit toward the minimum requirements for an SFR Master's degree, subject to approval by the student's SFR committee.

**Sequence.** The sequence of courses will be determined by the students and their advisers. Generally, however, students will complete the first year of the DSL program before beginning the SFR program. Thereafter, students may concurrently enroll in courses in the DSL and SFR programs, provided that they abide by the requirements of each program. The ordinary expectation will be that students will spend entire semesters at one location or the other.

**Recommended Program of Study and Advising.** All students in the program will have two advisers, one from DSL and one from SFR (the committee chair). Periodic interaction between the two advisers will be encouraged. A program of study will be developed for each student taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year, but some are offered every two or three years. Advisers will have available a list of projected relevant offerings in order to work with the student on an individualized program of study. The standard committee structure will apply to the SFR programs.

**Tuition.** Students will be charged the applicable DSL tuition to cover the J.D. program and the applicable SFR tuition to cover the SFR degree program. The DSL tuition will be paid for the semesters that the student is in residence at DSL and the SFR tuition will be paid for the semesters that the student is in residence at University Park. A student may take up to one course (3 credit hours) per semester at the campus where the student is not residence without, any change in tuition, but must pay additional tuition to the nonresidential campus if he or she wishes to take additional course work at that campus during that semester.\*

**Financial Aid and Assistantships.** Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Generally, SFR assistantships and financial aid will not apply to time spent at DSL.

**Fulfillment of Degree Requirements and Graduation.** A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree, provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count toward meeting the requirements of the other program must be completed before award of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the interprogram transfer of credits. With respect to SFR's requirement for a thesis or paper, work done while at DSL under the supervision of a DSL faculty member may be appropriate for incorporation into the thesis or paper with the approval of the SFR committee (in such cases, the committee should consider whether credits afforded such work will be subject to the 12-credit maximum for interprogram transfers described in paragraph 6(b) and the DSL faculty member should be a member of the committee).

\*After taking comprehensive examinations, a Ph.D. student must pay tuition for all courses taken at any campus where the Ph.D. student is not registered.

J.D./M.F.R., M.S., M.Agr., Ph.D.

Last Revised by the Department: Fall Semester 2003

Blue Sheet Item #: 31-05-139

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-078

Review Date: 02/21/2012

Faculty last updated: 9/18/12

## French (FR)

[Program Home Page](#)

BENEDICTE MONICAT, *Head of the Department*  
237 Burrowes Building  
814-865-1492

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- J.-Marc Authier, Ph.D. (Southern California) Associate Professor of French and Applied Linguistics
- Jennifer Boittin, Ph.D. (Yale) Associate Professor of French, Francophone Studies and History
- Vincent Bruvere, Ph.D. (Warwick) Assistant Professor of French and Francophone Studies
- Christine Clark-Evans, Ph.D. (Bryn Mawr) Associate Professor of French and Women's Studies
- Kathryn M. Grossman, Ph.D. (Yale) Professor of French
- Thomas A. Hale, Ph.D. (Rochester) Edwin Erle Sparks Professor of African, French, and Comparative Literature
- Celeste Kinginger, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of French and Applied Linguistics
- Norris J. Lacy, Ph.D. (Indiana) Edwin Erle Sparks Professor of French and Medieval Studies
- Vera Mark, Ph.D. (Texas, Austin) Assistant Professor of French and Linguistics
- Benedicte Monicat, Ph.D. (Maryland) Professor of French and Women's Studies
- Lisa Reed, Ph.D. (Université d'Ottawa) Associate Professor of French and Linguistics
- Willa Z. Silverman, Ph.D. (New York) Professor of French and Jewish Studies
- Allan Stoekl, Ph.D. (SUNY, Buffalo) Professor of French and Comparative Literature
- Jean-Claude Vuillemin, Ph.D. (Michigan State) Professor of French
- Monique Yaari, Ph.D. (Cincinnati) Associate Professor of French

This program offers training in French literature and civilization.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are generally required of all students educated (high school and college) in the continental United States. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Minimum qualifications for admission to the program typically include a B.A. in French or the equivalent, a minimum of 3.20 grade-point average (on a 4.0 scale), and the ability to speak and write in both French and English (a speech sample demonstrating the applicant's ability to speak extemporaneously and coherently about his/her study and career goals in French for anglophones, in English for francophones, and in French and English for speakers of other foreign languages is required). A written text on a literary or cultural topic also must be submitted. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.20 GPA may be made for students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

Candidates for the master's degree in French complete a minimum of eleven 3-credit graduate-level courses, plus a master's paper or a minimum of ten 3-credit courses, plus a thesis. A reading knowledge of a second foreign language plus oral and written examinations also are required. All candidates take FR 571 French Literary Theory and Criticism (3), FR 502 Introduction to French Linguistics (3), FR 580 Approaches to French Civilization (3), FR 581 Theory and Techniques of Teaching French (1-6), FR 501A Pro-Seminar in French Studies I (1.5), and FR 501B Pro-Seminar in French Studies II (1.5). In addition to the six required courses designated here, all candidates take six 3-credit courses in French and Francophone Studies. The M.A. degree (or equivalent) is normally a prerequisite to doctoral candidacy.

Candidates for the Women's Studies and French dual-title master's degree complete a minimum 33 credits plus a master's paper. All candidates take FR 501A Pro-Seminar in French Studies I (1.5), FR 501B Pro-Seminar in French Studies II (1.5), FR 502 Introduction to French (3), FR 571 French Literary Theory and Criticism (3), FR 580 Approaches to French Civilization (3), FR 581 Theory and Techniques of Teaching French (1-6), WMNST 501 Feminist Perspectives in Research and Teaching (3), WMNST 502 Global Feminism (3), WMNST 507 Feminist Theory (3), and 9 credits in literature (6 of those credits in Women's Studies-approved courses).

### Doctoral Degree Requirements

The Ph.D. degree prepares candidates for careers in teaching and research at the college or university level. Between 33 and 36 credits beyond the M.A. in French (or equivalent) is required in graduate course work. Credits must be distributed in one of two areas of specialization: civilization or literature.

Doctoral candidates must demonstrate either an advanced knowledge of one foreign language other than French or a reading ability of two foreign languages other than French (equivalent to the 12-credit level). All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral defense.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [FRENCH \(FR\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-021

Review Date: 06/12/2012

Last updated by Publications: 10/23/09

## Forensic Science (FRNSC)

[Program Home Page](#)

MITCHELL M. HOLLAND, *Chair*  
Program Office:  
107 Whitmore Laboratory  
814-863-6758

### Degree Conferred:

Master of Professional Studies in Forensic Science

### The Graduate Faculty

- Frank L. Dorman, Ph.D. (University of Vermont), Associate Professor of Biochemistry and Molecular Biology, Forensic Science
- Maureen D. Feineman, Ph.D. (University of California, Berkeley), Assistant Professor of Geosciences
- Mitchell M. Holland, Ph.D. (Maryland, College Park) Associate Professor of Biochemistry and Molecular Biology, Forensic Science
- Bhushan M. Jayarao, (Budapest, Hungary), Professor Veterinary Science
- David H. Kaye, (Yale Law School), Professor of Law, Dickenson Law School
- Ke Chung Kim, Ph.D. (Minnesota) Professor of Entomology
- John H. Kramer, Ph.D. (Iowa) Professor of Sociology, and Crime, Law, and Justice
- Akhlesh Lakhtakia, Ph.D. (Utah), D.Sc. (BHU, Varanasi) Charles G. Binder Professor, Engineering Science, and Mechanics
- George R. Milner, Ph.D. (Northwestern) Professor of Anthropology
- Cedric Neumann, Ph.D. (University of Lausanne, Switzerland), Assistant Professor of Statistics, Forensic Science
- Ralph R. Ristenbatt (John Jay College of Criminal Justice), Senior Research Assistant, Forensic Science
- Reena Roy, Ph.D. (Nebraska) Associate Professor of Biochemistry and Molecular Biology, Forensic Science
- Ayusman Sen, Ph.D. (Chicago) Professor of Chemistry
- Mark D. Shriver, Ph.D. (Texas) Associate Professor of Anthropology
- Jenifer Ann Smith, Ph.D. (Ohio State), Professor of Practice, Forensic Science
- Daniel G. Sykes, Ph.D. (Alberta) Senior Lecturer, Department of Chemistry, Forensic Science

The Master of Professional Studies (MPS) in Forensic Science is an inter-college degree program housed in the Eberly College of Science and includes ties with Departments of Anthropology, Biochemistry and Molecular Biology, Chemistry, Entomology, Psychology, and Sociology. The program is offered by Penn State graduate faculty members, with enrichment by mentors from the academic faculty, public crime laboratories, and private forensic laboratories. The curriculum is designed to provide students with innovative, hands-on, and multidisciplinary learning approaches to educate and train them in crime scene investigation, the science behind forensics, courtroom proceedings, and the ethical and social issues that they will be exposed to when they join the forensic community. In addition, the program will develop teamwork and communication skills, which will be important when working actual cases in a crime laboratory.

### Admission Requirements and the Application Process

Applications will be considered in accordance with the requirements of the Graduate School as described in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. The Masters degree in Forensic Science is appropriate for students with a baccalaureate degree in the biological sciences, chemistry, or a related field of study. Applicants are required to have a minimum cumulative GPA of 3.00 (on a 4.00 scale) in their undergraduate degree. The GRE's are required, with a score of 1100 (old system) or 306 (new system) to be competitive. In addition, each applicant is asked to provide a personal statement of interests and objectives, a statement of their definition of the word "ethics" and two letters of reference. Letters of reference can be submitted by the student's undergraduate advisor, research advisor, and/or an instructor for an upper level course taken as part of their major. An applicant may be asked to go through an interview process conducted by members of the forensic science faculty. Admission to the program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of spaces available for new students.

Applicants are referred to the program web site for guidance on how to submit their applications, the deadline for submitting applications, and when decisions on acceptance into the program will be announced: [www.forensics.psu.edu](http://www.forensics.psu.edu).

### Degree Requirements

#### Chemistry Emphasis

A minimum of 41 credits are required for completion of the program, with at least 19 credits from courses at the 500 and 800-level, and at least 6 credits at the 500 level. Students are required to take 27 credits from the core courses listed below and 11 additional credits of Chemistry coursework. Elective credits are from courses which are determined based on interest and career track. FRNSC 801 will serve as the capstone experience for completion of the MPS in Forensic Science.

#### Biology Emphasis

A minimum of 42 credits are required for completion of the program, with at least 20 credits from courses at the 500 and 800-level, and at least 6 credits at the 500 level. Students are required to take 27 credits from the core courses listed below and 12 additional credits of Biology coursework. Elective credits are from courses which are determined based on interest and career track. FRNSC 801 will serve as the capstone experience for completion of the MPS in Forensic Science.

#### Core Courses (27 credits)

#### FORENSIC SCIENCE (FRNSC)

- 400. Courtroom Proceedings and Testimony (1)
- 410. A Scientific Approach to Crime Scene Investigation (2)
- 411. Criminalistics: Trace and Impression Evidence (3)
- 413. Criminalistics: Biology (3)
- 415W. Laboratory in Crime Scene Investigation (2)
- 475. Forensic Science Seminar (1)
- 532. Drug Chemistry and Toxicology (3)
- 541. Forensic Seminar Series (1)
- 561. Ethics in Forensic Science (1)
- 801. Criminalistics III (4)
- 894. Research Projects in Forensic Science (6)

#### ADDITIONAL COURSES (11-12 credits)

#### Forensic Chemistry Emphasis (11):

CHEM 425 – Chromatography and Electrochemistry (3)  
CHEM 500 – Seminar in Chemistry (1)  
FRNSC 427W – Forensic Chemistry (4)  
FRNSC 831 – Forensic Chemistry II (3)

**Forensic Biology Emphasis (12):**

B M B 400 – Molecular Biology of the Gene (3)  
BMMB 590 – Colloquium (1)  
FRNSC 421W – Forensic Molecular Biology (4)  
FRNSC 821 – Forensic Molecular Biology II (4)

**Electives (Select at least 3 credits)**

- CRIM 406 – Sociology of Deviance (3)
- CRIM 423 – Sexual Violence (3)
- CRIM 425 – Organized Crime (3)
- CRIM 432 – The Courts (3)
- CRIM 453 – Women & Justice (3)
- PSYCH 471 – Adjustment & Social Relationships (3)

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-020

Review Date: 06/12/2012

Last updated by Publications: 1/21/10 (link check)

## Genetics (GENET)

### [Program Home Page](#)

RICHARD ORDWAY, *Chair, Intercollege Graduate Program in Genetics*  
208 Mueller Laboratory  
University Park, PA 16802  
814-863-5693

GAVIN P. ROBERTSON, *Co-chair, Intercollege Graduate Program in Genetics*  
Room T3423, Mail Code CH74  
Penn State College of Medicine  
500 University Drive  
Hershey, PA 17033  
717-531-8098

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Sarah E. Ades, Ph.D. (MIT) Assistant Professor of Biochemistry and Molecular Biology
- Hiroshi Akashi, Ph.D. (Chicago) Assistant Professor of Biology
- Charles Anderson, Ph.D. (Stanford) Assistant Professor of Biology
- Avery August, Ph.D. (Cornell) Assistant Professor of Immunology
- John E. Ayers, Ph.D. (Penn State) Professor of Plant Pathology
- Paul Babitzke, Ph.D. (Georgia) Associate Professor of Biochemistry and Molecular Biology
- Lu Bai, Ph.D. (Cornell) Assistant Professor of Biochemistry and Molecular Biology, and Physics
- Guy F. Barbato, Ph.D. (Virginia Tech) Associate Professor of Poultry Science
- David Blizard, Ph.D. (Wales) Senior Research Scientist, Center for Development and Health Genetics
- David M. Braun, Ph.D. (Missouri) Assistant Professor of Biology
- Sarah Kay Bronson, Ph.D. (Washington U) Assistant Professor of Cellular and Molecular Physiology (Hershey)
- Craig Cameron, Ph.D. (Case Western Reserve) Louis Martarano Associate Professor of Biochemistry and Molecular Biology
- John E. Carlson, Ph.D. (Illinois) Associate Professor of Molecular Genetics
- Laura Carrel, Ph.D. (Stanford) Assistant Professor of Biochemistry and Molecular Biology (Hershey)
- Douglas R. Cavener, Ph.D. (Georgia) Professor of Biology
- Vincent Chau, Ph.D. (Virginia) Professor of Cellular and Molecular Physiology (Hershey)
- Keith C. Cheng, M.D. (NYU School of Medicine); Ph.D. (Washington) Professor of Pathology (Hershey)
- Hui-Ling Chiang, Ph.D. (Harvard) Associate Professor of Cellular and Molecular Physiology (Hershey)
- Surinder Chopra, Ph.D. (Vrije U, Brussels) Assistant Professor of Maize Genetics
- Barbara J. Christ, Ph.D. (British Columbia) Professor of Plant Pathology
- Gary Clawson, M.D., Ph.D. (Michigan State) Professor of Pathology, and Biochemistry and Molecular Biology (Hershey)
- Pamela H. Correll, Ph.D. (George Washington) Associate Professor of Immunology
- Diana Cox-Foster, Ph.D. (Illinois) Professor of Entomology
- Richard Craig, Ph.D. (Penn State) J. Franklin Styer Professor Emeritus of Horticultural Botany; Professor Emeritus of Plant Breeding
- Rebecca Craven, Ph.D. (Tennessee) Associate Professor of Microbiology and Immunology (Hershey)
- Liwang Cui, Ph.D. (Kentucky) Assistant Professor of Entomology
- Claude W. dePamphilis, Ph.D. (Georgia) Associate Professor of Biology
- Kristin A. Eckert, Ph.D. (Wisconsin) Associate Professor of Pathology (Hershey)
- Robert B. Eckhardt, Ph.D. (Michigan) Professor of Developmental Genetics and Evolutionary Morphology
- James G. Ferry, Ph.D. (Illinois) Stanley Person Professor of Biochemistry and Molecular Biology
- Joanna Floros, Ph.D. (Temple) Professor of Cellular and Molecular Physiology (Hershey)
- Majid R. Foolad, Ph.D. (California, Davis) Professor of Plant Genetics
- David Geiser, Ph.D. (Northwestern) Assistant Professor of Plant Pathology
- Henry D. Gerhold, Ph.D. (Yale) Professor of Forest Genetics
- David S. Gilmour, Ph.D. (Cornell) Associate Professor of Biochemistry and Molecular Biology
- Sergei Grigoryev, Ph.D. (Moscow State) Assistant Professor of Biochemistry and Molecular Biology (Hershey)
- Santhosh Girirajan, Ph.D. (Medical College of Virginia, Va. Commonwealth Univ) Assistant Professor of Biochemistry and Molecular Biology; Assistant Professor of Anthropology
- Edward G. Gunther, Ph.D. (Yale) Assistant Professor, Jake Gittlen Cancer Research Institute (Hershey)
- Kyung-An Han, Ph.D. (SUNY, Buffalo) Assistant Professor of Biology
- Wendy Hanna-Rose, Ph.D. (Harvard) Assistant Professor of Biochemistry and Molecular Biology
- Ross C. Hardison, Ph.D. (Iowa) Professor of Biochemistry
- Eric T. Harvill, Ph.D. (California, Los Angeles) Assistant Professor of Microbiology and Infectious Disease
- Biao He, Ph.D. (SUNY Health Sciences Ctr, Brooklyn) Assistant Professor of Virology
- S. Blair Hedges, Ph.D. (Maryland) Professor of Biology
- Christopher R. Herzog, Ph.D. (Medical College of Ohio) Assistant Professor of Pharmacology
- Heather Hines, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Biology and Entomology
- Jianming Hu, Ph.D. (Penn State) Associate Professor of Microbiology and Immunology (Hershey)
- David R. Huff, Ph.D. (California, Davis) Associate Professor of Turfgrass Breeding and Genetics
- Seogchan Kang, Ph.D. (Wisconsin) Associate Professor of Plant Pathology
- Ralph L. Keil, Ph.D. (Cornell) Associate Professor of Biochemistry and Molecular Biology (Hershey)
- Kenneth Keiler, Ph.D. (MIT) Assistant Professor of Biochemistry and Molecular Biology
- Zhi-Chun Lai, Ph.D. (Albert Einstein College of Medicine) Associate Professor of Biology, and Biochemistry and Molecular Biology
- Philip Lazarus, Ph.D. (McGill) Professor of Pharmacology and Health Evaluation Science (Hershey)
- Robert Levenson, Ph.D. (SUNY, Stony Brook) Professor of Pharmacology (Hershey)
- David Liu, Ph.D. (CUNY) Assistant Professor of Neural and Behavioral Science
- Bernhard Lüscher, Ph.D. (Zurich) Associate Professor of Biology, and Biochemistry and Molecular Biology
- Hong Ma, Ph.D. (MIT) Professor of Biology
- Wojciech Makalowski, Ph.D. (Poznan, Poland) Associate Professor of Biology
- Kateryna Makova, Ph.D. (Texas Tech) Assistant Professor of Biology
- Yingwei Mao, Ph.D. (Michigan) Assistant Professor of Biology
- Gerald E. McClearn, Ph.D. (Wisconsin) Evan Pugh Professor of Health and Human Development
- Patricia McLaughlin, D.Ed. (Penn State) Professor of Neural and Behavioral Science (Hershey)
- Bruce A. McPheron, Ph.D. (Illinois) Professor of Entomology
- Paula C. McSteen, Ph.D. (East Anglia) Assistant Professor of Biology
- Pamela J. Mitchell, Ph.D. (Columbia) Associate Professor of Biochemistry and Molecular Biology
- David Mu, Ph.D., Associate Professor of Pathology, and Biochemistry and Molecular Biology (Hershey)
- Kathleen M. Mulder, Ph.D. (SUNY, Buffalo) Professor of Pharmacology (Hershey)
- Joshua Muscat, Ph.D. (New York University) Professor of Public Health Science (Hershey)
- Masatoshi Nei, Ph.D. (Kyoto, Japan) Evan Pugh Professor of Biology
- Davis T. W. Ng, Ph.D. (Northwestern) Associate Professor of Biochemistry and Molecular Biology
- B. Tracy Nixon, Ph.D. (MIT) Associate Professor of Biochemistry and Molecular Biology Pharmacology (Hershey)
- Curt Omiecinski, Ph.D. (Washington, Seattle) Professor of Veterinary Science; H. Thomas and Dorothy Willets Hallowell Chair

- Richard W. Ordway, Ph.D. (UMass Medical School) Associate Professor of Biology
- Leslie Parent, M.D. (Duke) Assistant Professor of Medicine, and Microbiology and Immunology (Hershey)
- Robert F. Paulson, Ph.D. (California, San Francisco) Associate Professor of Veterinary Science
- Anthony E. Pegg, Ph.D. (Cambridge) Evan Pugh Professor of Cellular and Molecular Physiology and
- Gary H. Perdew, Ph.D. (Oregon State) Professor of Veterinary Science
- Jeffrey M. Peters, Ph.D. (California, Davis) Assistant Professor of Environmental Toxicology
- C. Channa Reddy, Ph.D. (Indian Inst of Science) Distinguished Professor of Veterinary Science
- Joseph C. Reese, Ph.D. (Illinois) Associate Professor of Biochemistry and Molecular Biology
- Philip L. Reno, Ph.D. (Kent State) Assistant Professor of Anthropology
- Joan T. Richtsmeier, Ph.D. (Northwestern) Professor of Anthropology
- Marylyn D. Ritchie, Ph.D. (Vanderbilt) Director, Center for Systems Genomics; Associate Professor of Biochemistry and Molecular Biology
- Gavin P. Robertson, Ph.D. (California, Riverside) Assistant Professor of Pharmacology and Pathology (Hershey)
- Daniel J. Royse, Ph.D. (Illinois) Professor of Plant Pathology
- Jeffery Sample, Ph.D. (South Florida) Professor of Microbiology and Immunology (Hershey)
- Stephen W. Schaeffer, Ph.D. (Georgia) Associate Professor of Biology
- Robert A. Schlegel, Ph.D. (Harvard) Professor of Biochemistry and Molecular Biology
- Lisa Shantz, Ph.D. (Johns Hopkins) Associate Professor of Cellular and Molecular Physiology (Hershey)
- Cooduvalli S. Shashikant, Ph.D. (Osmania U, India) Associate Professor of Molecular and Developmental Biology
- Yuguang (Roger) Shi, Ph.D. (Australian Natl U) Assistant Professor of Cellular and Molecular Physiology
- Mark D. Shriver, Ph.D. (Texas, Houston) Assistant Professor of Anthropology
- Sharon P. Shriver, Ph.D. (Case Western Reserve) Assistant Professor of Biology
- Esther Siegfried, Ph.D. (Washington U) Assistant Professor of Biology, and Biochemistry and Molecular Biology
- David J. Spector, Ph.D. (Pennsylvania) Associate Professor of Microbiology and Immunology (Hershey)
- Graham H. Thomas, Ph.D. (Edinburgh) Associate Professor of Biology, and Biochemistry and Molecular Biology
- Chen-Pei David Tu, Ph.D. (Cornell) Professor of Biochemistry and Molecular Biology
- David J. Vandenberg, Ph.D. (Penn State) Assistant Professor of Biobehavioral Health
- Michael F. Verderame, Ph.D. (Columbia) Associate Professor of Medicine; Assistant Professor of Microbiology and Immunology (Hershey)
- George P. Vogler, Ph.D. (Colorado) Associate Professor of Biobehavioral Health
- Kent E. Vrana, Ph.D. (Louisiana State) Elliot S. Vesell Professor of Pharmacology (Hershey)
- Kenneth M. Weiss, Ph.D. (Michigan) Evan Pugh Professor of Anthropology and Genetics
- John W. Wills, Ph.D. (Tennessee, Knoxville) Professor of Microbiology and Immunology (Hershey)
- Jin-Ming Yang, Ph.D. (Shanghai Medical, China) Professor of Pharmacology (Hershey)
- Ian S. Zagon, Ph.D. (Colorado) Professor of Neuroscience and Anatomy (Hershey)
- Samuel Shao-Min Zhang, Ph.D. (Tokyo, Japan) Assistant Professor of Neural and Behavioral Science (Hershey)
- Jiyue Zhu, Ph.D. (Dartmouth Medical School) Assistant Professor of Cellular and Molecular Physiology (Hershey)

The Intercollege Graduate Program in Genetics is designed to prepare graduates for rapidly expanding opportunities in genetics in academic institutions, biotechnology and pharmaceutical companies, private research institutes, governmental research laboratories, etc. The program includes faculty from eighteen departments in the Eberly College of Science and the Colleges of Agricultural Sciences, Health and Human Development, and the Liberal Arts at the University Park campus and the Penn State College of Medicine at The Milton S. Hershey Medical Center. Beginning and advanced graduate-level courses are taught by active research faculty members in their own areas of specialization. Fields available of study and research include molecular, biochemical, physiological, cellular, behavioral, developmental, pharmacological, genomics, bioinformatics, population, and evolutionary genetics; also applications in recombinant DNA technology, genetic engineering, breeding plants or animals, and genetic counseling of humans. Please see the list of faculty on the Web site

[www.genetics.psu.edu](http://www.genetics.psu.edu)

for the full range of areas represented.

## Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Only under exceptional circumstances will an applicant be considered without these scores. In addition, applicants should have a cumulative undergraduate grade-point average of at least 3.00 and appropriate courses in biology (including genetics, organic chemistry or biochemistry), statistics, other sciences, and communications. The application must include three letters of reference and a statement describing and explaining interests in genetics, types of organism and research preferred, and goals during and after graduate studies.

All application materials should be submitted by January 31 for the best chance of admission and financial aid. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

## Master's Degree Requirements

The master's degree program can serve as an alternative for students who, for any number of reasons, do not proceed to the Ph.D. A committee appointed for each student, with the approval of the program chair, determines specific courses, communication skills, and research acceptable for satisfying M.S. degree requirements. Students must meet the M.S. degree requirements specified by the Graduate School in the *Graduate Bulletin*. In addition, specific genetics course requirements include 12 credits selected from a list of approved genetics courses, 3 credits in statistics, and 2 credits per year in genetics colloquium. A thesis is required of all candidates for the M.S. degree.

## Doctoral Degree Requirements

The student's Ph.D. committee, appointed after a written and oral candidacy examination is passed, determines specific requirements for courses and research, and administers the comprehensive and final examinations. The Graduate School requires no specified number of credits for the attainment of the doctorate. However, the Genetics program requires 15 credits in approved genetics courses, 3 credits in statistics, and 2 credits per year in genetics colloquium. The requirement in communication and foreign language skills is the same as that of the thesis adviser's department or program. All Ph.D. students are required to prepare and formally defend a thesis involving independent research.

## Other Relevant Information

Because the selection of the faculty adviser is one of the most important decisions that each student will make during their graduate career, we offer a rotation program to allow students to do three laboratory rotations with different faculty during the first semester. At the end of the first semester, students choose their doctoral adviser in consultation with the faculty adviser and chair of the Genetics program. Although most students accepted into the Genetics graduate program are admitted to the rotation program, some students may be admitted to receive training by a specific faculty member. All admissions must be approved by the IGDP Genetics Admissions Committee.

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. In most participating departments, Genetics applicants are eligible for departmental teaching or research assistantships, and other assistantships supported by grant funds of individual faculty who make these award decisions.

Applicants with a grade-point average above 3.60 and superior GRE scores are encouraged to request fellowship applications from the Graduate School before January 31.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[GENETICS \(GENET\) course list](#)

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/24/04

Faculty updated: 2/27/13

## Geography (GEOG)

[Program Home Page](#)

KARL S. ZIMMERER, *Head of the Department*  
302 Walker Building  
814-865-3433

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Cynthia A. Brewer, Ph.D. (Michigan State) Professor of Geography
- Robert P. Brooks, Ph.D. (UMass, Amherst) Professor of Geography
- Andrew M. Carleton, Ph.D. (Colorado) Professor of Geography
- Robert G. Crane, Ph.D. (Colorado) Professor of Geography
- Lorraine Dowler, Ph.D. (Syracuse) Associate Professor of Geography and Women's Studies
- Roger M. Downs, Ph.D. (Bristol) Professor of Geography
- William Easterling, Ph.D. (North Carolina) Dean; Professor of Geography
- Rodney A. Erickson, Ph.D. (Washington) Executive Vice President and Provost
- Amy K. Glasmeier, Ph.D. (California, Berkeley) Professor of Geography
- Deryck W. Holdsworth, Ph.D. (British Columbia) Professor of Geography
- Brian King, Ph.D. (Colorado) Assistant Professor of Geography
- Alexander Klippel, Ph.D. (Bremen, Germany) Assistant Professor of Geography
- C. Gregory Knight, Ph.D. (Minnesota) Professor of Geography
- Derrick J. Lampkin, Ph.D. (Arizona) Assistant Professor of Geography
- B. Ikubolajeh Logan, Ph.D. (California, Los Angeles) Professor of Geography
- Alan M. MacEachren, Ph.D. (Kansas) Professor of Geography
- James McCarthy, Ph.D. (California, Berkeley) Associate Professor of Geography
- Donna J. Peuquet, Ph.D. (SUNY, Buffalo) Professor of Geography
- Erica Smithwick, Ph.D. (Oregon State) Assistant Professor of Geography
- Alan H. Taylor, Ph.D. (Colorado) Professor of Geography
- Petra Tschakert, Ph.D. (Arizona) Assistant Professor of Geography
- Melissa Wright, Ph.D. (Johns Hopkins) Associate Professor of Geography
- Lakshman S. Yapa, Ph.D. (Syracuse) Professor of Geography
- Brenton M. Yarnal, Ph.D. (Simon Fraser) Associate Head; Professor of Geography
- Karl S. Zimmerer, Ph.D. (California, Berkeley) Head of the Department; Professor of Geography

### Affiliated Faculty

- Guoray Cai, Ph.D. (Pittsburgh) Associate Professor of Information Sciences and Technology, and Geography
- Susan W. Friedman, Ph.D. (Toronto) Adjunct Assistant Professor of Geography
- Stephen Matthews, Ph.D. (U of Wales) Associate Professor of Demography
- Douglas Miller, Ph.D. (Penn State) Associate Professor of Geography; Director for Outreach, Earth and Mineral Sciences Environment Institute
- Adam Rome, Ph.D. (Kansas) Associate Professor of History

### Faculty Emeriti

- Ronald F. Ablter, Ph.D. (Minnesota) Professor Emeritus of Geography
- Peirce F. Lewis, Ph.D. (Michigan) Professor Emeritus of Geography
- Frederick L. Wernstedt, Ph.D. (California, Los Angeles) Professor Emeritus of Geography
- Wilbur Zelinsky, Ph.D. (California, Berkeley) Professor Emeritus of Geography

The faculty encourages graduate students to arrange courses of study appropriate to their individual needs and aspirations. Programs in Geography may be directed toward a career in public service, teaching and research, private industry, or one of the many other vocational opportunities open to geographers.

Students typically concentrate their study on topics that fall within the special skills and interests of the faculty. Current specialties include behavioral geography; biogeography; cartography; climatology; cultural geography; feminist geography; geo-computation; geographic education; geographic information science; geography of the developing world; geographic theory; geographic visualization; historical geography; human dimensions of global change; nature and society; political geography; population geography; regional economic development and industrial location; remote sensing; and urban geography.

The M.S. program is broadly based. It is designed to provide beginning graduate students with basic training in systematic fields, geographical theory, and research techniques. Study at the Ph.D. level is also broad in the first year, then becomes more specialized.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission, as well as a personal statement. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course work in geography or a related discipline will be considered for admission to the M.S. program. Applicants with master's degrees from high-quality graduate programs in geography will be considered for admission to the doctoral program. The best-qualified applicants will be admitted up to the number of places that are available for new students. All students must have or must acquire a broad competence in physical geography, human geography, representation methods, and analysis methods (qualitative or quantitative).

Baccalaureate students must earn a master's degree before they will be considered for admission to the doctoral program.

### Master's Degree Requirements

The M.S. degree may be earned by completing a thesis or two papers. The thesis option requires completion of at least 30 graduate credits. If the two-paper option is elected, the candidate must earn 35 credits of graduate-level work. The master's papers are usually expanded versions of course or semester papers that are of sufficiently high quality that they can be submitted to scholarly journals. At least one of the papers offered to fulfill the M.S. papers requirement must have been written in connection with a departmental course or seminar.

All M.S. students are required to enroll in GEOG 500 Introduction to Geographic Research (3 credits), GEOG 502 Research Scholarship in Geography (3 credits), and at least 3 credits of GEOG 501A, B, C, or D Research Perspectives (1 credit each) during their first year of residence. All M.S. students are required to complete at least one seminar at the 500 level. Supporting courses are chosen in consultation with an entrance committee (in year one) or the adviser (in subsequent years).

### Doctoral Degree Requirements

There is no fixed number of credits; courses are prescribed according to the student's prior experience. The Graduate School's communication and foreign



language requirement for the Ph.D. degree shall be satisfied in a manner approved by the candidate's doctoral committee.

All doctoral students are required to enroll in GEOG 500 Introduction to Geographic Research (3 credits) and GEOG 502 Research Scholarship in Geography (3 credits) during their first year of residence.

### **Other Relevant Information**

Penn State's graduate program in Geography works with incoming students to design programs tailored to their specific interests and needs. Thus there are few formal requirements and a maximum of opportunities for students to pursue their own interests under the guidance of the faculty. Each student's work is supervised by his or her academic adviser and by a committee consisting of two additional members of the graduate faculty for M.S. students and three or four additional members for doctoral students.

### **Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[GEOGRAPHY \(GEOG\) course list](#)

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/14/04

Last updated by Publications: 4/26/11

## Geosciences (GEOSC)

### [Program Home Page](#)

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 University Park, PA 16802  
[lkump@psu.edu](mailto:lkump@psu.edu)  
 814-863-1274

### Degrees Conferred:

- [Ph.D., M.S.](#)
- [Integrated B.S./M.S. Program in Geosciences](#)

### The Graduate Faculty

- Richard B. Alley, Ph.D. (Wisconsin, Madison) Evan Pugh Professor of Geosciences
- Charles J. Ammon, Ph.D. (Penn State) Professor of Geosciences
- Sridhar Anandakrishnan, Ph.D. (Wisconsin, Madison) Professor of Geosciences
- Michael A. Arthur, Ph.D. (Princeton) Professor of Geosciences
- David Bice, Ph.D. (California, Berkeley) Professor of Geosciences
- Timothy J. Bralower, Ph.D. (California, San Diego) Professor of Geosciences
- Susan L. Brantley, Ph.D. (Princeton) Distinguished Professor of Geosciences
- Terry Engelder, Ph.D. (Texas A&M) Professor of Geosciences
- Matthew Fantle, Ph.D. (California) Assistant Professor of Geosciences
- Maureen Feineman, Ph.D. (California) Assistant Professor of Geosciences
- Donald M. Fisher, Ph.D. (Brown) Professor of Geosciences
- Katherine H. Freeman, Ph.D. (Indiana) Professor of Geosciences
- Kevin P. Furlong, Ph.D. (Utah) Professor of Geosciences
- Tanya Furman, Ph.D. (MIT) Professor of Geosciences
- Russell Graham, Ph.D. (Texas) Associate Professor of Geosciences
- Peter J. Heaney, Ph.D. (Johns Hopkins) Professor of Geosciences
- Christopher H. House, Ph.D. (California) Professor of Geosciences
- James F. Kasting, Ph.D. (Michigan) Evan Pugh Professor of Geosciences
- Klaus Keller, Ph.D. (Princeton) Associate Professor of Geosciences
- James Kubicki, Ph.D. (Yale) Professor of Geosciences
- Lee R. Kump, Ph.D. (South Florida) Professor of Geosciences
- Peter La Femina, Ph.D. (Miami) Associate Professor of Geosciences
- Jennifer L. Macalady, Ph.D. (California, Davis) Associate Professor of Geosciences
- Chris J. Marone, Ph.D. (Columbia) Professor of Geosciences
- Andrew A. Nyblade, Ph.D. (Michigan) Professor of Geosciences
- Hiroshi Ohmoto, Ph.D. (Princeton) Professor of Geochemistry
- Mark E. Patzkowsky, Ph.D. (Chicago) Professor of Geosciences
- David Pollard, Ph.D. (Cal Tech) Senior Scientist
- Eliza Richardson, Ph.D. (MIT) Assistant Professor of Geosciences
- Demian Saffer, Ph.D. (California) Professor of Geosciences
- Rudy L. Slingerland, Ph.D. (Penn State) Professor of Geology
- Peter Wilf, Ph.D. (Pennsylvania) Professor of Geosciences

### M.S. and Ph.D. Degrees

The Department of Geosciences offers M.S. and Ph.D. degree programs that provide students with a broad background in any of the major areas of geological sciences and intensive research experiences culminating in the preparation of a formal thesis. The goal of the programs is to prepare students for scientific careers in academia, government, or industry. A wide range of faculty interests and exceptional laboratory and other support facilities provide an extensive variety of areas of specialization in which students may choose their course work and research topics, which include: aqueous geochemistry, chemistry and physics of rocks and mineral, geodynamics, global change and earth history, sedimentary geology and paleobiology, solid earth and applied geophysics, surficial processes. A complete listing can be found at [www.geosc.psu.edu](http://www.geosc.psu.edu).

The research of faculty and students is facilitated through: the Biogeochemical Research Initiative for Education (BRIE, an NSF-sponsored graduate program in microbial biogeochemistry), the Petroleum Geosystems Initiative (an industry-sponsored, team-based M.S. program) linking the Department of Geosciences and the Department of Energy and Geo-Environmental Engineering and the Penn State Astrobiology Research Center (PSARC, an NSF-sponsored interdisciplinary program in the origin and evolution of life in the universe, aimed at understanding the connections between the environment and the biota on Earth, especially during the stages of its evolution) as well as the Environment Institute of the College of Earth and Mineral Sciences, including the Earth System Science Center, and the Center for Environmental Chemistry and Geochemistry.

In addition to extensive computing and supercomputing facilities developed in association with the Earth System Science Center, students have access to a wealth of analytical, experimental, and field equipment. State-of-the-art analytical equipment is maintained by the department and the Material Characterization Laboratory. The Department of Geography and the Office for Remote Sensing of Environmental Resources have remote sensing facilities.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are normally required for admission. Exceptions must be approved by the department.

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission, applicants generally are expected to have a bachelor's degree in some branch of the natural or physical sciences, engineering, or mathematics. An applicant also is expected to have completed standard introductory courses in geosciences, chemistry, physics, and mathematics through integral calculus, plus 15 credits of intermediate-level work in one or a combination of these subjects. Greater than minimal preparation in chemistry, geology, biology, mathematics, or physics may be required for particular subdisciplines. Applicants who have taken somewhat less than the indicated minimum in these subjects may be admitted but must make up their deficiencies concurrently with their graduate studies.

Students with special backgrounds, abilities, and interests whose undergraduate grade-point average in courses pertinent to geosciences is below a 3.00 (on a 4.00 scale) will be considered for admission only when there are strong indications that a 3.00 average can be maintained at the graduate level.

Students are admitted both to the M.S. and Ph.D. degree programs. A student may work toward a Ph.D. degree without first earning a master's degree. If this option is desired, the student must arrange the scheduling of a candidacy evaluation no later than the end of the third semester of residence at Penn State.

### Faculty Advisers

Upon arrival, students will be advised initially by a committee appointed by the associate head for Graduate program and Research. The committee in turn will designate an interim adviser. Before the end of the first academic year of residence, the student is expected to develop specific academic and research interests so that an appropriate permanent academic adviser and research supervisor may be chosen. The academic adviser and research supervisor are usually the same person, except when the research supervisor is not a member of the geosciences graduate faculty. In such a case, a geosciences program family member serves as the academic adviser.

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the Graduate Bulletin. In addition, several graduate fellowships are available for students within the Department of Geosciences.

Programs of study are planned to require no more than two years for the M.S. degree and three additional years, or five years total, for the Ph.D. degree. A student transferring to the department with the M.S. degree should plan on four additional years. Financial support from teaching or research assistantships or from fellowships is available to students in good standing, but not awarded beyond these limits except in unusual cases.

## Common Degree Requirements

All graduate students in geosciences, including both M.S. and Ph.D. students, are expected to acquire breadth of knowledge in the geosciences, a fundamental and advanced knowledge of their subdiscipline, and skills in the areas of data collection and quantitative analysis. Toward that end, all graduate students must select one of the approved courses in each of the following areas: (1) Geosciences Breadth -- 3-4 credits; (2) Disciplinary Fundamentals -- 3-4 credits; (3) Data Gathering -- 3-4 credits; and (4) Quantitative Analysis -- 3-4 credits.

**Prescribed courses** (3 credits): GEOSC 500 (3)

### Additional Courses

Disciplinary Fundamentals: Select 3 credits from GEOSC 488(4), GEOSC 489(4), GEOSC 502(4), GEOSC 507(3), GEOSC 518(3), GEOSC 519(3), GEOSC 533(3), GEOSC 542(1-4), GEOSC 548(3), GEOSC 585(3)

Data Gathering and Interpretation: Select 3 credits from GEOSC 410(3), GEOSC 413W(3), GEOSC 483(3), GEOSC 508(3), GEOSC 558(4), GEOSC 565(3), GEOSC 572(1-2)

Quantitative Analysis: Select 3 credits from E MCH 524A(3), GEOSC 514(3), GEOSC 560(3), GEOSC 561(4), MNG 557(3-6), P N G 425(3); GEOSC 597(3) (either Multivariate Analyses in Geosciences OR Data Analysis in the Earth Sciences)

A current list of approved courses is maintained by the Department's Graduate Program Office in room 507 Deike Building. The list of approved courses may be modified by approval of the Department's Graduate Program Committee.

## Additional Master's Degree Requirements

Master's degree students are required to take 30 graduate credits, which include at least 18 credits at the 500 to 600 level. The 12 to 16 common degree credits described above satisfy the Graduate School minimum of at least 12 credits in course work in the major program.

As part of the M.S. program, each student is required to complete a thesis. The thesis must be defended in an oral examination administered by an M.S. committee.

## Additional Doctoral Degree Requirements

Admission to Ph.D. candidacy is determined by an oral examination before a candidacy committee. Preparation and defense of two research proposals will serve as one means of assessing the student's ability. At least one of these proposals should represent original work by the student, but the other may be an actual thesis proposal and involve limited initial input from the adviser or others.

Course work in addition to the common degree requirements described above will be selected by the student in consultation with his/her committee.

The comprehensive examination is both oral and written. It is administered by the doctoral committee after the student has essentially completed course work and after a foreign language requirement (if required by the committee) is fulfilled. A final oral defense of the thesis is required.

## Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

## Integrated B.S./M.S. Program in Geosciences

The Department of Geosciences offers an integrated B.S./MS. Program that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Geosciences within 5 years of study. Students who wish to complete the Integrated B.S./M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S./M.S. program by the end of their junior year

During the first three years, the student follows the course scheduling of one of the options in Geosciences (see *Undergraduate Degree Program Bulletin*); however, if a student intends to enter the Integrated B.S./M.S. program, he/she would be encouraged to take, wherever appropriate, upper level classes. By the end of the junior year, the student normally would apply for admission to the program. A decision of acceptance would be made prior to the beginning of the senior year and a M.S. Advising Committee would be appointed. During the senior year, the student would follow the scheduling of the B.S. Geosciences option he/she has selected, with an emphasis on completing 500-level coursework wherever appropriate. During the senior year, the student will start work on a thesis designed to meet the departmental requirements of a M.S. Thesis. During the fifth year, the student will take courses fulfilling the departmental M.S. degree requirements and complete the M.S. Thesis. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, an assistantship requiring the payment of graduate tuition.

## Admission Requirements

Students who wish to complete the Integrated B.S./M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S./M.S. program at the by the end of their junior year. Typical test scores of students admitted to the Geosciences Graduate Program are: GPA 3.5, and GRE's Verbal 570, and Quantitative 700. Three letters of recommendation by faculty members for admission to graduate studies are required. The applications are reviewed by the Admissions Committee of the Geosciences Graduate Program and acted upon by the Associate Head for Graduate Programs.

## Requirements

B.S. Degree Portion: Total B.S. Requirements - 121 Credits  
(For details on courses see the *Undergraduate Degree Programs Bulletin*.)

General Education: 45 Credits  
18 of these are included in the REQUIREMENTS FOR THE MAJOR

Requirements for the Major - 94 Credits

Common Requirements for all options - 61 Credits

Prescribed Courses - 61 credits

Additional Courses - 3 Credits

Additional Geosciences Courses - 15 Credits

Supporting Courses and Related Areas - 15 Credits

M.S. Portion: Total M.S. Requirements - 30 Credits

Prescribed Courses: GEOSC 501(1), GEOSC 600(1-15)

Additional Courses - 9 credits

Disciplinary Fundamentals: Select 3 credits from GEOSC 479, GEOSC 481, GEOSC 489, GEOSC 519, GEOSC 533, GEOSC 548, GEOSC 585

Data Gathering: Select 3 credits from GEOSC 413W, GEOSC 483, GEOSC 558, GEOSC 565, GEOSC 572

Quantitative Analysis: Select 3 credits from E MCH 524A, GEOSC 560, GEOSC 561, GEOSC 514, MNG 557, P N G 425, P N G 430, P N G 511, STAT 500

Additional Geosciences Courses at the 400 and 500 level - 6 Credits

Supporting Areas: 6 Credits of Graduate course work.

These courses should be related to the thesis work of the student.

If a student has accumulated more than 121 Credits as an undergraduate student, 9 credits of 400- or 500-level class credits can be transferred to the MS program, provided these courses were not used to fulfill BS requirements.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [GEOSCIENCES \(GEOSC\) course list](#)

NOTE: GEOSC 439, GEOSC 470W, GEOSC 472A, GEOSC 472B includes from one to several field trips for which an additional charge will be made.

Unit A.  
(MATSC) POWDER X-RAY DIFFRACTION (1) Compound identification, lattice parameter measurement, and other applications of the powder diffraction method.

Unit B.  
(MATSC) TRANSMISSION ELECTRON MICROSCOPY (1) Principles and practice of transmission electron microscope operation. Students undertake individual projects.

Unit C.  
(MATSC) SPECTROSCOPY (1) Emission spectrographic analysis of powders and atomic absorption analysis of solutions.

Unit D.  
(MATSC) ELECTRON MICROPROBE ANALYSIS (1) Qualitative and quantitative elemental analysis of microvolumes within solids. Emphasis on individual student projects.

Unit E.  
(MATSC) SCANNING ELECTRON MICROSCOPY (1) Principles and practice of scanning electron microscope operation. Students undertake individual projects.

Unit G.  
(MATSC) ANALYTICAL ELECTRON MICROSCOPY (1) Modern analytical electron microscope techniques: scanning transmission electron microscopy; electron energy loss spectroscopy; energy dispersive analysis of X-rays. Prerequisite: MATSC (GEOSC) 511B.

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185D

Review Date: 4/15/08

Faculty updated: 7/3/13

## German (GER)

[Program Home Page](#)

B. RICHARD PAGE, *Head of the Department*  
427 Burrowes Building  
814-865-5481

### Degree Conferred:

Ph.D., M.A.  
Dual-Title Ph.D. Degree in German and Language Science

### The Graduate Faculty

- Thomas O. Beebee, Ph.D. (Michigan) Distinguished Professor of Comparative Literature and German
- Bettina Brandt, Ph.D. (Harvard) Lecturer in German
- Hartmut Heep, Ph.D. (Illinois) Associate Professor of German and Comparative Literature
- Carrie N. Jackson, Ph.D. (Wisconsin, Madison) Associate Professor of German and Linguistics
- Martina Kolb, Ph.D. (Yale) Assistant Professor of German and Comparative Literature
- B. Richard Page, Ph.D. (Wisconsin, Madison) Associate Professor of German and Linguistics
- Daniel Purdy, Ph.D. (Cornell) Associate Professor of German
- Michael Putnam, Ph.D. (Kansas) Assistant Professor of German and Linguistics
- Dennis Schmidt, Ph.D. (Boston College) Professor of Philosophy, German, and Comparative Literature
- Adrian Wanner, Ph.D. (Columbia) Professor of Russian and Comparative Literature

Programs of study with major emphasis upon literature, culture, linguistics, or applied linguistics lead to advanced degrees.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are desirable. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Minimum qualifications for admission include 30 undergraduate credits in German beyond the intermediate level. Provision is made, however, for admission with limited deficiencies. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. Requirements for admission to the M.Ed. degree program include 18 credits in education and related psychology. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

The M.A. in German is designed to offer students a general foundation in German culture, language, linguistics, and literature. After completing a small set of core requirements, students may pursue their individual interests from among the courses offered by faculty who specialize in German Applied Linguistics, Culture, Linguistics, and Literature. The M.A. degree requires a minimum of 36 credits and is designed as a terminal degree.

The following courses are required for the M.A. degree:

- German 510: Introduction to Literary Criticism and Its Application
- German 511: The Teaching of College German
- German 513, 514 or 515: German Phonetics and Phonology, German Syntax, or Introduction to German Linguistics or Introduction to German Applied Linguistics

Practical experience in supervised teaching is required for all graduate degrees. Students who wish to earn a Master's Degree must write a research paper of between thirty and fifty pages on a topic defined in conjunction with a faculty adviser. The research paper should demonstrate mastery of primary and secondary literature, interpretative skills, and academic prose in both German and English. A one-hour oral defense of the paper shall be scheduled two weeks after its formal submission to the adviser. A committee consisting of faculty adviser and two other members of the German program selected by the M.A. candidate shall evaluate the student's knowledge of the subject matter.

### Doctoral Degree Requirements

For the Ph.D., a student must complete at least 66 credits (including M.A. credits) of graduate-level work. GER 510, 511, and 513, 514 or 515 are required of all students. Other requirements include: (1) demonstrated reading knowledge of one foreign language in addition to German and English, (2) successful passing of the comprehensive examination with written and oral components, and (3) completed doctoral dissertation. Options are offered in German Literature and Culture and in German Applied Linguistics; see the student handbook for details.

### Dual-Title Graduate Degree in German and Language Science

Graduate students with research and educational interests in German and Language Science may apply to German and Language Science Ph.D. Graduate Program. The goal of the dual-title degree German and Language Science graduate program is to enable graduate students from German to acquire the knowledge and skills of their major area of specialization in German, while at the same time gaining the perspective and methods of the Language Sciences.

### Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through the Department of Germanic and Slavic Languages and Literatures (see below for admission requirements for the Graduate Program in German). Upon admission to the German Program and with a recommendation from a Language Science program faculty member in the Department of Germanic and Slavic Languages and Literatures, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

### Requirements for the Dual-Title Ph.D. Degree in German and Language Science

The doctoral degree in German and Language Science is awarded only to students who are admitted to the German doctoral program and admitted to the dual-title degree in Language Science. The minimum course requirements for the dual-title Ph.D. degree in German and Language Science, in addition to the German Program requirements, are as follows:

- Language Science proseminar courses (LING 521 and LING 522; 6 credits).
- Research Methods/Statistics (LING 525 or equivalent; 3 credits).
- Theoretical Linguistics (LING 500 or LING 504; 3 credits)
- Cognitive Neuroscience or Psycholinguistics (LING/PSY 520, PSY 511 or equivalent; 3 credits)
- Research internships with two different Language Science faculty mentors (CSD 596, GER 596, LING 596, PSY 596, SPAN 596; 6 credits).

Particular courses may satisfy both the German requirements and those in the Language Science program. Final course selection is determined by the student in consultation with the dual-title program advisors and the major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

**Student Aid**

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

EXCHANGE FELLOWSHIPS AT CHRISTIAN ALBRECHTS UNIVERSITÄT, KIEL, AND THE PHILLIPS UNIVERSITÄT, MARBURG--Available to graduate students in German and other fields for a full academic year. Students must have a good command of German.

WALTER EDWIN THOMPSON AND DR. REGINA BLOCK THOMPSON SCHOLARSHIP FUND--Thompson Fellowships are available each year for graduate students in the Department of Germanic and Slavic Literatures and Languages. These fellowships can be awarded in addition to other grants or stipends.

**Courses**

\*GER 001G. ELEMENTARY GERMAN FOR GRADUATE STUDENTS (3) Designed for students preparing to satisfy language requirements for advanced degrees.

\*GER 002G. ELEMENTARY GERMAN FOR GRADUATE STUDENTS (3) Continuation of GER 001G, with opportunity for reading in special fields.

\*No graduate credit is given for this course.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**[GERMAN \(GER\) course list](#)**

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-093

Review Date: 01/12/2010

Last updated by Publications: 9/16/11

## Geographic Information Systems (GIS)

[Program Home Page](#)

*Department of Geography, via World Campus*

### Degrees Conferred:

M.G.I.S.

### The Graduate Faculty

Todd Bacastow, Ph.D. (Penn State) Professor of Practice for Geospatial Intelligence  
 Joseph A. Bishop, Ph.D. (Penn State) Research Associate  
 Cynthia A. Brewer, Ph.D. (Michigan State) Professor of Geography  
 Roberts P. Brooks, Ph.D. (UMass, Amherst) Professor of Geography  
 Mark W. Corson, Ph.D. (South Carolina) Associate Professor of Geography  
 Robert G. Crane, Ph.D. (Colorado) Professor of Geography  
 David W. DiBiase, M.S. (Wisconsin-Madison) Senior Lecturer of Geography  
 Mark Gahegan, Ph.D. (Curtin) Professor of Geography  
 Peter L. Guth, Ph.D. (MIT) Professor of Geography  
 Patrick J. Kennelly, Ph.D. (Oregon State) Associate Professor of Geography  
 Fritz C. Kessler, Ph.D. (Kansas) Associate Professor of Geography  
 Alexander Klippel, Ph.D. (Bremen, Germany) Assistant Professor of Geography  
 C. Gregory Knight, Ph.D. (Minnesota) Professor of Geography  
 Alan M. MacEachren, Ph.D. (Kansas) Professor of Geography  
 Douglas A. Miller, Ph.D. (Penn State) Associate Professor of Geography  
 Anthony C. Robinson, Ph.D. (Penn State) Research Associate  
 Adena B. Schutzbert, M.S. (Penn State) Senior Lecturer of Geography  
 Alan H. Taylor, Ph.D. (Colorado) Professor of Geography  
 Ian Turtton, Ph.D. (Edinburgh) Senior Research Associate, Geography  
 Denise H. Wardrop, Ph.D. (Penn State) Associate Professor of Geography  
 Brenton M. Yarnal, Ph.D. (Simon Fraser) Professor of Geography

The Master of Geographic Information Systems (M.G.I.S.) degree is awarded to students who demonstrate mastery of the technical competencies and leadership skills required to design, manage, and use geographic information technologies successfully in a wide range of professional fields. The MGIS program is intended specifically for working professionals who are able to participate only on a part-time basis and at a distance. It is offered exclusively through World Campus. The MGIS complements, but does not replace, the Department of Geography's more research-focused Master of Science program, which is offered at the University Park campus. Students who expect to pursue the Ph.D. in Geography should apply for admission to the residential M.S. program.

### Admission Requirements

Students who wish to pursue the M.G.I.S. degree must be admitted both to the MGIS program and to Penn State's Graduate School. The Graduate School requires applicants to possess any baccalaureate degree from a regionally accredited institution earned under residence and credit conditions substantially equivalent to those required by Penn State. It also requires official TOEFL or IELTS scores for students from countries in which English is not the primary language. Minimum TOEFL scores are 550 for the paper test or 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a masters degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Additional requirements imposed by the Department of Geography include:

- Statement of professional experience and goals including documentation of a minimum two years of professional experience, preferably (but not necessarily) related to geographic information technologies. A résumé may be attached as a supplement, but the statement itself should be an essay (two to three pages) that demonstrates the applicant's verbal communication skills;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and that he or she has the requisite minimum of two years of professional experience;
- Two official transcripts from each post-secondary institution attended, including the institution that conferred the applicant's baccalaureate degree (and any graduate degrees, if applicable). Applicants are expected to have earned a grade-point average of 3.0 (or equivalent) or better during their final two years of undergraduate work;
- Official Graduate Records Examinations (GRE) score reported directly from the testing center to Penn State. GRE scores are required; however, this requirement may be waived under certain circumstances. Please contact the graduate program directly.

A committee consisting of at least three Geography faculty members, including one faculty member not currently participating in the MGIS program, will meet three times annually to screen applications and identify applicants qualified for admission. Three cohorts of approximately twelve students each will be admitted during three annual admissions cycles. Applicants who are only able to participate part-time and at a distance while maintaining full-time professional responsibilities (and who are therefore effectively excluded from participation in the department's resident program) will be preferred. The best-qualified applicants will be admitted up to the number of spaces that are available for new students.

Prior to admission in the MGIS program, students may enroll in MGIS courses as nondegree graduate students. Nondegree graduate students who are subsequently admitted to the MGIS program may count up to 15 credits of course work accumulated in nondegree status toward the M.G.I.S. degree. Applicants for nondegree graduate status must submit transcripts that confirm they have received a baccalaureate degree from an accredited institution under residence and credit conditions substantially equivalent to those required by Penn State. Admission as a nondegree student neither guarantees nor implies subsequent admission to the MGIS degree program. Changing from nondegree status to regular graduate status requires a new admission application.

By Graduate School rules, a maximum of 10 credits of high-quality graduate work completed at a regionally accredited institution may be applied toward the requirements for the M.G.I.S. degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree program at Penn State. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser or program and the Graduate School. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality, and must appear on an official graduate transcript of an accredited university.

### Degree Requirements

Students earn the M.G.I.S. degree by successfully completing 35 credits of course work, including a supervised independent project. Course requirements include a minimum of 18 credits at the 500 level or above, 6 to 9 credits of which are earned through individual studies (GEOG 596). Students are encouraged to create and maintain personal e-portfolios that chronicle their achievements in the program, outline long-term professional development strategies, and foster meaningful interactions among students and faculty members. The independent project demonstrates the student's ability to apply advanced knowledge and skills related to geographic information systems in a way that makes a substantial contribution to his or her professional work. For most students, the project culminates in a formal public presentation, attended by a member of the graduate faculty associated with the MGIS program, which takes place at an appropriate professional conference (such as annual conferences of the Urban and Regional Information Systems Association, the American Congress on Surveying and Mapping, or ESRI). Alternative arrangements are made for students with special needs or constraints. For example, students who

submit written reports of project aims and outcomes for publication in adviser-approved peer-reviewed journals are exempt from the public presentation requirement. Presentations and papers are preceded by dress rehearsals that are open to all students in the program through Web and audio conferencing. As part of his or her individual studies, every student is expected to contribute a formal peer review of one other student's rehearsal.

An Advisory Board consisting of accomplished GIS professionals in government and industry, as well as Penn State faculty members in a variety of disciplines who specialize in geographic information science and technology, guides the ongoing development of the MGIS curriculum. Designed for students who are able to participate only on a part-time basis and at a distance, the curriculum is spread over three years; however, students who are able to manage heavier course load may complete the program in a shorter period of time. Courses are ten weeks in length and require eight to twelve hours of student effort per week. Most courses are offered four times annually, starting in early January, April, July, and October. Most students will complete four courses per year, one course at a time. First-year courses are designed to help students develop the information literacy and technical competencies they need to become knowledgeable and skillful users of desktop geographic information technologies. Second-year courses prepare students for leadership in their organizations with regard to the design, specification, and management of complex geographic information infrastructures. During the third year, students complete electives and an independent study project by which they demonstrate a substantive contribution to their organization as well as the ability to communicate their contribution to a professional audience. Students who successfully complete the Penn State MGIS satisfy the minimum educational achievement required for professional certification by the Geographic Information Systems Certification Institute ([www.gisci.org](http://www.gisci.org)).

### Student Aid

Graduate assistantships are not available. Financial aid opportunities for part-time students who participate through the World Campus are discussed at [http://worldcampus.psu.edu/StudentServices\\_FinancialAidOffice.shtml](http://worldcampus.psu.edu/StudentServices_FinancialAidOffice.shtml).

## PRESCRIBED COURSES

### MASTER OF GEOGRAPHIC INFORMATION SYSTEMS

#### GEOGRAPHY (GEOG)

- 482. The Nature of Geographic Information (2)
- 864. Professionalism in GIS&T (2)
- 483. Problem-Solving with GIS (3)
- 484. GIS Database Development (3)
- 583. Geospatial System Analysis and Design (3)
- 584. Geospatial Technology Project Management (3)
- 586. Geographical Information Analysis (3)
- 596. Individual Studies (3)

In lieu of the 8 credits of prescribed introductory courses (GEOG 482 or 864 + 483 + 484) plus 6 additional elective credits, MGIS students may substitute 14 credits associated with courses that comprise the Geospatial Intelligence Option. This option is designed for current or aspiring practitioners in government agencies, businesses, and non-governmental organizations that rely on insights produced through skillful, knowledgeable, and conscientious analysis of diverse geo-referenced data to plan for emergencies, to coordinate responses to natural and human induced disasters, to enforce the law, and to plan and conduct military operations.

### GEOSPATIAL INTELLIGENCE OPTION

#### GEOGRAPHY (GEOG)

- 882. Geographic Foundations of Geospatial Intelligence (3)
- 883. Remote Sensing for the Geospatial Intelligence Professional (3)
- 884. Geographic Information Systems for the Geospatial Intelligence Professional (3)
- 885. Advanced Analytic Methods in Geospatial Intelligence (3)
- 889. Seminar in Geospatial Intelligence (2)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [GEOGRAPHY \(GEOG\) courses](#)

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-092

Review Date: 01/12/2010

DATE LAST REVIEWED BY PUBLICATIONS: 7/9/07 (link check)



## Health Administration (H ADM)

[Program Home Page](#)

STEVEN A. PETERSON, *Interim Graduate Program Coordinator*  
School of Public Affairs, Penn State Harrisburg  
W-153 Olmsted Building; 717-948-6042

### Degree Conferred:

M.H.A.

### Graduate Faculty

- Goktug Morcol, Ph.D. (Virginia Tech) *Associate Professor of Public Administration*
- Bing Ran, Ph.D. (Waterloo) *Assistant Professor of Public Administration*
- Triparna Vasavada, Ph.D. (SUNY-Albany) *Assistant Professor of Public Administration*

Recognizing that the national health care system is in a period of reform and redesign, the program emphasis involves design/redesign in a 36-credit curriculum. Based on eight core courses defined as the foundation of administration in health care, the degree is designed for part-time professional students already engaged in health administration careers. The mission of the program is to further student knowledge and skills in a continuous learning cycle. Students are expected not only to know the existing health system, but are to develop a capability for design consistent with demands of access to care, management, and control of costs and quality of care delivery.

Part-time students may start the program at the beginning of any semester. They usually take one or two 3-credit courses each semester. Students may also take one or two courses during the summer session to maintain steady progress toward the degree. All Health Administration courses are available during the evening for the convenience of part-time students. A student may complete the M.H.A. on a part-time basis in about two to four years.

### Admission Requirements

Applicants must have received their baccalaureate degree from an accredited college or university prior to starting the graduate program. Applicants who are still completing their baccalaureate requirements at the time of the application may be admitted to the Graduate School conditional on the awarding of the baccalaureate degree.

Admission to the MHA program is based on clear suitability for the MHA program as demonstrated by the application as a whole, to include: a completed application, evidence of a bachelor's degree from an accredited college; a statement of career and educational goals; a successful undergraduate record with a grade-point average of 3.00 (with particular attention given to the last two years of undergraduate work); satisfactory scores on the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) are required if the GPA is less than 3.00; three years of work experience; and names of three references willing to provide recommendations.

The GPA requirement may be relaxed if the student has professional experience or other strong evidence suggesting likely success in the MHA program. Some applicants may be accepted on a non-matriculated probationary basis, pending performance at the B (3.00) level over 15 hours of approved credit.

### Program Requirements

All undergraduate degrees are acceptable for admission. All students are expected to have had at least an introductory course in statistics and statistical software.

If these introductory knowledge and skill areas have not been completed prior to admission they must be satisfied prior to completion of 12 graduate credits. Reading and introductory courses--for which not graduate credit is given--are available at Penn State Harrisburg. The computer area may be satisfied by completing a 1-credit computer course: P ADM 486 Applied Statistical Package.

The degree requires a minimum of 36 graduate credits, including a 3-credit, faculty-supervised paper. Three credits of 400-level work may be included in the electives. An overall 3.00 (B) grade-point average must be earned in all 400- and 500-level work.

#### REQUIRED COURSES: 24 credits

H ADM 539, H ADM 540, H ADM 541, H ADM 542, H ADM 545, P ADM 503, P ADM 506, P ADM 510

#### ELECTIVE CONCENTRATION: 9 credits

H ADM 543, H ADM 546, H ADM 548, H ADM 551, H ADM 552, H ADM 597, P ADM 505, P ADM 511, P ADM 512, P ADM 514, P ADM 515, P ADM 516, P ADM 520

#### CAPSTONE COURSE: 3 credits

H ADM 594

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HEALTH ADMINISTRATION \(H ADM\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

Faculty updated: 6/5/12

## Health Policy and Administration (H P A)

[Program Home Page](#)

DENNIS G. SHEA, *Head*  
604 Ford Building  
814-863-5421

### Degrees Conferred:

- [M.S., Ph.D., M.H.A., M.B.A./M.H.A.\(concurrent\)](#)
- [Integrated B.S. in Health Policy and Administration/Master of Health Administration \(MHA\) Admission and Degree Requirements](#)

### The Graduate Faculty

- Rhonda BeLue, Ph.D. (Cornell) *Assistant Professor of Health Policy and Administration*
- S. Diane Brannon, Ph.D. (Cornell) *Professor of Health Policy and Administration*
- Jonathan Clark, Ph.D. (Harvard) *Assistant Professor of Health Policy and Administration*
- Joseph Dionisio, Ph.D. (Point Park) *Professor of Practice and Director of External Relations and Professional Development*
- Elizabeth Farmer, Ph.D. (Duke) *Associate Professor of Health Policy and Administration*
- Marianne Hillemeier, Ph.D. (Michigan) *Associate Professor of Health Policy and Administration, Demography, Health Evaluation Sciences, Obstetrics and Gynecology, and Nursing*
- Kyoungrae Jung, Ph.D. (Yale) *Assistant Professor of Health Policy and Administration*
- Deirdre McCaughey, Ph.D. (Manitoba) *Assistant Professor of Health Policy and Administration*
- Patricia Miranda, Ph.D. (Michigan) *Assistant Professor of Health Policy and Administration*
- Jessica Mittler, Ph.D. (Harvard) *Assistant Professor of Health Policy and Administration*
- John Moran, Ph.D. (Penn State) *Assistant Professor of Health Policy and Administration*
- Dennis Scanlon, Ph.D. (Michigan) *Associate Professor of Health Policy and Administration; Professor-in-Charge of M.S./Ph.D. Program*
- Mark Sciegaj, Ph.D. (Brandeis) *Associate Professor of Health Policy and Administration*
- Dennis G. Shea, Ph.D. (Rutgers) *Professor of Health Policy and Administration and Economics; Department Head*
- Pamela Farley Short, Ph.D. (Yale) *Professor of Health Policy Administration, Demography, and Health Evaluation Sciences*
- Karen Volmar, J.D. (Boston College) *Associate Professor of Health Policy and Administration; Executive Director, Master of Health Administration*

The graduate degrees in the Department of Health Policy and Administration focus on management, policy, and research in health services, with particular attention to the recurrent problems of cost, quality, and access to health services.

The doctoral program (Ph.D.) is designed to provide advanced knowledge and skills in health services research, with an emphasis track in health policy and economics, health care organizations or population health and demography. The doctorate in H P A prepares students to become independent health services researchers in academic and nonacademic settings.

The Master of Science (M.S.) degree in Health Policy and Administration provides a solid foundation of knowledge and skills in health services research. The M.S. in H P A prepares students for further graduate study toward a doctorate in health services research or related fields or for research and analytic work in academic and nonacademic health services research settings.

The professional Master of Health Administration (M.H.A.) program prepares students for the complexities they will face in managing organizations that plan, finance and deliver health care. The curriculum emphasizes strategic decision-making, financial management, communication and detailed aspects of the U.S. health care system. These include health law, epidemiology, health insurance, government health-financing programs, ethics, managed care, long-term care, health care technology, marketing, and strategic planning for health services.

The integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) program allows qualified undergraduate students to earn both degrees in five calendar years of full time academic study. Students completing an integrated B.S./M.H.A. are prepared to advance quickly to positions of leadership in health care organizations.

The M.B.A. program of the Smeal College of Business and the Department of Health Policy and Administration of the College of Health and Human Development offer a concurrent degree program. The M.B.A./M.H.A. graduate will be well-grounded in both business and health management and prepared for positions in hospitals, nursing homes, managed care and health insurance organizations, health care consulting, and pharmaceutical companies, as well as for helping businesses in all sectors understand the unique features of the health care system.

### Doctoral Admission and Degree Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) and a well-considered statement of experience and career goals are major criteria for admission. Some work experience in health services is preferred, but not required.

The H P A doctoral curriculum includes study in three substantive areas: (1) core courses in health services organization, delivery, finance and policy; (2) core courses in health services research methods and statistics, and (3) courses and a doctoral thesis in an emphasis track approved by the doctoral committee.

### M.S. Admission and Degree Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) and a well-considered statement of experience and career goals are major criteria for admission. Some work experience in health services is preferred, but not required.

The M.S. curriculum in H P A includes study in three substantive areas: (1) a core set of courses in health services organization, delivery, finance, and policy; (2) courses in health services research methods and statistics, and (3) courses and a master's thesis approved by the thesis advisor. At least 15 credits of the program must be completed in H P A departmental course offerings at the 400- and 500-level. At least 18 credits of the degree must be in 500- and 600-level courses. A 6-credits master's thesis must be completed as part of the degree requirement.

### M.H.A. Admission and Degree Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. This requirement will be waived for applicants with five or more years of relevant work experience. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale), a relevant personal statement and three letters of recommendation are necessary. Some work experience in health care is preferred, but not required.

The program can be completed on a full-time basis in 21 months or on a part-time basis or with the aid of technology through the World Campus in 28 months. Requirements for the completion of the M.H.A., include 49 credits with at least 39 credits at the 500- or 800-level. Included in the 49 credits is a residency in a health care setting and a capstone course to demonstrate evidence of analytical ability and synthesis of material.

### Integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) Admission and Degree Requirements

The following credentials will be considered for admission:

- A demonstrated ability to communicate effectively, an advanced level of maturity, and high motivation to pursue a career in the health care field
- Academic references
- Successful completion of 60 undergraduate credits having maintained a cumulative GPA of 3.4 or better

Students admitted to the B.S. in Health Policy and Administration/M.H.A. are able to earn both the B.S. and M.H.A. in five calendar years of full-time academic study.

#### **M.B.A./M.H.A. Concurrent Degree Program Admission and Degree Requirements**

Students may apply to be admitted to either the M.H.A. or the M.B.A. program initially. During the initial year in either graduate program, students may apply to complete the concurrent degree program and must meet admission requirements for the other program. See the M.H.A. and M.B.A. degree program descriptions for further admission requirements of each program.

Students complete 88 credits associated with both the M.H.A. and M.B.A. degrees. Included within the required credits is a 10-week integrated residency during a summer. The time required to complete the M.B.A./M.H.A. can be as much as 34 months.

#### **Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

#### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HEALTH POLICY AND ADMINISTRATION \(H P A\) course list](#)

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-104

Review Date: 01/10/2012

Last updated by Publications: 7/02/10

## Human Development and Family Studies (HD FS)

[Program Home Page](#)

STEVEN ZARIT, *Department Head, Human Development and Family Studies*  
S-211 Henderson Building  
814-865-5260  
[mis6@psu.edu](mailto:mis6@psu.edu)

DOUGLAS M. TETI, *Professor in Charge of Graduate Programs in Human Development and Family Studies*  
S-211 Henderson Building  
814-863-8000

### Degrees Conferred:

Ph.D., M.S. (A master's degree is offered only to persons interested in studying for a doctorate.)

### The Graduate Faculty

- David M. Almeida, Ph.D. (Victoria) Associate Professor of Human Development and Family Studies
- Leann Birch, Ph.D. (Michigan) Distinguished Professor of Human Development and Family Studies
- Clancy Blair, Ph.D. (Alabama, Birmingham) Associate Professor of Human Development and Family Studies
- Alan Booth, Ph.D. (Nebraska, Lincoln) Distinguished Professor of Human Development, Sociology, and Demography
- Chalandra M. Bryant, Ph.D. (Texas, Austin) Associate Professor of Human Development and Family Studies
- Robert L. Burgess, Ph.D. (Washington, St. Louis) Professor of Human Development
- Linda M. Burton, Ph.D. (Southern California) Professor of Human Development and Sociology
- J. Douglas Coatsworth, Ph.D. (Minnesota) Assistant Professor of Human Development and Family Studies
- Linda Collins, Ph.D. (Southern California) Professor of Human Development and Family Studies
- Sherry Corneal, Ph.D. (Penn State) Associate Professor of Human Development and Family Studies
- Ann C. Crouter, Ph.D. (Cornell) Professor of Human Development and Family Studies
- Anthony R. D'Augelli, Ph.D. (Connecticut) Professor of Human Development
- Judith F. Dunn, Ph.D. (Cambridge) Adjunct Professor of Human Development and Family Studies
- Craig Edelbrock, Ph.D. (Oregon State) Professor of Human Development and Family Studies
- David J. Eggebeen, Ph.D. (North Carolina) Associate Professor of Human Development and Family Studies, and Sociology
- Donald H. Ford, Ph.D. (Penn State) Professor Emeritus of Human Development
- Paul A. Games, Ph.D. (Iowa) Professor Emeritus of Human Development
- Scott Gest, Ph.D. (Minnesota) Assistant Professor of Human Development and Family Studies
- Mark T. Greenberg, Ph.D. (Virginia) Professor of Human Development and Family Studies and Bennett Chair of Prevention Research
- Bernard G. Guernsey, Jr., Ph.D. (Penn State) Professor Emeritus of Human Development and Counseling Psychology
- Louise F. Guernsey, Ph.D. (Penn State) Professor Emerita of Human Development and Family Studies and Counseling Psychology
- Melissa A. Hardy, Ph.D. (Indiana) Distinguished Professor of Human Development and Family Studies, and Sociology; Director, Gerontology Center
- Scott M. Hofer, Ph.D. (Southern California, Los Angeles) Assistant Professor of Human Development and Family Studies
- Kathryn Hood, Ph.D. (Temple) Associate Professor of Human Development
- Rukmalie Jayakody, Ph.D. (Michigan) Associate Professor of Human Development and Family Studies, and Demography
- Eva S. Lefkowitz, Ph.D. (California, Los Angeles) Associate Professor of Human Development and Family Studies
- Eric Loken, Ph.D. (Harvard) Assistant Professor of Human Development and Family Studies
- Jennifer L. Maggs, Ph.D. (Victoria) Associate Professor of Human Development and Family Studies
- Susan M. McHale, Ph.D. (North Carolina) Professor of Human Development and Family Studies
- Gordon K. Nelson, Ph.D. (Wisconsin) Associate Professor of Human Development (Capital College)
- Judith L. Newman, Ph.D. (Temple) Associate Professor of Human Development (Abington College)
- Robert Plomin, Ph.D. (Texas) Adjunct Professor of Human Development and Family Studies
- Michael Rovine, Ph.D. (Penn State) Associate Professor of Human Development and Family Studies
- K. Warner Schaie, Ph.D. (Washington) Evan Pugh Professor of Human Development and Psychology
- Rainer Silbereisen, Ph.D. (Jena) Adjunct Professor of Human Development and Family Studies
- Edward Smith, Ph.D. (North Carolina) Senior Research Associate in the College of Health and Human Development
- Emilie Phillips Smith, Ph.D. (Michigan State) Associate Professor of Human Development and Family Studies
- Graham B. Spanier, Ph.D. (Northwestern) Professor of Human Development and Family Studies, Sociology, Demography, and Family and Community Medicine
- Cynthia A. Stifter, Ph.D. (Maryland) Professor of Human Development and Family Studies
- Dena Swanson, Ph.D. (Emory) Assistant Professor of Human Development and Family Studies
- Douglas M. Teti, Ph.D. (Vermont) Professor of Human Development
- Fred W. Vondracek, Ph.D. (Penn State) Professor of Human Development
- Sherry L. Willis, Ph.D. (Texas) Professor of Human Development
- Steven H. Zarit, Ph.D. (Chicago) Professor of Human Development

This interdisciplinary program is one of the graduate programs of the College of Health and Human Development. It is administered through the Department of Human Development and Family Studies. The Human Development and Family Studies graduate program is designed to educate students about research, theory, and methodology related to the study of individuals and families across diverse populations and diverse settings. There is a strong interest in the ways in which social institutions and settings such as day care facilities, schools, neighborhoods, and social policy institutions facilitate (or inhibit) opportunities for development and change for individuals and families. Understanding the characteristics and conditions that place individuals or families at risk for developing problems, designing effective prevention programs to address those risks, and mounting rigorous evaluations of such programs is a growing emphasis in the program. All students, regardless of substantive area, are encouraged to develop strong skills in research methods, a hallmark of our graduate training. Through course work and apprenticeship experiences, students develop an understanding of the program's multidisciplinary life span/life course, and applied orientation. As student's progress through the program, they are expected to develop specialized expertise in two or more of the department's areas of concentration: individual development, family studies, intervention research, and research methods. Further specialization is possible in adult development and aging, biological bases of behavior, child and adolescent development, cognitive development and functioning, family relationships, integrative theories of human development, interpersonal relationships, and social-emotional development and change.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Entering students should have at least 6 credits in the biological and physical sciences; 12 in the social sciences and, depending upon proposed area of emphasis, basic courses in sociology, psychology, and economics; and 6 in developmental and family studies. Students not meeting these requirements may be admitted with limited deficiencies to be made up concurrently with their graduate work.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission for fall semester only. Early application is required, and a special application to HD FS must be completed; additional information can be obtained from the professor in charge of Graduate Recruitment and Interdisciplinary Training. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Degree Requirements

Entering students take three required 3-credit courses (Life Span Development, Family Studies, and Intervention Research), four required 3-credit methods courses in Research Methods and Statistics, and 2 credits of a professional development seminar during the first two years. Over time, course work becomes

increasingly specialized and tailored to the student's individual interests. Yearly Plans of Study developed in consultation with the student's adviser specify course work and apprenticeship experience directed at the student's emerging scholarly and career interests. For the master's degree, in addition to the required courses, students take 9 credits in their substantive field and 6 credits of thesis research. For the doctorate, in addition to the required courses, students must take a total of 12 credits in their substantive field, 6 methodology elective credits, and 6 credits of thesis research.

### **Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HUMAN DEVELOPMENT AND FAMILY STUDIES \(HD FS\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/21/04

Last reviewed by Publications: 1/10/11

## Human Dimensions of Natural Resources and the Environment (HDNRE)

Co-Chairs, Department of Agricultural Economics and Rural Sociology and Department of Geography

### Degrees Conferred:

Students electing the dual-title intercollege program in HDNRE through participating majors may earn a degree with dual-title at both the Ph.D. and M.S./M.A. levels, i.e., Ph.D. in (graduate program name) and Human Dimensions of Natural Resources and the Environment, or M.S./M.A. in (graduate program name) and Human Dimensions of Natural Resources and the Environment.

The following graduate programs offer dual-title degrees in HDNRE: M.A. and Ph.D. in Anthropology and HDNRE; M.S. and Ph.D. in Energy and Mineral Engineering and HDNRE; M.S. and Ph.D. in Forest Resources and HDNRE; M.S. and Ph.D. in Geography and HDNRE; M.S. and Ph.D. in Recreation, Park and Tourism Management and HDNRE; and M.S. and Ph.D. in Rural Sociology and HDNRE.

### The Graduate Faculty

- Richard B. Alley, Ph.D. (Wisconsin, Madison) Evan Pugh Professor of Geosciences
- Theodore R. Alter, Ph.D. (Michigan State) Professor of Agricultural, Environmental, and Regional Economics
- John C. Becker, J.D. (Dickinson) Professor of Agricultural Economics and Law
- Stephen J. Beckerman, Ph.D. (New Mexico) Associate Professor of Anthropology
- André L. Boehman, Ph.D. (Stanford) Professor of Fuel Science
- Mallika Bose, Ph.D. (Wisconsin) Assistant Professor of Landscape Architecture
- Caru Bowns, Ph.D. (California, Davis) Assistant Professor of Landscape Architecture
- Kathy Brasier, Ph.D. (Wisconsin) Assistant Professor of Rural Sociology
- C. Andrew Cole, Ph.D. (Southern Illinois) Assistant Professor of Landscape Architecture and Ecology
- Robert G. Crane, Ph.D. (Colorado) Professor of Geography; Director, Alliance for Earth Sciences, Engineering, and Development in Africa
- Duane R. Diefenbach, Ph.D. (Georgia, Athens) Adjunct Assistant Professor; Leader—Wildlife, PaCFWRU
- Stuart Echols, Ph.D. (Virginia Tech) Assistant Professor of Landscape Architecture
- Semih Eser, Ph.D. (Penn State) Professor of Energy and Geo-Environmental Engineering
- Jill L. Findeis, Ph.D. (Washington State) Distinguished Professor of Agricultural Economics
- James C. Finley, Ph.D. (Penn State) Professor of Forest Resources
- Leland Glenna, Ph.D. (Missouri) Assistant Professor of Rural Sociology and Science Technology and Society
- Larry Gorenflo, Ph.D. (California, Santa Barbara) Associate Professor of Landscape Architecture
- Alan R. Graefe, Ph.D. (Texas A&M) Associate Professor of Leisure Studies
- Murali Haran, Ph.D. (Minnesota) Assistant Professor of Statistics
- Clare Hinrichs, Ph.D. (Cornell) Associate Professor of Rural Sociology
- Nina G. Jablonski, Ph.D. (Washington) Distinguished Professor of Anthropology
- Jason Kaye, Ph.D. (Colorado State) Assistant Professor of Soils and Biogeochemistry
- Klaus Keller, Ph.D. (Princeton) Associate Professor of Geosciences
- C. Gregory Knight, Ph.D. (Minnesota) Professor of Geography
- Neil P. Korostoff, M.L.A. (Pennsylvania) Associate Professor of Landscape Architecture
- A.E. Luloff, Ph.D. (Penn State) Professor of Rural Sociology
- James McCarthy, Ph.D. (California, Berkeley) Assistant Professor of Geography
- Robert McKinstry, J.D., M.F.S. (Yale) Adjunct Professor of Forest Resources
- Douglas Miller, Ph.D. (Penn State) Assistant Professor of Geography; Director for Outreach, Earth and Mineral Sciences Environment Institute
- Timothy Murtha, Ph.D. (Penn State) Assistant Professor of Landscape Architecture
- Wayne L. Myers, Ph.D. (Michigan) Professor of Forest Biometrics
- Lee A. Newsom, Ph.D. (Florida) Associate Professor of Anthropology
- Daniel F. Perkins, Ph.D. (Michigan State) Professor of Agricultural and Extension Education
- Charles Ray, Ph.D. (Texas A&M) Assistant Professor of Wood Products Operations
- Gary J. San Julian, Ph.D. (Colorado State) Professor of Wildlife Resources
- Michael C. Saunders, Ph.D. (Georgia) Professor of Entomology
- Kamini Singha, (Stanford) Assistant Professor of Geosciences
- Arthur Small, (California, Berkeley) Associate Professor of Meteorology
- Sanford Smith, Ph.D. (Penn State) Lecturer in Forest Resources
- Ken Tamminga, M.P.L. (Queen's) Associate Professor of Landscape Architecture
- Petra Tschakert, Ph.D. (Arizona) Assistant Professor of Geography
- Nancy Tuana, Ph.D. (California, Santa Barbara) DuPont/Class of '49 Professor of Philosophy, Humanities, and Women's Studies; Director, Rock Ethics Institute
- George Vahoviak, Ph.D. (Penn State) Affiliate Associate Professor of Recreation, Park, and Tourism Management; Program Director, Shaver's Creek Center
- Thorsten Wagener, Ph.D. (Imperial College) Assistant Professor of Civil Engineering
- James W. Wood, Ph.D. (Michigan) Professor of Anthropology and Demography
- Melissa Wright, Ph.D. (Johns Hopkins) Associate Professor of Geography and Women's Studies
- Brenton M. Yarnal, Ph.D. (Simon Fraser) Professor of Geography; Director, Center for Integrated Regional Assessment
- Karl S. Zimmerer, Ph.D., (California, Berkeley) Head and Professor of Geography
- Harry C. Zinn, Ph.D. (Colorado) Associate Professor of Recreation, Park, and Tourism Management

The HDNRE dual-title intercollege degree program is administered by the HDNRE Program Committee. The committee maintains program definition, identifies appropriate faculty and courses, and recommends policies and procedures for its operation. This dual-title intercollege degree program is offered through graduate major programs in four colleges: Agricultural Sciences, Earth and Mineral Sciences, Health and Human Development, and the Liberal Arts. HDNRE enables students to attain and be identified with the content, techniques, applications, methods, and policy implications of an interdisciplinary focus on Human Dimensions of Natural Resources and the Environment, while maintaining a close association with areas of application.

Through participation in HDNRE, student programs of study will emphasize integrated, multidisciplinary approaches designed for improving their understanding about and management of natural resources. Areas of study will reflect the faculty advisor's home department and disciplinary thrust. To pursue a dual-title intercollege degree under this program, the student must first apply and be admitted through one of the existing graduate programs that offers the dual-title degree in HDNRE (Anthropology; Energy and Mineral Engineering; Forest Resources; Geography; Recreation, Park, and Tourism Management; or Rural Sociology).

### Admission Requirements

HDNRE requirements include: (1) a minimum baccalaureate Jr/Sr grade point average of 3.0 out of a 4.0 scale; (2) a statement of professional goals, natural resource management philosophy, and reasons for applying to the program; and (3) three letters of reference from individuals capable of evaluating the applicant's potential for graduate work in interdisciplinary natural resource management. TOEFL scores are required of all students for whom English is a second language.

The language of instruction at Penn State is English. All international applicants whose first language is not English or who have not received a baccalaureate or master's degree from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test, a score of 213 on the computer-based test, or 80 points on the new Internet-based Test with a minimum of 20 points on the speaking portion; or the IELTS module with a minimum composite score of 6.5 is required for admission.

### Degree Requirements

To qualify for a dual-title intercollege degree, students must satisfy the requirements of the major program in which they are enrolled, including the communication/foreign language requirements, if any. In addition, they must satisfy the minimum requirements in the HDNRE dual-title intercollege program described here. Final course selection is determined by the student and her/his respective graduate committee. All dual-title intercollege degree candidates must enroll in HDNRE 590 in each of their first two semesters.

**M.S./M.A. Degree:** A candidate for the dual-title intercollege M.S./M.A. in HDNRE must complete 17 credit hours of HDNRE coursework beyond the bachelor's degree in addition to curricular requirements for the masters degree in the student's primary program. The HDNRE requirement includes four common courses in the HDNRE curriculum – i.e., HDNRE 590 Colloquium (two credits), HDNRE 574 Integrated Perspectives in Human Dimensions of Natural Resources and the Environment, HDNRE 575 Ethical Issues in Human Dimensions of Natural Resources and the Environment, and RSOC 555 Human Dimensions of Natural Resources. In addition, each HDNRE student will take either ANTH 559 Behavioral Ecology (to be changed to Human Ecology – name change proposal at Department) or FOR 565 GIS-Based Socio-Ecological Landscape Analysis, and one additional course selected in consultation with the student's graduate committee. The HDNRE Colloquium must be taken in each of the first two semesters of enrollment in the dual-title intercollege degree program. In addition, 6 semester credit hours of Thesis Research (in the student's home graduate degree program) are required if the candidate is writing a thesis. Particular courses may satisfy both the graduate major program requirements and those of the HDNRE dual-title intercollege program. All courses must be approved by the student's M.S./M.A. committee.

The thesis supervisor and chair of the student's graduate committee shall be a member of the student's major program, and a member of the dual-title program. All members of the committee must hold Graduate Faculty status or secure the same before serving on the committee.

The culminating experience (e.g., thesis, scholarly paper, project) must incorporate an HDNRE interest together with the primary field of study. All students are also required to successfully complete an oral defense of the M.S./M.A. project completed as part of the master's requirements if required by the participating program.

**Ph.D. Degree:** A candidate for the dual-title intercollege HDNRE Ph.D. must complete, in addition to curricular requirements for the doctoral degree in the student's primary program, a minimum of 18 credit hours of HDNRE coursework. This includes the required courses for the HDNRE M.S./M.A. program. The HDNRE Colloquium must be taken each of the first two semesters of enrollment in the dual-title intercollege degree program, and once more prior to graduation. In addition, 9 semester credit hours of Thesis Research (either in the home department or in HDNRE) are required. Particular courses may satisfy both the graduate major program requirements and those of the HDNRE program. If an HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary course work must be selected, with the approval of the student's doctoral committee. As well, a continuing doctoral candidate must take 3 credits of HDNRE 590 (each student must enroll the first two semesters and then once more prior to graduation).

All Ph.D. students will be required to complete, present, and defend a dissertation that incorporates a topic related to HDNRE, in addition to the participating program.

All participating primary programs (Anthropology; Energy and Mineral Engineering; Forest Resources; Geography; Recreation, Park, and Tourism Management; and Rural Sociology) have agreed to incorporate the dual-title program within the student's dissertation work.

## Student Aid

Forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

## Primary Programs of Study

All students (M.S./M.A. and Ph.D.) in the dual-title intercollege graduate degree program in HDNRE are expected to complete the common series of courses (HDNRE 590 – 2 credit minimum for masters students and 3 credit minimum for doctoral students, HDNRE 574, HDNRE 575, and RSOC 555). As well, each student is required to take either ANTH 559 or FORS 565 and one additional course selected in consultation with the student's graduate committee. All students must complete the required course of study in their primary program. Further, all HDNRE Ph.D. students will be encouraged to assist in teaching at least one course as part of their training and education in the dual-title intercollege graduate degree program.

## Rural Sociology

### M.S.

- M.S. – minimum of 30 credits (400, 500, 600 level) plus thesis
- Research Methods (AGEC 525 or its equivalent)
- Statistics – two semester sequence (AG 400 or RSOC 573 or their equivalent)
- Two or more of the following courses for Rural Sociology (RSOC 444, 452, 501, 502, 508, or 516)
- 6 semester credit hours of Thesis Research
- A final oral defense of thesis
- M.S. – 17 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course).
- 6 semester credit hours of Thesis Research if a thesis is required.

### Ph.D.

- Ph.D. – no specified minimum credit requirements plus dissertation
- RSOC 502
- Either RSOC 516 or 517
- Two of the following (includes untaken course from above; RSOC 501, 508, 525, 530, 552, 555, 597A-E)
- Research Methods (AGEC 525 or its equivalent)
- Statistics – two semester sequence (AG 400 or RSOC 573 or their equivalent)
- 9 semester credit hours of Thesis Research
- Comprehensive examinations in four areas (Rural Sociology; Methods/Statistics; two additional areas. These areas of concentration are developed in consultation with major professor and others. One of these areas must be HDNR.)
- A final oral defense of dissertation
- Ph.D. – 18 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course). If a HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary courses must be selected with the approval of the student's doctoral committee.
- 9 semester credit hours of Thesis Research

## Forest Resources

### M.S.

- M.S. – minimum of 30 credits (400, 500, 600 level) plus thesis
- 12 credits in 400 and 500 level courses appropriate to field of interest
- 6 credits of graduate level statistics
- 2 graduate seminar colloquium credits
- At least 6 and no more than 15 credits of Thesis Research
- At least 18 credits total must consist of 500- or 600-level course series, and only 6 thesis research credits (600) are applicable
- A final oral examination
- M.S. – 17 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course).
- 6 semester credit hours of Thesis Research if a thesis is required.

### Ph.D.

- Ph.D. – no specified minimum credit requirements plus dissertation
- Candidacy Examination
- 2 credits of 590
- 1 credit FOR 602 credit (Supervised Experience in College Teaching)

- Satisfy Language or Culture requirement
- Comprehensive Examination
- A final oral defense of dissertation
- Ph.D. – 18 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course). If a HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary courses must be selected with the approval of the student's doctoral committee.
- 9 semester credit hours of Thesis Research

### Energy and Mineral Engineering

#### M.S.

- M.S. – minimum of 30 credits (24 course credits + 6 credits of Thesis Research)
- 15 credits representing physical (EGEE 500 – 3 credits) and chemical (EGEE 510 -3 credits) interactions, quantitative skills (EGEE 520 -3 credits), integrative design experience (EGEE 580 – 5 credits), or equivalent substitution in these main programmatic areas, and Colloquium (EGEE 590- 1 credit)
- A final oral defense of thesis
- M.S. – 17 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course).
- 6 semester credit hours of Thesis Research if a thesis is required.
- Ph.D. – minimum of 15 credits of 500-level courses plus dissertation
- Candidacy examination
- Comprehensive examination
- A final oral defense of dissertation
- Ph.D. – 18 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course). If a HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary courses must be selected with the approval of the student's doctoral committee.
- 9 semester credit hours of Thesis Research

### Recreation, Park, and Tourism Management

#### M.S.

- M.S. – minimum of 36 credits including thesis
- 9 credits RPTM core courses (RPTM 501, 527, 545)
- Research Methods (RPTM 530)
- Statistics – one statistics course at 400 or 500 level
- 5 credits of RPTM electives
- 6 semester credit hours of thesis research
- A final oral defense of thesis
- M.S. – 17 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course).
- 6 semester credit hours of Thesis Research if a thesis is required.
- Ph.D. – no specified minimum number of credits plus dissertation
- 12 credits RPTM core courses (RPTM 501, 527, 545, 597)
- Research Methods (RPTM 533 plus a qualitative methods course)
- Candidacy and comprehensive examination
- Statistics – three statistics courses beyond master's coursework
- 6 credits of RPTM electives
- Dissertation research (no specified minimum of credit hours)
- A final oral defense of dissertation
- Ph.D. – 18 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course). If a HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary courses must be selected with the approval of the student's doctoral committee.
- 9 semester credit hours of Thesis Research

### Anthropology

#### M.A.

- M.A. – minimum of 30 credits (24 course credits + 6 credits of Thesis Research)
- 12 credits in Anthropology (including ANTH 408 and ANTH 456)
- 6 credits of graduate level statistics
- At least 6, but no more than 15 credits of Thesis Research
- At least 18 credits total must consist of 500- or 600- level course series, and only 6 thesis research credits (600) are applicable
- A final oral examination
- M.A. – 17 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course).
- 6 semester credit hours of Thesis Research if a thesis is required.

#### Ph.D.

- Ph.D. – The M.A. requirements as noted above (or equivalent)
- 18 additional graduate level credits
- Satisfy foreign language requirement
- Comprehensive Examination
- A final oral defense of dissertation
- Ph.D. – 18 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course). If a HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary courses must be selected with the approval of the student's doctoral committee.
- 9 semester credit hours of Thesis Research

### Geography

#### M.S.

- M.S. –Thesis option or two-paper option: thesis option minimum of 30 credits, plus thesis; paper option minimum of 35 credits, plus two papers, one of which must be associated with a seminar. Geography 500 and 502, 3 credits of 501, 2 credits of 590, and a minimum of 3 other 500-level seminar credits from the Department required. Proposal defense required of both options;
- Illustrated Paper presentation required at end of 2 nd year.
- M.S. – 17 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course).
- 6 semester credit hours of Thesis Research if a thesis is required.

#### Ph.D.



- Ph.D. – Geography 500 and 502, 2 credits of 590; no other course or credit requirements, plus dissertation
- Proposal defense a minimum of two weeks before comprehensive exam; final oral defense of dissertation.
- Ph.D. – 18 credits in HDNRE program (HDNRE 590, HDNRE 574, HDNRE 575, RSOC 555; either ANTH 559 or FORS 565; plus one course). If a HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary courses must be selected with the approval of the student's doctoral committee.
- 9 semester credit hours of Thesis Research

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HUMAN DIMENSIONS OF NATURAL RESOURCES AND THE ENVIRONMENT \(HDNRE\) course list](#)

Last Revised by the Department: Fall Semester 2008

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Review Date: 6/17/08

## Higher Education (HI ED)

[Program Home Page](#)

DAVID BAKER, *Director of Graduate Studies*  
400 Rackley Building  
814-863-2690  
[Highered@psu.edu](mailto:Highered@psu.edu)

### Degrees Conferred:

Ph.D., D.Ed., M.Ed.

### The Graduate Faculty

- John J. Cheslock, Ph.D. (Cornell) Associate Professor of Higher Education
- Michael Dooris, Ph.D. (Penn State) Affiliate Associate Professor of Education
- Dorothy H. Evensen, Ph.D. (NYU) Professor of Education
- Roger L. Geiger, Ph.D. (Michigan) Distinguished Professor of Education
- Robert M. Hendrickson, Ed.D. (Indiana) Professor of Education
- Beverly Lindsay, Ph.D. (American) Professor of Education
- Leticia Oseguera, Ph.D. (UCLA) Assistant Professor of Education
- David M. Post, Ph.D. (Chicago) Professor of Education
- Roger L. Williams, D.Ed. (Penn State) Affiliate Associate Professor of Education
- Liang Zhang, Ph.D. (Cornell) Associate Professor of Higher Education

The graduate program in Higher Education has as its goal the preparation of individuals who will pursue careers and exert leadership in postsecondary education as administrators, faculty, or researchers in the nation's colleges and universities and in a variety of public and private agencies and associations in the United States and other nations. With emphasis on the systematic study of higher education, the program builds on the scholarly and scientific disciplines offered throughout the University and applies these studies to the professional functions and responsibilities that its graduates will assume, and to the knowledge of the field of higher education. The program is concerned with four broad areas of higher education study and with three areas of special emphasis: academic programs and evaluation, organization and administration, and perspectives on higher education policy and practice.

With mounting awareness of the changes occurring in various academic and professional fields, of the need for higher education reform, and of the need for improved articulation among the various levels of education, higher education faculty cooperates with other departments of the University to offer a number of courses and seminars for graduate students interested in pursuing a minor in higher education.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the graduate program and authorized by the dean of the Graduate School, such as the Miller Analogies Test (MAT), are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

**APPLICATION DEADLINE:** Candidates may enter the program at the beginning of the fall or spring semester, or the summer session. To allow sufficient time for processing applications, required information must be received by January 1 for international applicants and those wishing to be considered for Graduate Fellowships, or February 1 for all other applicants. Those wishing consideration for the spring semester should submit materials by September 15. Applicants should contact the program office for additional application materials.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Joint Degree Program between The Pennsylvania State University Dickinson School of Law (J.D.) and the Higher Education Program (M.Ed., D.Ed., Ph.D.)

**Joint Degree Program.** The Pennsylvania State University Dickinson School of Law (DSL) and the Higher Education (HI ED) Program are offering a joint degree program leading to a Juris Doctor (J.D.); and a Master of Education (M.Ed), a Doctor of Education (D.Ed), or a Doctor of Philosophy (Ph.D.) in Higher Education.

### Admission Requirements

The number of openings in the joint degree J.D./M.Ed., D.Ed., or Ph.D. program will be limited to students with an outstanding academic record who have successfully completed two semesters at the Dickinson School of Law.

Applicants to the joint degree program:

1. must have been admitted to the Dickinson School of Law
2. should have successfully completed two semesters of course work at the Dickinson School of Law with a grade-point average of 3.0
3. must submit two letters of recommendation from the Dickinson School of Law faculty
4. must submit a career statement

Note: Students are eligible to start taking courses in the HI ED program after successfully completing two semesters of law school work.

### College-Specific Admission Requirements

**DSL:** A bachelor's or equivalent degree from an accredited college is a prerequisite for admission; however, there is no standard prescribed undergraduate curriculum. An applicant should have acquired significant oral and written communication skills before entering law school. The following are required of applicants: a completed application form for DSL; submission of the results of the law school admission test (LSAT); completion of an LSDAS report; a one-page personal statement; employment records since high school; and two letters of recommendation.

**HI ED:** The following are required of all applicants: a completed application form to HI ED; submission of the results of the Graduate Record Examination (GRE), Miller Analogy Test (MAT), or LSAT; an official undergraduate transcript or transcripts; a personal statement; employment records since high school; and four letters of recommendation.

All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the Test of English as a Second Language (TOEFL) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test or a score of 213 on the computer-based test, or 80 points on the new Internet-based test with a minimum of 23 points on the new speaking portion; or the International English Language Testing System (IELTS) with a minimum composite score of 6.5 is required for admission.

### Residency

Students will normally spend four semesters in residence at DSL and as many additional semesters in residence as needed to complete the additional requirements for the pertinent HI ED degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the HI ED program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period. D.Ed. candidates must take at least 90 credits, of which at least 30 credits must be earned at the University Park campus.

## Liaisons

The department and faculty liaisons for DSL shall be the Associate Dean for Academic Affairs and the student advisor will be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for HI ED shall be the Professor-in-Charge (PIC) or such faculty member(s) as may be designated by the PIC.

## PRESCRIBED COURSES

**DSL:** All students in the J.D. program are required to take the first-year curriculum in DSL. In the second or third year, students must take CORE 934 (Professional Responsibility).

*The fall curriculum for the first year consists of the following courses:*

### CORE COURSES (CORE)

900. Civil Procedure (4)  
910. Criminal Law (3)  
912. Legal Analysis, Research & Writing I (3)  
925. Torts (4)

*The spring curriculum of the first year consists of the following courses:*

### One 3-credit Elective

### CORE COURSES (CORE)

903. Constitutional Law (3)  
905. Contracts (4)  
914. Legal Analysis, Research & Writing II (3)  
920. Property (4)

**HI ED:** All students pursuing a Ph.D. must satisfy the following minimum requirements:

**Core Courses:** 18 credits

### HIGHER EDUCATION (HI ED)

548. Curriculums in Higher Education (2-3)  
552. Administration in Higher Education (3)  
556. Higher Education Students and Clientele (3)  
562. Organizational Theory and Higher Education (3)

**Research Requirements:** 12 credits

Statistics through Multivariate Analysis:

AG 400(4) and R SOC 573(3) or STAT 500(3) and STAT 501(3)

### HIGHER EDUCATION (HI ED)

585. Research Design  
586. Qualitative Research Methods

**Advanced Skills:** 9 credits

**Specialization in Higher Education:** 12 credits

**Cognate Minor:** 15 credits (minimum)

### PROPOSAL WRITING

HI ED 594 (Research Topics) (minimum of 3 credits; maximum of 9)

**Ph.D. DISSERTATION** (non-credit; for continuous registration after completion of coursework and Oral Comprehensive Exam)

HI ED 601 (full time) or HI ED 611 (part time)

*All students pursuing a D.Ed. must satisfy the following minimum requirements:*

**Core Courses:** 18 credits

### HIGHER EDUCATION (HI ED)

548. Curriculums in Higher Education (2-3)  
552. Administration in Higher Education (3)  
556. Higher Education Students and Clientele (3)  
562. Organizational Theory and Higher Education (3)

**Research Requirements:** 12 credits

Statistics through Multivariate Analysis:

AG 400(4) and R SOC 573(3) or STAT 500(3) and STAT 501(3)

### HIGHER EDUCATION (HI ED)

585. Research Design (3)  
586. Qualitative Research Methods (3)

**Specialization in Higher Education:** 12 credits

**Minor or General Studies Grouping:** 15 credits (minimum)

### INTERNSHIP

HI ED 595 (9 credits optional based on previous experience in higher education administration)

### VI. D.Ed. THESIS RESEARCH

HI ED 594 (Research Topics) (minimum of 3 credits; maximum of 9)

**DISSERTATION** (minimum of 15 credits)

HI ED 600 (thesis research) or HI ED 610 (Thesis Research Off-Campus)

*Students pursuing the M.Ed. must satisfy the following requirements: (30 credits for degree)*

- Higher Education Courses (15 credits minimum; HI ED 545 (Higher Education in the U.S.) is required).
- Research methods (3 credits)
- Minor field or General Studies Grouping (6 credits)
- Master's Paper (3 credits)
- HI ED 596 (Independent Study)

## INTERPROGRAM TRANSFER OF CREDITS

**DSL:** A maximum of twelve credits for HI ED course work may be transferred for credit toward the J.D. degree at DSL. Students must obtain a grade satisfactory to DSL for the course work to be credited towards the J.D. degree. The following HI ED program may qualify for credit in DSL: (1) HI ED 545 (Higher Education in the United States); (2) HI ED 552 (Administration in Higher Education); (3) HI ED 560 (Legal Issues in Higher Education); (4) HI ED 546 (College Teaching) and (5) HI ED 587 (Education Policy and Politics).

**HI ED:** What courses may be credited will be determined by the student's degree program. Normally a maximum of twelve credits of DSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee. Normally, a maximum of 30 credits from a master's degree program will be counted for credit for the minimum requirements for a Ph.D. or D.Ed. degree.

### Sequence

The sequence of courses will be determined by the students and their advisors.

### Recommended Program of Study and Advising

All students in the program will have two advisors, one from DSL and one from HI ED. Periodic interaction between the two advisors will be encouraged. A program of study will be developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisors will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the HI ED programs.

### Tuition

Students will be charged the applicable DSL tuition to cover the J.D. program and the applicable graduate tuition to cover the HI ED degree program. DSL tuition will be paid for the semesters in which the student is registered for DSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

### Financial Aid and Assistantships

Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Generally, assistantships and financial aid granted by HI ED will not apply to time spent at DSL.

### Fulfillment of Degree Requirements and Graduation

All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the interprogram transfer of credits. With respect to HI ED program requirements for a thesis or paper, work done while at DSL under the supervision of a DSL faculty member may be appropriate for incorporation into the thesis or paper with the approval of the HI ED degree program committee (in such cases, the committee should consider whether the credits afforded such work will be subject to the twelve credit maximum for interprogram transfers). A DSL faculty member must be a member of the committee).

If for some reason the student cannot complete the requirements of the J.D., the student will still be allowed to count DSL courses already taken toward the pertinent HI ED degree, even if he or she is no longer in the joint degree program.

### Course Descriptions

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [HIGHER EDUCATION \(HI ED\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/12/04

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-436

Review Date: 6/12/07

Faculty updated: 4/16/13

## History (HIST)

### [Program Home Page](#)

MICHAEL KULIKOWSKI, Head of the Department  
DAVID ATWILL, Director of Graduate Studies  
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### Degrees Conferred:

Ph.D., M.A.  
Ph.D., M.A. Dual-Title Graduate Degree in History and Asian Studies  
Ph.D., M.A. Dual-Title Graduate Degree in History and Classics and Ancient Mediterranean Studies  
Ph.D., M.A. Dual-Title Graduate Degree in History and Women's Studies

### The Graduate Faculty

David G. Atwill, Ph.D. (Hawaii) Associate Professor of History and Asian Studies  
Kathleen Baldanza, Ph.D. (Penn) Assistant Professor of History and Asian Studies  
William A. Blair, Ph.D. (Penn State) Professor of History  
Daniel C. Beaver, Ph.D. (Chicago) Associate Professor of History  
Jonathan E. Brockopp, Ph.D. (Yale) Associate Professor of History  
Gary S. Cross, Ph.D. (Wisconsin, Madison) Distinguished Professor of History  
Ronnie Po-chia Hsia, Ph.D. (Yale) Professor of History  
Grace Delgado, Ph.D. (UCLA) Assistant Professor of History  
Solsiree Del Moral, Ph.D. (Wisconsin) Assistant Professor of History  
Alan Derickson, Ph.D. (California) Professor of History  
Sophie C. M. deSchaepdrijver, Ph.D. (Amsterdam) Associate Professor of History  
Greg Eghigian, Ph.D. (Chicago) Associate Professor of History  
Garrett G. Fagan, Ph.D. (McMaster) Associate Professor of Classics and Ancient Mediterranean Studies and History  
Cary Fraser, Ph.D. (Geneva) Associate Professor of African and African American Studies and History  
Lori D. Ginzberg, Ph.D. (Yale) Professor of History and Women's Studies  
Amy Greenberg, Ph.D. (Harvard) Professor of History and Women's Studies  
Baruch Halpern, Ph.D. (Harvard) Professor of History, Jewish Studies, and Classics and Ancient Mediterranean Studies  
Paul B. Harvey, Ph.D. (Pennsylvania) Associate Professor of History and Classics and Ancient Mediterranean Studies  
Benjamin T. Hudson, Ph.D. (Oxford) Professor of History  
Anthony E. Kaye, Ph.D. (Columbia) Associate Professor of History  
Joan B. Landes, Ph.D. (NYU) Professor of Women's Studies and History  
Daniel L. Letwin, Ph.D. (Yale) Associate Professor of History  
Russell K. Lohse, Ph.D. (Texas) Assistant Professor of History  
David McBride, Ph.D. (Columbia) Professor of African/African American Studies and African American History  
Sally A. McMurry, Ph.D. (Cornell) Professor of History  
Kathryn Merkel-Hess, Ph.D. (California, Irvine) Assistant Professor of History and Asian Studies  
Wilson J. Moses, Ph.D. (Brown) Professor of History  
Mark Munn, Ph.D. (Bryn Mawr) Professor of History, and Classics and Ancient Mediterranean Studies  
Mark E. Neely, Jr., Ph.D. (Yale) McCabe Greer Professor of the Era of the American Civil War  
On-Cho Ng, Ph.D. (Hawaii) Professor of History and Asian Studies  
Carol Reardon, Ph.D. (Kentucky) Professor of History  
Matthew Restall, Ph.D. (California, Los Angeles) Professor of History  
A. G. Roeber, Ph.D. (Brown) Professor of History  
Anne Carver Rose, Ph.D. (Yale) Professor of History and Jewish Studies  
Paul Lawrence Rose, Ph.D. (Sorbonne) Professor of History and Jewish Studies  
Gonzalo Rubio, Ph.D. (Johns Hopkins) Associate Professor of History, and Classics and Ancient Mediterranean Studies  
Janina Safran, Ph.D. (Harvard) Associate Professor of History  
Kathryn Salzer, Ph.D. (Toronto) Assistant Professor of History  
Gregory Smits, Ph.D. (Southern California) Associate Professor of History  
Catherine Wanner, Ph.D. (Columbia) Associate Professor of History  
Nan E. Woodruff, Ph.D. (Tennessee) Professor of History

Graduate instruction at the master's degree level is offered in the following areas of history: the Ancient Mediterranean; Medieval, Early Modern, and Modern European, including Great Britain and Russia; the United States, including colonial American and African American history; the Middle East; East and South Asian; and Latin America. In addition, graduate instruction is offered in such comparative or topical areas as Military History, Women's History, History of Religion, Jewish History, and the History of Science.

Doctoral programs ordinarily are limited to American, Ancient, Medieval, Early Modern British and European, Modern European, and East Asian History; as well as comparative studies in the History of War and Society; Women's History; the History of Industry, Agriculture, and Society; the History of Science and Technology; and the History of Religion. Prospective doctoral candidates are invited to contact the graduate officer about the current availability of any of these or other areas before applying.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Applicants to the doctoral program must hold or be near completion of the master's degree (or its equivalent); all others will be considered for admission to the master's program, even if it is their ultimate intention to pursue a doctoral degree at Penn State.

To be considered for admission, applicants must submit transcripts that show (1) substantial course work in history with a minimum grade-point average of 3.50 (on a 4.0 scale) in all undergraduate history courses, (2) a minimum junior/senior GPA in all courses of 3.30, (3) at least three semesters of college-level work in a foreign language (additional language training appropriate to the fields in which the applicant proposes to work may also be required for admission) and (4) where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Each applicant must submit the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application; the general examination scores are mandatory, the history examination is optional. Students with scores of 650 or better in each of the verbal, quantitative, and analytic sections of the general examination will be given preference in admission. Applicants from abroad whose native language is not English must submit the scores of TOEFL to the Graduate School; admission to the history program normally requires a score of 600 or better.

The Department of History further requires all applicants to submit directly to the department a statement of intent outlining their proposed fields of study and career goals, as well as a sample of their written work (undergraduate history thesis, master's thesis, seminar paper or equivalent research paper) as evidence of their historical research and writing skills. Three letters of recommendation are required; it is strongly preferred that at least two of them be from historians.

### Master's Degree Requirements

(1) Candidates for the M.A. degree must earn a minimum of 33 credits of graduate-level work, of which 18 credits will be in the student's major area and 6 credits each in two other areas, one of which may be in another discipline. Three credits in History 592 (Proseminar) in the student's major area of historical study, or in a related field if no Proseminar exists in the major area. (2) Reading proficiency in at least one foreign language must be demonstrated no later

than the beginning of the second year of residence. (3) Students electing to write a master's thesis will take 6 credits of thesis research as part of the 18 credits in their major area, and will be given an oral examination on the thesis and topics related to the thesis. Students offering a master's paper in lieu of a thesis will be given an oral examination based on the master's paper and any of the student's course and seminar work in history related to the paper.

### Doctoral Degree Requirements

History 592 (Proseminar in the major field or related field) is the only course required of all Ph.D. candidates. The remainder of a student's doctoral program, including foreign language requirements, will be determined by the doctoral committee. In order to be admitted to doctoral candidacy, students must submit a historiographical essay in the proposed research field and pass an oral examination (the candidacy examination) on the essay and on possible dissertation topics suggested by the essay. After completing all course work, doctoral candidates must pass written and oral examinations in the research field, a primary area of specialization, and two additional areas (one of which may be outside the discipline of history). Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the degree.

### Other Relevant Information

The department's graduate officer, who supervises the overall graduate program in history and maintains student records, will assign newly admitted graduated students to advisers on the basis of each student's expressed area of interest. Advisers provide assistance in planning courses of study, guidance in choosing thesis and dissertation topics, direction in conducting research, and career counseling. Students who serve as graduate assistants will be given a variety of experiences as they assist different professors, ranging from paper-grading and administering exams, to preparing and delivering occasional lectures, to conducting review or discussion sections for large lecture courses. Advanced doctoral students may hold lectureships while working on their dissertations; lecturers have complete instructional responsibility for one or two sections of an undergraduate course in their area of specialization.

### Student Aid

In addition to the fellowships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the Graduate Bulletin, the following awards typically have been available to graduate students in this program:

#### JAMES HAMILTON HARTZELL AND LUCRETIA IRVINE BOYD HARTZELL HISTORY AWARD

A \$200 to \$300 award made annually to a graduate student in the Department of History whose field of interest is Pennsylvania history.

#### JAMES LANDING FELLOWSHIP AND THE WARREN HASSLER FELLOWSHIP FOR STUDY IN THE CIVIL WAR

Each fellowship is available each year to doctoral candidates who are working on their dissertations. The award consists of a stipend that earns the successful candidate one semester of release time for research and writing. No tuition waiver if offered.

#### HILL FELLOWSHIPS FOR STUDY IN HISTORY

Awarded annually by the Department of History to doctoral candidates who are working on their dissertations. The amount of the award varies, but it generally supports one semester free of duties.

#### EDWIN ERLE SPARKS FELLOWSHIP IN THE HUMANITIES

One fellowship is available each year to doctoral candidates in the Department of History who are working on their dissertations.

#### MARK AND LUCY MACMILLAN STITZER AWARD

Awarded by the Department of History each year to support graduate student travel for the purpose of research. The number and value of these awards depends on the quality of proposals received, the level of funding required by each meritorious project, and the funds available in the endowment. Preference is given to request for doctoral dissertation research.

#### THE E-TU ZEN SUN AWARD FOR OUTSTANDING TEACHING BY A GRADUATE ASSISTANT

One award is made each year to recognize excellence in teaching by a History graduate assistant in the conduct of discussion sections, review sessions, or lecture presentations. The value of the award varies depending on funds available, but it is normally about \$500.

### Dual-Title Graduate Degree in History and Asian Studies

Graduate students with research and educational interests in international education may apply to the History/Asian Studies Degree Program. The goal of the dual-title degree History and Asian Studies is to enable graduate students from History to acquire the knowledge and skills of their major area of specialization in History while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent historians who are experts in Asian Studies as well. The dual-title degree in History and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see <http://asian.la.psu.edu/graduate.shtml>).

### Admission Requirements

For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to the History graduate program. Once accepted into the History program, the student can apply to the Admissions Committee of the Asian Studies. The Asian Studies admissions committee reviews applications and recommends students for admission to the Asian Studies program to the Graduate School. There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and History, though applicants interested in the program should make that known clearly on their applications and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

Each applicant must submit the scores of the Graduate Record Examinations (GRE) taken within five years previous to the date of application; the general examination scores are mandatory, the history examination is optional. Students with scores of 650 or better in each of the verbal, quantitative, and analytic sections of the general examination will be given preference in admission.

General Graduate School requirements are stated in the [GENERAL INFORMATION](#) section of the Graduate Bulletin.

### Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the History program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies advisor, and their History program advisor.

Upon a student's acceptance by the Asian Studies Admissions Committee, the student will be assigned an Asian Studies academic advisor in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their advisor. The student and advisor will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the History department and the Asian Studies program.

### Requirements for the History/Asian Studies Ph.D.

The doctoral degree in History and Asian Studies is awarded only to students who are admitted to the History doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in History and Asian Studies are as follows:

- History 592 and History 593 (proseminars in historical methods and research)
  - For students entering with a B.A. degree, a two-year sequence of these courses is required, for a total of four courses
  - For students entering with an M.A. degree, a one-year sequence of these courses is required, for a total of two courses
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502 (the required proseminar sequence in Asian Studies). As many as 6 may come from History, as approved by the student's doctoral advisor and the ASP Director of Graduate Studies. The remaining credits can be taken in ASIA or in any department other than History.

Particular courses may satisfy both the History requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisors and their major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

### **Dual-Title Graduate Degree in History and Classics and Ancient Mediterranean Studies**

This dual-title degree program will increase the intellectual rigor, breadth, and depth of graduate work in history through immersion in the disciplinary fields covered by the Department of Classics and Ancient Mediterranean Studies: the philology and literature of ancient Mediterranean languages; the history and material cultures of those societies.

This dual-title program will thus provide a context in which history graduate students will learn how to synthesize knowledge within and across traditional disciplinary boundaries. In addition, this dual-title degree program will provide qualified history graduate students opportunities for instructional training encouraging an interdisciplinary approach to teaching.

The primary advantages of this dual-title program include the intellectual and academic advantages and benefits of interdisciplinary study, as well as the enhancement of the reputation of the history department through an innovative program, leading to recruitment of highly qualified history graduate students, and an improved placement of doctoral graduates in the highly-competitive field of ancient history.

### **Admission Requirements**

Students must first be admitted to the graduate program of the Department of History; only after admittance by the Department of History will history graduate students be eligible to apply for graduate study in the dual-title program. An admissions committee of CAMS faculty will review applications for graduate study in the dual-title program. The dual-title program will follow the timetable and admissions requirements of the Department of History. Applicants to this dual-title degree program should have a junior/senior cumulative average of at least a 3.30 (on a 4.00 scale) and appropriate academic preparation. Preference will be given to those candidates whose undergraduate record demonstrates expertise in ancient Mediterranean studies (history; literature; archaeology) and proficiency to the 12th credit level in one or more ancient languages. Where applicable, a minimum GPA of 3.5 (on a 4.00 scale) is requisite for graduate work previously undertaken. Prospective students seeking admission to this dual-title degree program are required to write a statement of purpose that addresses the ways in which their research and profession goals will reflect an interest in interdisciplinary research in history and the disciplines and fields included in the CAMS dual-title program.

### **Degree Requirements**

This dual-title degree will have requirements in addition to those for graduate degrees in History. Those requirements include additional course work in ancient languages, additional components to the candidacy and comprehensive examinations at the doctoral level, and the completion of CAMS-related thesis at the master's level (optional; see below) and doctoral levels (compulsory). A dual-title M.A. committee and/or a Ph.D. (doctoral) committee, chaired by faculty closely related to the student's field of interest, will supervise and direct the graduate study of each student accepted into this dual-title program. That committee will, as pertinent, also serve as the student's candidacy committee and, in accordance with Graduate Faculty policies, serve as the student's doctoral Comprehensive Examination committee. Students will be expected to attend and participate actively in the CAMS regularly-scheduled colloquia.

### **Master's Degree**

33 credits, including 18 credits at the 500-level and above. 6 required credits in CAMS: CAMS 592: CAMS Proseminar; CAMS 593: Research Seminar. 6 required credits in 500-level History Seminars (e.g., History 502, 503, 504, 505). Students electing to complete a thesis must enroll for 6 credits at the 600-level. Students electing to submit research papers (see the next paragraph), in lieu of a thesis, must enroll for additional 500-level credits to fulfill the Graduate Faculty requirement of 18 credits at the 500-level or above. 9 additional credits in 500 or 400-level work in CAMS courses.

### **Ph.D. Degree**

6 required credits in CAMS: CAMS 592: CAMS Proseminar; CAMS 593: Research Seminar. 6 required credits in 500-level History seminars (e.g., History 502, 503, 504, 505). 9 additional credits (a minimum of 6 should be at the 500-level) in CAMS courses or History courses relevant to the student's research interests. Reading knowledge of a second ancient language--proficiency to be demonstrated through 400/500 level course work in that language as instructed by CAMS language faculty--or competence, demonstrated in course work or field study as approved by the student's dual-title doctoral committee, in a research technique in a technical field relevant to the dual-title program: e.g., archaeology, art history, anthropology, historical linguistics, literary studies and analysis. Following Department of History guidelines, the comprehensive examination must take place in either spring or summer of the second year (if entering as a M.A./Ph.D. student) or in either spring or summer of the second year (if entering as a Ph.D. only student). Dual-title students may receive an additional one to two semesters of coursework prior to taking the examination only if the student's dual-title doctoral committee determines that need. That committee will then request the written approval of the Department of History's Director of Graduate Studies.

Dissertation on a CAMS-related topic is required of students in this dual-title degree program, as approved by the student's dual-title doctoral committee.

#### **Communications and English Competency Requirements**

The student will fulfill the English Competency requirements specified by the History department. Master's students will fulfill a requirement of reading knowledge of one ancient language; Ph.D. candidates will fulfill a requirement of reading knowledge of two ancient languages or of one ancient language and competence in a research technique. Language proficiency will be demonstrated through 400/500 level work in the languages concerned, as instructed by CAMS faculty. Students will be expected to acquire and demonstrate reading proficiency in those modern foreign languages (e.g., but not exclusively, French, German, Italian) appropriate to their research interests, as identified in consultation with their dual-title master's and/or doctoral committee.

#### **Candidacy**

In order to be admitted to doctoral candidacy in this dual-title program, students must meet the Ph.D. candidacy requirements specified by the History and CAMS dual-title programs. A Ph.D. candidacy examination is required of all students pursuing a doctorate in this dual-title program. The examination may be taken on completion of at least 18 credits of acceptable graduate work at Penn State and must be taken by the third semester of full-time study in this doctoral program. A single candidacy examination will contain elements of History and the participating program (CAMS). Following successful passage of the candidacy exam, a program plan will be submitted to the Departments of History and the participating program after consultation with members of the student's doctoral committee.

#### **Committee Composition**

For the dual-title M.A., the student's dual-title master's committee will include, at a minimum, one CAMS faculty member. For the dual-title Ph.D., one CAMS faculty member, at a minimum, will be a member of the dual-title doctoral committee. The chair of the committee may represent both the History and the CAMS dual-title programs. Graduate Faculty requirements stipulate that a minimum of four graduate faculty must constitute a doctoral committee of which at least two members of the doctoral committee must be from the major program and at least one member must be the outside member. The outside member of the doctoral committee of a dual-title student must have no budgetary connection either to History or to CAMS.

#### **Comprehensive Exams**

Dual-title students must successfully pass a comprehensive examination, as required by History. The comprehensive examination must take place in either spring or summer at the end of the student's third year (if entering as a master's/Ph.D. student) or in either spring or summer of the second year (if entering as a Ph.D. only student); dual-title students may receive an additional one or two semesters of coursework prior to taking the examination only by petition from the student's dual-title doctoral committee and the written approval of the participating program's Director of Graduate Studies. The comprehensive examination must reflect the dual-title content or the History and CAMS dual-title programs. The participating program faculty on the student's dual-title doctoral committee are responsible for administering the part of the comprehensive examination covering CAMS topics. The comprehensive exam will have written and oral components. The CAMS portion of this examination will focus on those CAMS-related fields the student has studied as well as the topic of the proposed Ph.D. The comprehensive examination will therefore cover the research field, as well as the other historical fields, ancient languages, and research techniques the student has studied.

#### **Dissertation**

A dissertation on a CAMS topic is required of students in this dual-title degree program. The CAMS topic of the dissertation will be approved by the student's

dual-title doctoral committee.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-094

Review Date: 01/12/2010

Last updated by Publications: 12/21/12



## Health Education (HLHED)

[Program Home Page](#)

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### Degrees Conferred:

M.Ed.

### The Graduate Faculty

- Raffy R. Luquis, Ph.D. (Arkansas) *Associate Professor of Health Education*
- William D. Milheim, Ph.D. (Kent State) *Professor of Education*
- Samuel W. Monismith, D.Ed. (Penn State) *Associate Professor of Health Education*

The Health Education program emphasizes behavioral and organizational strategies to plan, implement, and evaluate interventions that enable individuals, groups and communities to achieve personal, environmental, and social health. It complements other professional fields such as education, nutrition, physical therapy, occupational therapy, dental hygiene, nursing, health care administration, and preventive psychology.

The program follows a professional development focus, as many of the students are employed in the broad areas of disease prevention and health promotion and are pursuing graduate study on a part-time basis. The M.Ed. is a professional degree emphasizing applied research.

The program requires a research-based culminating experience. The faculty has a broad range of interests, including health promotion, family systems, teaching and training methods, violence and substance abuse prevention and control, and multicultural health issues.

A minimum of 30 graduate credits is required for the completion of the degree. A 3 credit research-based culminating writing experience is required. The program requires students to complete 21 credits in Prescribed Core courses and 9 credits in Elective courses.

### Admission Requirements

Students must have a baccalaureate degree from an accredited college or university, an overall minimum undergraduate grade-point average of 2.50 and a junior/senior GPA of 3.00 (on a 4.00 scale) for admission into the program. Students are also required to submit:

- A completed application form with application fee;
- Two copies of an official transcript from an accredited, college-level university;
- Supplementary application.

An application is available on the Web at [www.hba.psu.edu](http://www.hba.psu.edu) or by calling 717-948-6250.

### Degree Requirements

A minimum of 30 graduate credits is required for the completion of the degree. A 3-credit research-based culminating experience is required. The program has a required core of courses totalling 18 credits as follows:

#### Prescribed Core Courses: 21 credits

- HLHED 415 Planning and Development of Health Education Programs (3)
- HLHED 456 Advanced Techniques in School and Community Health Education (3)
- EDUC 440 Education Statistics and Measurement (3) or EDPSY 400 Introduction to Statistics in Educational Research (3)
- HLHED 552 Current Health Education Issues (3)
- HLHED 553 Multicultural Health Issues (3)
- EDUC 586 Educational Research Design (3) or HLHED 530 Research Techniques in Health Education (3)
- *Culminating Experience*: HLHED 591 Culminating Health Education Seminar (3) or HLHED 587 Master's Project (3)

#### Elective Courses: 9 credits

A minimum of 12 credits is to be selected from the following HLHED courses: HLHED 420, 421, 443, 497, 501, 516, 590, 596, or 597.

Students also may select electives from suitable courses in Psychology, Community Psychology and Social Change, Education, Training and Development, or Health Administration programs. Note that 6 credits must be at the 500 level. Please contact the program office for further information about electives.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HEALTH EDUCATION \(HLHED\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

Last Revised by the Department: Fall Semester 2007

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Review Date: 6/12/07

Last updated by Publications: 1/12/12

## Horticulture (HORT)

[Program Home Page](#)

RICHARD P. MARINI, *Head of the Department*  
102 Tyson Building  
814-865-2571

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Richard N. Arteca, Ph.D. (Washington State) Professor of Horticultural Physiology
- Rick Bates, Ph.D. (Virginia Tech) Associate Professor of Ornamental Horticulture
- Robert D. Berghage, Ph.D. (Michigan State) Associate Professor of Horticulture
- Kathleen B. Brown (formerly Evensen), Ph.D. (Florida) Professor of Postharvest Physiology
- Robert M. Crassweller, Ph.D. (Ohio State) Professor of Tree Fruit
- David Decoteau, Ph.D. (UMass) Professor of Horticulture
- David M. Eissenstat, Ph.D. (Utah) Professor of Woody Plant Physiology
- Majid R. Foolad, Ph.D. (California, Davis) Professor of Plant Genetics
- Mark J. Gultinan, Ph.D. (California, Irvine) Professor of Plant Molecular Biology
- Charles W. Heuser, Ph.D. (Rutgers) Professor of Horticultural Physiology
- Kathleen Kelley, Ph.D. (Michigan State) Associate Professor of Consumer Horticulture
- Roger T. Koide, Ph.D. (California, Berkeley) Professor of Horticultural Ecology
- William J. Lamont, Jr. Ph.D. (Cornell) Professor of Vegetable Crops
- Jonathan P. Lynch, Ph.D. (California, Davis) Professor of Plant Nutrition
- Richard P. Marini, Ph.D. (Virginia Tech) Professor of Horticulture; Department Head
- Michael D. Orzolek, Ph.D. (Maryland) Professor of Vegetable Crops
- Elsa Sanchez, Ph.D. (Washington State) Associate Professor of Horticultural Systems Management
- James C. Sellmer, Ph.D. (Wisconsin, Madison) Associate Professor of Ornamental Horticulture
- Dan T. Stearns, M.S. (North Carolina State) Professor of Landscape Contracting

Students may specialize in crop production and marketing, integrated crop management, plant genetics and breeding, horticultural plant physiology, postharvest physiology, plant molecular biology and biotechnology, and horticultural ecology.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of the graduate program officer, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Prerequisites for admission vary according to the area of specialization, but basic courses in physical sciences, mathematics, biological sciences, communication skills, and social sciences and humanities are required. Students who lack prerequisite courses may be admitted but are required to make up deficiencies without degree credit.

Students with a 2.75 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

See [hortweb.cas.psu.edu/academic/gradprog.html](http://hortweb.cas.psu.edu/academic/gradprog.html) for the most current Admission requirements.

### Master's Degree Requirements

All M.S. degree candidates must complete at least one graduate course in biometry, at least 2 credits of resident or extension education (HORT 596 or HORT 602), and two seminars (HORT 590). A thesis is required for the M.S. degree.

### Doctoral Degree Requirements

The communication requirement for the Ph.D. degree may be satisfied by completing at least 6 graduate credits in an area of communications skills approved by the student's advisory committee.

All Ph.D. candidates must present at least three seminars (HORT 590) for credit and complete at least two graduate courses in statistics or statistical applications. Ph.D. students must take 2 credits of resident or extension education (HORT 596 or HORT 602).

The candidacy examination must be taken within six months after beginning residency.

Within one semester after passing the candidacy examination, the student's doctoral committee, with the thesis adviser in charge, will have the program planning meeting. The purposes of this meeting are to (1) determine the student's strengths and weaknesses in pertinent subject matter areas; (2) guide the student in developing a plan of study; and (3) review and discuss the proposed thesis research.

The comprehensive examination, composed of both written and oral parts, will be given when, in the student's and adviser's opinion, the student is ready for the examination, and when the communication requirements and essentially all courses have been completed.

After the thesis is completed and all other requirements for the Ph.D. have been met, the dean of the Graduate School will schedule the final examination. Normally, three months must elapse between the comprehensive and the final examinations. A major part of the examination will be an oral defense of the thesis.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. Students who wish to compete for fellowships should be sure that their application materials are complete by January 15 for entry the following fall semester. The following award typically has been available to graduate students in this program:

#### WALTER THOMAS MEMORIAL SCHOLARSHIP

Available to students studying the nutrition of horticultural crops; stipend equivalent to a half-time assistantship. Apply through the Department of Horticulture.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HORTICULTURE \(HORT\) course list](#)

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## Human Resources and Employment Relations (HRER)

[Program Home Page](#)

PAUL F. CLARK, *Head*  
003 Keller Building  
814-865-5425

### Degree Conferred:

- [M.S. in Human Resources and Employment Relations](#)
- [Master of Professional Studies in Human Resources and Employment Relations \(MPS HRER\)](#)
- [Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations \(LRHRER\)](#)
- [Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations \(SPHRER\)](#)

### The Graduate Faculty

- Mark S. Anner, Ph.D. (Cornell) Associate Professor of Labor Studies and Employment Relations, and Political Science
- Paul F. Clark, Ph.D. (Pittsburgh) Professor of Labor Studies and Employment Relations
- Sarah Damaske, Ph.D. (NYU) Assistant Professor of Labor Studies and Employment Relations
- Alan Derickson, Ph.D. (California, San Francisco) Professor of Labor Studies and Employment Relations, and History
- Elaine Farndale, Ph.D. (Cranfield, UK) Assistant Professor of Labor Studies and Employment Relations
- Dennis Gouran, Ph.D. (Iowa) Professor of Speech Communication and Labor Studies and Employment Relations
- Tommy Hogan, Ph.D. (UMUC) Professor of Practice of Labor Studies and Employment Relations
- Helen Liu, Ph.D. (Cornell) Assistant Professor of Labor Studies and Employment Relations
- Sumita Raghuram, Ph.D. (Minnesota) Associate Professor of Labor Studies and Employment Relations
- Paul Whitehead, J.D. (Harvard) Professor of Practice of Labor Studies and Employment Relations
- Weichun Zhu, Ph.D. (Nebraska) Assistant Professor of Labor Studies and Employment Relations

The master of science degree in Human Resources and Employment Relations (HRER) is a two-year program designed for students anticipating careers in some aspect of labor and human resources or labor-management relations. The program has the following objectives:

- provide students with an understanding of the roles employers, employees, employee organizations, and public policy makers play in the employment relationship;
- familiarize students with the complex personal and organizational issues inherent in the employment relationship;
- prepare students to systematically analyze complex issues and evaluate research results in the process of administering labor and human resource systems;
- prepare students for advanced graduate or professional training beyond the master's degree;
- prepare students for employment as practitioners in the field.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) or the Graduate Management Admission Test (GMAT) are required. Applicants with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Applicants must have three letters of recommendation sent from people who can assess adequately their likelihood of completing the graduate program.

Students are expected to have completed successfully an undergraduate statistics course plus a minimum of 12 undergraduate credits in the social sciences as part of their baccalaureate degree.

### Degree Requirements

#### THESIS OPTION:

The HRER thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 36 credits, including a minimum of 30 at the 400 and 500 level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations. A student's thesis should reflect the chosen emphasis.

#### RESEARCH PAPER OPTION:

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. It requires a minimum of 37 credits at the 400 and 500 level. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations. A student's research paper should reflect the chosen emphasis.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Course Requirements

#### Core Courses (22 credits)

HRER 501, HRER 502, HRER 504, HRER 505, HRER 512, HRER 513, HRER 516

Required course are offered once per academic year and elective courses at least once every two academic years.

#### Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

#### Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. Examples of suitable elective courses are: HRER 500, HRER 535, HRER 536, HRER 594, HRER 595, HRER 596, HRER 597, HRER 599; LER 411, LER 401, LER 444, LER 458Y; ECON 412, ECON 436W, ECON 571; EDLDR 565, EDLDR 574; HIST (LER) 555; MGMT 321, MGMT 523, MGMT 548; PSYCH 484, PSYCH 485, PSY 522; SOC 455, SOC 456, SOC 555

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HUMAN RESOURCES AND EMPLOYMENT RELATIONS \(HRER\) course list](#)

## Master of Professional Studies in Human Resources and Employment Relations (MPS HRER)

PAUL F. CLARK, *Professor in charge*

The MPS in Human Resources and Employment Relations (HRER) is a 33 credit program of study for professionals working in human resources/employment relations or considering a career in some aspect of human resources and employment relations. The program will prepare students to:

- understand the roles that employers, employees, employee organizations and unions, and public policy makers play in the employment relationship;
- analyze the complex personal, legal, and organizational issues inherent in the employment relationship;
- understand the ethical dimensions of human resource and employment relations;
- analyze complex issues and evaluate research results in the process of administering labor and human resource systems;

Courses include the study of employment law, labor and employment relations, human resources, workplace organization, labor markets, ethics, and the employment relationship, recruiting/selection, compensation and benefits, workforce development, and diversity in the workplace.

The program will highlight the changing nature of the HRER field, including the impact of the globalization of private and public organizations and the growing importance of diversity in the workforce. It will culminate in a capstone class in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Upon completion of the MPS HRER, students will be equipped to work as professionals in human resource management, employment relations, and general management with private employers, unions, government agencies, and non-profit organizations.

Students pursuing the MPS in HRER would be required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations. The focused coursework should make the degree more relevant to potential students and add value to the degree from the student's perspective.

Students will choose and complete one concentration which will include six credits beyond the 24 required credits. Double counting six required credits, including the Research Project, the concentration would be 12 credits of coursework in a particular area of HRER. Three additional elective credits chosen from LER, HRER, or WFED courses must also be completed. Students will be required to complete the capstone project in their area of concentration. (For example, students choosing the Benefits and Compensation concentration would be required to complete a capstone project that focused on some aspect of benefits and compensation).

### Degree Requirements

**PRESCRIBED COURSES:** 24 credits

#### HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)

501. Labor and Employment Law (3)  
 504. Seminar in Industrial Relations (3)  
 505. Seminar in Human Resources (3)  
 800. International Context of HRER (3)  
 802. Organizations in the Workplace (3)  
 816. Labor Market Analysis (3)  
 836. Diversity in the Workplace (3)  
 894. Research Project (3)

#### AREAS OF CONCENTRATION (student must complete one)

##### --Benefits and Compensation

LER 424 Employment Compensation (3)  
 LER 425 Employment Benefits (3)

##### --Employment and Labor Law

LER 401 Law of Labor-Management Relations (3)  
 HRER 811 Labor and Employment Law II (3)

##### --Labor and Collective Bargaining

LER 401 Law of Labor-Management Relations (3)  
 LER 435 Labor Relations in the Public Sector (3)

##### --Staffing, Training, and Development

LER 426 Staffing and Training (3) or WF ED 471 Training in Industry and Business (3)  
 WF ED 573 Needs Assessment for Industrial Trainers (3)

#### ELECTIVE COURSES: 9 credits

Select 6 credits in area of concentration.  
 Select an additional 3 credit course from LER, HRER, or WF ED courses listed below.

#### LABOR AND EMPLOYMENT RELATIONS (LER)

401. Law of Labor-Management Relations (3)  
 424. Employment Compensation (3)  
 425. Employment Benefits (3)  
 426. Staffing and Training (3)  
 435. Labor Relations in the Public Sector (3)  
 444. Occupational Health: Policy and Practices (3)  
 445Y. Politics of Affirmative Action(3)  
 460. Human Resources Ethics (3)  
 464. Communication Skills for Leaders in Groups and Organizations (3)  
 472. Work-Life Practices and Policies (3)

#### HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)

811. Labor and Employment Law II (3)

#### WORKFORCE EDUCATION AND DEVELOPMENT (WF ED)

471. Training in Industry and Business (3)  
 573. Needs Assessment for Industrial Trainers (3)

### 3. Admission Requirements

In order to enter the MPS in HRER, applicants must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution prior to starting the graduate program. above. Students who do not have a GPA of 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate School conditional on the awarding of the baccalaureate degree. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who are better suited for another graduate level program will be encouraged to apply to the appropriate program. Applicants to the MPS HRER should submit the following materials:

- Penn State graduate degree application form and application fee;
- World Campus program application;
- A 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills. Documentation of a minimum of two years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and document the requisite minimum of two years of work experience;
- Official transcript(s) of all institutions attended;

TOEFL score, if applicable. A TOEFL score of 550 on the paper test, a score of 213 on the computer-based test, or **80** points on the new Internet-based test with a minimum of 19 points on the new speaking portion is required for admission.

**A minimum composite score of 6.5 on the IELTS test is required for admission.**

*Graduate Record Examination (GRE) scores are not required.*

#### 4. Recommended Sequence of Courses

Most adult students will participate in the online program on a part-time basis because of full-time professional responsibilities. The typical student course load is expected to be one course or two courses each semester (fall, spring, and possibly summer). Below, we illustrate one course per semester program. The sequence of courses may change and additional courses may be scheduled per semester depending on enrollment and demand. Course development will focus on one area of concentration creating one path through the degree. Additional courses for other areas of concentration will be added as enrollments increase to support a broader curriculum.

##### Year one: 9 Credits

HRER 501(3): Labor and Employment Law (fall)  
 HRER 504(3): Seminar in Industrial Relations (spring)  
 HRER 505(3): Seminar in Human Resources (summer)

##### Year two: 9 Credits

HRER 800(3): International Context of HRER (fall)  
 HRER 802(3): Organizations in the Workplace (spring)  
 HRER 836(3): Diversity in the Workplace (summer)

##### Year three: 9 credits

HRER 816(3): Labor Market Analysis (fall)  
 Electives (3): (spring)  
 Electives (3): (summer)

*Electives for concentration*

##### Year four: 6 credits

Electives (3): Fall/Spring)

HRER 894 Research Project (Can be offered fall, spring, and summer depending on demand.)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

## Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations (LRHRER)

PROFESSOR PAUL F. CLARK, *Head*

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about (1) the roles of employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) and how to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the HRER field. The program culminates with an M.S. research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

### Bachelor of Science

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION:** 45 credits

(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 18 credits

**REQUIREMENTS FOR THE MAJOR:** 98-99 credits

[12 credits may be double counted, 6 must be at the 500 level]

**B.S. REQUIREMENTS:** 62-63 credits

(This includes 10 credits of General Education courses)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 36-37 credits

**PRESCRIBED COURSES:** (16 credits)

(Some courses in this category have prerequisites that are not included in the major)

LER 100 GS(3), LER 312(4) (Sem: 3-8)

ECON 002 GS(3), ECON 315 GS(3), PSYCH 281 GS(3) (Sem: 1-8)

**ADDITIONAL COURSES:** (13 credits)

(Some courses in this category have prerequisites that are not included in the major)

LER 201 GS(3) or LER 401(3) (Sem: 3-8)

SCM 200(4) or STAT 200 GQ(4) (Sem: 3-8)

LER 136 US(3) or WMNST 136 US(3) or LER 400 IL(3) (Sem: 5-8)

LER 458Y US(3) or HIST 458Y US(3) or LER 414W(3) (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS:** (33-34 credits)

(LER courses that are used in the Additional Courses category may not be double counted to satisfy this requirement. Some courses in this category have prerequisites that are not included in the major.)

Select 15-21 credits from appropriate LER courses, at least 9 must be at the 400 level (only 3 credits of LER 495 or 3 credits of LER 496 may be used to satisfy this requirement) (Sem: 5-8)

Select 12-19 credits from the department list in consultation with an adviser, at least 6 credits must be at the 400 level, 3 each from 3 categories:

1. ECON 342 GS(3), ECON 370 GS(3), ECON 412(3), ECON 436W(3), ECON 445(3) (Sem: 5-8)
2. MGMT 100(3), MGMT 321(3), MGMT 331(3), MGMT 341(3), MGMT 424(3) (Sem: 3-8)
3. PL SC 451(3), PL SC 471(3), PL SC 473(3), PL SC 474(3) (Sem: 5-8)
4. PSYCH 482(3), PSYCH 484(3), PSYCH 485(3) (Sem: 5-8)
5. SOC 119 GS;US(4), SOC 409 US(3), SOC 444(3), SOC 455(3), SOC 456(3) (Sem: 3-8)
6. ACCTG 211(4), CAS 352(3), H P A 460(3), HD FS 425 US(3), HIST 155 GH;US(3), S T S 407(3) (Sem: 5-8)

**M.S. REQUIREMENTS:** 36 credits

[12 credits may be double counted, 6 must be at the 500 level]

**PRESCRIBED COURSES:** (21 credits)

HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 512(3)\*, HRER 513(3)\*\*, HRER 516(3)

\*or other statistics course approved in advance by graduate director

\*\*or other methods course approved in advance by graduate director

**ADDITIONAL COURSES:** (15 credits)

Select 15 credits from the following list in consultation with adviser (only 6 credits may be at the 400 level).

LER 400 IL(3), LER 401(3), LER 414W(3), LER 424(3), LER 434(3), LER 435(3), LER 437(3), LER 444(3), LER 458Y US(3), LER 460(3), LER 465(3), LER 470(3), HRER 500(3), HRER 535(3), HRER 536(3), HRER 594(1-6), HRER 595(1-6), HRER 596(1-6), HRER 597(1-3), HRER 600(3-6)

**Emphasis Courses (6 credits)**

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S. prescribed or additional courses in consultation with their adviser.

**Masters Research Paper or a Masters Thesis (6 credits)**

Students must complete either a Masters Research Paper or a Masters Thesis. Students choosing the Thesis option must complete 6 thesis credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

[HUMAN RESOURCES AND EMPLOYMENT RELATIONS \(HRER\) course list](#)

[LABOR AND EMPLOYMENT RELATIONS \(LER\) course list](#)

## Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations (SPHRER)

The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University's international education program, if they choose to have that experience. Students also will learn about (1) the roles that employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, and (3) how to systematically analyze those complex issues and evaluate research relevant to those analyses.

For the B. S./M. S. degree in Integrated Spanish B.S. and Human Resources and Employment Relations M.S., a minimum of 154 credits is required. Twelve graduate level credits can apply to both undergraduate and graduate degrees; six of these must be at the 500 level. Students can complete the B.S. in Spanish and not advance to the M.S. HRER degree if they desire.

## Bachelor of Science

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION:** 45 credits

(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 18 credits

**REQUIREMENTS FOR THE MAJOR:** 101 credits

(This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.)

**PRESCRIBED COURSES:** (27 credits)

[Some courses in this category have prerequisites that are not included in the major]

SPAN 100(3), SPAN 120(3), SPAN 200(3), SPAN 253(3), SPAN 305(3) (Sem: 1-6)

SPAN 300W(3), SPAN 410(3), SPAN 412(3), SPAN 414(3) (Sem: 5-8)

**ADDITIONAL COURSES:** (12 credits)

SPAN 210(3) or SPAN 220(3), SPAN 353(3) or SPAN 354(3) (Sem: 3-6)

SPAN 472(3) or SPAN 476(3) (Sem: 5-8)

Select 3 credits of SPAN 415(3), SPAN 418(3), SPAN 420(3), SPAN 439(3), SPAN 490(3), SPAN 491(3), or SPAN 497(1-9) (Sem: 5-8)

**LABOR AND EMPLOYMENT RELATIONS:** (32 credits)

[Prescribed undergraduate credits in Labor and Employment Relations option]

ECON 002 GS(3), LER 100 GS(3), LER 201(3), LER 312(4), LER 400 IL(3), LER 414W(3), LER 458Y US(3), STAT 200 GQ(4) (Sem: 1-6)

HRER 501(3), HRER 512(3) (Sem: 7-8)

## Master of Science

EMPLOYMENT RELATIONS/HUMAN RESOURCES M.S.: (30 credits)

[HRER credits to be selected from the following in consultation with an HRER adviser]

HRER 500, HRER 502, HRER 504, HRER 505, HRER 513, HRER 516, HRER 535, HRER 536, HRER 595\*, HRER 596\*, HRER 597, HRER 599

[\* Heritage speakers (students with Spanish language in family background but not necessarily a native speaker) should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 300W]

[HUMAN RESOURCES AND EMPLOYMENT RELATIONS \(HRER\) course list](#)

[LABOR AND EMPLOYMENT RELATIONS \(LER\) course list](#)

[SPANISH \(SPAN\) course list](#)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 35-06-466 (HRER) 4/10/07; 40-06-254 (M.P.S.) 04/10/2012

UCA Revision #1: 8/8/06

Faculty updated: 9/26/12



## Hotel, Restaurant, and Institutional Management (HRIM)

[Program Home Page](#)

ANNA MATTILA, *Professor in Charge*  
224 Mateer Building  
814-863-5757  
[klh3@psu.edu](mailto:klh3@psu.edu)

### Degree Conferred:

Ph.D., M.S.

### The Graduate Faculty

- William P. Andrew, Ph.D. (Penn State) Associate Professor of Hotel, Restaurant, and Institutional Finance
- Albert Bartlett, Ph.D. (Penn State) Associate Professor of Hospitality Management
- Peter Bordi, Ph.D. (Penn State) Associate Professor of Hospitality Management
- Martha Conklin, Ph.D. (New York) Associate Professor of Hospitality Management
- David Cranage, Ph.D. (Penn State) Assistant Professor of Hospitality Management
- Anna Mattila, Ph.D. (Cornell) Associate Professor of Hospitality Management
- Daniel Mount, Ph.D. (U.S. International U) Associate Professor of Hospitality Management
- Karthik Namasivayan, Ph.D. (Cornell) Assistant Professor of Hospitality Management
- John O'Neill, Ph.D. (Rhode Island) Assistant Professor of Hospitality Management
- Arun Upneja, Ph.D. (U of Houston) Associate Professor of Hospitality Management
- Hubert B. Van Hoof, Ph.D. (Arizona State) Professor of Hospitality Management

The Hotel, Restaurant, and Institutional Management M.S. and Ph.D. degree programs are designed to prepare individuals for research and educational roles in the hospitality industry. The programs offer advanced graduate research training for students who desire to become educators, researchers, and knowledge-based professionals in the hospitality field. Student's individualized programs are designed to ensure they will have a mastery of the scope of knowledge covering the entire spectrum of hospitality management as well as the ability to complete significant research in a specific hospitality area.

Students in the program may elect the dual-title degree program in Operations Research for the Ph.D. and M.S. degrees. (See also [Operations Research](#).)

### Admission Requirements

Entry into the program requires a baccalaureate degree from a regionally accredited institution as well as a minimum of one to two years of work experience in the hospitality industry.

Scores for the Graduate Record Examinations (GRE), Graduate Management Aptitude Test (GMAT), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Exceptions to this minimum average are sometimes made for students with special backgrounds, abilities, interests, and circumstances. Students are expected to have managerial competency in accounting, marketing, economics, human resource management, management information systems, and computer technology prior to entry into the program. Deficiencies in any of these areas must be made up in the first year that the student is enrolled (and will not be counted toward the program's 36-credit requirement).

### Master's Degree (M.S.) Requirements

The master's degree program is designed to help students develop solid graduate-level research skills within a focused hospitality research area. Each student must complete a core of 12 credits of Methods Courses to include HRIM 503, STAT 500, and 6 credits of Methods Courses. In addition, students must take a minimum of 3 credits of HRIM 590 Colloquium. Students also complete a minimum of 15 credits of concentration area course work that is custom tailored to the student's hospitality research interests and academic and professional background.

A master's thesis is required of all students. The thesis is based on original empirical research. A master's committee of three persons who oversee the master's thesis is appointed for each candidate. This committee gives the final master's exam, which is an oral defense of the master's thesis.

### Doctoral Degree Requirements

The doctoral program is an advanced graduate research program designed for students who want to become educators, researchers, and knowledge-based professionals in the hospitality field. Students' programs are individualized to ensure in addition to a mastery of the scope of knowledge in hospitality management they will also have the ability to complete significant research in a focused hospitality management area. In addition to satisfying the requirements of the Graduate School, a student must complete the following courses prior to scheduling the Ph.D. comprehensive examination: HRIM 585, HRIM 586, HRIM 590 (total of 3 credits), 12 credits of quantitative and statistical analysis, 18 credits in an HRIM concentration area, and 12 credits from an outside supporting area.

The language or communication requirement for the Ph.D. can be fulfilled by (1) demonstrating proficiency in an approved foreign language, or (2) demonstrating proficiency in computer programming, or (3) completing a minor. The demonstration of proficiency is determined by an HRIM faculty committee.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HOTEL, RESTAURANT, AND INSTITUTIONAL MANAGEMENT \(HRIM\) course list](#)

Last Revised by the Department: Fall Semester 2005

Blue Sheet Item #: 33-07-109

Blue Sheet Item #: 33-07-110

Review Date: 06/14/05

Faculty updated: 4/16/13



## Humanities (HUMAN)

### [Program Home Page](#)

PATRICIA E. JOHNSON, *Graduate Program Coordinator*  
 School of Humanities  
 W-356 Olmsted Building  
 Penn State Harrisburg  
 777 W. Harrisburg Pike  
 Middletown, PA 17057  
 pej1@psu.edu; 717-948-6329

### Degree Conferred:

M.A.

### The Graduate Faculty

- George W. Boudreau, Ph.D. (Indiana) Associate Professor of Humanities and History
- C. Patrick Burrowes, Ph.D. (Temple) Associate Professor of Communications and Humanities
- Gloria B. Clark, Ph.D. (SUNY, Binghamton) Associate Professor of Humanities and Spanish
- Margaret Rose Jaster, Ph.D. (Maryland) Associate Professor of Humanities and Literature
- Patricia E. Johnson, Ph.D. (Minnesota) Professor of Humanities and Literature
- Peter J. Kareithi, Ph.D. (Massachusetts) Associate Professor of Humanities and Communications
- Glen A. Mazis, Ph.D. (Yale) Professor of Humanities and Philosophy
- Catherine A. Rios, M.F.A. (Columbia) Associate Professor of Humanities and Communications
- Kathryn Robinson, Ph.D. (Texas Tech) Director, School of Humanities; Professor of Humanities
- Yu Shi, Ph.D. (Iowa) Assistant Professor of Speech Communications and Humanities
- Troy M. Thomas, Ph.D. (California, Berkeley) Associate Professor of Humanities and Art
- Robin Veder, Ph.D. (William and Mary) Associate Professor of Humanities and Art History/Visual Culture
- Craig Welsh, M.F.A. (Marywood) Associate Professor of Humanities and Communications
- Matthew T. Wilson, Ph.D. (Rutgers) Professor of Humanities and English
- Samuel Winch, Ph.D. (Indiana) Associate Professor of Humanities and Communications
- David Witwer, Ph.D. (Brown) Associate Professor of History and Humanities

This program is interdisciplinary, emphasizing critical theories and interpretive approaches that transcend disciplinary boundaries as well as providing advanced study within various humanities disciplines. These include art history, communications, history, literature, music history, philosophy, and writing. The program offers small classes, individualized advising, and assistance in developing advanced analytical, synthetic, and interpretive skills. It accommodates both part- and full-time students.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. In addition, applicants must have earned at least a 3.00 grade-point average in their junior and senior years and have studied in two humanities disciplines (usually a major in one area and some course work in another). Exceptions may be made for those with special backgrounds or abilities who are committed to advanced interdisciplinary study. All applicants must submit the following items: an application form and fee; two copies of official transcripts from all colleges/universities attended; a letter explaining personal or career goals and reasons for wishing to enroll in the program; two letters of reference (preferably from previous professors or others familiar with the applicant's intellectual/creative work or interests); and a writing sample (an academic paper; if this is not available, consult the graduate coordinator for an alternative).

Students applying for fellowships or assistantships must submit scores from the Graduate Record Examinations (GRE) or similar examination by January 15. An admissions committee often interviews applicants in person or by telephone. Applications are reviewed on a rolling basis.

### Degree Requirements

All students must complete 30 credits, 18 of which must be at the 500 level, achieve a 3.00 grade-point average, and successfully complete an interdisciplinary master's production (academic thesis or creative production with academic essay). Students work with their faculty advisers and supervisory committees to select courses in accordance with their individual interests.

Courses required of all students include HUM 500, a foundation course in research methods; HUM 560, a capstone course in interdisciplinary theory and research; and HUM 580, the master's production. (See course titles and descriptions in this section.) Recommended courses include HUM 525 Studies in Aesthetics, and HUM 535 Topics in Cultural and Intellectual History, both multidisciplinary courses, covering the content of various disciplines from the perspective of one discipline. To acquire breadth in the humanities, students must take at least one course in each of three disciplines; single-discipline courses are available as HUM 515 Seminar (repeatable for credit). Other courses in particular disciplines are available at the 400 level. Other available 500-level courses are listed in this section. Students planning to teach in a junior or community college may arrange a teaching internship (HUM 550), subject to appropriate preparation and approval by both the program and the community college.

A full-time student can expect to complete the program in four semesters, a part-time student in six or more semesters. Students are expected to complete all requirements for the degree within six years, although the deadline may be extended at the discretion of the graduate coordinator in accordance with policies approved by the Graduate Council.

### Required Courses

#### HUMANITIES (HUM)

- 500. RESEARCH METHODS AND SCHOLARLY INQUIRY IN THE HUMANITIES (3)
- 560. INTERRELATIONS IN THE HUMANITIES (3)
- 580. MASTER'S PRODUCTION (1-6)

#### Recommended Courses

#### HUMANITIES (HUM)

- 525. STUDIES IN AESTHETICS (3)
- 535. TOPICS IN CULTURAL AND INTELLECTUAL HISTORY (3 per semester, maximum of 9)

#### Other Courses

#### HUMANITIES (HUM)

- 502. ENGLISH COMPOSITION STUDIES (3)
- 515. SEMINAR (3 per semester, maximum of 9)
- Unit A. Art History (3)
- Unit B. History (3)
- Unit C. Literature (3)
- Unit D. Music History and Analysis (3)
- Unit E. Philosophy (3)

Unit F. Communications (3)  
Unit G. Writing (3)  
530. SEMINAR IN COMPARATIVE ARTS (3 per semester, maximum of 9)  
550. JUNIOR COLLEGE TEACHING INTERNSHIP (3)  
590. COLLOQUIUM (1-3)  
596. INDIVIDUAL STUDIES (1-9)  
597. SPECIAL TOPICS (1-9)

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[HUMANITIES \(HUM\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

Last updated: 6/5/12

## Industrial Engineering (I E)

[Program Home Page](#)

PAUL M. GRIFFIN, *Head of the Harold and Inge Marcus Department of Industrial and Manufacturing Engineering*  
310 Leonhard Building  
814-865-7601

### Degrees Conferred:

M.Eng., M.S., Ph.D.

### The Graduate Faculty

- David J. Cannon, Ph.D. (Stanford) Associate Professor of Industrial Engineering
- Enrique del Castillo, Ph.D. (Arizona State) Distinguished Professor of Industrial Engineering
- Tom M. Cavalier, Ph.D. (Virginia Tech) Professor of Industrial Engineering
- M. Jeya Chandra, Ph.D. (Syracuse) Professor of Industrial Engineering
- Chia-Jung Chang, Ph.D. (Georgia Tech) Assistant Professor of Industrial Engineering
- Edward C. De Meter, Ph.D. (Virginia Tech) Professor of Industrial Engineering
- Andris Freivalds, Ph.D. (Michigan) Professor of Industrial Engineering
- Terry L. Friesz, Ph.D. (John Hopkins) Harold and Inge Marcus Chaired Professor of Industrial Engineering
- Paul M. Griffin, Ph.D. (Texas A&M) Peter and Angela Dal Pezzo Department Head; Professor of Industrial Engineering
- Catherine M. Harmonosky, Ph.D. (Purdue) Associate Professor of Industrial Engineering
- Sanjay Joshi, Ph.D. (Purdue) Professor of Industrial Engineering
- E. Amine Lehtihet, Ph.D. (Lehigh) Professor of Industrial Engineering
- Deborah J. Medeiros, Ph.D. (Purdue) Associate Professor of Industrial Engineering
- David A. Nembhard, Ph.D. (Michigan) Associate Professor of Industrial Engineering; Harold and Inge Marcus Career Professor
- Harriet Black Nembhard, Ph.D. (Michigan) Associate Professor of Industrial Engineering; Bashore Career Professor
- Vittal Prabhu, Ph.D. (Wisconsin) Professor of Industrial Engineering
- A. Ravi Ravindran, Ph.D. (Berkeley) Professor of Industrial Engineering
- Ling Rothrock, Ph.D. (Georgia Tech) Associate Professor of Industrial Engineering
- Vinayak Shanbhag, Ph.D. (Stanford) Associate Professor of Industrial Engineering
- Timothy W. Simpson, Ph.D. (Georgia Tech) Professor of Industrial Engineering and Mechanical Engineering
- Soundar R. Tirupatikumara (Kumara), Ph.D. (Purdue) Allen E. Pearce/Allen M. Pearce Chaired Professor; Distinguished Professor of Industrial Engineering
- Jose A. Ventura, Ph.D. (Florida) Professor of Industrial Engineering
- Robert C. Voigt, Ph.D. (Wisconsin) P.E. Professor of Industrial Engineering
- Richard A. Wysk, Ph.D. (Purdue) Leonhard Chair in Engineering; Professor of Industrial Engineering
- Tao Yao, Ph.D. (Stanford) Associate Professor of Industrial Engineering

Graduate study and research are conducted in manufacturing process, information engineering operations research-management science, production engineering, process design, systems engineering, human factors, ergonomics, quality engineering, and robotics.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission, at the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

To be admitted into the program, an applicant must have received a baccalaureate degree from a regionally accredited institution. Graduates in engineering, physical sciences, and mathematics who present a 3.00 grade-point average will be considered for admission. For all international students whose native language is not English, scores from the Test of English as a Foreign Language (TOEFL) are required with a minimum score of 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test required for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Degree Requirements

Three degrees are offered: Master of Engineering (M.Eng.), Master of Science (M.S.), and the Doctor of Philosophy (Ph.D.).

The M.Eng. is a professional degree program aimed at preparing students with a breadth of technical and managerial skills to make significant immediate contributions in an industrial setting. The degree requirements include 27 credits of course work, one credit of I E 590 (Colloquium), and a scholarly paper for which two credits of I E 596 (Individual Studies) must be taken. Of the 27 credits of required course work, at least 18 must be prefixed I E, and at least 15 must be at the 500 level. Of the 15 credits at the 500 level, at least 12 must be in I E courses. The scholarly paper must demonstrate comprehensive and in-depth knowledge of a topic in industrial engineering, and it should be suitable for submission for publication in a refereed journal as approved by the committee.

The M.S. degree program is intended for students to gain advanced knowledge for research, analysis, and design in industrial engineering. The degree requirements include 24 credits of course work and two I E 590 (Colloquium) credits. Of the 24 credits of required course work, at least 15 must be prefixed I E, and at least 12 must be at the 500 level. Of the 12 credits at the 500 level, at least nine must be I E courses. A thesis is required, for which six credits of I E 600 or I E 610 must be taken.

For the M.Eng. and M.S. degrees, area options are available in Human Factors/Ergonomics Engineering, Manufacturing Engineering and Quality Engineering. M. Eng. and M. S. dual-title degree programs in Industrial Engineering and Operations Research are also offered.

The Ph.D. program emphasizes scholarly research, and prepares students for research and development careers in industry, government, and academe. Students are admitted to candidacy after passing a written examination. The Ph.D. is awarded upon completion of a program of advanced study that includes a minimum period of residence, passing the English proficiency and comprehensive examinations, completing a satisfactory dissertation, and passing the final oral examination. The degree requirements consist of 45 credits of course work and four I E 590 (Colloquium) credits. Of the 45 credits of required course work, 36 must be prefixed I E, and at least 30 must be at the 500 level. Nine credits must be from outside the Department and must include a six-credit sequence, with at least three credits at the 500 level. A Ph.D. dual-title degree program in Industrial Engineering and Operations Research is also available.

Continuous registration is required for all graduate students until the paper, thesis, or dissertation is approved.

### Master of Engineering (M.Eng.) Degree - Human Factors/Ergonomics Engineering Option

To receive the M.Eng. degree in Industrial Engineering with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 30 credits beyond the bachelor's degree: 27 credits of course work, 1 credit of colloquium, and 2 credits of individual studies leading to a scholarly paper, as required for the M.Eng. degree in Industrial Engineering.

The 30 credits for the Option in Human Factors/Ergonomics Engineering must include the following:

#### I. CORE REQUIREMENT

## 1. Experimental Design (3 credits)

**INDUSTRIAL ENGINEERING (I E)**

511. Experimental Design in Engineering

## II. ELECTIVES

## 1. Human Factors - Any three courses from the following list: (9 credits)

**INDUSTRIAL ENGINEERING (I E)**

552. Mechanics of the Musculoskeletal System

553. Engineering of Human Work

558. Engineering of Cognitive Work

Any of these courses may be substituted by other suitable I E 500-level courses, subject to the approval of the IME Graduate Faculty.

## 2. Industrial Engineering (6 credits)

Any two I E courses approved for graduate credit.

## 3. Any three courses from the following list; at least one course must be at the 500 level. (9 credits)

**BIOENGINEERING (BIOE)**

507. Biomedical Signal Processing

**INDUSTRIAL HEALTH AND SAFETY (I H S)**

445. Industrial Hygiene &amp; Toxicology

447. Industrial Hygiene Measurements

450. Environmental Health &amp; Safety

470. Analytical Methods for System Safety

**KINESIOLOGY (KINES)**

565. Neurophysiological Basis of Movement

574. Modeling in Biomechanics

578. Physiology &amp; Mechanical Behavior of Skeletal Tissues

579. Advanced Biomechanics of Human Motion

**PSYCHOLOGY (PSYCH)**

453. Sensation &amp; Perception

456. Advanced Cognitive Psychology

458. Visual Cognition

462. Physiological Psychology

## III. Colloquium (1 credit)

I E 590. Colloquium (or 1 credit of O R 590)

## IV. Individual Studies (2 credits)

I E 596 Individual Studies

**Master of Engineering (M.Eng.) Degree - Manufacturing Engineering Option**

To receive the M.Eng. degree in Industrial Engineering with an Option in Manufacturing Engineering, a student must complete at least 30 credits beyond the bachelor's degree: 27 credits of course work, 1 credit of colloquium, and 2 credits of individual studies leading to a scholarly paper, as required for the M.Eng. degree in Industrial Engineering.

The 30 credits required for the Option in Manufacturing Engineering must include the following:

## I. CORE REQUIREMENT

**INDUSTRIAL ENGINEERING (I E) (9 credits)**

511. Experimental Design in Engineering

550. Manufacturing Systems

582. Information Technology for Industrial &amp; Manufacturing Engineering

## II. ELECTIVES

## 1. Students must take at least one course from each of the following four groups; at least two courses must be at the 500 level.

**a. Materials and Manufacturing Processes**

INDUSTRIAL ENGINEERING (I E)

428. Metal Casting

438. Metal Cutting Principles &amp; Practices

518. Materials, Forming Processes &amp; Quality

528. Metal Cutting Theory

538. Experimental Investigation in Materials Processing

561. Weld Design

580. Analysis of Machining Precision

**b. Process, Assembly and Product Engineering**

INDUSTRIAL ENGINEERING (I E)

464. Assembly of Printed Circuit Boards

563. Computer-Aided Design for Manufacturing

576. Computer-Aided Tolerancing in Design &amp; Manufacturing

579. Designing Product Families

**c. Manufacturing Productivity and Quality**

INDUSTRIAL ENGINEERING (I E)

402. Advanced Engineering Economy

456. Industrial Robot Applications

507. Operations Research: Scheduling Models  
 551. Computer Control of Manufacturing Systems  
 553. Engineering of Human Work  
 556. Robotic Concepts  
 558. Engineering of Cognitive Work  
 566. Advanced Quality Control

**d. Manufacturing Integration Methods for Systems Design**

INDUSTRIAL ENGINEERING (I E)  
 455. Production Planning & Control  
 505. Linear Programming  
 509. Operations Research: Waiting Line Models  
 521. Non-Linear Programming  
 522. Discrete Event Systems Simulation  
 532. Reliability Engineering  
 540. Manufacturing Systems Simulation  
 554. Production, Planning & Control  
 562. Expert Systems Design in Industrial Engineering  
 578. Using Simulation Models for Design

2. Any two I E or non-I E courses approved for graduate credit. See "\*\*IME List of Approved Non-I E Courses--All Options" (attached) (6 credits)

III. Colloquium (1 credit)

I E 590 Colloquium (or 1 credit of O R 590)

IV. Individual Studies (2 credits)

I E 596 Individual Studies

**Master of Engineering (M.Eng.) Degree - Quality Engineering Option**

To receive the M.Eng. degree in Industrial Engineering with an Option in Quality Engineering, a student must complete at least 30 credits beyond the bachelor's degree: 27 credits of course work, 1 credit of colloquium, and 2 credits of individual studies leading to a scholarly paper, as required for the M.Eng. degree in Industrial Engineering.

I. CORE REQUIREMENT

INDUSTRIAL ENGINEERING (I E)  
 511. Experimental Design in Engineering

II. ELECTIVES

1. Any three courses from the following list: (9 credits)

**INDUSTRIAL ENGINEERING (I E)**  
 532. Reliability Engineering  
 566. Quality Control  
 576. Computer-Aided Tolerancing in Design and Manufacturing  
 583. Response Surface Methodology and Process Optimization  
 584. Time Series Control and Process Adjustment

2. Any one course from the following list: (3 credits)

**STATISTICS (STAT)**  
 500. Applied Statistics  
 505. Applied Multivariate Statistical Analysis  
 506. Sampling Theory and Methods  
 511. Regression Analysis and Modeling  
 512. Design and Analysis of Experiments

3. Any two I E courses from the following list; of which at least one course must be at the 500 level. (6 credits)

**INDUSTRIAL ENGINEERING (I E)**  
 454. Applied Decision Analysis  
 468. Optimization Modeling and Methods  
 505. Linear Programming  
 516. Applied Stochastic Processes  
 519. Dynamic Programming  
 520. Multiple Criteria Optimization  
 521. Nonlinear Programming

4. Any two I E or non-I E courses approved for graduate credit. See "\*\*IME List Of Approved No-I E Courses-All Options" (attached). (6 credits)

III. Colloquium (1 credit)

I E 590 Colloquium (or 1 credit of O R 590)

IV. Individual Studies (2 credits)

I E 596 Individual Studies

**\*IME List of Approved Non-I E Courses - All Options**  
**(The material covered in a course already taken should not be duplicated.)**

**500 LEVEL:** Any courses, subject to approval by the Graduate Program Coordinator

**400 LEVEL:**

BIOE 419  
CMPEN 362, CMPSC 431W, CMPSC 456, CMPSC 468  
E MCH 461  
ENGR 411, ENGR 407  
FD SC 430  
I H S 430, I H S 445, I H S 447, I H S 450, I H S 470  
MATH 451, MATH 456, MATH 485, MATH 486  
MATSE 425, MATSE 450  
M I S 431, M I S 479W  
MKTG 437  
PHIL/S T S 432 (for students interested in health systems)  
PSYCH 413, PSYCH 456, PSYCH 458, PSYCH 462  
SCM 450W, SCM 430, SCM 435  
STAT 460, STAT 464  
W P 416

**Other Relevant Information**

Students in this program may elect the dual-title degree program in Operations Research for the Ph.D. and M.S. degrees.

**Student Aid**

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following award typically has been available to graduate students in this program:

**HAROLD & INGE MARCUS GRADUATE FELLOWSHIPS**--Consideration for these fellowships shall be given to all students exhibiting academic excellence who have been admitted to Penn State as candidates for a graduate degree in the Department of Industrial and Manufacturing Engineering, College of Engineering.

**BENJAMIN W. NIEBEL MANUFACTURING FELLOWSHIP**

Consideration for this fellowship shall be given to all students exhibiting academic excellence who have been admitted to Penn State as candidates for a graduate degree in the Department of Industrial and Manufacturing Engineering, College of Engineering.

**Courses**

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**[INDUSTRIAL ENGINEERING \(I E\) course list](#)**

Last Revised by the Department: Fall Semester 2005

Blue Sheet Item #: 33-07-112

Blue Sheet Item #: 33-07-113

Review Date: 06/14/05

UCA Revision #2: 7/30/07

Faculty updated: 3/21/13



## Immunology and Infectious Diseases (I&ID)

[Program Home Page](#)

### Current Co-Chairs

Margherita Cantorna, Department of Veterinary and Biomedical Sciences, University Park  
Neil Christensen, Department of Pathology, College of Medicine, The Milton S. Hershey Medical Center

### Degrees Conferred:

Ph. D., M.S.

### The Graduate Faculty

- Avery August, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Ottar Bjonstad, Ph.D., (Entomology, College of AgSci)
- Robert Bonneau, Ph.D., (Microbiology and Immunology, CoM)
- Margherita Cantorna, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Pamela Correll, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Neil D. Christensen, Ph.D., (Pathology, CoM)
- Timothy Craig, D.O., (Medicine, CoM)
- Liwang Cui, Ph.D., (Entomology, College of AgSci)
- Richard Frisque, Ph.D., (Biochemistry and Molecular Biology, ECoS)
- Thomas Gardner, M.D., (Ophthalmology, CoM)
- Bryan Grenfell, Ph.D., (Biology, ECoS)
- Eric Harvill, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Biao He, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Andrew Henderson, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Eddie Holmes, Ph.D., (Biology, ECoS)
- Peter Hudson, Ph.D., (Biology, ECoS)
- Walter Koltun, M.D., (Surgery, CoM)
- Andrea M. Mastro, Ph.D., (Biochemistry and Molecular Biology, ECoS)
- Stanley Naides, M.D., (Medicine, CoM)
- Christopher Norbury, Ph.D., (Microbiology and Immunology, CoM)
- Robert Paulson, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- David Phelps, Ph.D., (Pediatrics, CoM)
- Jason L. Rasgon, Ph.D. (California, Davis) Associate Professor of Entomology
- Catharine Ross, Ph.D., (Nutrition, HHD)
- Witold Rybka, M.D., (Medicine, CoM)
- Todd Schell, Ph.D., (Microbiology and Immunology, CoM)
- Robert A. Schlegel, Ph.D., (Biochemistry and Molecular Biology, ECoS)
- Anthony Schmitt, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)
- Shao-Cong Sun, Ph.D., (Microbiology and Immunology, CoM)
- Michael Teng, Ph.D., (Biochemistry and Molecular Biology, ECoS)
- Satvir S. Tevethia, Ph.D., (Microbiology and Immunology, CoM)
- Emmy Truckenmiller, Ph.D., (Microbiology and Immunology, CoM)
- Na Xiong, Ph.D., (Veterinary and Biomedical Sciences, College of AgSci)

The Intercollege Graduate Program in Immunology and Infectious Diseases (IGDP in I&ID) prepares graduates for diverse opportunities in academic institutions, pharmaceutical companies, private research foundations, governmental research and regulatory programs. The program includes faculty from 12 departments in the College of Agricultural Sciences, Health and Human Development and Eberly College of Science at the University Park campus and the College of Medicine at the Penn State Milton S. Hershey Medical Center. The IGDP in I&ID is also supported by the Huck Institutes of Life Sciences which provides modern telecommunications facilities and sophisticated equipment for state-of-the-art research applications. Doctoral students not only explore new conceptual connections, but also engage in active group learning experiences and explore a variety of potential career opportunities before graduation. Two unique aspects are (1) optional dual mentors will expose students to complementary viewpoints and encourage students to pursue problems at the interface between traditional disciplines, and (2) an optional internship will provide a mechanism for students to obtain practical experience in future professional settings.

### General Admission Requirements

#### M.S. or Ph.D. degrees

Application deadline is January 10 for priority consideration.

1. Completed official Penn State Graduate School application
2. Paid nonrefundable application fee
3. Two official transcripts from each institution attended
4. Application for a U.S. visa (International applicants only)
5. Graduate Record Examinations (GRE) general test
6. Three letters of recommendation
7. Statement of goals that pertains to the life sciences
8. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test, a score of 213 on the computer-based test, or 80 points on the new Internet-based test with a minimum of 23 points on the speaking portion; or the International English Language Testing System (IELTS) module with a minimum composite score of 6.5 is required for admission.
9. Students must have completed a bachelor's degree at an accredited college or university and have a minimum of a 3.0/4.0 junior/senior undergraduate grade-point average.

### Program Requirements

#### M.S. or Ph.D. degrees

Students are expected to have a foundation and basic knowledge in immunology, infectious diseases, molecular biology, cell biology, biochemistry, and virology. Required course are designed to fulfill this aspect of the training. The courses offered at the Hershey and University Park Campuses are interchangeable and fulfill requirements on both campuses. All students receive A-F grades except for rotations, internships and research credits for which students will receive R (satisfactory/passing) or F (unsatisfactory/failing).

#### General coursework required for both M.S. and Ph.D. Students

**IBIOS 590 COLLOQUIUM** (2 credits) All students are required to enroll for 4 credits of colloquium.

**IBIOS 591 ETHICS IN THE LIFE SCIENCES** (1 credit)

**IBIOS 596** INDEPENDENT STUDIES: LABORATORY ROTATIONS (1-3 credits per semester)

**IBIOS 600** THESIS RESEARCH (1-9 credits per semester)

**IBIOS 601** THESIS PREPARATION (0 credit per semester) For those students who passed their comprehensive exams (For Ph.D. students only)

**IBIOS 511** .MOLECULAR IMMUNOLOGY (2) or **MICRO/CMBIO 554**.PRINCIPLES OF IMMUNOLOGY (2)

**BMMB/VB SC 432** MECHANISMS OF MOLECULAR CELL COMMUNICATION(2) or **CMBIO/BCHEM 503** CORE MOLECULAR BIOLOGY (3)

**BMMB 501** CORE CONCEPTS IN BIOMOLECULAR SCIENCE (5), or **B M B 401H** BIOCHEMISTRY (3) and **B M B 400** MOLECULAR BIOLOGY (2-3)

#### Supporting Courses

**IBIOS 595** INTERNSHIP (1)

**VB SC 602/IBIOS 602** SUPERVISED EXPERIENCE IN COLLEGE TEACHING. (1) All students are strongly encouraged to enroll for 1 credit (or the equivalent) although this is an optional requirement.

**IBIOS/V SC/BMMB 515** INNATE IMMUNITY (2)

**IBIOS/V SC/BMMB 516** VIRAL EVASION OF IMMUNE RESPONSES (2)

**IBIOS/V SC/BMMB 518** T CELL RECOGNITION AND DEVELOPMENT (2)

**IBIOS/V SC/BMMB 519** DEVELOPMENT OF THE HEMATOPOIETIC AND VASCULAR SYSTEM (2)

**MICRO 550** MEDICAL MICROBIOLOGY (2)

**MICRO 572** LITERATURE REPORTS (1)

**MICRO 553** SCIENCE OF VIROLOGY (4)

The Graduate School requires all graduate students to maintain a 3.0 grade-point average.

#### M.S. Degree Requirements

Masters students must have a minimum of 30 credits and a 3.0 overall GPA. IBIOS 595 (Internship) and 596 (Rotations) credits all count toward the 30 credits. 18 credits need to be in the major at the 500-600 level. If pursuing a Masters thesis option, up to 6 IBIOS 600 credits may be A-F graded and 12 credits need to be in the major at the 400-500 level. The student selects a thesis committee (upon consultation with faculty advisor), writes a thesis, and defends his/her work. If all course credits and requirements are met, students do not have to be registered for classes while writing and/or defending his/her work. If pursuing a masters non-thesis option, 18 credits must be in 500-level courses; and the student must have a first authored manuscript (based on his/her research) that has been submitted to a peer reviewed journal. The manuscript is given to at least the faculty advisor and the IGDP Chair for evaluation.

Students must present their thesis in accordance with the Penn State guidelines as described in the *THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses*. Current copies may be obtained from the following website:

<http://www.gradsch.psu.edu/current/thesis/guide.html>

#### Ph.D. Degree Requirements

Ph.D. students must have a minimum of 30 credits and a 3.0 overall GPA through out the program. IBIOS 595 (Internship) and 596 (Rotations) credits all count toward the 30 credits. 18 credits need to be in the major at the 500-600 level. Up to 6 IBIOS 600 credits may be A-F graded and 12 credits need to be in the major at the 400-500 level. Additional course work is left to the discretion of the student and advisor.

#### Grade Point Average/Unsatisfactory Scholarship:

Students are required to have a minimum grade-point average of 3.0 through out the course of their training. Furthermore, the student must have a 3.0 to take the doctoral candidacy, the comprehensive and final oral examinations. One or more failing grades (F) or a cumulative grade-point average below 3.0 may be considered evidence of unsatisfactory scholarship and be grounds for dismissal from the program.

#### English Competence:

A candidate for the degree of Doctor of Philosophy is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the Ph.D. This will be assessed for both domestic and international students as part of the candidacy exam, which includes a reading and original writing component. Should deficiencies be identified at the candidacy examination, students will be directed into appropriate remedial activities, including additional English and communication courses. Competence must be formally attested by the program before the doctoral comprehensive examination is scheduled. (International students should note that passage of the minimal TOEFL requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.)

Besides coursework, research, and teaching, IGDP in I&ID doctoral students participate in the following:

#### Candidacy Exam:

This exam should be taken by the end or during the student's third semester in the I&ID Program. The student will be assigned two scientific papers from the primary literature to read and analyze for approximately one month. The papers will be selected based upon the students' background and coursework. The analysis should involve exploring the relevant literature as well as the fundamental issues in immunology, infectious diseases, biochemistry, molecular biology and biology. Following this independent research the student will take a written exam to answer several questions related to the two papers followed by an oral exam a week later. The questions and oral exam will be administered by at least three members of the graduate program and include individuals from both UP and CoM. The overall goal of the exam is to assure that the student has an intellectual foundation in immunology and infectious diseases. The exam is designed to evaluate basic knowledge in immunology, infectious diseases, biochemistry, molecular biology and related disciplines as well as the students' ability to integrate this understanding to effectively evaluate experimental design, results, and the conclusions drawn. In the event that the student does not pass this exam, the student's committee will make a recommendation as to whether to offer another opportunity or to terminate the student's enrollment in the program.

#### Doctoral Committee:

Upon successful completion of the Candidacy Examination, the student in consultation with the mentors will, as soon as possible, select a doctoral committee. The committee will consist of both mentors, one additional member of the IGDP in I&ID and one faculty member who is not a member of the IGDP in I&ID. If the three I&ID members of the committee are also members of the same department, the fourth committee member must be from a different department. This committee is responsible for supervising the academic program and monitoring the progress of the student towards his/her degree. It is the charge of this committee to assure that the student carries out a substantial piece of independent research and presents it as a dissertation. Doctoral Thesis Committee Composition is based on the Graduate Degree Programs Bulletin published by the Graduate School (refer to [http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm?section=degreeReq1](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq1)) regarding [Doctoral Committees](#) and requires:

- 4 person minimum of approved PSU Graduate Faculty.
- 2 members must be inside the major and 1 member must be outside the major. Note - the outside member must be member of the approved PSU Graduate Faculty. The outside member for intercollege graduate programs may be inside the major but committee membership must have representation from more than one department.
- A person not affiliated with PSU may be added as a special member (beyond the 4 members of the approved PSU Graduate Faculty) upon recommendation of the head of the program and approval of the graduate dean.
- Have committee chair or one of the co-chairs be a member of the approved PSU Graduate Faculty. Typically it's the faculty advisor.
- The doctoral candidate and three committee members must be physically present for the comprehensive exam and defense. No more than one person may be present via telephone. Telephone or video conference arrangements must be approved by the Dean of the Graduate School.
- Need approval of 2/3 of the committee members for passing comprehensive exam and defense dissertation.

**Comprehensive Examination:**

Evaluation via the Doctoral Committee to determine the feasibility of proposed research and the preparedness of the student. Students must be registered for classes (typically IBIOS 600) the semester they take this exam.

Ph.D. Defense: Evaluation via the Doctoral Committee of the thesis research.

Students must present their thesis in accordance with the Penn State guidelines as described in the *THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses*. Current copies may be obtained from the following Web site:  
<http://www.gradsch.psu.edu/current/thesis/guide.html>

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BIOCHEMISTRY, MICROBIOLOGY & MOLECULAR BIOLOGY \(BMMB\) course list](#)

[INTEGRATIVE BIOSCIENCES \(IBIOS\) course list](#)

[MICROBIOLOGY \(MICRO\) course list](#)

[VETERINARY SCIENCE \(V SC\) course list](#)

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-440

Review Date: 6/12/07

Faculty updated: 4/2/12

## International Affairs (INTAF)

[Program Home Page](#)

Tijanjana Maluwa, *Director, School of International Affairs*  
252 Lewis Katz Building  
814-865-8971

### Degree Conferred:

M.I.A.

### The Graduate Faculty

- David Blandford, Ph.D. (Manchester) *Professor of Agricultural Economics*
- William Butler, LL.D. (London) *John Edward Fowler Distinguished Professor of Law*
- Dennis C. Jett, Ph.D. (Witwatersrand) *Professor of International Affairs*
- John A. Kelmelis, Ph.D. (Penn State) *Professor of International Affairs*
- Flynt L. Leverett, Ph.D. (Princeton) *Professor of International Affairs*
- Jill Findeis, Ph.D. (Washington State) *Professor of Agricultural, Environmental and Regional Economics and Demography*
- Fariborz Ghadar, D.B.A. (Harvard) *Professor of Global Management Studies*
- C. Gregory Knight, Ph.D. (Minnesota) *Professor of Geography*
- Gerald LeTendre, Ph.D. (Stanford) *Associate Professor of Educational Theory and Policy*
- Quan Li, Ph.D. (Florida State) *Associate Professor of Political Science*
- Tijanjana Maluwa, Ph.D. (Cambridge) *Professor of Law*
- Denis F. Simon, Ph.D. (California, Berkeley) *Professor of International Affairs*
- John Nichols, Ph.D. (Minnesota) *Professor of Communications and Associate Dean for Graduate Studies and Research*
- Eileen Trauth, Ph.D. (Pittsburgh) *Professor of Information Sciences and Technology*
- Mirna Urquidi-MacDonald, Ph.D. (Paris-Sud) *Professor of Engineering Science and Mechanics*

The School of International Affairs (SIA) is designed to prepare students for occupations involving public service, private enterprise, nonprofit organizations, and international organizations worldwide. The Master's in International Affairs (MIA) degree program will provide students with a substantial knowledge base in international systems, institutions, issues and history and the advanced analytical tools and cross-cultural skills and competencies necessary for these occupations. Students will work closely with faculty to design a curriculum around their core course work, which incorporates a functional or regional theme and provides the opportunity to apply and enhance the core knowledge component with a thematically based set of graduate courses from across Penn State's existing graduate and professional curriculum.

### Admission Requirements

Admission to the MIA degree program will require: (i) a bachelor's degree from a U.S. regionally accredited institution or (ii) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.

International applicants whose native language is not English will submit a satisfactory TOEFL or IELTS score from a test taken within two years of application. A satisfactory TOEFL score is 550 or above on the paper test, 213 or above on the computer-based test or 80 or above on the new internet-based test (with a minimum of 23 points on the new speaking portion). A satisfactory IELTS score is a minimum composite score of 6.5. If the applicant's qualifying degree is from a country where English is the native language and the degree is from an institution where English is the language of instruction, the applicant may apply for an exemption from these requirements.

Admissions will be based on a review of all submitted materials and spaces will be offered to the best qualified applicants, taking into account academic achievement, relevant work experience and other indices of aptitude for advanced study in international affairs.

### Master's Degree Requirements

The M.I.A. will consist of 400, 500 and 800 level courses which were either created for the program or are pre-existing across the graduate curriculum. The program will require six courses which are designed to establish a base of knowledge in key subject areas which reflect the basic mission of the SIA. These courses will form the core curriculum for the M.I.A. This core curriculum is designed to provide students with a strong foundation in the ethical dimensions of international exchange, with skills essential to perform quantitative and qualitative analysis in cross-cultural contexts and with leadership training designed to understand and bridge the cultural differences. **A minimum of 42 graduate credits** will be required for completion of the program, at least 18 of which will be from courses at the 500 and 800 level. Students will be required to take 18 credits of core courses, five courses of which are at the 800 level and one course of which is at the 500 level.

In addition to completing the core curriculum, students will choose their remaining courses, with faculty guidance, from a substantial list of graduate courses **for a total of 21 credits**. The courses usually will be clustered around areas of concentration designated by the SIA faculty, but students also will be permitted to design an independent interdisciplinary curriculum with faculty approval. The areas of concentration, which will be pre-approved by the faculty, will take advantage of Penn State's rich graduate curriculum by aggregating in appropriate thematic clusters pre-existing and specially-created graduate-level classes.

In addition to the core curriculum and elective courses, degree candidates must complete either: (i) a master's paper; or (ii) a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, they must enroll in 3 credits of INTAF 594. The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will enroll in 3 credits of INTAF 595. The student will participate in a supervised internship placement of sufficient depth and professionalism that would allow the student to experience the integration of their curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows: (i) four semesters of a Penn State language sequence or its equivalent (15 credits); (ii) native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or (iii) performance on a proficiency evaluation sufficient to equal four semesters of language learning; for this purpose, either Penn State's proficiency certification process (described below) or another pre-approved proficiency assessment may be used.

### Joint Degree Program between The Pennsylvania State University Dickinson School of Law (J.D.) and the School of International Affairs (M.I.A.)

#### Joint Degree Program:

The Dickinson School of Law (DSL) and the School of International Affairs (SIA) are offering a joint degree program that will enable a student to complete in four academic years both a Juris Doctor degree (J.D.) and a Master's in International Affairs (M.I.A.). A J.D./M.I.A. graduate will have the education and skills background to practice law in the United States, to work in an international context and to assume a leadership role in international affairs. The student will complete a minimum of 109 credits including eleven required law courses, two of which involve skills training, and seven required international affairs courses, one of which involves either an internship or a master's paper.

#### Admission Requirements

Students applying to the joint degree program must be admitted separately into both DSL and SIA. Students must first be admitted into the law school and will always complete their first two semesters in law before commencing the M.I.A. component. Credits earned towards an M.I.A. prior to entry into DSL will

not be credited towards the J.D.

### College Specific Admission Requirements

**DSL:** The DSL admissions process considers academic transcripts, leadership activities, community activities, work experience, personal background, letters of recommendation, the personal statement, LSAT scores and the LSAT writing sample. An admissions committee identifies candidates who are academically prepared for law study and who will contribute to the promotion of diversity and excellence in the student body and the legal profession. There is no standard prescribed undergraduate curriculum. All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals. The following are required of J.D. degree applicants: a completed application form, an LSAT score, an LSDAS report, a one-page personal statement and two letters of recommendation.

**SIA:** The following are required of M.I.A. applicants: (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. There is no standard prescribed undergraduate curriculum. All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals. Upon the student's request, the LSAT may replace the GRE for joint degree admissions purposes.

International applicants who are applying to the Joint Degree program, and who do not qualify for the English exemption, must provide a satisfactory English test score. Joint degree applicants will be required to achieve a minimum TOEFL score of 575 on the paper test, 230 on the computer-based test or 88 on the internet-based test (with a minimum speaking score of 20); a minimum of 6.5 on the IELTS will also be acceptable.

### Residency

A typical J.D./M.I.A. joint degree student will be in residence at DSL for six semesters and at SIA for two semesters.

### Liaisons

The respective liaisons for DSL and SIA shall be as follows: the department and faculty liaisons for DSL shall be the Associate Dean for Academic Affairs and the student adviser will be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for SIA shall be the Director or such faculty member(s) as may be designated by the Director.

### Interprogram Transfer of Credits

**DSL:** A maximum of twelve credits of M.I.A. course work may be transferred for credit toward the J.D. degree at DSL. Courses eligible for cross-counting towards the J.D. and M.I.A. include the courses on the M.I.A. Electives list (Appendix A-31) and any other courses taken as M.I.A. electives with the express written permission of the M.I.A. and J.D. advisers. Students must obtain a grade satisfactory to DSL for the course work to be credited towards the J.D. degree.

**SIA:** A maximum of twelve credits of M.I.A. course work may be transferred for credit toward the J.D. degree at DSL. Because of the interdisciplinary nature of the M.I.A. degree, courses taken in DSL as a part of the elective component of the M.I.A. automatically count towards the M.I.A. Courses eligible for cross-counting towards the J.D. and M.I.A. include the courses on the M.I.A. Electives list (Appendix A-31) and any other courses taken as M.I.A. electives with the express written permission of the M.I.A. and J.D. advisers.

### Sequence

The sequence of courses will be determined by the students and their advisers. However, students are required to complete the first year of the DSL program before beginning the M.I.A. program. It is expected that most joint degree students will complete the first two semesters of the M.I.A. consecutively in either the first or second year after completion of the first year of the J.D. degree.

### Recommended Program of Study and Advising

All students in the program will have two advisers, one from DSL and one from SIA. Periodic interaction between the two advisers will be encouraged. A program of study will be developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisers will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the SIA programs.

### Tuition

Students will be charged the applicable DSL tuition to cover the J.D. program and the applicable SIA tuition to cover the M.I.A. degree program. The DSL tuition will be paid for the semesters that the student is in residence at DSL, and the SIA tuition will be paid for the semesters that the student is in residence there. A student may take up to one course (3 credit hours) per semester in the school where the student is not in residence without any change in tuition, but must pay additional tuition to the non-residential program if he or she wishes to take additional course work at that campus during that semester.

### Financial Aid and Assistantships

Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

### Fulfillment of Degree Requirements and Graduation

A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [INTERNATIONAL AFFAIRS \(INTAF\) course list](#)

Last Revised by the Department: Spring Semester 2013

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Review Date: 04/09/2013

Last updated by Publications: 9/9/09

## Integrative Biosciences (IBIOS)

[Program Home Page](#)

Peter Hudson, *Chair, IBIOS Graduate Education*  
 201 Life Sciences Building  
 University Park, PA 16802  
 1-866-PS-IBIOS; 1-866-77-42467 (toll-free in USA)  
[gradinfo@huck.psu.edu](mailto:gradinfo@huck.psu.edu)

### Degree Conferred:

Ph.D.

### The Integrative Biosciences Graduate Faculty

- Raj Acharya, Ph.D. (Minnesota) Professor of Computer Science and Engineering
- Hiroshi Akashi, Ph.D. (Chicago) Assistant Professor of Biology
- Reka Albert, Ph.D. (Notre Dame) Assistant Professor of Physics
- Naomi Altman, Ph.D. (Stanford) Associate Professor of Statistics
- Sarah Assmann, Ph.D. (Stanford) Professor of Biology
- Maria Bewley, Ph.D. (University of Leeds) Assistant Professor of Biochemistry
- Le Bao, Ph.D. Assistant Professor of Statistics
- Judith Bond, Ph.D. (Rutgers) Professor and Chair, Biochemistry and Molecular Biology
- James Broach, Ph.D. (California, Berkeley) Chair, Biochemistry and Molecular Biology, Penn State College of Medicine
- Donald Bryant, Ph.D. (California, Los Angeles) Ernest C. Pollard Professor of Biotechnology, and Professor of Biochemistry and Molecular Biology
- John Carlson, Ph.D. (Illinois) Professor of Molecular Genetics; Director, Schatz Center for Tree Molecular Genetics
- Laura Carrel, Ph.D. (Stanford Reserve) Assistant Professor of Biochemistry and Molecular Biology
- Francesca Chiaromonte, Ph.D. (Minnesota) Associate Professor of Statistics
- Keith Cheng, M.D.; Ph.D. (NYU; U Washington) Professor of Pathology; Adjunct Professor of Biochemistry and Molecular Biology
- Surinder Chopra, Ph.D. (Vrje U of Brussels, Belgium) Associate Professor of Maize Genetics
- Michael Chorney, Ph.D. (Cornell, Sloan Kettering Cancer Center) Professor of Microbiology
- Daniel Cosgrove, Ph.D. (Stanford) Professor of Biology
- Claude de Pamphilis, Ph.D. (Georgia) Associate Professor of Biology
- Cheng Dong, Ph.D. (Columbia) Distinguished Professor of Bioengineering
- Nina Fedoroff, Ph.D. (Rockefeller) Willaman Professor of Life Sciences; Director, Biotechnology Institute
- Gregory Ferry, Ph.D. (Illinois) Stanley Person Professor of Molecular Biology
- John Flanagan, Ph.D. (Tennessee) Professor of Biochemistry and Molecular Biology
- Majid R. Foolad, Ph.D. (California, Davis) Professor of Plant Genetics
- David Geiser, Ph.D. (Georgia) Associate Professor of Plant Pathology
- Channe Gowda, Ph.D. (Mysore, India) Professor of Biochemistry and Molecular Biology
- Mark Gultinan, Ph.D. (California, Irvine) Professor of Plant Molecular Biology; Director, Endowed Program in the Molecular Biology of Cocoa
- Ross Hardison, Ph.D. (Iowa) Professor of Biochemistry
- Teryl J. Hartman, Ph.D.; M.P.H., (Minnesota; Harvard School of Public Health) Assistant Professor of Nutrition
- S. Blair Hedges, Ph.D. (Maryland) Professor of Biology
- Heather Hines, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Biology and Entomology
- Peter Hudson, F.R.S. (UK) Willaman Professor of Biology
- Leonard Jefferson, Ph.D. (Vanderbilt) Evan Pugh Professor; Chair of Cellular and Molecular Physiology
- Byron Jones, Ph.D. (Arizona) Professor of Biobehavioral Health and Pharmacology
- Seogchan Kang, Ph.D. (Wisconsin) Associate Professor of Plant Pathology
- Teh-hui Kao, Ph.D. (Yale) Professor of Biochemistry and Molecular Biology
- Kathryn LaNoue, Ph.D. (Yale) Professor of Cellular and Molecular Physiology
- Arthur Lesk, Ph.D. (Princeton) Professor of Biochemistry and Molecular Biology
- Jia Li, Ph.D. (Stanford) Associate Professor of Statistics
- Qunhua Li, Ph.D. Assistant Professor of Statistics
- Bruce G. Lindsay, Ph.D. (Washington) Willaman Professor and Head of Statistics
- Shaun Mahony, Ph.D. (National Centre for Biomedical Engineering Science) Assistant Professor of Biochemistry and Molecular Biology
- George Makhatazde, Ph.D. (Moscow Physico-Technical Institute) Professor of Biochemistry and Molecular Biology
- Kateryna Makova, Ph.D. (Texas Tech) Assistant Professor of Biology
- Costas Maranas, Ph.D. (Princeton) Professor of Chemical Engineering
- Timothy McNellis, Ph.D. (Yale) Assistant Professor of Plant Pathology
- Webb C. Miller, Ph.D. (Washington), Professor of Biology and Computer Science and Engineering
- Kathleen Mulder, Ph.D. (SUNY, Buffalo) Professor of Pharmacology
- Masatoshi Nei, Ph.D. (Kyoto University, Japan) Evan Pugh Professor of Biology
- Anton Nekrutenko, Ph.D. (Texas Tech) Assistant Professor of Biochemistry and Molecular Biology
- Karl M. Newell, Ph.D. (Illinois) Professor of Kinesiology and Biobehavioral Health
- Randen Patterson, Ph.D. Assistant Professor of Biology
- Anthony Pegg, Ph.D. (Cambridge) Evan Pugh Professor of Cellular and Molecular Physiology, and Pharmacology; J. Lloyd Huck Professor of Cell and Molecular Biology
- B. Franklin Pugh, Ph.D. (Wisconsin, Madison) Associate Professor of Biochemistry and Molecular Biology
- Calyampudi Rao, Sc.D. (Cambridge) Eberly Professor Emeritus of Statistics
- W. Brian Reeves, M.D. (Thomas Jefferson) Staff Physician
- Marilyn D. Ritchie, Ph.D. (Vanderbilt) Director, Center for Systems Genomics; Associate Professor of Biochemistry and Molecular Biology
- Gavin Robertson, Ph.D. (California, Riverside) Associate Professor of Pharmacology
- Marilyn Roossinck, Ph.D. (Colorado School of Medicine) Professor of Plant Pathology and Biology
- Ira Ropson, Ph.D. (Johns Hopkins) Associate Professor of Biochemistry and Molecular Biology
- James Rosenberger, Ph.D. (Cornell) Professor of Statistics
- Stephen Schaeffer, Ph.D. (Georgia) Associate Professor of Biology
- Cara-Lynne Schengrund, Ph.D. (Seton Hall) Professor of Biochemistry and Molecular Biology
- Stephan Schuster, Ph.D. (University of Munich, Germany) Professor of Biochemistry and Molecular Biology
- Cooduwalli Shashikaut, Ph.D. (Osmania University, India) Associate Professor of Molecular and Developmental Biology
- Mark Shriver, Ph.D. (U of Texas Health Science Center) Associate Professor of Anthropology
- Thomas Spratt, Ph.D. (Chicago) Associate Professor of Biochemistry
- Jack Vanden Heuvel, Ph.D. (Wisconsin) Professor of Molecular Toxicology
- David J. Vandenberg, Ph.D. (Penn State) Associate Professor of Biobehavioral Health
- George Vogler, Ph.D. (Colorado, Boulder) Professor of Biobehavioral Health
- Kent Vrana, Ph.D. (Louisiana State) Medical Center Professor and Chair of Pharmacology
- James Wang, Ph.D. (Stanford) Associate Professor of Information Sciences and Technology
- Kenneth Weiss, Ph.D. (Michigan) Evan Pugh Professor of Anthropology and Genetics

Calling upon the expertise of more than seventy faculty members representing twenty-seven different departments among eight different colleges between two different campuses, the Integrative Biosciences (IBIOS) Graduate Program offers a unique opportunity to learn about and work in multiple disciplines. This graduate education component of the Huck Institutes of the Life Sciences is supported by modern telecommunications facilities and equipment. Doctoral students not only explore new conceptual connections, but also engage in active group learning experiences and explore a variety of potential career opportunities before graduation. Two unique aspects are (1) dual mentors who will expose students to complementary viewpoints and encourage students to

pursue problems at the interface between traditional disciplines, and (2) an optional internship that provides a mechanism for students to obtain "real world" experience in future professional settings.

The program offers the following areas of research emphasis (called options): Bioinformatics and Genomics, and Chemical Biology.

### General Admission Requirements

Faculty begin reviewing applications December 1.

1. Completed official Penn State Graduate School application
2. Paid nonrefundable application fee (\$45 U.S.)
3. Two official transcripts from each institution attended
4. Completed Integrative Biosciences Graduate Degree Program application
5. Application for a U.S. visa (International applicants only)
6. Graduate Record Examinations (GRE) general test
7. Three letters of recommendation
8. Statement of goals that pertains to the life sciences
9. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) examination. A minimum TOEFL score of 600 on the paper test, 250 on the computer-based test, or 100 (including 23 on the speaking component) on the Internet-based test is required.
10. Students must have completed a bachelor's degree at an accredited college or university and have a minimum of a 3.0/4.0 junior/senior undergraduate grade-point average.

### Prescribed (Required) Courses:

1. Foundation of basic knowledge in molecular biology, cell biology, biochemistry, and computational methods in the life sciences. The IBIOS Graduate Program expects at least 6 credits (or the equivalent) in one or more of these disciplines, taken either as an undergraduate or as a part of the graduate curriculum. The specific courses are left to the discretion of each option.
2. IBIOS 590 COLLOQUIUM (4 credits, 2 per semester during any of the first four semesters in residence), a monthly colloquium that will present life science topics of general interest to all faculty and graduate students in the Huck Institutes of the Life Sciences.
3. IBIOS 591 ETHICS IN LIFE SCIENCES (1 credit), an examination of integrity and misconduct in life sciences research, including issues of data collection, publication, authorship, and peer review.
4. IBIOS 595 INTERNSHIP (optional, 1 credit), an external work assignment relevant to individual research or career goals. (Register for IBIOS 595 in 520 Thomas Building)
5. IBIOS 596 INDIVIDUAL STUDIES: Laboratory Rotations (1-3 credits per semester, depending upon option)
6. IBIOS 600 THESIS RESEARCH (variable credits)
7. IBIOS 601 Ph.D. DISSERTATION FULL-TIME (0 credits)
8. IBIOS 602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1 credit each semester), two semesters or the equivalent is required after the first year in residence. International Fellows must pass an English proficiency exam before teaching.

The Graduate School requires all graduate students to maintain a 3.0 grade-point average. Individual options may require a higher GPA.

Students must present their thesis in accordance with the Penn State guidelines as described in the *THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses*. Current copies may be obtained from the web site [www.gradsch.psu.edu/current/thesisguide](http://www.gradsch.psu.edu/current/thesisguide) or the Thesis Office, 115 Kern Building, University Park, PA 16802; 814-865-5448.

Elective courses. Students may select any 400- to 500-level courses pending approval by the Faculty Mentor and the Option Director - available elective courses vary from year to year.

## BIOINFORMATICS AND GENOMICS (BG) OPTION

### College of Medicine (Hershey)

#### Prescribed (Required) Courses:

- IBIOS stable number Genomics (3 credits), currently offered as 598B, a special topics course. Videoconferenced between UP and COM
- GEN 520. Genetics (Offered at COM and now planned to be videoconferenced between COM and UP.)
- BCHEM 502. Biological Chemistry (3 credits)
- IBIOS 591. Ethics (1 credit)
- IBIOS 590. Colloquium (1 credit)
- HES 615. Statistical Genetics
- CMBIO 520. Genetic Analysis (3 credits)
- Electives: Choose at least three credits from courses that support the chosen thesis research.

### University Park

#### Prescribed (Required) Courses:

- IBIOS stable number Genomics (3 credits), currently offered as 598B, Bioinformatics I - BIOL 597F, CSE/STAT 598 (3 credits)
- IBIOS 591. Ethics (1 credit)
- IBIOS 590. Colloquium (1 credit)
- Electives. Choose at least three credits from the following courses.
  - BIOL 597F, CSE 598F, STAT 597F Bioinformatics II
  - GEN 520. Genetics (Offered at COM and now planned to be videoconferenced between COM and UP.)
  - STAT 597D. Genometrics
  - BIOL 497D. Practical Bioinformatics
  - BIOL 497G/597G. Computer Programming in C: Biological Applications
  - BIOL 505. Statistical Methods in Evolutionary Genetics
  - B M B 597C. Computers for biochemists and molecular biologists
  - CSE 598E, STAT 597E. Data Mining
  - IBIOS 597G, HORT 597A, and AGRO 597G. Plant Genomics
  - BMMB 597A or BMMB 501. Core Concepts in Biomolecular Science

See also [BIOTECHNOLOGY](#).

## CHEMICAL BIOLOGY (CB) OPTION

#### Prescribed (Required) Courses:

- Graduate level courses in biochemistry or molecular biology (6 credits, 3 per semester of the first year)
- Chemical Biology elective (6 credits, 3 per semester of the first year)

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-07-441

Review Date: 6/12/07





## Business Administration, Master of (iMBA)

[Program Home Page](#)

ASHUTOSH (ASH) DESHMUKH, *Chair, iMBA Program*  
[imba@psu.edu](mailto:imba@psu.edu)  
 814-898-6712

### Degree Conferred:

M.B.A.

### The Graduate Faculty -- Penn State Erie, The Behrend College

- Kerry A. Adzima, Ph.D. (West Virginia) Assistant Professor of Economics
- Ashutosh V. Deshmukh, Ph.D. (Memphis) iMBA Program Chair; Professor of Accounting and Management Information Systems
- Greg Filbeck, D.B.A. (Kentucky) Professor of Finance, Samuel Patton Black III Chair in Insurance and Risk Management
- Sanjay Kumar, Ph.D. (Texas, Dallas) Assistant Professor of Management
- Diane H. Parente, Ph.D. (SUNY, Buffalo) Breene Professor of Management
- Mary Beth Pinto, Ph.D. (Pittsburgh) Breene Professor of Marketing
- Matthew Swinarski, Ph.D. (SUNY, Buffalo) Associate Professor of Management Information Systems
- Jessica Zhao, Ph.D. (SUNY, Buffalo) Associate Professor of Finance

### The Graduate Faculty -- Penn State Great Valley, School of Graduate Professional Studies

- John Mason, Ph.D. (Michigan State) Associate Professor of Management
- Denise Potosky, Ph.D. (Rutgers) Associate Professor of Management
- Walter Wang, Ph.D. (Louisiana State) Associate Professor of Marketing

### The Graduate Faculty -- Penn State Harrisburg, The Capital College

- Thomas Buttross, Ph.D. (Mississippi) Associate Professor of Accounting
- Refik Culpun, Ph.D. (NYU) Professor of Management and International Business
- Patrick Cusatis, Ph.D. (Penn State) Associate Professor of Finance
- Janet Duck, Ph.D. (Penn State) Assistant Professor of Management
- David A. Morand, Ph.D. (Cornell) Professor of Management
- Jeff Tsai, Ph.D. Professor of Economics
- Walter Wang, Ph.D. (Louisiana State) Associate Professor of Marketing
- Richard Young, Ph.D. (Penn State) Professor of Supply Chain Management

### The Graduate Faculty -- The Smeal College of Business

- Robert P. Crum, D.B.A. (Kentucky) Associate Professor of Accounting
- Edward Ketz, Ph.D. (Virginia Tech) Associate Professor of Accounting
- Chris Muscarella, Ph.D. (Purdue) Professor of Finance

The Penn State Intercollege Master of Business Administration (iMBA) is an online degree program of Penn State Erie, The Behrend College; Penn State Great Valley, The School of Graduate Professional Studies; Penn State Harrisburg; and Smeal College of Business, Penn State University Park. The iMBA curriculum emphasizes cross-functional organizational thinking; focuses on business planning and strategy; closely follows the quality guidelines for accreditation of AACSB (American Assembly of Collegiate Schools of Business), the accrediting body affiliated with The International Association for Management Education; and uses cutting-edge instructional technology to transcend issues of time and space, and to support effective teaching and learning.

Within the context of these goals, the iMBA curriculum was developed around four core business areas and six themes. The core business areas include: Financial Reporting, Analysis, and Markets; Domestic and Global Economic Environments; Human Behavior in Organizations; Creation and Distribution of Goods and Services.

The themes were derived from values and concepts found in high performing organizations: Leadership; Strategic Planning; Customer and Market; Information and Analysis; Human Resources; Process Management.

These business areas and themes are integrated at the course level. Students apply knowledge developed in these areas to multidimensional problems and issues throughout the program, which includes two required one-week culminating or capstone residential experiences.

### Admission Requirements

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants are required to take the Graduate Management Admission Test (GMAT). Applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English, must take the TOEFL (Test of English as a Foreign Language).

Admissions decisions are based on a review of a complete admission portfolio, including an application, a statement of intent, a current resume, official transcripts from each undergraduate and graduate institution attended, two letters of recommendation, and GMAT scores. An applicant's credentials are compared to the standards set by other candidates in the current application pool. Please see <http://www.worldcampus.psu.edu/iMBA> for additional program information.

Applicants must have completed the following prerequisites or the equivalent before they may matriculate: Quantitative Analysis (e.g., QUANT 310), Business Statistics (e.g., STAT 200 or MSIS 200), Accounting (e.g., ACCTG 211), Microeconomics (e.g., ECON 002) and Macroeconomics (e.g., ECON 004). Applicants who have developed relevant knowledge and skills in one or more of these areas through work experiences may demonstrate their proficiency through the application portfolio. A working knowledge of the Microsoft Office suite is required.

### Master's Degree Requirements

The iMBA degree requires 48 credits distributed across the following courses: IMBA 501, IMBA 502, IMBA 513, IMBA 515, IMBA 516, IMBA 517, IMBA 521, IMBA 522, IMBA 523, IMBA 530, IMBA 531, IMBA 543, IMBA 544, IMBA 550, IMBA 560, IMBA 561, IMBA 562, IMBA 573, and IMBA 574. Attendance at the two one-week Residency Experiences is mandatory. Following the iMBA course schedule, which involves completing credits over eight consecutive terms, a part-time student can complete the program in two years (see [http://www.worldcampus.psu.edu/pub/imba/afs\\_sched.shtml](http://www.worldcampus.psu.edu/pub/imba/afs_sched.shtml)).

### Other Relevant Information

The iMBA is an online graduate degree program delivered via World Campus (<http://www.worldcampus.psu.edu>). Students progress through the program in cohorts. They must be computer literate and have immediate, ready, and reliable access to a computer and the Internet. Although not all aspects of the course are delivered via electronic media, Internet access is required to successfully complete the course of

instruction, as well as participate in online discussion groups. See (<http://www.worldcampus.psu.edu/general-technical-requirements>) for the most current technical requirements. Students are required to complete the two one-week residency experiences. No alternatives and substitutions are possible.

## Courses

### *Term One*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

501. Markets, Industry Analysis, and Business Strategy (3)  
502. Financial and Accounting Tools (3)

### *Term Two*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

513. Data Analysis Resource Module (2)  
515. Accounting for External Reporting (2)  
516. Organizational Behavior and Performance(2)

### *Term Three*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

521. Strategic Analysis (2)  
522. Financial Management (2)  
523. Organizational Development, Intervention and Change (2)

Residency Experience I (required)

### *Term Four*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

517. Corporate Governance (2)  
531. Project Management (2)  
543. Accounting for Internal Decision Making (2)

### *Term Five*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

530. Marketing in a Global Environment (3)  
544. Managing Human Resources(3)

### *Term Six*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

550. Corporate Information Strategy(3)  
560. Corporate Innovative Strategies (3)

### *Term Seven*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

561. Global Operations and Supply Chain Management (3)  
562. Global Business Management (3)

### *Term Eight*

#### **INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION (iMBA)**

573. Strategic Planning (3)  
574. Strategic Financial Decisions (3)

Residency Experience II (required)

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[INTERCOLLEGE MASTER OF BUSINESS ADMINISTRATION \(iMBA\) course list](#)

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-07-007

Review Date: 6/17/08

Faculty last updated: 8/8/12

## Homeland Security

Jeremy Plant, Ph.D., Interim Chair, Homeland Security Graduate Education  
 Professor of Public Policy  
 Program Coordinator, Public Administration  
 W160F Olmstead Building  
 Penn State Harrisburg  
 777 West Harrisburg Pike  
 Middletown, PA 17057  
 Phone: 717-948-6045; Fax: 717-948-6320  
 Email: jfp2@psu.edu

### Degree Conferred

M.P.S.

### Graduate Faculty

#### Agricultural Biosecurity and Food Defense Option

Walter R. McVey, Jr., M.S. (West Virginia) Senior Project Manager in VBSC  
 Catherine Cutter, Ph.D. (Clemson) Associate Professor of Food Science  
 Fred Gildow, Ph.D. (Cornell) Professor of Plant Pathology  
 Gretchen Kuldau, Ph.D. (California) Associate Professor of Plant Pathology  
 Seogchan Kang, Ph.D. (Wisconsin) Professor of Plant Pathology

#### Computer and Network Security Option

Raj Acharya, Ph.D. (Minnesota/Mayo Grad School of Med) Professor of Computer Science and Engineering  
 Piotr Berman, Ph.D. (MIT) Associate Professor of Computer Science and Engineering  
 Guohong Cao Ph.D. (Ohio State) Professor of Computer Science and Engineering  
 Trent Jaeger, Ph.D. (Michigan) Associate Professor of Computer Science and Engineering  
 George Kesidis, Ph.D. (California, Berkeley) Professor of Computer Science and Engineering, and Electrical Engineering  
 Thomas La Porta, Ph.D. (Columbia) Distinguished Professor of Computer Science and Engineering  
 Yanxi Liu, Ph.D. (Massachusetts) Associate Professor of Computer Science and Engineering  
 John Metzner, (NYU) Professor of Computer Science and Engineering, and Electrical Engineering  
 David Miller, Ph.D. (California, Santa Barbara) Professor of Electrical Engineering  
 Patrick McDaniel, Ph.D. (Michigan) Professor of Computer Science and Engineering  
 Sofya Raskhodnikova, Ph.D. (MIT) Assistant Professor of Computer Science and Engineering  
 Anand Sivasubramaniyam Ph.D. (Georgia Tech) Professor of Computer Science and Engineering  
 Adam Smith, Ph.D. (MIT) Associate Professor of Computer Science and Engineering  
 Aylin Yener, Ph.D. (Rutgers) Professor of Electrical Engineering  
 Sencun Zhu, Ph.D. (George Mason) Associate Professor of Computer Science and Engineering, and Information Sciences and Technology

#### Geospatial Intelligence Option

Todd Bacastow, Ph.D. (Penn State) Professor of Practice for Geospatial Intelligence  
 Mark Corson, Ph.D. (South Carolina) Associate Professor of Geography  
 Peter Guth, Ph.D. (Penn State) Visiting Professor of Geography  
 David Hall, Ph.D. (Penn State) Dean, College of Information Sciences and Technology; Professor of Information Sciences and Technology  
 Jay Parrish, Ph.D. (Penn State) Senior Lecturer

#### Homeland Security (Base Program)

Thomas Arminio (U.S. Naval War College) Instructor in Homeland Security  
 Peter Forster (Penn State) Senior Lecturer in Information Sciences and Technology  
 Jeremy Plant (Virginia) Professor of Public Administration and Public Policy  
 Paul Thompson, J.D. (Georgetown) Senior Lecturer in Homeland Security and Public Affairs

#### Information Security and Forensics Option

Guoray Cai, Ph.D. (Pittsburgh) Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering  
 Chao-Hsien Chu, Ph.D. (Penn State) Professor of Information Sciences and Technology, and Management Science  
 Peter Forster (Penn State) Senior Lecturer in Information Sciences and Technology  
 Dongwon Lee, Ph.D. (UCLA) Associate Professor of Information Sciences and Technology, and Computer Science and Engineering  
 Peng Liu, Ph.D. (George Mason) Professor of Information Sciences and Technology, and Computer Science and Engineering  
 Prasenjit Mitra, Ph.D. (Stanford) Associate Professor of Information Sciences and Technology, and Computer Science and Engineering  
 Irene Petrick, Ph.D. (Penn State) Professor of Practice in Information Sciences and Technology  
 Gerald M. Santoro, Ph.D. (Penn State) Assistant Professor of Information Sciences and Technology, and Communication Arts and Sciences  
 Robin G. Qiu, Ph.D. (Penn State) Associate Professor of Information Science  
 Anna Squicciarini, Ph.D. (Univ Milan, Italy) Assistant Professor of Information Sciences and Technology  
 Heng Xu, Ph.D. (National Singapore) Assistant Professor of Information Sciences and Technology  
 Sencun Zhu, Ph.D. (George Mason) Associate Professor of Computer Science and Engineering, and Information Sciences and Technology

#### Public Health Preparedness Option

Vernon M. Chinchilli, Ph.D. (North Carolina) Distinguished Professor of Public Health Sciences  
 Eugene J. Lengerich, V.M.D., M.S. (Pennsylvania) Professor of Public Health Sciences  
 Craig Meyers, Ph.D., (UCLA) Professor of Microbiology and Immunology  
 Zhengmin Qian, M.D., Ph.D. (Rutgers) Assistant Professor of Public Health Sciences

### Program Description

The intercollege Master of Professional Studies in Homeland Security (MPS-HLS) degree program is designed to prepare professionals and develop leaders for the field of homeland security by providing exceptional graduate education. The curriculum is delivered in a distance education format through the Penn State World Campus in order to accommodate the needs and careers of professionals who are already active in homeland security and public health, or those interested in transitioning into the field. The program provides enrollees with an integrated, cross-functional curriculum that is focused on a set of unified educational goals in order to help them understand and manage the complexities of homeland security in a global environment. Students select from one of six disciplines of study: homeland security (base program); public health preparedness; geospatial intelligence; computer and network security; information security and forensics; and agricultural biosecurity and food defense. The participating academic units for this collaborative program are: Penn State Harrisburg, the College of Medicine, the College of the Liberal Arts, the College of Earth and Mineral Sciences, the College of Information Sciences and Technology, Penn State Great Valley School of Graduate Professional Studies, the College of Engineering, and the College of Agricultural Sciences.

### General Admission Requirements

#### Educational Background

An applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.

#### Core Application Packet

- Statement of purpose

- Vita or résumé
- Three letters of recommendation
- Two official transcripts from each institution attended
- Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) score, if applicable
- Application fee

#### Statement of Purpose and Curriculum Vitae

A statement of professional experience and goals (up to 500 words) and the candidate's vita or résumé must accompany the application.

#### Letters of Recommendation

- The individuals writing letters should be familiar with you and comfortable discussing your professional and/or academic strengths and accomplishments.
- The Admissions Committee prefers that all letters be written within the last six months and reference the applicant's current career goals and/or ability to perform graduate level study.
- A person choosing to submit a letter of reference will do this through the online application process and either select our pre-formatted template or upload his/her own letter.

#### GPA Requirements

Your grade-point average is interpreted by the Admissions Committee in the context of a completed application. Some options may require a minimum GPA.

#### GRE Requirements

The Graduate Record Examination may be required by some options.

#### TOEFL

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with IBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

#### Other Considerations

Special backgrounds, abilities, and interests related to homeland security are desirable.

Course Enrollment before Formal Acceptance

- If a student wishes to enroll in a course (s) while he/she completes the application process, the student can do so by contacting Adult Learner Enrollment Services at 800-252-3592.
- Students who have completed an application and have already been accepted to the program will be given preference for course enrollment.
- All other students will be enrolled in courses on a first-come, first-served basis depending on availability.

#### Financial Aid

World Campus students who are enrolled in a degree program and meet all other federal student aid eligibility requirements may be eligible for federal aid programs. Students must complete the Free Application for Federal Student Aid (FAFSA) to be considered for student aid.

#### Degree Requirements

The Master of Professional Studies in Homeland Security program requires a minimum of 33 credits, 24 of which must be earned at Penn State. Up to 10 graduate credits may be transferred in from a regionally accredited institution (as is permissible by Graduate Council policy); if the full 10 credits are transferred, the minimum total number of credits in the degree program will be 34. At least 18 credits must be courses at the 500 level and above, of which 6 credits must be in 500-level courses. Students are expected to maintain a B (3.0) or better average in academic courses to be retained in the program. Each student will take a 9 credit *core curriculum* consisting of HLS/PDM 801, HLS/PHIL 803, and HLS/CRIM 805. Students will also take 12 credits of prescribed courses for the specialized option. There are 9 elective credits of elective that are chosen from an approved list in consultation with the student's advisor. The list of electives is maintained by the Option Director and is provided to the students in the option. Finally, each degree candidate must complete a capstone project on a topic related to homeland security and defense (XXX 594 - Research Topics).

#### Prescribed Courses

Homeland security refers to the unifying core for the vast global network of organizations and institutions that are involved in the efforts to secure society. Regardless of field of specialization, or chosen discipline for graduate study, all professionals in the program will participate in a Unifying Core Curriculum with the following educational goals and objectives:

- Understand major policies and legislation that shapes homeland security in a globalized society.
- Become familiar with organizations that play a key role in the implementation of homeland security policies and administration, and recognize the interactions among them.
- Understand the way in which a person or group responds to a set of conditions so as to prevent and respond to incidents and catastrophic events when needed.
- Recognize the impact that catastrophic events, both natural and man-made, have on society and the domestic and global economy.
- Identify and assess potential threats, vulnerabilities, and consequences.
- Apply leadership skills and principles that are necessary for producing and acting on information of value within a collaborative setting.
- Communicate effectively in the context of particular institutional cultures.
- Use, conduct, and interpret research and data effectively in decision-making.
- Practice ethics and integrity as a foundation for analytical debate and conclusion.
- Develop an appreciation of the cultural, social, psychological, political, and legal aspects of terrorism and counterterrorism.

The Core Curriculum consists of the following three courses:

**HLS/P ADM 801:** Homeland Security Administration: Policies and Programs (3) Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management approaches.

**HLS/PHIL 803:** Homeland Security: Social and Ethical Issues (3) This course examines the social, political, legal, and ethical issues that arise in the context of homeland security.

**HLS/CRIM 805:** Violence, Threats, Terror, and Insurgency (3) Provides an overview of the domestic and global issues related to homeland security.

Listed below are the courses required/suggested for the option:

#### Agricultural Biosecurity and Food Defense Option

Director: Gretchen Kuldau, Ph.D. (California) Associate Professor of Plant Pathology  
0205 Buckout Laboratory, University Park; 814 863 7232; [kuldau@psu.edu](mailto:kuldau@psu.edu)

#### Core Curriculum

HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)  
 HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)  
 HLS/CRIM 805: Violence, Threats, Terror, and Insurgency (3)

**Prescribed Courses**

AGBIO 520\*: Agricultural Biosecurity: Protecting a Key Infrastructure (3)  
 AGBIO 521: Food Defense: Prevention Planning For Food Processors (3)  
 AGBIO 801: Veterinary Infectious Disease Diagnostic and Surveillance Systems (3)  
 AGBIO 802: Plant Protection: Responding to Introductions of Threatening Pest and Pathogens (3)

**Courses with an asterisk (\*) found in other Options****Electives**

Choose 9 credits from an approved elective list in consultation with advisor. The list of electives is maintained by the Option Director and is provided to the students in the option.

**Capstone Experience**

AGBIO 594: Agricultural Biosecurity and Food Defense - Capstone Experience (3)

**Computer and Network Security Option**

Director: Patrick McDaniel, Ph.D. (Michigan) Associate Professor of Computer Science and Engineering  
 360A Information Sciences and Technology Building; 814-863-3599; [pdm12@psu.edu](mailto:pdm12@psu.edu)

**Core Curriculum**

HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)  
 HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)  
 HLS/CRIM 805: Violence, Threats, Terror, and Insurgency (3)

**Prescribed Courses**

CSE 514: Computer Networks (3)  
 CSE 543\*: Introduction to Computer and Network Security (3)  
 CSE 546: Cryptography (3)  
 E E 561: Information Theory (3)

**Courses with an asterisk (\*) found in other Options****Electives**

Choose 9 credits from an approved elective list in consultation with advisor. The list of electives is maintained by the Option Director and is provided to the students in the option.

**Capstone Experience**

CSE 594: Research Topics (3)

**Geospatial Intelligence Option**

Director: Todd Bacastow, Ph.D. (Penn State) Professor of Practice for Geospatial Intelligence  
 2217 Earth and Engineering Sciences Building, University Park; 814-863-0049; [bacastow@psu.edu](mailto:bacastow@psu.edu)

**Core Curriculum**

HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)  
 HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)  
 HLS/CRIM 805: Violence, Threats, Terror, and Insurgency (3)

**Prescribed Courses**

GEOG 882: Geographic Foundations of Geospatial Intelligence (3)  
 GEOG 883\*: Remote Sensing for the Geospatial Intelligence Professional (3)  
 GEOG 884: Geographic Information Systems for the Geospatial Intelligence Professional (3)  
 GEOG 885: Advanced Analytic Methods for Geospatial Intelligence (3)

**Courses with an asterisk (\*) found in other Options****Electives**

Choose 9 credits from an approved elective list in consultation with advisor. The list of electives is maintained by the Option Director and is provided to the students in the option.

**Capstone Experience**

GEOG 594A: Research Topics: Analytic Experience in Geospatial Intelligence (1)  
 GEOG 594B: Research Topics: Geospatial Intelligence Capstone Experience (2)

**Homeland Security (Base Program)**

Director: Dr. Jeremy F. Plant, Professor of Public Administration and Public Policy, School of Public Affairs; Interim Program Chair, iMPS-Homeland Security  
 W160 Olmsted Building, Penn State Harrisburg; 717-948-6045; [jfp2@psu.edu](mailto:jfp2@psu.edu)

**Core Curriculum**

HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)  
 HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)  
 HLS/CRIM 805: Violence, Threats, Terror, and Insurgency (3)

**Prescribed Courses**

P ADM 401: Foundations of Homeland Security (3)  
 P ADM 404: Homeland Security and Defense in Practice (3)  
 P ADM 802: Collaboration and Integration: Multifaceted Approaches to Homeland Security (3)  
 P ADM 803\*: Strategic Planning and Organizational Imperatives in Homeland Security and Defense (3)

**Courses with an asterisk (\*) found in other Option****Electives**

Choose 9 credits from an approved elective list in consultation with advisor. The list of electives is maintained by the Option Director and is provided to the students in the option.

**Capstone Experience**

P ADM 594: Research Topics (3)

**Information Security and Forensics Option**

Director: Peter Forster, Ph.D. (Penn State) Senior Lecturer of Information Sciences and Technology, and Management Science  
 101N Information Sciences and Technology Building, University Park; 814-863-8304; [pkf1@psu.edu](mailto:pkf1@psu.edu)

**Core Curriculum**

HLS 801/P ADM: Homeland Security Administration: Policies and Programs (3)  
 HLS 803/PHIL: Homeland Security: Social and Ethical Issues (3)

HLS/CRIM 805: Violence, Threats, Terror, and Insurgency (3)

**Prescribed Courses**

IN SC 561: Web Security and Privacy (3)  
IST 454: Computer and Cyber Forensics (3)  
IST 515: Information Security and Assurance (3)  
IST 554\*: Network Management and Security

**Courses with an asterisk (\*) found in other Options****Electives**

Choose 9 credits from an approved elective list in consultation with advisor. The list of electives is maintained by the Option Director and is provided to the students in the option.

**Capstone Experience**

IST 594: Research Topics

**Public Health Preparedness Option**

Director: Eugene J. Lengerixh, V.M.D., M.S., Professor, Public Health Sciences, Penn State College of Medicine, MC H070; 500 University Drive; Hershey, Pennsylvania; 717-531-6066; [PHP\\_Programs@psu.edu](mailto:PHP_Programs@psu.edu)

**Core Curriculum**

HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)  
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)  
HLS/CRIM 805: Violence, Threats, Terror, and Insurgency (3)

**Prescribed Courses**

PHP 410: Public Health Preparedness for Disaster and Bioterrorism Emergencies I (3)  
PHP 510: Public Health Preparedness for Disaster and Bioterrorism Emergencies II (3)  
PHP 527\*: Public Health Evaluation of Disasters and Bioterrorism (3)  
PHP 530: Critical Infrastructure Protection of Health Care Delivery Systems (3)

**Courses with an asterisk (\*) found in other Options****Electives**

Choose 9 credits from an approved elective list in consultation with advisor. The list of electives is maintained by the Option Director and is provided to the students in the option.

**Capstone Experience**

PHP 594: Research Topics (3)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-06-000

Review Date: 04/10/2012

Last updated by Publications: 5/17/11

## Information Science (IN SC)

[Program Home Page](#)

JAMES A. NEMES, *Professor and Interim Director of Academic Affairs*  
 School of Graduate Professional Studies  
 30 East Swedesford Road  
 Malvern, PA 19355  
 610-648-3335

### Degree Conferred:

M.S. in Information Science

### The Graduate Faculty

- Adrian Barb, Ph.D. (University of Missouri) *Assistant Professor of Information Science*
- Joanna DeFranco, Ph.D. (New Jersey Institute of Technology) *Assistant Professor of Software Engineering*
- Nil H. Ergin, Ph.D. (University of Missouri-Rolla), *Assistant Professor of Systems Engineering*
- Kathryn Jablokow, Ph.D. (Ohio State) *Associate Professor of Mechanical Engineering*
- Phillip A. Laplante, Ph.D. (Stevens Institute of Tech) P.E. *Associate Professor of Software Engineering*
- John I. McCool, Ph.D. (Temple) *Distinguished Professor of Systems Engineering*
- Colin J. Neill, Ph.D. (Wales) *Director of Engineering Programs and Associate Professor of Software and Systems Engineering*
- James A. Nemes, D.Sc. (George Washington University) *Professor and Interim Director of Academic Affairs*
- Michael J. Piovoso, Ph.D. (Delaware) *Professor of Electrical Engineering*
- Robin G. Qiu, Ph.D. (Penn State) *Associate Professor of Information Science*
- Sally S. Richmond, M.S.I.S. (Penn State) *Lecturer in Information Science*
- David W. Russell, Ph.D. (CNAA, London) *Professor of Electrical Engineering*
- Raghvinder Sangwan, Ph.D. (Temple) *Associate Professor of Software Engineering*
- Kailasam Satyamurthy, Ph.D. (Clemson) *Assistant Professor of Engineering and Management*
- Shamsnaz Virani, Ph.D. (Alabama) *Assistant Professor of Systems Engineering*

The graduate program in Information Science is designed to enable students to contribute to the development, implementation, and utilization of information technologies by providing a balance of theory and practice. Students gain insight in the role and management of emerging information technologies to gain competitive advantage.

### Admission Requirements

Students who have a baccalaureate degree in information systems, information science or other quantitative, scientific, or business discipline and those with experience in information technology will be considered for admission to the program. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Students should have earned at least a 3.00 junior/senior average (on a 4.00 scale) in their baccalaureate program. Although not required, scores from the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT) will be considered by the admissions committee if submitted. If the admissions committee determines an area of weakness or insufficient baccalaureate preparation, the student may be required to take one or both pre-program requirement courses (IST 441 and SWENG 400). Pre-program requirements do not count toward the 33-credit program total. Scores from the Test of English as a Foreign Language (TOEFL) are required of international applicants at the time of application. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 119 on the speaking section for the internet-based test. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Program Requirements

The requirement for the degree is 33 credits, consisting of 18 credits of required core courses (IN SC 431, IN SC 521, IN SC 525, IN SC 526, INFSY 560, INFSY 563), 12 credits approved electives, selected with the assistance of a graduate adviser, followed by an integrative capstone course, which includes a master's paper (IN SC 539). A grade-point average of at least 3.0 must be achieved, with at least 18 credits at the 500 level. Students lacking adequate preparation may be required to take one or both of the pre-program requirement courses (IST 441 and SWENG 400). Pre-program requirements do not count toward the 33-credit program total.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[INFORMATION SCIENCE \(IN SC\) course list](#)

[INFORMATION SCIENCES AND TECHNOLOGY \(IST\) course list](#)

[INFORMATION SYSTEMS \(INFSY\) course list](#)

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-19

Review Date: 11/13/2012

Last updated Publications: 08/20/09

## Information Systems (INFSY)

[Program Home Page](#)

GIRISH H. SUBRAMANIAN, *Program Director*  
Penn State Harrisburg  
School of Business Administration  
777 W. Harrisburg Pike  
Middletown, PA 17057-4898  
717-948-6140  
[MSIshbg@psu.edu](mailto:MSIshbg@psu.edu)

### Degree Conferred:

M.S.

### The Graduate Faculty

- Melvin Billingsley, Ph.D. (Yale) Professor of Biotechnology and Entrepreneurship
- Gregory A. Crawford, Ph.D. (Rutgers) Associate Librarian
- Rhoda Joseph, Ph.D. (City University of New York, Baruch College), Assistant Professor of Information Systems
- Parag C. Pendharkar, D.B.A. (Southern Illinois) Professor of Information Systems
- Girish Subramanian, Ph.D. (Temple) Professor of Information Systems
- Gayle J. Yaverbaum, Ph.D. (Temple) Professor of Information Systems

### The Program

Operating under the auspices of the School of Business Administration, Penn State Harrisburg's master's degree program in information systems is designed to meet the rapidly increasing need for technically grounded, upper-level information resources managers within business organizations. With the exception of a small percentage of students who are full-time, the students served by the M.S.I.S. program are employees of area businesses, state and local governments, and not-for-profit organizations who study on a part-time basis. In order to accommodate both full- and part-time students, courses are primarily offered in the evening.

The two-fold nature of the program requires a manager to have competence both in information technology and in management theory; therefore, the curriculum combines the highly technical content of information science with the managerial emphasis of information systems. Unlike computer science programs, which tend to focus on computer hardware and architecture, this program is organized around applied computer-based activities, the development of communication skills, and managerial principles.

Students may elect to take one of two options in the program: Information Systems in Health Care Management and Delivery, or Information Systems in the Life Sciences. Each of these options requires a total of 36 credits. Alternatively, students can earn the degree without notation of an option; the total credits required for the degree under this choice are 30 credits.

### Admission Requirements

Applicants to the program must hold a baccalaureate degree in any field from a regionally accredited, college-level institution. Students who apply for the option in Life Sciences must hold a baccalaureate degree in life sciences or a related field from a regionally accredited college-level institution. Decisions are based primarily on undergraduate junior-senior grade-point average and the Graduate Management Admissions Test (GMAT) scores. (Please visit [www.gmac.com](http://www.gmac.com) for more information on the GMAT). Postbaccalaureate course work, professional experience, and the statements provided in the application are also taken into account.

Students are also required to submit the following:

- a completed application form with application fee
- two copies of official transcripts from all colleges or universities attended;
- official scores from the GMAT test (the test must have been taken within the past five years);
- letters of recommendation (optional);
- supplemental application;

An application is available on the web at [www.hbg.psu.edu](http://www.hbg.psu.edu) or by calling 717-948-6250.

The Test of English as a Foreign Language (TOEFL) ([www.toefl.org](http://www.toefl.org)) must be taken by applicants for whom English is not their first language or whose language of instruction was not English. Submit the results of that test with the application for admission. A TOEFL score of 550 (paper-based test) or 213 (computer-based test) or higher is required for admission.

All students with international credentials must submit transcripts to Educational Credential evaluators, Inc. (ECE) for a "course by course" academic evaluation of transcripts and degree. An ECE application can be obtained on the web at: [www.ece.org](http://www.ece.org).

### Application Dates

Candidates may enter the program at the beginning of the fall, spring, or summer session. To allow time for applications to be processed, all information, including GMAT score, must be received by Enrollment Services no later than July 18 for admission to the fall semester, November 18 for admission to the spring semester, and April 18 for admission to the summer session.

Applicants from outside the United States must follow the early admission dates in order to allow the necessary clearances and paperwork to be processed in time.

### Entry Requirements

**Analytic Skills Requirement:** Prior to enrolling in their M.S.I.S. course work, students are required to demonstrate competence in Analytic skills. This requirement may be demonstrated by: (1) satisfactory completion of college-level courses in calculus and statistics such as QUANT 310 or MATH 110 plus STAT 200 or (2) successful completion of a calculus and statistics proficiency examination approved by the M.S.I.S. program. This requirement must be taken either during the first semester or summer session of the student's matriculation and completed with a grade of C or better.

**Credit by Examination:** Interested students should obtain a Credit by Examination form from Enrollment Services and should consult with the M.S.I.S. Program to schedule the exam and obtain a list of suggested preparatory materials.

**Computer Skills Requirement:** Students are required to demonstrate proficiency in the use of Microcomputer Applications. This requirement can be satisfied through completion of a college-level microcomputer applications course within the past five years with a grade of B or higher or by documented significant computer-related work experience. If this requirement has not been met prior to admission, a college-level microcomputer course such as M I S 103 or CMPSC 203--Microcomputers in Business--is required. Course work must be taken either during the first semester or summer session of the student's matriculation and completed with a grade of B or higher.

**Communication Skills Requirement:** Successful completion of the M.S.I.S. program requires the ability to think clearly and to write and speak persuasively. Part of this requirement can be met by obtaining a score of "4" or more on the Graduate Management Admission Test (GMAT) Analytical Writing Assessment (AWA). If this score is not achieved, students must satisfy this requirement through additional course work in writing skills or other work developed in consultation with the M.S.I.S. Program. This requirement must be satisfied during the first semester or summer session of the student's matriculation and completed with a grade of B or higher. The speech component of this requirement is satisfied through individual and group presentations in courses in the M.S.I.S. Program.



*Pre-Program Requirement:* The Pre-program requirement provides a basic foundation in theory, tools and techniques required for the management of profit and non-profit organizations. It also provides a basic understanding of applications of financial accounting, the creation and distribution of goods and services, and how people relate to others in various organizations, helping to merge two related disciplines: business and information systems. Students who have completed the appropriate pre-program courses previously must have completed the courses with a grade of B or higher within seven years prior to admission, or through equivalent graduate course work completed with a B or higher within seven years prior to admission or college level course work validated by recent work experience. Students who have not met these tests of relevancy, grade or currency, prior to admission to the program must take these courses at the graduate level and early in Program. Students choosing an option in life sciences are required to have a baccalaureate degree in life sciences or a related field.

Pre-Program Requirement: 9 credits  
ACCT 501, BUS 505, MGMT 511, BUSEC 502

## Degree Requirements

The M.S.I.S. program requires, excluding prerequisite requirements, 30-36 credits of course work at the graduate level (500-level or higher). Options require 36 credits.

These are distributed over three groups of courses: Prescribed Courses, Additional Courses, and Electives.

## M.S.I.S. Degree Program

### Master of Science in Information Systems

#### Pre-Program Courses

ACCT 501. Financial Analysis (3)  
BUS 505. Data Analysis for Business Decisions (2)  
BUSEC 502. Prices, Markets, and Competitive Strategy (2)  
MNGMT 511. Organizational Behavior (2)

#### Prescribed Courses

INFSY 535. Object-Oriented Design and Program Development (3)  
INFSY 540. Information Technology and Knowledge Management (3)  
INFSY 554. Master's Project (3)

#### Additional Courses (choose 15 credits)

INFSY 543. Electronic Commerce (3)  
or  
INFSY 550. Strategic Information Systems (3)  
or  
INFSY 587. Global Information Technology (3)  
INFSY 545. Program, Data, and File Structures (3)  
INFSY 547. WEB Enabled Technologies (3)  
INFSY 555. Data Management (3)  
INFSY 556. Data Warehousing (3)  
INFSY 560. Data Communications Systems and Networks (3)  
INFSY 562. Network Protocols (3)  
or  
INFSY 563. Network Security Management (3)  
or  
INFSY 564. Mobile computing (3)  
INFSY 565. Intelligent Systems (3)  
INFSY 566. Data Mining and Knowledge Discovery (3)  
INFSY 570. Software Engineering in the Analysis and Design of Information Systems (3)  
INFSY 575. Seminar in Information Technology Management (3) (as approved for major by Program)  
INFSY 597. Special Topics (3)

#### Electives (6 credits)

Elective courses allow students to select additional elective courses of interest. Six credits of elective courses should be taken from 500-level courses offered by Penn State Harrisburg's School of Business Administration.

## M.S.I.S. Degree with Options

### Information Systems in Health Care Management and Delivery Option

#### Pre-Program Courses

ACCT 501. Financial Statement Analysis (3)  
BUS 505. Data Analysis for Business Decisions (2)  
BUSEC 502. Prices, Markets, and Competitive Strategy (2)  
MNGMT 511. Organizational Behavior (2)

#### Prescribed Courses

INFSY 535. Object-Oriented Design and Program Development (3)  
INFSY 540. Information Technology and Knowledge Management (3)  
INFSY 554. Master's Project (3)

#### Additional Courses

INFSY 555. Data Management (3)  
INFSY 556. Data Warehousing (3)  
INFSY 560. Data Communications Systems and Networks (3)  
INFSY 565. Intelligent Systems (3)  
INFSY 566. Data Mining and Knowledge Discovery (3)

#### Option Courses

H ADM 539. Health Systems Organizations (3)  
INFSY 585. Advanced Applications in Medical Informatics (3)

#### Select 6 credits from:

H ADM 540. Health Administrative Policy Formulation (3)  
H ADM 541. Health Economics (3)  
H ADM 542. Health Care Politics (3)  
H ADM 543. Long-Term Care Administration (3)  
H ADM 548. Health Care Quality (3)  
H ADM 551. Health Care Law (3)  
H ADM 552. Health Delivery Systems: managed care (3)  
HES 570. Health Economics (3)  
INFSY 575. Seminar in Information Technology Management (3) (as approved for option by Program)  
INFSY 597. Special Topics (3) (as approved for option by Program)

## Information Systems in Life Sciences Option

### Prerequisite

A baccalaureate degree in a life sciences field

### Pre-Program Courses

ACCT 501. Financial Analysis (3)  
 BUS 505. Data Analysis for Business Decisions (2)  
 BUSEC 502. Prices, Markets, and Competitive Strategy (2)  
 MNGMT 511. Organizational Behavior (2)

### Prescribed Courses

INFSY 535. Object-Oriented Design and Program Development (3)  
 INFSY 540. Information Technology and Knowledge Management (3)  
 INFSY 554. Master's Project (3)

### Additional Courses

INFSY 555. Data Management (3)  
 INFSY 556. Data Warehousing (3)  
 INFSY 560. Data Communications Systems and Networks (3)  
 INFSY 565. Intelligent Systems (3)  
 INFSY 566. Data Mining and Knowledge Discovery (3)

### Option Courses

INFSY 578. Technology and Life Sciences (3)

### Select 9 credits from:

BUSAD 534. Ethical Dimensions of Management in the Biotechnology and Health Industry (3)  
 BUSAD 583. Future of the Biotechnology and Health Industry: Strategic Implications (3)  
 INFSY 575. Seminar in Information Technology Management (3) (as approved for option by Program)  
 INFSY 597. Special Topics (3) (as approved for option by Program)  
 S T S 589. Ethics and Values in Science and Technology (3)  
 SWENG 552. Bioinformatics (3)

Students electing an option in the M.S.I.S. program must complete a total of 36 credits in the major to obtain the degree.

A minimum 3.0 grade-point average is required before a student is awarded an M.S. degree in Information Systems.

All course work must be completed within six years, or seven consecutive summers of matriculation.

## Transfer Credits

Up to 10 transfer credits may be applied toward the degree. However, credits used to complete a previous graduate degree may not be applied. These courses must have been taken within the past five years, appear on a graduate transcript, and have been passed with a B grade or higher. It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg. Credit will not be given for any class used to complete a previous degree.

## Course Substitutions

Because some students enter the Program with advanced knowledge in one or more subject areas, up to six credits in prescribed or additional courses may be replaced with more advanced graduate courses in the same subject area. Except for INFSY 554, which must be taken at the College, INFSY prescribed and additional courses, in cases where there is equivalent knowledge, must be replaced with more advanced courses in the same field. Substitutions are based on a minimum of six credits of advanced undergraduate course work in an area of concentration or credits earned in an equivalent graduate-level program at a regionally accredited, college-level institution. These courses must have been completed within the past five years and have earned a grade of B or better. Substituted courses must be replaced with other advanced graduate courses in the field for which the substitute is the foundation/prerequisite. Substitutions are based on past academic performance. An examination cannot be used for earned graduate course credit.

## Grade-Point Average and Time Limit

A 3.00 (out of 4.00) minimum grade-point average is required FOR THE AWARD OF THE M.S.I.S. degree. All course work must be completed within six years, or seven consecutive summers, of matriculation.

## Financial Aid

There are a limited number of scholarships, fellowships, and research grants available, as well as several graduate assistantships. For more information on these, contact Penn State Harrisburg's School of Business Administration.

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact one of the following offices: Financial Aid Office, 717-948-6307 or Enrollment Services, 717-948-6250.

## Graduate School Assistantships

Full time graduate students who are interested in an assistantship should contact the graduate program coordinator. Students must be nominated for an assistantship by their program coordinator.

Students applying for an assistantship should submit scores from the Graduate Management Admissions Test (GMAT), or similar examinations by January 30.

## CONCURRENT DEGREE OFFERINGS WITH THE DICKINSON SCHOOL OF LAW

Penn State Harrisburg, School of Business Administration  
 The Dickinson School of Law

### Degrees Conferred:

J.D. (Dickinson)  
 M.B.A. (Penn State Harrisburg)  
 M.S.I.S. (Penn State Harrisburg)

## Concurrent Degree Programs

The Dickinson School of Law and the School of Business Administration of Penn State Harrisburg offer cooperative programs leading to the degrees of Juris Doctor (J.D.) to be granted by the Dickinson School of Law, and either the Master of Business Administration (M.B.A.) or Master of Science in Information Systems (M.S.I.S.) to be granted by Penn State Harrisburg. These concurrent degree opportunities facilitate the completion of both a law degree and a professional degree in business or information systems. The programs are designed primarily for location-bound students who enter law school with an undergraduate degree in business, information systems or related fields.

## Admission Requirements

The concurrent programs require that the student first be admitted to the Dickinson School of Law. Subsequently, the student is recommended for and applies for admission to the graduate school for the Penn State Harrisburg M.B.A. program or M.S.I.S. program.

The following are required for applicants:

*The Dickinson School of Law:* Completed Law School application; Law School Admission Test (LSAT) score; Law School Data Assembly Service (LSDAS) report; one page personal statement; employment record since high school; two letters of recommendation.

*M.B.A. and M.S.I.S. Programs:* Completed Graduate School application; Graduate Management Admission Test (GMAT); letter of recommendation from the associate dean of the Dickinson School of Law; evidence of proficiency in analytic skills through college-level calculus and statistics demonstrated either by completion of courses or successful completion of a mathematics proficiency examination approved by the program; evidence of proficiency in microcomputer applications skills; proficiency in writing evidenced by a score of "4" or higher on the analytical writing assessment portion of the GMAT; proficiency in entry-level financial accounting as demonstrated by completion of college-level course work; completion of a set of pre-program business core requirements demonstrated by completion of a minimum of six credits of advanced undergraduate work in each core areas. Each course must have been completed with a grade of B or higher within seven years prior to admission to the M.B.A. or M.S.I.S. program. The School of Business Administration will review the applicant's transcripts for acceptability of the courses.

No courses from the M.B.A program or M.S.I.S. program may count toward the J.D. program until the student is matriculated at The Dickinson School of Law. However, graduate-level courses taken in either in the M.B.A. or M.S.I.S. program at Penn State Harrisburg or at another graduate-level institution may be applied to the M.B.A. or M.S.I.S. in accordance with the transfer policies of the Graduate School.

### Transfer of Credits

For those students meeting the entry and pre-program requirements of the M.B.A. and M.S.I.S. programs, 30 additional credits are required. Nine credits of course work at the Dickinson School of Law may be transferred toward the M.B.A. or the M.S.I.S. degrees, subject to program approval. Students must obtain a grade satisfactory to the M.B.A. and M.S.I.S. program in order for the credits to be transferable. Nine credits of M.B.A. or M.S.I.S. courses may be transferred for credit toward the J.D. degree at the Dickinson School of Law, subject to the approval of the school of law.

### Advising of Students

All students in the concurrent program have two advisers, one in the School of Business Administration and one from the faculty at the Dickinson School of Law. Because the concurrent program is designed to be taken in synchrony with the objective that both degrees will be earned simultaneously, students who do not demonstrate progress toward completion of both degrees may be denied continuation in the concurrent program. Such a decision will rest jointly with the faculties of the M.B.A. or M.S.I.S. program and the J.D. program.

### Tuition

The Dickinson School Of Law and Penn State Harrisburg will each charge their own tuition to students in the J.D./M.B.A. and J.D./M.S.I.S. programs.

### Additional Information

For more information and the latest updates on the concurrent programs, call the law school at 717-240-5207 or 800-840-1122, or visit the Web sites at: <http://www.dsl.psu.edu>  
<http://www.hbg.psu.edu>

## CONCURRENT DEGREE OFFERINGS WITH THE PENN STATE COLLEGE OF MEDICINE, THE DEPARTMENT OF PHARMACOLOGY

Penn State Harrisburg, School of Business Administration  
The Penn State College of Medicine, The Department of Pharmacology

### Degrees Conferred:

Ph.D. (College of Medicine)  
M.B.A. or M.S.I.S. (Penn State Harrisburg)

### Concurrent Degree Programs

The Penn State College of Medicine, Department of Pharmacology, and The School of Business Administration of Penn State Harrisburg offer cooperative programs leading to the degrees of Doctor Of Philosophy (Ph.D.) to be granted by the Penn State College of Medicine, and either the Master of Business Administration (M.B.A.) or Master of Science in Information Systems (M.S.I.S.) to be granted by Penn State Harrisburg. These concurrent degree opportunities facilitate the completion of both a pharmacology doctorate and a professional degree in business administration or information systems. The programs are designed primarily for students interested in pursuing a career involving high-quality independent research and positions of management responsibility within the pharmacological community.

### Admission Requirements:

The concurrent programs require that the student first be admitted to the pharmacology program. Subsequently, the student is recommended for and applies for admission to the graduate school for the Penn State Harrisburg M.B.A. or M.S.I.S. program.

The following are required for applicants:

*Pharmacology:* Completed application; Graduate Record Examination (GRE) Score; A bachelor's degree reflecting a reasonable background in zoology or biology, mathematics and chemistry; a minimum junior/senior grade point average of 3.00 and with appropriate course backgrounds; two letters of recommendation; a curriculum vitae; a description of career goals. Reading knowledge of one or two foreign languages is recommended.

*M.B.A. and M.S.I.S. Programs:* Completed Graduate School application; Graduate Management Admission Test (GMAT) score; letter of recommendation from the department chair of the pharmacology department; evidence of proficiency in analytic skills through college-level calculus and statistics demonstrated either by completion of courses or successful completion of a mathematics proficiency examination approved by the program; evidence of proficiency in microcomputer applications skills; proficiency in writing evidenced by a score of "4" or higher on the writing assessment portion of the GMAT; proficiency in entry-level financial accounting as demonstrated by completion of college-level course work; completion of a set of pre-program business core requirements demonstrated by completion of a minimum of six credits of advanced undergraduate work in each core area. Each course must have been completed with a grade of B or higher within seven years prior to admission to the M.B.A. or M.S.I.S. program. The School of Business Administration will review the applicant's transcripts for acceptability of the courses.

No courses from the M.B.A program or M.S.I.S. program may count toward the Ph.D. until the student is admitted to the Pharmacology Program. However, graduate-level courses taken in either in the M.B.A. or M.S.I.S. program at Penn State Harrisburg or at another graduate-level institution may be applied to the M.B.A. or M.S.I.S. in accordance with the transfer policies of the Graduate School.

It is anticipated that most students in the concurrent programs will require additional graduate credits in order to satisfy the entry and pre-program requirements in business administration. Nine credits of course work in pharmacology may be transferred toward the M.B.A. or M.S.I.S. Students must obtain a grade satisfactory to the program in order for the credits to be transferable. Nine credits of M.B.A. or M.S.I.S. course work may be transferred for credit toward the Ph.D. degree, subject to the approval of the department of pharmacology.

All students in the concurrent program have two advisers, one in the School of Business Administration and one from the faculty in the department of Pharmacology. Because the concurrent program is designed to be taken in synchrony with the objective that both degrees will be earned simultaneously, students who do not demonstrate progress toward completion of both degrees may be denied continuation in the concurrent program. Such a decision will rest jointly with the faculties of the M.B.A. or M.S.I.S. and the Ph.D. programs.

**The Course Matrix**

For more information and the latest updates on the concurrent programs, call the department of pharmacology at 717-531-8285 or visit the Web sites at:  
[http://www.hmc.psu/pharmacology\\_program.index.html](http://www.hmc.psu/pharmacology_program.index.html)

<http://www.hbg.psu.edu>

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BUSINESS ADMINISTRATION \(BUSAD\) course list](#)

[HEALTH ADMINISTRATION \(H ADM\) course list](#)

[INFORMATION SYSTEMS \(INFSY\) course list](#)

[SCIENCE, TECHNOLOGY AND SOCIETY \(S T S\) course list](#)

[SOFTWARE ENGINEERING \(SWENG\) course list](#)

Last Revised by the Department: Fall Semester 2006

Blue Sheet Item #: 34-07-473

Review Date: 6/13/06

Last updated by Publications: 5/23/11

## Learning, Design, and Technology (LDT)

[Program Home Page](#)

KYLE PECK, *Director of Graduate Studies*  
314 Keller Building  
814-865-0473  
[cjr24@psu.edu](mailto:cjr24@psu.edu)

### Degrees Conferred:

Ph.D., D.Ed., M.S., M.Ed.

### The Graduate Faculty

- Alison A. Carr-Chellman, Ph.D. (Indiana) *Professor of Education*
- Roy B. Clariana, Ed.D. (Memphis) *Professor of Education*
- Simon R. Hooper, Ph.D. (Penn State) *Associate Professor of Education*
- Susan M. Land, Ph.D. (Florida State) *Associate Professor of Education*
- Doris Lee, Ph.D. (Texas) *Professor of Education*
- Orrin Murray, Ph.D. (Michigan) *Assistant Professor of Education*
- Kyle L. Peck, Ph.D. (Colorado) *Professor of Education*
- Priya Sharma, Ph.D. (Georgia) *Associate Professor of Education*
- Heather Zimmerman, Ph.D. (Washington) *Assistant Professor of Education*

This program provides advanced professional preparation in the development of effective, efficient instructional materials and the use of technology in educational settings. Skill and knowledge in the fields of educational psychology, instructional design, computer technologies, development of educational materials, and evaluation of educational outcomes combine to prepare graduates for a variety of roles and professional environments. Graduates are employed by corporate, agency, and military training departments; entrepreneurial consulting companies; public school districts, community college learning resource centers, and colleges and universities. The program offers an M.S. degree for students who will continue into the Ph.D. program and a career in higher education, and two options within the M.Ed., Instructional Systems Design and Educational Technology.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) (for master's or doctorate) or Miller Analogies Test (for master's), transcripts, letters of reference, application letter, and writing assignment are required for admission.

### Master's Degree Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. For the M.S. degree, EDPSY 400 or its equivalent is prerequisite. M.Ed. and M.S. candidates are expected to complete the following courses: INSYS 415, INSYS 521, INSYS 522, INSYS 525 or INSYS 527, four INSYS emphasis courses, and 6 credits of professional orientation in Educational Psychology, Educational Leadership, Workforce Education and Development, and/or Adult Education. Other courses may be substituted with approval from the candidate's adviser. The Leadership in Technology Integration emphasis requires INSYS 471 instead of INSYS 521.

The M.S. degree requires: as core courses INSYS 415 and EDPSY 421; as required courses INSYS 575 or EDPSY 475, and 6 credits of INSYS 600/610; and a master's thesis.

The M.Ed. Instructional Systems Design option requires: as core courses INSYS 415, INSYS 521, INSYS 522, and INSYS 525; as required courses , INSYS 527, and EDPSY 421; and a master's project paper, internship and paper, or design apprenticeship.

The M.Ed. with an Educational Technology option requires: as core courses INSYS 415 and EDPSY 421; as required courses AEE 521 or STAT 500; EDTEC 448, EDTEC 561, EDTEC 562; EDTEC 566 or EDTEC 566; and EDTEC 567; and a master's paper documenting the effectiveness of a technology-related intervention in an educational setting.

### Doctoral Degree Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. In addition to those requirements for a master's degree, D.Ed. and Ph.D. candidates are expected to complete the following courses: EDPSY 421, two doctoral CORE courses (INSYS 581, INSYS 583, or INSYS 586), 12 credits of Instructional Systems emphasis courses, and a 15-credit minor or supporting field.

The Ph.D. candidate is expected to complete four research design courses covering both quantitative and qualitative methods. The communication requirement must be satisfied by completing one course in applied statistics, and either one course in advanced statistics or one course in advanced qualitative data analysis. The Ph.D. candidate is also expected to complete a research apprenticeship working directly with a faculty member.

The D.Ed. candidate is expected to complete two research design courses, choosing from experimental, qualitative, or survey research design, and a 9- to 15-credit internship.

As part of the candidacy exam, candidates are required to prepare residency plans indicating how they will be professionally immersed during their residency period. This plan is then reviewed again prior to graduation.

Candidates for doctoral degrees with a minor in Learning, Design, and Technology must take a minimum of 15 credits approved in advance by the professor in charge of the Learning, Design, and Technology program.

### Student Aid

A limited number of graduate assistantships are available to students in this program. These and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 699. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[INSTRUCTIONAL SYSTEMS \(INSYS\) course list](#)

[EDUCATIONAL TECHNOLOGY \(EDTEC\) course list](#)

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-120

Review Date: 11/13/2012

Faculty updated: 3/1/13



## International Agriculture and Development

Thomas H. Bruening, Program Coordinator, Associate Professor, Agricultural and Extension Education  
102 Ferguson Building  
814-863-7420; thb2@psu.edu

Edwin Rajotte, Co-Program Coordinator, Professor, Entomology  
508 Agricultural Sciences and Industries Building  
814-863-6461; egrajotte@psu.edu

### Degrees Conferred

Students electing this degree program through participating programs will earn a degree with a dual-title at the Master's or Ph.D. level. Students receive a degree that lists their major program and International Agriculture and Development (INTAD).

The International Agriculture and Development (INTAD) program is offered through the Departments of Agricultural and Extension Education, Agricultural Economics and Rural Sociology, and Entomology. The dual title degree enables qualified students from the CAS and other select programs at Penn State to combine their major degree with an internationally focused program of study to gain global competency skills and techniques for application of their discipline in a global environment.

### The Graduate Faculty

David Ablor, Ph. D. (Chicago) Professor of Agricultural, Environmental, and Regional Economics and Demography  
Theodore R. Alter, Ph.D. (Michigan State) Professor of Agricultural, Environmental, and Regional Economics  
Paul A. Backman, Ph.D. (California, Davis) Professor of Biological Control, Plant Diseases, Agrosecurity, and Sustainable Agriculture  
Mark A. Brennan, Ph. D. (Penn State) Associate Professor of Leadership Development  
Thomas H. Bruening, Ph.D. (Iowa State) Associate Professor of Agricultural and Extension Education  
James G. Beierlein, Ph.D. (Purdue) Professor of Agricultural Economics  
Alessandro Bonanno, Ph.D. (Connecticut) Assistant Professor of Agricultural Economics  
Jill L. Findeis, Ph.D. (Washington State) Distinguished Professor of Agricultural, Environmental and Regional Economics and Demography  
James C. Finley, Ph.D. (Penn State) Professor of Forest Resources  
Leland Glenna, Ph.D. (Missouri) Assistant Professor of Rural Sociology and Science, Technology and Society  
Stephan J. Goetz, Ph.D. (Michigan State) Director of Northeast Regional Center for Rural Development, Professor of Agricultural and Regional Economics  
Patreese D. Ingram, Ph.D. (Western Michigan) Professor of Agricultural and Extension Education  
Michael G. Jacobson, Ph.D. (North Carolina State) Associate Professor of Forest Resources  
Leif Jensen, Ph.D. (Wisconsin) Professor of Rural Sociology and Demography  
Matt Kaplan, Ph.D. (CUNY) Professor of Agricultural and Extension Education  
John Kelmelis, Ph. D. (Penn State) Professor, School of International Affairs  
Flynt L. Leverett, Ph.D. (Princeton) Professor, School of International Affairs  
Albert E. Luloff, Ph.D. (Penn State) Professor of Rural Sociology  
James McCarthy, Ph.D. (California, Berkeley) Associate Professor of Geography  
Anouk Patel-Campillo, Ph.D. (Cornell) Assistant Professor of Rural Sociology  
Esther Prins, Ph.D. (Cornell) Assistant Professor of Adult Education  
Edwin Rajotte, Ph.D. (Rutgers) Professor of Entomology and IPM Coordinator  
Rama Radhakrishna, Ph.D. (Penn State) Professor of Agricultural and Extension Education  
Carolyn E. Sachs, Ph. D. (Kentucky) Professor of Rural Sociology and Women's Studies, Head of Women's Studies Department  
Denis Simon, Ph.D. (California, Berkeley) Professor, School of International Affairs  
Ann R. Tickamyer, Ph.D. (North Carolina) Professor of Rural Sociology  
Jack Watson, Ph.D. (Arizona) Professor of Soil Science  
Karl S. Zimmerer, Ph.D. (California, Berkeley) Head of the Department; Professor of Geography, College of Earth and Mineral Sciences

The INTAD Graduate dual-title degree program is administered by the INTAD- Academic Program Management Committee. The committee maintains the curriculum, identifies courses appropriate for the program, and develops and recommends policy and procedures for the program's operation to the dean of the College of Agricultural Sciences and the dean of the Graduate School. Faculty members of the INTAD Graduate program also serve on the student graduate committee for students who chose to do the dual-title program. This dual-title program enables students to learn about international agriculture while maintaining a close association with their primary area of interest in their home department.

### Admission Requirements

To pursue the INTAD dual-title offering, a student must first apply to and be admitted to one of the participating graduate degree programs and the Graduate School at Penn State. Upon acceptance into the major program, the student can apply to the INTAD dual-title program. The student will submit an application to the INTAD Academic Program Committee. The application will include a written personal statement indicating the career goals they hope to accomplish by earning a dual-title degree.

Further information about the admissions process will be posted on [agsci.psu.edu/international](http://agsci.psu.edu/international). Requirements listed here are in addition to the general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Degree Requirements

To qualify for the INTAD dual-title degree, students must satisfy the requirements of the graduate program in which they are enrolled. In addition, they must satisfy the minimum requirements of the INTAD dual-title degree specified here.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

### Master's Degree:

#### Course Requirements

Students are required to complete a minimum of 12 INTAD course credits (400, 500, or 800) for a dual-title Master's degree. Nine credits will be from the core curriculum, which includes a 3-credit seminar course, the International Agricultural Development Seminar (INTAD 820), and two courses from the Departments of Agricultural Economics/Rural Sociology and Agricultural and Extension Education. The remaining three credits must be taken as internship or applied courses/independent studies with international development content.

Final course selection is determined by the students, their major program advisors and their INTAD advisors. Such advisors will discuss with the student a program of study that meets the student's career goals and that is in accord with the policies of the Graduate Council and the INTAD dual-title program. Some courses may satisfy both the major graduate program requirements and those of the INTAD dual-title program. Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits

at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. A student who is registered for at least nine credits is considered to be engaged in full-time academic work for the semester.

### **Thesis**

Students pursuing a Master of Science (M.S.) degree that requires a master's thesis, in addition to the 12 credits specified above, must write the thesis on a topic that reflects both the graduate program in their primary degree and the dual-title offering in INTAD. Thesis research credits (SUBJ 600) must be taken in the major program.

All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

### **Ph.D. Degree:**

Students admitted to the doctoral INTAD dual-title offering must exhibit high research competence, including ability to identify, conceptualize, and execute a significant research project that makes a significant addition to the body of knowledge in the field. Students also should be fluent in reading, writing, and speaking English.

### **Course Requirements**

Students are required to complete a minimum of 18 INTAD credits for a dual-title Ph.D. degree. Nine credits will be from the core curriculum, which includes a 3-credit seminar course, the International Agricultural Development Seminar (INTAD 820), and two courses from the Departments of Agricultural Economics/Rural Sociology and Agricultural and Extension Education. The remaining 9 credits must be taken from among INTAD electives. In addition, they will be encouraged to pursue proficiency in a language other than English, as appropriate.

Final course selection is determined by the students, their major program advisors and their INTAD advisors. Such advisors will discuss with the student a program of study that meets the student's career goals and that is in accord with the policies of the Graduate Council and the INTAD dual-title program. Some courses may satisfy both the major graduate program requirements and those of the INTAD dual-title program. The 18 required credits must be at the 500-level or above. Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. A student who is registered for at least nine credits is considered to be engaged in full-time academic work for the semester.

### **Candidacy**

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student's advisor in consultation with the INTAD program coordinators.

### **Committee Composition**

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

### **Comprehensive Exam**

At the end of their coursework, students must complete a comprehensive examination that follows the guidelines established by the primary program and reflecting both their primary program and the dual-title degree curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the exam and the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive evaluation.

### **Dissertation and Dissertation Defense**

Doctoral students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both their primary program and the INTAD dual-title program. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required.

### **Financial Aid**

Graduate Assistantships and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. A limited number of Research Assistantships are also available through the CAS.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400-499 may be used to meet some graduate degree requirements when taken by graduate students but courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education but may do not meet requirements for an advanced degree.

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-017

Review Date: 06/21/2011



## Industrial Relations and Human Resources (IRHR)

[Program Home Page](#)

PAUL F. CLARK, *Head*  
133 Willard Building  
814-865-5425

### Degree Conferred:

M.S. in Industrial Relations and Human Resources

### The Graduate Faculty

- Mark S. Anner, Ph.D. (Cornell) Assistant Professor of Labor Studies and Industrial Relations, and Political Science
- Forrest S. Briscoe, Ph.D. (MIT) Assistant Professor of Labor Studies and Industrial Relations, and Sociology
- Paul F. Clark, Ph.D. (Pittsburgh) Professor of Labor Studies and Industrial Relations
- Alex Colvin, Ph.D. (Cornell) Assistant Professor of Labor Studies and Industrial Relations
- Alan Derickson, Ph.D. (California, San Francisco) Professor of Labor Studies and Industrial Relations, and History
- Robert Drago, Ph.D. (Massachusetts, Amherst) Professor of Labor Studies and Industrial Relations, and Women's Studies
- Ronald L. Filippelli, Ph.D. (Penn State) Professor of Labor Studies and Industrial Relations
- Dennis Gouran, Ph.D. (Iowa) Professor of Speech Communication and Labor Studies and Industrial Relations
- Sumita Raghuram, Ph.D. (Minnesota) Associate Professor of Labor Studies and Industrial Relations
- Jackie Krasas Rogers, Ph.D. (USC) Associate Professor of Labor Studies and Industrial Relations, Sociology, and Women's Studies
- James B. Stewart, Ph.D. (Notre Dame) Professor of Labor Studies and Industrial Relations
- Mark Wardell, Ph.D. (Missouri) Associate Professor of Labor Studies and Industrial Relations

The master of science degree in Industrial Relations and Human Resources (IRHR) is a two-year program designed for students anticipating careers in some aspect of labor and human resources or labor-management relations. The program has the following objectives:

- provide students with an understanding of the roles employers, employees, employee organizations, and public policy makers play in the employment relationship;
- familiarize students with the complex personal and organizational issues inherent in the employment relationship;
- prepare students to systematically analyze complex issues and evaluate research results in the process of administering labor and human resource systems;
- prepare students for advanced graduate or professional training beyond the master's degree;
- prepare students for employment as practitioners in the field.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) or the Graduate Management Admission Test (GMAT) are required. Applicants with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Applicants must have three letters of recommendation sent from people who can assess adequately their likelihood of completing the graduate program.

Students are expected to have completed successfully an undergraduate statistics course plus a minimum of 12 undergraduate credits in the social sciences as part of their baccalaureate degree.

### Degree Requirements

**THESIS OPTION:** The IRHR thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 36 credits, including a minimum of 30 at the 400 and 500 level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations. A student's thesis should reflect the chosen emphasis.

**RESEARCH PAPER OPTION:** The IRHR research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. It requires a minimum of 37 credits at the 400 and 500 level. For the degree, and overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations. A student's research paper should reflect the chosen emphasis.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Course Requirements

#### Core Courses (22 credits)

IRHR 501, IRHR 502, IRHR 504, IRHR 505, IRHR 512, IRHR 513, IRHR 516

Required course are offered once per academic year and elective courses at least once every two academic years.

#### Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

#### Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. Examples of suitable elective courses are: L I R 411, L I R 401, L I R 444, L I R 458Y; IRHR 500, IRHR 535, IRHR 536, IRHR 594, IRHR 595, IRHR 596, IRHR 597, IRHR 599; ECON 412, ECON 436, ECON 571; EDLDR 565, EDLDR 574; HIST (L I R) 555; MGMT 321, MGMT 523, MGMT 548; PSYCH 484, PSYCH 485, PSY 522; SOC 455, SOC 456, SOC 555.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[INDUSTRIAL RELATIONS AND HUMAN RESOURCES \(IRHR\) course list](#)

### Integrated B.S. in Labor and Industrial Relations and M.S. in Industrial Relations and Human Resources (LRIRHR)

PROFESSOR PAUL F. CLARK, *Head*

The integrated B.S. in Labor and Industrial Relations and M.S. in Industrial Relations and Human Resources is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LIR and IRHR with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about (1) the roles of employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) and how to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the IRHR field. The program culminates with an M.S. research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

**Bachelor of Science**

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION: 45 credits**

(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES: 18 credits****REQUIREMENTS FOR THE MAJOR: 98-99 credits**

[12 credits may be double counted, 6 must be at the 500 level]

**B.S. REQUIREMENTS: 62-63 credits**

(This includes 10 credits of General Education courses)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 36-37 credits****PRESCRIBED COURSES: (16 credits)**

(Some courses in this category have prerequisites that are not included in the major)

L I R 100 GS(3), L I R 312(4) (Sem: 3-8)  
ECON 002 GS(3), ECON 315 GS(3), PSYCH 281 GS(3) (Sem: 1-8)

**ADDITIONAL COURSES: (13 credits)**

(Some courses in this category have prerequisites that are not included in the major)

L I R 201 GS(3) or L I R 401(3) (Sem: 3-8)  
SCM 200(4) or STAT 200 GQ(4) (Sem: 3-8)  
L I R 136 US(3) or WMNST 136 US(3) or L I R 400 IL(3) (Sem: 5-8)  
L I R 458Y US(3) or HIST 458Y US(3) or L I R 414W(3) (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS: (33-34 credits)**

(L I R courses that are used in the Additional Courses category may not be double counted to satisfy this requirement. Some courses in this category have prerequisites that are not included in the major.)

Select 15-21 credits from appropriate L I R courses, at least 9 must be at the 400 level (only 3 credits of L I R 495 or 3 credits of L I R 496 may be used to satisfy this requirement) (Sem: 5-8)

Select 12-19 credits from the department list in consultation with an adviser, at least 6 credits must be at the 400 level, 3 each from 3 categories:

1. ECON 342 GS(3), ECON 370 GS(3), ECON 412(3), ECON 436(3), ECON 445(3) (Sem: 5-8)
2. MGMT 100(3), MGMT 321(3), MGMT 331(3), MGMT 341(3), MGMT 424(3) (Sem: 3-8)
3. PL SC 451(3), PL SC 471(3), PL SC 473(3), PL SC 474(3) (Sem: 5-8)
4. PSYCH 482(3), PSYCH 484(3), PSYCH 485(3) (Sem: 5-8)
5. SOC 119 GS:US(4), SOC 409 US(3), SOC 444(3), SOC 455(3), SOC 456(3) (Sem: 3-8)
6. ACCTG 211(4), CAS 352(3), H P A 460(3), HD FS 425 US(3), HIST 155 GH(3), S T S 407(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

**M.S. REQUIREMENTS: 36 credits**

[12 credits may be double counted, 6 must be at the 500 level]

**PRESCRIBED COURSES: (21 credits)**

IRHR 501(3), IRHR 502(3), IRHR 504(3), IRHR 505(3), IRHR 512(3)\*, IRHR 513(3)\*, IRHR 516(3)

\*or other statistics course approved in advance by graduate director

\*\*or other methods course approved in advance by graduate director

**ADDITIONAL COURSES: (15 credits)**

Select 15 credits from the following list in consultation with adviser (only 6 credits may be at the 400 level).

L I R 400 IL(3), L I R 401(3), L I R 414W(3), L I R 424(3), L I R 434(3), L I R 435(3), L I R 437(3), L I R 444(3), L I R 458Y US(3), L I R 460(3), L I R 465(3), L I R 470(3), IRHR 500(3), IRHR 535(3), IRHR 536(3), IRHR 594(1-6), IRHR 595(1-6), IRHR 596(1-6), IRHR 597(1-3), IRHR 600(3-6)

**Emphasis Courses (6 credits)**

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S. prescribed or additional courses in consultation with their adviser.

**Masters Research Paper or a Masters Thesis (6 credits)**

Students must complete either a Masters Research Paper or a Masters Thesis. Students choosing the Thesis option must complete 6 thesis credits (IRHR 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

[INDUSTRIAL RELATIONS AND HUMAN RESOURCES \(IRHR\) course list](#)  
[LABOR AND INDUSTRIAL RELATIONS \(L I R\) course list](#)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

**Integrated B.S. in Spanish and M.S. in Industrial Relations and Human Resources (SPIRHR)**

<http://lsir.la.psu.edu/qshms/integratedspanishirhrbms.htm>

The integrated Spanish B.S. and IRHR M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University's international education program, if they choose to have that experience. Students also will learn about (1) the roles that employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, and (3) how to systematically analyze those complex issues and evaluate research relevant to those analyses.

For the B. S./M. S. degree in Integrated Spanish B.S. and Industrial Relations and Human Resources M.S., a minimum of 154 credits is required. Twelve graduate level credits can apply to both undergraduate and graduate degrees; six of these must be at the 500 level. Students can complete the B.S. in Spanish and not advance to the M.S. IRHR degree if they desire.

**Bachelor of Science**

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION: 45 credits**

(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 18 credits**REQUIREMENTS FOR THE MAJOR:** 101 credits

(This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.)

**PRESCRIBED COURSES:** (27 credits)

[Some courses in this category have prerequisites that are not included in the major]

SPAN 100(3), SPAN 120(3), SPAN 200(3), SPAN 253(3), SPAN 305(3) (Sem: 1-6)

SPAN 300W(3), SPAN 410(3), SPAN 412(3), SPAN 414(3) (Sem: 5-8)

**ADDITIONAL COURSES:** (12 credits)

SPAN 210(3) or SPAN 220(3), SPAN 353(3) or SPAN 354(3) (Sem: 3-6)

SPAN 472(3) or SPAN 476(3) (Sem: 5-8)

Select 3 credits of SPAN 415(3), SPAN 418(3), SPAN 420(3), SPAN 439(3), SPAN 490(3), SPAN 491(3), or SPAN 497(1-9) (Sem: 5-8)

**LABOR AND INDUSTRIAL RELATIONS:** (32 credits)

[Prescribed undergraduate credits in Labor and Industrial Relations option]

ECON 002 GS(3), L I R 100 GS(3), L I R 201(3), L I R 312(4), L I R 400 IL(3), L I R 414W(3), L I R 458Y US(3), STAT 200 GQ(4) (Sem: 1-6)

IRHR 501(3), IRHR 512(3) (Sem: 7-8)

**Master of Science**

INDUSTRIAL RELATIONS/HUMAN RESOURCES M.S.: (30 credits)

[IRHR credits to be selected from the following in consultation with an IRHR adviser]

IRHR 500, IRHR 502, IRHR 504, IRHR 505, IRHR 513, IRHR 516, IRHR 535, IRHR 536, IRHR 595\*, IRHR 596\*, IRHR 597, IRHR 599

[\* only 3 credits of IRHR 595 and IRHR 596 may be used to satisfy this requirement]

**Courses**

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[INDUSTRIAL RELATIONS AND HUMAN RESOURCES \(IRHR\) course list](#)

[LABOR AND INDUSTRIAL RELATIONS \(L I R\) course list](#)

[SPANISH \(SPAN\) course list](#)

Last Revised by the Department: Fall Semester 2006

Blue Sheet Item #: 34-07-474

Review Date: 6/13/06

UCA Revision #1: 8/8/06

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Last updated by Publications: 9/27/06

## Information Sciences and Technology (IST)

### [Program Home Page](#)

DAVID L. HALL, *Dean, College of Information Sciences and Technology*  
MICHAEL McNEESE, *Associate Dean for Research and Graduate Programs*

Office of the Dean  
College of Information Sciences and Technology  
The Pennsylvania State University  
332 Information Sciences and Technology Building  
University Park, PA 16802-6823  
Dean's office: 814-865-3528; Graduate office: 814-865-8711

### Degree Conferred

Ph.D., M.S., M.P.S. in Information Sciences

### The Graduate Faculty

University Park:

- Reka Albert, Ph.D. (Notre Dame) Affiliate Associate Professor of Information Sciences and Technology; Associate Professor of Physics
- John W. Bagby, J.D. (Tulsa) Professor of Information Sciences and Technology
- Christian Brady, Ph.D. (Oxford) Dean, Schreyer Honors College; Affiliate Professor of Information Sciences and Technology; Associate Professor of Classical Studies and Jewish Studies
- Guoray Cai, Ph.D. (Pittsburgh) Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering
- Brian Cameron, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology
- John Carroll, Ph.D. (Columbia) Edward M. Frymoyer Chair Professor of Information Sciences and Technology
- Chao-Hsien Chu, Ph.D. (Penn State) Professor of Information Sciences and Technology; Director, Professional Master's Degrees; Affiliate Professor, Management Science and Information Systems, Smeal College of Business
- Shawn Clark, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology
- Henry C. "Hank" Foley, Ph.D. (Penn State) Vice President for Research and Dean of the Graduate School; Professor of Information Sciences and Technology, and Chemical Engineering
- Frederico T. Fonseca, Ph.D. (Maine) Associate Dean for Undergraduate Studies; Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering
- Peter K. Forster, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology
- C. Lee Giles, Ph.D. (Arizona) David Reese Professor of Information Sciences and Technology; Professor of Computer Science and Engineering
- Edward J. Glantz, Ph.D. (Penn State) Professor of Practice in Information Sciences and Technology
- Christopher H. Griffin, Ph.D. (Penn State) Affiliate Faculty of Information Sciences and Technology; Research Associate, Applied Research Lab
- Jens Grossklags, Ph.D. (California, Berkeley) Assistant Professor of Information Sciences and Technology
- David L. Hall, Ph.D. (Penn State) Dean; Professor of Information Sciences and Technology, and Electrical Engineering
- John Harwood, Ph.D. (Nebraska) Senior Director, Teaching and Learning with Technology; Associate Professor of Information Sciences and Technology; Associate Professor of English
- Steven R. Haynes, Ph.D. (London School of Economics) Senior Lecturer in Information Sciences and Technology
- John Horgan, Ph.D. (Univ College, Cork, Republic of Ireland) Associate Professor of Information Sciences and Technology; Associate Professor of Science, Technology, and Society; Director, International Center for the Study of Terrorism
- Bernard James Jansen, Ph.D. (Texas A&M) Associate Professor of Information Sciences and Technology
- Alexander Klippel, Ph.D. (Bremen) Assistant Professor of Geography; Affiliate Faculty, College of Information Sciences and Technology
- Soundar Kumara, Ph.D. (Purdue) Affiliate Professor of Information Sciences and Technology
- Lynette Kvasny, Ph.D. (Georgia State) Associate Professor of Information Sciences and Technology
- Phillip LaPlante, Ph.D. (Stevens Inst) Professor of Software Engineering and Affiliated Faculty of Information Sciences and Technology
- Dongwon Lee, Ph.D. (UCLA) Associate Professor of Information Sciences and Technology; Affiliate Associate Professor of Computer Science and Engineering
- Ping Li, Ph.D. (Leiden) Professor of Psychology and Linguistics; Affiliate Professor of Information Sciences and Technology
- Peng Liu, Ph.D. (George Mason) Professor of Information Sciences and Technology; Affiliate Professor of Computer Science and Engineering, and Information Systems and Supply Chains
- Carleen Maitland, Ph.D. (Delft University of Technology) Associate Professor of Information Sciences and Technology
- Alan MacEachren, Ph.D. (Kansas) Affiliate Professor of Information Sciences and Technology; E. Willard and Ruby S. Miller Professor of Geography
- William McGill, Ph.D. (Maryland), Assistant Professor of Information Sciences and Technology
- Michael D. McNeese, Ph.D. (Vanderbilt) Associate Dean of Research and Graduate Programs; Professor of Information Sciences and Technology, and Psychology
- Prasenjit Mitra, Ph.D. (Stanford) Associate Professor of Information Sciences and Technology
- Burt Monroe, Ph.D. (Oxford) Affiliate Faculty of Information Sciences and Technology
- David Mudgett, Ph.D. (Yale) Senior Lecturer in Information Sciences and Technology
- Karl Mueller, Ph.D. (California, Berkeley) Professor of Chemistry; Affiliate Professor of Information Sciences and Technology
- Rosalie Ocker, Ph.D. (Rutgers) Senior Lecturer in Information Sciences and Technology
- Irene Petrick, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology
- Erika Poole, Ph.D. (Georgia Tech) Assistant Professor of Information Sciences and Technology
- Sandeep Puroo, Ph.D. (Wisconsin--Milwaukee) Associate Professor of Information Sciences and Technology
- Pamda Raghavan, Ph.D. (Penn State) Professor of Computer Science and Engineering; Affiliate Professor of Information Sciences and Technology
- A. (Ravi) Ravindran (California, Berkeley) Professor of Industrial Engineering; Chair, Enterprise Integration Consortium
- Madhu Reddy, Ph.D. (California, Irvine) Associate Professor of Information Sciences and Technology
- Frank E. Ritter, Ph.D. (Carnegie Mellon) Professor of Information Sciences and Technology, Computer Science and Engineering, and Psychology
- Mary Beth Rosson, Ph.D. (Texas at Austin) Professor of Information Sciences and Technology
- Timothy Ryan, Ph.D. (Texas at Austin) Assistant Professor of Biological Anthropology and Geosciences; Assistant Professor of Information Sciences and Technology
- Jungwoo Ryoo, Ph.D. (Kansas) Assistant Professor of Information Sciences and Technology
- Gerald M. Santoro, Ph.D. (Penn State) Senior Lecturer in Information Sciences and Technology
- Stuart Selber, Ph.D. (Michigan Tech) Associate Professor of English and Science, Technology, and Society; Affiliate Associate Professor of Information Sciences and Technology
- Donald Shemanski, J.D. (Georgetown) Professor of Practice in Information Sciences and Technology
- Timothy Simpson, Ph.D. (Georgia Tech) Professor of Mechanical Engineering and Industrial Engineering; Affiliate Professor of Information Sciences and Technology
- Allan Sonstebj, Ph.D. (Penn State) Affiliated Faculty of Information Sciences and Technology; Associate Director, Communications and Navigation Office
- Anna Squicciarini, Ph.D. (University of Milan, Italy) Assistant Professor of Information Sciences and Technology
- Andrea Tapia, Ph.D. (New Mexico) Associate Professor of Information Sciences and Technology
- James B. Thomas, Ph.D. (Texas) Dean, Smeal College of Business; Professor of Information Sciences and Management
- Eileen M. Trauth, Ph.D. (Pittsburgh) Professor of Information Sciences and Technology; Affiliate Professor of Women's Studies, International Affairs, Labor Studies and Employee Relations, Management and Organization
- James Z. Wang, Ph.D. (Stanford) Professor of Information Sciences and Technology, and Computer Science and Engineering
- Dinghao Wu, Ph.D. (Princeton) Senior Lecturer and Research Scientist in Information Sciences and Technology
- Heng Xu, Ph.D. (National Singapore) Assistant Professor of Information Sciences and Technology
- Jinchao Xu, Ph.D. (Cornell) Distinguished Professor of Mathematics; Affiliate Faculty of Information Sciences and Technology
- John Yen, Ph.D. (California, Berkeley) Director, Strategic Research Initiatives; Professor of Information Sciences and Technology; Affiliate Professor of

## Computer Science and Engineering

- Xiaolong (Luke) Zhang, Ph.D. (Michigan) Associate Professor of Information Sciences and Technology
- Sencun Zhu, Ph.D. (George Mason) Associate Professor of Information Sciences and Technology, and Computer Science and Engineering

## Great Valley:

- Adrian Sorin Barb, Ph.D. (Missouri) Assistant Professor of Information Science
- Joanna F. DeFranco, Ph.D. (New Jersey Inst of Tech) Assistant Professor of Information Science
- Kathryn W. Jablolkow, Ph.D. (Ohio State) Associate Professor of Mechanical Engineering
- Phillip A. Laplante, Ph.D. (Stevens Inst) P.E. Professor of Software Engineering
- John I. McCool, Ph.D. (Temple) Distinguished Professor of Systems Engineering
- Colin Neill, Ph.D. (Wales, United Kingdom) Associate Professor of Software Engineering
- James Nemes, D.Sc. (George Washington) Division Head and Professor of Mechanical Engineering
- Michael J. Piovoso, Ph.D. (Delaware) Professor of Electrical Engineering
- Robin G. Qiu, Ph.D. (Penn State) Associate Professor of Information Science
- David W. Russell, Ph.D. (Council for National Academic Awards, United Kingdom) Professor of Electrical Engineering
- Raghvinder S. Sangwan, Ph.D. (Temple) Associate Professor of Information Science
- Kailasam Satyamurthy, Ph.D. (Clemson) Assistant Professor of Information Science

## Harrisburg:

- Melvin L. Billingsley, Ph.D. (George Washington) Professor of Information Systems
- Gregory A. Crawford, Ph.D. (Rutgers) Librarian; Director, Penn State Harrisburg Library
- Rhoda Joseph, Ph.D. (CUNY, Baruch College), Assistant Professor of Information Systems
- Roderick Lee, Ph.D. (Penn State) Assistant Professor of Information Systems
- Parag C. Pendharkar, D.B.A. (Southern Illinois) Professor of Information Systems
- Girish Subramanian, Ph.D. (Temple) Professor of Information Systems
- Gayle J. Yaverbaum, Ph.D. (Temple) Professor of Information Systems

## Program Description

The Doctor of Philosophy degree in Information Sciences and Technology offers advanced graduate education for students contemplating careers in academic teaching and research, or research in a non-academic setting. The program is interdisciplinary in nature and expects scholarship at the highest level exhibiting depth of competency in at least one of the core areas of the Information Sciences and Technology and an understanding of the integration of the critical constructs that drive the field: people, information, and technology.

The Master of Science in Information Sciences and Technology is an interdisciplinary degree program that focuses on the theoretical, application-oriented, and educational issues facing a digital, global economy. The program is designed to build an understanding of how information and technology fundamentally impact (and are impacted by) people, organizations, and the world community. Topical areas within IST span a broad range including: human computer interaction, computational techniques, applications (e.g., bio-informatics and geographical information systems), societal issues (such as digital divide issues), user issues (e.g., computer-aided cognition), and information systems design and development providing exposure and grounding in many of the aspects of the information sciences. The program is especially attractive to students interested in gaining state-of-the-art understanding of information technology and its use as a solution in multiple venues.

The Master of Professional Studies in Information Sciences (also referred to as Master in Information Sciences as an abbreviated program name) is an innovative program that targets professionals and organizational leaders who wish to seek a professional education and training program that can (1) empower them to assume greater responsibilities related to information sciences and information technologies, and/or (2) assist them in transitioning into a career that utilizes information science and information technologies to deal with information-centric challenges. The purpose of the proposed professional master program is to produce professionals and organizational leaders who not only can select and draw upon the necessary foundations within the information sciences and information technology areas, test the applicability of these foundations for addressing a given issue, and apply resulted solutions, but also can be aware of the multitude of technological trends and environmental factors that organizations must address in the changing global economy.

## Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants are required to submit scores from the general portions of the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT), three letters of reference, and a one-three page personal statement of relevant experience and goal. In addition, applicants to the Ph.D. and M.S. programs are required to submit a current resume, statement of research interests, and a sample of applicant's writing (e.g., technical paper, etc.). The GRE or GMAT requirement may be waived for applicants to the Professional Master Program if the student has five or more years of relevant information sciences and technology working experience.

Because the program is multidisciplinary in nature, students from many different disciplines may be acceptable for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics as well as computer and information technology (related work experience can be used to demonstrate such competency). A student may be accepted into the program with "provisional status" for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study (and/or graduate-level study). However, accomplishments demonstrated through work experience and recommendation letters from the applicant's academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 22 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

## Degree Requirements

### Doctoral Degree Requirements

The doctoral degree requirements include the general requirements of the Graduate Council as listed under the Doctoral Degree Requirements. To complete a Ph.D. degree, students must in their first semester take the 6-credit introduction to interdisciplinary research methods (IST 501), one of the three foundations courses (IST 510, IST 520, IST 530), and one credit of graduate colloquium (IST 590). In their second semester, students must take the remaining two foundations courses and a second credit of graduate colloquium.

In addition to these first-year requirements, doctoral students must complete 12 credits of research methodology courses selected to introduce or amplify methods relevant to their doctoral research agenda, and 12 credits of specialization courses, also selected to reinforce their research training.

In addition, all candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of scholarly and professional work. The candidacy examination will be used as an occasion to assess English proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three

complementary research areas will be included as part of the candidacy assessment process. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken) or a minimum of 9 credits of 500-level statistics courses. Students must have completed 18 graduate credits before taking the candidacy exam and must complete the candidacy exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of the course work, usually at the end of the student's second year in the program. A research-based dissertation must be completed under the direction of the Ph.D. committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination.

[General guidance](#) of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed.

At least one regular member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the "Outside Field Member." In cases where the candidate is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser's primary appointment is held (i.e., the adviser's administrative home; in the case of tenure-line faculty, this is the individual's tenure home). This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student's dissertation adviser and also represent a field outside the student's major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

## M.S. Degree Requirements

The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400 level or above, with at least 18 credits at the 500 level or above; 27 of the 30 credits must be earned at University Park. These credits are distributed among the following requirements:

*Core Courses (9 credits).* All candidates are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by choosing 3 from the following: IST 501, IST 511 or IST 512, IST 521 or IST 522, IST 531 or IST 532.

*Specialization Courses (12-15 credits).* In consultation with his/her advisor, a candidate is expected to choose courses in one or more areas customized to support the thesis or project requirement. In addition to advanced courses in IST, a support area could be in law, business, education, engineering, the liberal arts, science, or any area that is linked to the information sciences. Students pursuing the thesis option must take 12 credits of specialization courses; those pursuing the project option must take 15 credits.

*Research Methods (3 credits).* All candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking at least one research methods course offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research topic.

*Thesis or Project (3-6 credits).* Students may choose a thesis or project option. Students who choose the thesis option must write a thesis and register for 6 credits of IST 600. The thesis should focus on a well-defined problem relevant to the information sciences. Students who choose the project option must complete a project and register for 3 credits of IST 594. The project is to be a focused piece of technical work that applies the student's expertise and knowledge base, and that is documented and presented as a research paper. The student must present the thesis or project in a public presentation and successfully defend the thesis/project to the adviser and committee.

*Language and Communication.* All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken).

## M.P.S. Degree Requirements

The Master of Professional Studies degree in Information Sciences program requires a minimum of 33 credits, 24 of which must be earned at Penn State. Up to 9 graduate credits may be transferred in from an accredited institution (as is permissible by the Graduate School). At least 18 credits must be courses at the 500 level and above. A student will first take 9-credits of core courses. The student will then take 12 credits of prescribed courses for the base program or the Information Assurance and Decision Support (IADS) Option. The remaining 9 course credits of electives are chosen in consultation with the student's advisor. Lastly, the student must complete a master project guided by the student's advisor. A student can choose to be in the Base Program or in the IADS Option. These credits are distributed among the following requirements:

*Core Courses (9 credits).* The core of the Master in Information Sciences program consists of four courses -- IST 552 (or INFSY 540), IST 554, IST 562, and IST 594 -- for a total of 12 credits. These courses represent the core technical foundations to study Information Sciences and Technology.

*The Base Program (12 credits of prescribed courses and 9 credits of electives).* The base program consists of four prescribed (required) courses, IST 516, IST 521 (or IST 522), IST 532 (or IST 531) and IST 564 and 9 credits of elective courses, in addition to the 9-credit core and three-credit capstone course. It is designed for students who do not have a special interest in mind. The elective courses are chosen in consultation with the student's advisor. Hence, it offers the flexibility that enables the student to build an in-depth knowledge and skills about information sciences tailored to his/her interests and background. Students from Harrisburg region can also select courses from Harrisburg Campus to fulfill the prescribed courses (by substitution) and 9 credits of electives.

*Information Assurance and Decision Support (IADS) Option (12 credits of prescribed courses and 9 credits of electives).* The IADS option consists of four prescribed (required) courses, IST 515, IST 555, IST/STAT 557, and IST 885, and 9 credits of elective courses, in addition to the 9-credit core and three-credit capstone courses. These courses enable the student to focus on developing knowledge and skills for information analysis, information assurance and decision support including theories, techniques, and applications of data mining, data fusion, information search, information security, and intelligent resource allocation. Students who prefer more flexibility in time and location can take the online courses, offered through World Campus as meeting elective requirements.

*Master Project (3 credits).* The project requires all students in the Master in Information Sciences program to focus on a well-defined issue or problem relevant to the information sciences and technology. The student will submit a project proposal to his/her faculty advisor for approval. Upon completion of the project, the student will share or present the project results at a final presentation as a component of IST 594.

*Language and Communication.* All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken).

## Courses

Graduate courses carry numbers from 500 to 699 or 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [INFORMATION SCIENCES AND TECHNOLOGY \(IST\) course list](#)

Last Revised by the Department: Spring Semester 2013

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Review Date: 06/11/2013

Last updated by Publications: 7/23/12

## Kinesiology (KINES)

[Program Home Page](#)

NANCY I. WILLIAMS, *Head of the Department*  
275 Recreation Building  
814-863-1163  
[kinesgrad@psu.edu](mailto:kinesgrad@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- April Armstrong, M.D. (Western Ontario) Associate Professor of Orthopaedics
- W. E. Buckley, Ph.D. (Penn State) Professor of Exercise and Sport Science, and Health Education
- John H. Challis, Ph.D. (Loughborough University of Technology) Professor of Kinesiology
- David E. Conroy, Ph.D. (Utah) Professor of Kinesiology
- Mary Jane De Souza, Ph.D. (Connecticut) Professor of Kinesiology
- Danielle Symons Downs, Ph.D. (Florida) Associate Professor of Kinesiology
- Mark Dyreson, Ph.D. (Arizona) Professor of Kinesiology
- Robert B. Eckhardt, Ph.D. (Michigan) Professor of Developmental Genetics and Evolutionary Morphology
- Steriani Elavsky, Ph.D. (Illinois) Assistant Professor of Kinesiology
- Jinger S. Gottschall, Ph.D. (Colorado) Assistant Professor of Kinesiology
- Douglas R. Hochstetler, Ph.D. (Penn State) Associate Professor of Kinesiology
- Peter M. Hopsicker, Ph.D. (Penn State) Associate Professor of Kinesiology
- Lacy A. Holowatz, Ph.D. (Penn State) Assistant Professor of Kinesiology
- W. Larry Kenney, Ph.D. (Penn State) Professor of Physiology and Kinesiology
- Donna H. Korzick, Ph.D. (Penn State) Associate Professor of Kinesiology and Physiology
- R. Scott Kretchmar, Ph.D. (Southern California) Professor of Exercise and Sport Science
- Teresa Lang, Ph.D. (Penn State) Research Associate
- Mark L. Latash, Ph.D. (Rush) Distinguished Professor of Kinesiology
- Timothy R. McConnell (Kent State) Adjunct Professor of Kinesiology
- Sayers John Miller, Ph.D. (Penn State) Assistant Professor of Kinesiology
- Karl M. Newell, Ph.D. (Illinois) Professor of Kinesiology and Biobehavioral Health, Marie Underhill Noll Chair
- James A. Pawelczyk, Ph.D. (North Texas) Associate Professor of Physiology and Kinesiology
- Stephen J. Piazza, Ph.D. (Northwestern) Associate Professor of Kinesiology
- David N. Proctor, Ph.D. (Kent State) Professor of Kinesiology
- Robert L. Sainburg, Ph.D. (Rutgers) Professor of Kinesiology
- George F. Salvaterra, Ph.D. (Penn State) Affiliate Assistant Professor of Kinesiology
- Wayne J. Sebastianelli, M.D. (Rochester) Professor of Orthopaedics and Rehabilitation
- Neil A. Sharkey, Ph.D. (California, Davis) Professor of Kinesiology
- Semyon M. Slobounov, Ph.D. (Illinois) Professor of Kinesiology
- Kenneth L. Swalgin, Ph.D. (Ohio) Assistant Professor of Kinesiology
- Richard L. Tutwiler, Ph.D. (Penn State) Affiliate Associate Professor of Kinesiology
- Nancy I. Williams, Sc.D. (Boston U) Professor of Kinesiology
- David Yukelson, Ph.D. (North Texas State) Affiliate Associate Professor of Exercise and Sport Science
- Vladimir M. Zatsiorsky, Ph.D. (Central Institute of Physical Culture, Moscow) Professor of Kinesiology

The graduate programs in Kinesiology are research oriented and are designed to meet the specific goals and interests of the student. The primary goal of the overall program is to provide students the opportunity to study in depth one area of specialization and to develop necessary research skills to enhance their professional competence. The master's program is designed to prepare students for future graduate study, while the doctoral program is directed toward careers in research and in teaching at the advanced undergraduate and graduate levels in colleges and universities. Six areas of study are available at both the master's and doctoral levels: (1) athletic training and sports medicine, (2) biomechanics, (3) exercise physiology, (4) history and philosophy of sport, (5) motor control, and (6) psychology of movement and sport. Several well-equipped research facilities are available to support graduate study, including the Biomechanics Laboratory, Motor Behavior Laboratory, and Noll Physiological Research Center.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Scores from the Graduate Record Examinations (GRE) are required for admission. The minimum requirements for admission to the master's program include a 3.00 junior/senior grade-point average (on a 4.00 scale), satisfactory recommendations, a total of 1000 or higher on the verbal and quantitative sections of the GRE, and appropriate background courses in physical, biological, behavioral, and/or social science, depending on the intended area of specialization. Candidates from majors other than exercise and sport science/physical education are welcome to apply. In addition, doctoral applicants are expected to meet more stringent admission standards, including documented research capabilities (e.g., from an M.S. degree). Experience is highly desirable. Admission is highly competitive and the best-qualified students will be admitted subject to space availability and compatibility of the student with the department's research mission.

### Master's Degree Requirements

All master's candidates are required to complete a research methods course and an acceptable statistics course; show proficiency in the English language; and write a thesis. In addition, each specialization may require specific courses. All specializations require a minimum of 30 credits.

### Doctoral Degree Requirements

A program to meet the individual needs of each student is planned with the adviser in consultation with the doctoral committee members. Students should elect at least 15 credits from courses within the department and at least 6 credits from courses outside the department. It is expected that the depth of knowledge in each area of study comes from independent study and research experiences, in addition to the dissertation, which are under the direction of the faculty. Specific required courses include the Colloquium and Proseminar.

### Student Aid

Graduate assistantships that are available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[KINESIOLOGY \(KINES\) course list](#)

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/21/04

Faculty updates: 2/11/13



## Laboratory Animal Medicine (L A M)

### [Program Home Page](#)

RONALD P. WILSON, *Professor and Chair of the Department of Comparative Medicine*  
 Department of Comparative Medicine, H054  
 College of Medicine  
 P.O. Box 850  
 500 University Drive  
 Hershey, PA 17033-0850  
 717-531-8462

### Degree Conferred:

M.S.

### Graduate Faculty

- Timothy K. Cooper, D.V.M. (Illinois), Ph.D. (Johns Hopkins), Assistant Professor of Comparative Medicine and Pathology
- Xuwen Peng, D.V.M. (Huazhong Agricultural U), Ph.D. (Penn State) Associate Professor of Comparative Medicine
- Ronald P. Wilson, V.M.D. (Pennsylvania), M.S. (Penn State) Professor and Chair of Comparative Medicine

All students entering the program must have completed a professional degree program in veterinary medicine and must hold the degree of D.V.M., V.M.D., or equivalent. This program is only offered at the Penn State College of Medicine, Milton S. Hershey Medical Center.

The Department of Comparative Medicine is a basic science, academic department of the College of Medicine. It is concerned with the range of variation of normal and abnormal structure, function, and behavior in a variety of species of animals used for teaching, testing, and research. Its faculty, staff, and students work in a multidisciplinary and collaborative fashion with all other departments in the college to advance the research mission.

Graduate study in laboratory animal medicine consists of advanced training in biology, medicine and methodology pertinent to animal-based research, and the development of scholarship and research capabilities within the specialty. The general plan is one that provides a broad, basic foundation upon which the individual can build a career in teaching and research and/or in the professional direction of research animal facilities. To earn the Master's degree, each student must complete at least 30 credits of coursework at the 500 or 600 levels.

The curriculum of this training program includes:

#### First Year:

##### COMPARATIVE MEDICINE (C MED)

- 501. Biology and Care of Laboratory Animals (3)
- 503. \* Laboratory Animal Genetics (3)
- 507. \* Techniques of Laboratory Animal Experimentation (3)
- 515. Experimental Surgery of Laboratory Animals (3)
- 530. Diseases of Laboratory Animals I (3)
- 531. Diseases of Laboratory Animals II (3)
- 535.\* Comparative Pathology (3)
- 590. Colloquium (1 credit per semester)
- 596. Independent Studies (1-3)
- 600. (3)

##### BIOMEDICAL SCIENCES (BMS)

- 591. Ethics in the Life Sciences (1)

\*Courses offered every other year on an alternating basis; thus students entering program on even numbered years will take during second year.

#### Second Year:

##### COMPARATIVE MEDICINE (C MED)

- 590. Colloquium (1 credit/semester)
- 596. Independent Studies (up to 9 credits) for non-thesis option
- 600. Research project for M.S. thesis (6-9)

Students may, with the approval of the Program Director, enroll in graduate level courses offered at the Penn State College of Medicine, Penn State Harrisburg, University Park, or Penn State's World Campus.

Thesis Research: The submission and defense of a thesis based on an original hypothesis-driven research project is required. A minimum of 9 credits of thesis research (CMED 600) are required (a maximum of 6 credits may receive a quality grade).

Non-thesis Option: A non-thesis option may be elected by the student but must be approved in writing by the Program Director. A scholarly paper on a topic relevant to the fields of laboratory animal medicine or laboratory animal science must be written and presented. Up to 9 credits of independent study (CMED 596) may be earned for this work.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-022

Review Date: 06/12/2012

## Language Science

PHILIP BALDI, *Director*  
Program in Linguistics  
323 Weaver Building  
814-863-7891  
phb@psu.edu

### Degrees Conferred

Students electing this degree program through participating programs earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and Language Science.

The following graduate programs offer dual degrees in Language Science: German and Psychology.

### The Graduate Faculty

Marc Authier (University of Southern California) Associate Professor of French and Linguistics  
\*Philip Baldi (University of Rochester), Professor of Linguistics and Classics  
\*Paola Dussias (University of Arizona) Associate Professor of Spanish, Psychology and Linguistics  
\*Henry Gerfen (University of Arizona) Associate Professor of Spanish and Linguistics  
\*Carrie Jackson (University of Wisconsin) Assistant Professor of German and Linguistics  
\*Judith Kroll (Brandeis University) Distinguished Professor of Psychology, Linguistics, and Women's Studies  
\*Ping Li (Leiden University) Professor of Psychology and Linguistics  
\*John Lipski (University of Alberta) Edwin Erle Sparks Professor of Spanish and Linguistics  
\*Elina Mainela-Arnold (University of Wisconsin) Assistant Professor of Communication Sciences and Disorders and Linguistics  
\*Carol A. Miller (University of Pennsylvania) Associate Professor of Communication Sciences and Disorders and Linguistics  
\*Maya Misra (Tufts University) Assistant Professor of Communication Sciences and Disorders and Linguistics  
\*B. Richard Page (University of Wisconsin) Associate Professor of German and Linguistics  
Lisa Reed-Authier (University of Ottawa) Associate Professor of French and Linguistics  
Aaron Rubin (Harvard University) Assistant Professor of Classics and Ancient Mediterranean Studies, Jewish Studies and Linguistics  
Gonzalo Rubio (Johns Hopkins), Associate Professor of Classics and Ancient Mediterranean Studies and Linguistics  
\*Nuria Sagarra (University of Illinois) Assistant Professor of Spanish Linguistics and Applied Linguistics  
\*Robert Schrauf (Case Western Reserve University), Associate Professor of Applied Linguistics  
\*Susan Strauss (University of California Los Angeles), Associate Professor of Applied Linguistics and Asian Studies  
\*Janet van Hell (University of Amsterdam) Visiting Professor of Psychology and Linguistics  
\*Daniel Weiss (Harvard University) Assistant Professor of Psychology and Linguistics

\* Member of Center for Language Science

### Program Objectives of the Dual-Title Degree in Language Science

A dual-title degree program in participating programs and Language Science will prepare students to combine the theoretical and methodological approaches of several disciplines in order to contribute to research in the rapidly growing area of Language Science. This inherently interdisciplinary field draws on linguistics, psychology, speech-language pathology, and cognitive neuroscience, as well as other disciplines, to address both basic and applied research questions in such areas as first and second language acquisition, developmental and acquired language disorders, literacy, and language pedagogy. Dual-title degree students will receive interdisciplinary training that will enable them to communicate and collaborate productively with a wide range of colleagues across traditional discipline boundaries. Such training will open up new employment opportunities for students and give them the tools to foster a thriving interdisciplinary culture in their own future students. The dual-title program will facilitate the formation of a cross-disciplinary network of peers for participating students as part of their professional development.

The dual-title degree program will not duplicate other degree programs in the University.

### Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through one of the participating graduate degree programs (see Appendix E for admissions requirements of potential participating programs). Upon admission to one of the above programs and with a recommendation from a Language Science program faculty member in that department, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

### Doctoral Degree Requirements

The dual-title Ph.D. degree in Language Science will have the following requirements.

Course work (21 credits of 500-level courses)  
6 credits, Proseminar in the Language Science of Bilingualism (LING 521), Proseminar in Professional Issues in Language Science (LING 522)  
3 credits, Research methods/statistics in Language Science (such as LING 525, PSY 507, PSY 508)  
3 credits in theoretical linguistics (students will choose between LING 500 or LING 504)  
3 credits, Cognitive Neuroscience or Psycholinguistics (such as PSY/LING 520, PSY 511)  
6 credits, Research internships (students will choose one course among the following: CSD 596, GER 596, LING 596, PSY 596, SPAN 596)

### Language Science Research Meetings

Students must participate in weekly Language Science Research meetings each semester in residence.

### Foreign Language and English Competency Requirements

The student will fulfill the language requirement specified by the participating department through which the student is admitted to the dual-title degree program.

### Candidacy Examination

In order to be admitted to doctoral candidacy in the dual-title degree program, students will take a candidacy examination that is administered by the primary program. However, the dual-title degree student may require an additional semester or more to fulfill requirements for the primary program and dual-title program; therefore, the candidacy examination may be delayed. In addition, the student will be required to present a portfolio of work in Language Science to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a plan of future study, and samples of writing that indicate the student's work in Language Science. The candidacy examination committee will be composed of faculty from the primary program, as well as at least one faculty member affiliated with Language Science. The designated Language Science faculty member may be appointed in the student's primary program, but he or she may also hold a formal appointment with Linguistics. The Language Science member will participate in constructing and grading candidacy examination questions in the area of Language Science.

### Doctoral Committee Composition

A doctoral committee consisting of at least four members of the Graduate Faculty must be appointed and will include a representative of the Language Science dual-title program. In addition, an official "outside member" must be appointed as one of the four members. The student's doctoral committee will include faculty from the primary program as well as faculty from Language Science. Faculty members who hold appointments in both the primary program and Language Science may serve in a combined role.

### **Comprehensive Examination**

The student's doctoral committee will include faculty from the primary program as well as faculty from Language Science. Faculty members who hold appointments in both the primary program and Language Science may serve in a combined role. The Language Science representative(s) will help to insure that the field of Language Science is integrated into the comprehensive examination.

### **Dissertation**

A dissertation on a topic related to Language Science is required for a dual-title Ph.D. degree in Language Science.

### **Linguistics Minor**

The doctoral minor provides interested students with an opportunity to complete a program of scientific study focused on the nature, structure, and use of human language. The minor is designed to cover the foundations of the discipline of linguistics by reviewing fundamental core areas such as phonology and syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and discourse analysis.

The minor requires a minimum of 15 credits, 6 of which must be at the 500 level. Nine credits are prescribed in syntax (LING 402), phonology (LING 404), and a general introduction to linguistics (LING 401), although a linguistics course at the 500 level may be substituted for LING 401 with the approval of the director of the program in Linguistics.

### **Student Aid**

Most students will be funded through their primary departments, and will be considered for graduate assistantships according to the procedures of those departments. The Center for Language Science currently has two graduate assistantships for which dual-title degree students will be eligible.

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item #: 37-07-033

Review Date: 6/16/09

Last updated by Publications (faculty): 11/01/11

## Landscape Architecture (LARCH)

[Program Home Page](#)

RONALD E. HENDERSON, ASLA, *Department Head*  
121 Stuckeman Family Building  
814-865-9511

### Degree Conferred:

- [M.L.A., M.S., M.S. Dual-title Degree with Human Dimensions of Natural Resources and the Environment \(HDNRE\)](#)

### The Graduate Faculty

- Peter J. Aeschbacher, M.Arch., M.U.P. (UCLA) Associate Professor of Landscape Architecture
- C. Timothy Baird, M.L.A. (Pennsylvania) Associate Professor of Landscape Architecture
- Mallika Bose, Ph.D. (Wisconsin) Associate Professor of Landscape Architecture
- Sean Burkholder, M.L.A. (Harvard), Assistant Professor of Landscape Architecture
- C. Andrew Cole, Ph.D. (Southern Illinois) Associate Professor of Landscape Architecture and Ecology
- Stuart Echols, Ph.D. (Virginia Tech) Associate Professor of Landscape Architecture
- Kelleann Foster, M.L.A. (Massachusetts) Associate Professor of Landscape Architecture
- Larry Gorenflo, Ph.D. (UCSB) Associate Professor of Landscape Architecture
- Ronald E. Henderson, M.L.A. (Pennsylvania) Professor of Landscape Architecture and Asian Studies; Chair in Integrative Design
- Timothy P. Johnson, M.L.A. (Ohio State) Associate Professor of Landscape Architecture
- Gary B. Kesler, M.L.A. (Harvard), Associate Dean Undergraduate Studies, College of Arts and Architecture and Associate Professor of Landscape Architecture
- Barry W. Kew, M.L.A. (Virginia) Assistant Professor of Landscape Architecture
- Neil P. Korostoff, M.L.A. (Pennsylvania) Associate Professor of Landscape Architecture
- Timothy M. Murtha, Ph.D. (Penn State) Associate Professor of Landscape Architecture
- Brian A. Orland, M.L.A. (Arizona), Professor of Landscape Architecture
- M. Eliza Pennypacker, M.L.A. (Virginia) Professor of Landscape Architecture
- Cecilia Rusnak, M.A. (Iowa) Associate Professor of Landscape Architecture
- Bonj Szczygiel, M.L.A. (Penn State) Associate Professor of Landscape Architecture
- Ken Tamminga, M.P.L. (Queen's) Professor of Landscape Architecture
- Thomas C. Yahner, M.L.A. (Penn State) Associate Professor of Landscape Architecture

#### *M.L.A. in Landscape Architecture (Professional Degree)*

The M.L.A. in Landscape Architecture program is an accredited professional degree program focused on preparation to practice landscape architecture for students who hold a bachelor's degree in another field.

#### *M.S. in Landscape Architecture (Research Degree)*

The M.S. in Landscape Architecture program is a research focused degree program designed to offer students graduate level research inquiry into landscape architecture for students who hold a bachelor's degree.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

To be admitted to the program, applicants must be able to meet the following requirements:

- For admission to the M.L.A. in Landscape Architecture applicants must have completed a bachelor's degree from any discipline prior to entry into the M.L.A. program.
- For admission to the M.S. in Landscape Architecture, applicants must have completed a bachelor's degree in Landscape Architecture or a closely related discipline (e.g., geography, ecology, and anthropology).

All submissions for admission must include:

1. A graduate school application; applicants must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.
2. Evidence of creativity (portfolio or other), evidence of analytical ability (research paper or other), and an essay explaining why the individual seeks to study landscape architecture at Penn State
3. Official undergraduate transcript
4. GRE scores
5. TOEFL scores (see below)
6. 3 letters of recommendation

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission. At the discretion of the program, a student may be admitted provisionally for graduate study without these scores.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 600 for the paper-based test or a total score of 100 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### M.L.A. in Landscape Architecture Degree Requirements

The M.L.A. in Landscape Architecture curriculum requires completion of 49 credits of graduate work at the 400-level and above, including a minimum of 44 credits at the 500-level and above. In addition, to fulfill the requirements of professional accreditation, students must undertake 34 credits of prerequisite classes.

Requirements for professional accreditation:

#### **LANDSCAPE ARCHITECTURE (LARCH)**

- 060. History of Landscape Architecture (3)
- 065. Built Environment and Culture (3)
- 231. Introduction to Design Implementation (3)
- 241. Vegetation Ecology and Landscape Design (3)
- 251. Design Visualization and Graphics I (3)

272. Landscape Architecture Field Trip (1)  
 331. Landscape Architectural Design Implementation III (3)  
 332. Landscape Architectural Design Implementation II (3)  
 341. Plants, People and Place: Plants in Landscape Architectural Design (3)  
 361W. Historic Issues in Landscape Architecture (3)  
 382. Professional Practice (3)  
 431. Landscape Architectural Design Implementation I (3)

Core Requirements for the Graduate Degree:

#### LANDSCAPE ARCHITECTURE (LARCH)

414. Design and Theory V: Advanced Landscape Architectural Design (10)  
 502. Intellectual History and Theory of Landscape Architecture (3)  
 510. Graduate Seminar in Landscape Architecture (3)  
 515. Design and Theory I - Introduction (5)  
 520. Design and Theory II (5)  
 530. Design and Theory III (5)  
 540. Design and Theory IV (5)  
 550. Graduate Studio IV (7)  
 590. Colloquium (6)

### M.S. in Landscape Architecture Degree Requirements

The core curriculum is a two-year research-focused 40-credit minimum program including a minimum of 18 credits at the 500-level and above. Students are required to take graduate level coursework, including graduate seminars (12 credits), graduate colloquium (4 credits), research design (3 credits), and a course in quantitative/qualitative analysis (3 credits minimum). Students must also complete a M.S. thesis.

Core graduate requirements:

#### LANDSCAPE ARCHITECTURE (LARCH)

501. Research Writing in Landscape Architecture (3)  
 502. Intellectual History and Theory of Landscape Architecture (3)  
 510. Graduate Seminar (12)  
 590. Graduate Colloquium (4)  
 600. Thesis Research (1- 15)

The student and the student's adviser, subject to the approval of the departmental Graduate Program Committee, determine specific course requirements.

### Option 1: M.S. in Landscape Architecture (Community and Urban Design)

The Community and Urban Design (CUD) Option provides students with in-depth inquiry into the theory and practice of community-based and urban design that responds to trends related to urban growth and change, the rise of the non-profit sector in community governance, and poverty and environmental degradation in urbanized and urbanizing areas. The intent of the CUD Option is to introduce students to theory, methods, and research surrounding specific topics in CUD. Students undertake hands-on design work and research as well as coursework in methods and computer applications, planning and policy, and ethics and society.

The CUD Option offers a topical curricular "track" within the M.S. in Landscape Architecture program. The core degree requirements for the CUD Option are the same as for the M.S.: 40 credits, comprising seminars, electives, design, and research, but focuses student core seminars and methods on CUD specific courses. Twenty-four credits of the following coursework must be completed for the CUD option:

- Depth and Hands-on Experience in Design and Research Inquiry
- 9 credits of breadth at 400-500 level are required in the following subject areas:
  - 3 credits in Methods and Computer Applications
  - 3 credits in Community and Urban Design in Planning
  - 3 credits in Ethics and Society

Additional CUD-oriented breadth electives are recommended, but optional, within the remaining elective credits required in the M.S. in Landscape Architecture.

Students are expected to complete the requirements of the M.S. in Landscape Architecture with CUD option in four semesters.

### Option 2: M.S. in Landscape Architecture (Watershed Stewardship)

The pedagogic foundation of the Graduate Option in Watershed Stewardship is the integration of depth, breadth, and experience for each student. From their undergraduate background students will bring a focus which will be enhanced via graduate level coursework in their field. They will also be required to take graduate courses in watershed-related disciplines outside their own major: the breadth requirements. And through community focused experience of at least 8 credits of Keystone Projects (FOR 570 and FOR 571) and at least 2 credits of seminars (LARCH 510 or FOR 591A and FOR 591B), students will be challenged to analyze and understand watersheds and creatively synthesize community-appropriate solutions.

The degree requirements for Graduate Option in Watershed Stewardship are the same as those for the Master of Science in Landscape Architecture degree program with the addition of a minimum of 2 credits of FOR 591A and FOR 591B Watershed Stewardship Graduate Seminar sections focused on watershed stewardship in their first year, and at least 8 credits of FOR 570 and FOR 571 Watershed Stewardship sections for the Keystone Project in their second year.

Students in the Graduate Option in Watershed Stewardship will be required to take a minimum of 9 credits of elective course work to ensure breadth of training in essential watershed stewardship subjects. Three credits of 400- or 500-level course work will be required from each of the following three subject categories: (1) Water Resources Sciences, (2) Social Science, Public Policy, or Economics, and (3) Humanities.

### Dual-Title Graduate Degree in Landscape Architecture and Human Dimensions of Natural Resources and the Environment

Graduate students with research and educational interests in landscape architecture or a closely related discipline (e.g., architecture, geography, ecology, anthropology, etc.) may apply to the M.S. degree in Landscape Architecture/Human Dimensions of Natural Resources and the Environment Program. The goal of the dual-title degree Landscape Architecture and Human Dimensions of Natural Resources and the Environment graduate program is to enable graduate students from Landscape Architecture to acquire the knowledge and skills of their major area of specialization in Landscape Architecture, while at the same time gaining the perspective and methods of Human Dimensions of Natural Resources and the Environment.

This dual-title graduate degree program does not duplicate any other degree program at the University.

### Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to Penn State's Graduate School as well as to the Landscape Architecture graduate program (M.S. degree in Landscape Architecture). Once accepted into the Landscape Architecture program, the student can apply to the Admissions Committee of Human Dimensions of Natural Resources and the Environment. The Human Dimensions of Natural Resources and the Environment admissions committee reviews applications and recommends students for admission to the dual-title degree program to The Graduate School.

In addition to the admission requirements for the Landscape Architecture M.S. degree program, the Human Dimensions of Natural Resources and the Environment program also requires a minimum baccalaureate Jr/Sr grade-point average of 3.0 on a 4.0 scale.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Landscape Architecture program in which they are primarily enrolled. In

addition, they must satisfy the requirements described below, as established by the Human Dimensions of Natural Resources and the Environment committee. Within this framework, final course selection is determined by the student, the Human Dimensions of Natural Resources and the Environment adviser, and the Landscape Architecture program adviser.

Upon a student's acceptance by the Human Dimensions of Natural Resources and the Environment admissions committee, the student will be assigned a Human Dimensions of Natural Resources and the Environment academic adviser in consultation with the Human Dimensions of Natural Resources and the Environment chair. As students develop specific scholarly interests, they may request that a different Human Dimensions of Natural Resources and the Environment faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Landscape Architecture program and the Human Dimensions of Natural Resources and the Environment Program.

### **Requirements for Landscape Architecture and Human Dimensions of Natural Resources and the Environment Master's degree**

The Master of Science degree in Landscape Architecture and Human Dimensions of Natural Resources and the Environment is awarded only to students who are admitted to the Landscape Architecture Master of Science degree program and then admitted to the dual-title degree in Human Dimensions of Natural Resources and the Environment.

#### **The HDNRE program requires:**

A candidate for the dual-title intercollegiate M.S. in HDNRE must complete 17 credit hours of HDNRE coursework beyond the bachelor's degree in addition to curricular requirements for the masters' degree in the student's primary program. The HDNRE requirement includes four common courses in the HDNRE curriculum – i.e., HDNRE 590 Colloquium (2 credits), HDNRE 574 Integrated Perspectives in Human Dimensions of Natural Resources and the Environment, HDNRE 575 Ethical Issues in Human Dimensions of Natural Resources and the Environment, and R SOC 555 Human Dimensions of Natural Resources. In addition, each HDNRE student will take either ANTH 559 Human Ecology or FOR 565 GIS-Based Socio-Ecological Landscape Analysis, and one additional course selected in consultation with the student's graduate committee. The HDNRE Colloquium must be taken in each of the first two semesters of enrollment in the dual-title intercollegiate degree program. In addition, 6 semester credit hours of Thesis Research (in Landscape Architecture) are required.

A thesis committee for the dual-title M.S. degree will consist of two graduate faculty members from Landscape Architecture and one graduate faculty member from the Human Dimensions of Natural Resources and the Environment Program. The thesis topic itself will be an integration of both Landscape Architecture and HDNRE.

Candidates for the dual-title Master of Science degree in Landscape Architecture and Human Dimensions of Natural Resources and the Environment will also be required to pass a final defense covering the general field of Landscape Architecture and Human Dimensions of Natural Resources and the Environment Program, with emphasis on the student's area of specialization. The defense is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate major program requirements and those of the dual-title program. Final course selection is determined by the students in consultation with their dual-title program advisers and their major program advisers.

### **Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### **[LANDSCAPE ARCHITECTURE \(LARCH\) course list](#)**

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-023

Review Date: 06/12/2012

Last updated by Publications: 12/16/11

## Leadership Development (LEAD)

DANIEL C. INDRO, *Academic Division Head*  
 School of Graduate Professional Studies  
 Penn State Great Valley  
 30 East Swedesford Road  
 Malvern, PA 19355-1443  
 610-648-3229  
[www.sgps.psu.edu](http://www.sgps.psu.edu)

### Degree Conferred:

M.L.D.

### The Graduate Faculty

- Janice L. Dreachslin, Ph.D. (Wayne State) Professor of Health Policy and Administration
- Janet M. Duck, Ph.D. (Penn State) Assistant Professor of Management and Organization
- Kathryn Jablokow, Ph.D. (Ohio State) Associate Professor of Engineering
- Barrie E. Litzky, Ph.D. (Drexel) Associate Professor of Management and Organization
- Denise Potosky, Ph.D. (Rutgers) Associate Professor of Management and Organization
- John J. Sosik, Ph.D. (SUNY, Binghamton) Professor of Management and Organization
- Eric W. Stein, Ph.D. (Pennsylvania) Associate Professor of Management Science and Information Systems

The Penn State Great Valley Master of Leadership Development (MLD) program is a 36-credit interdisciplinary professional program that blends the social and behavioral sciences with ethical studies to develop outstanding organizational and community leaders. As part of the School's Management Division, the program is accredited under the specialized accreditation received from the Association to Advance Collegiate Schools of Business International (AACSB). The program is designed to meet the educational needs of professionals at the middle to senior levels of management. Note that the focus of this program is different from that of the MBA offered by the School: While the MBA program provides an overview of leadership, the purpose of the MLD program is to provide an in-depth analysis of the theory and practice of authentic transformational leadership by providing an environment in which faculty and students can have a complete and open collaboration on what constitutes exemplary leadership. The MLD curriculum emphasizes strategic leadership and the creation of wealth in organizations, balancing financial measure of performance with learning and growth, and customer and external process perspectives. The program builds on the mid- and high-level managerial and administrative experience of students in order to achieve its goal of promoting positive change in individuals, teams, organizations, and communities.

The program provides training in leadership-relevant research, and some students continue on to pursue a doctoral degree. Required research may be conducted in Penn State Great Valley's Library and Computer Center, which provide local research support as well as access to the library and computer resources of the entire Penn State system.

The MLD program is geared primarily toward the needs of part-time students who are employed full-time. Courses in the program, which are offered at Great Valley, are scheduled for the convenience of adult learners, mainly in the evening or on Saturdays.

### Admission Requirements

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Requirements listed here are in addition to the Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

An undergraduate and/or graduate GPA of at least 3.0 on a 4.0 scale is required for admission. It is strongly preferred that applicants present at least five years of related professional work experience.

All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) and receive a minimum of 570 (paper score), or 230 (electronic score), or 80 points on the new Internet-based test with a minimum of 23 points on the speaking portion; or the International English Language Testing System (IELTS) with a minimum composite score of 6.5 for admission and submit the results of that test with the application for admission.

Admission decisions are based on a review of the applicant's professional and academic accomplishments as presented in the Admissions Dossier and the quality of the applicant's credentials in relation to those of other applicants who meet the requirements for admission. A complete Admissions Dossier includes the following:

- Online application and non-refundable application fee;
- current resume, preferably indicating at least five years of related work experience;
- two official transcripts from each regionally-accredited college or university attended, (both undergraduate and graduate), with credit conditions equivalent to those required by Penn State; or a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.
- completion of two 300-word leadership essay questions developed by the faculty to assess an applicant's logical reasoning and writing skills;
- two confidential evaluation forms/letters of endorsement from executives or community leaders detailing their evaluation of the applicant's leadership ability and potential.

Application Filing Dates: Penn State Great Valley's MLD program has a rolling admissions policy. Students may be admitted and enroll in classes in early September or early January. More detailed information about the program may be found at <http://www.sgps.psu.edu/prospective/academicprograms/leadership/mld.ashx>. More detailed information about the application process and the application requirements may be found at <http://www.sgps.psu.edu/prospective/academicprograms/leadership/mld/admission.ashx>.

### Degree Requirements

Thirty-six (36) credits are required to complete the MLD degree. A series of leadership cornerstone (12 credits) and leadership competency courses (9 credits) are required to provide all MLD students with a common body of knowledge. Leadership Context courses (12 credits) and a Capstone course (3 credits) round out the program.

Leadership Cornerstone courses (12 credits) provide a foundation for leadership development studies. They include: LEAD 501 (Leadership Across the Lifespan), BUSAD 555/LEAD 555 (Full-Range Leadership Development), BUSAD 556/LEAD 556 (Diversity Leadership), and LEAD 557 (Leadership Models and Methods).

Leadership Competency courses (9 credits) build a foundation for effective leadership communication, creativity/innovation, and moral development. They include: LEAD 561 (Dynamic Communication in Leadership Contexts), [MGMT 573 (Corporate Innovation Strategies or SYSEN 550 (Creativity, Innovation, and Change) or BUSAD/LEAD 519 (Developing Creative High Performance Organizations)], and [BUSAD 534 (Ethical Dimensions of Management in the Biotechnology and Health Industry) or PHIL 597 (Ethical Dimensions of Leadership) or BUSAD 576 (Ethical Issues in Information Technology)].

Leadership Context courses (12 credits) provide an overview of the situations in which leadership processes are embedded. They include: LEAD 562 (Strategic Leadership), [BUSAD 551 (Business Environment) or BUSAD 530 (Biotechnology and Health Industry Overview)], and a choice of 2 context-specific electives (6 credits).

All students must complete a capstone course that provides students with an opportunity to enact what they have learned in their course work in the context of promoting positive change in their community, LEAD 582 (Social Entrepreneurship and Community Leadership).

### Student Aid

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley.

Most students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To learn more about payment options for students who receive employer tuition reimbursement benefits, or for more information on other payment options that may be available to you, contact the Great Valley Financial Aid Office, 610-648-3311.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BUSINESS ADMINISTRATION \(BUSAD\) courses](#)

[INTERNATIONAL BUSINESS \(I B\) courses](#)

[LEADERSHIP \(LEAD\) courses](#)

[MANAGEMENT \(MGMT\) courses](#)

[SYSTEMS ENGINEERING \(SYSEN\) courses](#)

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-06-138

Review Date: 04/13/2010

Date last updated by Publications: 8/21/09



## Literacy Education (LEDUC)

### [Program Home Page](#)

ANN BERGER-KNORR, *Program Coordinator*  
Penn State Harrisburg  
Middletown, PA 17057  
717-948-6213

### Degree Conferred:

M.Ed.

### The Graduate Faculty

- Ann L. Berger-Knorr, Ph.D. (Penn State) Assistant Professor of Reading
- Mary Napoli, Ph.D. (Penn State) Assistant Professor of Education

The Master of Education in Literacy Education at Penn State Harrisburg is designed to provide full-time and part-time graduate students with a focused program of study in the field of reading education. The program is aligned with the standards of the Pennsylvania Department of Education. Following successful completion of the program, students are eligible to take the Praxis examination for certification as a reading specialist (K-12). Specifically, the goals of the program are to develop in students: (1) specialized, in-depth knowledge about the teaching of reading and writing; (2) the clinical skills necessary for diagnosing and intervening with reading disabled students; (3) the ability to interpret and to evaluate literacy research; (4) the literacy leadership skills necessary to support the professional practices in a K-12 setting; (5) provide rigorous offerings aligned with the standards of the International Reading Association (IRA) and the National Council for the Accreditation of Teacher Education (NCATE); and (6) prepare students for the complexities they will face as reading specialists in schools serving the K-12 population.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the [Graduate Bulletin](#).

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

### Admission

The M.Ed. Program in Literacy Education has five important admission requirements.

First, candidates must have achieved an overall junior/senior grade point average of 3.00 or higher. For candidates applying for admission who have completed credits beyond the baccalaureate degree, we will evaluate the last (approximately) 60 credits completed.

Second, candidates must submit two letters of recommendation. These letters must be from former professors or professionals who can attest to the academic ability and potential of the candidate.

Third, candidates must submit a 200-300 word personal statement that addresses their career goals and reasons for pursuing a graduate degree.

Fourth, candidates must have a valid Pennsylvania Teaching Certificate and present evidence that they have completed a course in the methods of teaching reading such as EDUC 320 (Methods in Teaching Beginning Readers) or 321 (Methods in Teaching Intermediate and Advanced Readers) with a grade of C or better.

Fifth, candidates must submit test scores from one of the following: Graduate Record Examination, Miller Analogies Test, or Praxis examinations completed for certification.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Retention

Candidates must maintain a minimum 3.00 grade point average, satisfactorily complete all required key assessments, attain a grade of "C" or better in all required core courses. Candidates who do not make satisfactory progress will be notified in writing noting the specific deficiencies and requesting that they meet with the program coordinator to develop a remediation plan. Failure to meet or to satisfactorily complete the remediation plan will result in termination from the program.

All persons enrolled in Teacher Education Programs at Penn State Harrisburg are expected to demonstrate the professional dispositions that are aligned with the unit's vision statement. The faculty shall evaluate the approved dispositions demonstrated by the candidates in class and during field experiences. Candidates may be rated as exemplary, acceptable, or unacceptable. Candidates are expected to attain acceptable or exemplary ratings in order to graduate.

### Degree Requirements

The Master of Education degree in Literacy Education consists of 42 credits that prepare candidates for the Pennsylvania Reading Specialist Certification (K-12). The degree requirements for the Master of Education in Literacy Education includes 36 credits in foundational, pedagogical, and advanced theoretical work in reading, writing and educational research design and a 6 credit capstone clinical practicum for a total of 42 credits. A minimum grade-point average of 3.00 for work done at the University and acceptable or higher ratings on the professional dispositions are required for graduation.

### Prescribed Core Course Requirements (39 Credits)

#### EDUCATION (EDUC)

- 422. Literature for Children and Adolescents (3)
- 425. Literacy Assessment (3)
- 452. Teaching Writing (3)
- 466. Foundations of Teaching English as a Second Language (3)
- 471. Best Practices in Literacy (3)
- 477. Teaching Struggling Readers and Writers (3)
- 561. Psychology of Reading (3)
- 562. Diagnostic Evaluation of Reading Problems (3)
- 563. Advanced Methods of Teaching Reading (3)
- 564. Reading Clinic (6)
- 565. Literacy Leadership (3)
- 586. Educational Research Designs (3)

**Electives**

(Choose 3 credits from the following)

Students can choose either one of two electives in the program. Both elective courses (ENGL 409 or EDUC 432) require specialized study in the teaching of writing. ENGL 409 (taken concurrently with EDUC 452) will allow the student to complete a writing fellowship with the Capital Area Writing Project. Or, EDUC 432 allows for the in-depth study of writing through children's literature.

EDUC 432 Children's Literature in the Writing Curriculum (3)  
ENGL 409 Composition Theory and Practice for Teachers (3)

**Transfer Credits**

Subject to the limitations given below, a maximum of 10 credits of high-quality graduate work done at a regionally accredited institution may be applied toward the requirements for the master's degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree program at Penn State. The student should distinguish carefully between the transferability of credit and its applicability in a particular degree program. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of an accredited university. Pass-fail grades are not transferable to an advanced degree program unless the "Pass" can be substantiated by the former institution as having at least B quality.

A maximum of 15 graduate credits taken as a nondegree student prior to admission to a graduate degree program may be applied to a graduate program, with departmental approval. The credits must have been earned within five years preceding entry into the degree program.

Forms for transfer of credit can be obtained from the graduate program office.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit courses below the 400 level in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2008

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Editorial updates: 11/27/12

## Mechanical Engineering (M E)

KAREN A. THOLE, *Head of the Department of Mechanical and Nuclear Engineering*  
137 Reber Building  
814-865-2519

### Degrees Conferred:

- [Ph.D., M.S.](#)
- [Integrated B.S. and M.S. in Mechanical Engineering](#)

### The Graduate Faculty

- Ashok D. Belegundu, Ph.D. (Iowa) Professor of Mechanical Engineering
- André L. Boehman, Ph.D. (Stanford) Professor of Fuel Science, and Materials Science and Engineering
- James G. Brasseur, Ph.D. (Stanford) Professor of Mechanical Engineering, Bioengineering, and Mathematics
- Jack S. Brenizer, Ph.D. (Penn State) Professor of Mechanical and Nuclear Engineering
- Sean N. Brennan, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Mechanical Engineering
- Liming Chang, Ph.D. (Illinois) Professor of Mechanical Engineering
- Fan-Bill Cheung, Ph.D. (Notre Dame) Professor of Mechanical Engineering
- John M. Cimbala, Ph.D. (Cal Tech) Professor of Mechanical Engineering
- Edward C. De Meter, Ph.D. (Virginia Tech) Professor of Mechanical Engineering and Industrial Engineering
- Hosam Fathy, Ph.D. (Michigan) Assistant Professor of Mechanical Engineering
- Mary I. Frecker, Ph.D. (Michigan) Professor of Mechanical Engineering
- Amanul Haque, Ph.D. (Illinois, Urbana-Champaign) Professor of Mechanical Engineering
- Daniel C. Haworth, Ph.D. (Cornell) Professor of Mechanical Engineering
- Jun (Tony) Huang, Ph.D. (California, Los Angeles) Associate Professor of Engineering Science and Mechanics
- Kathryn Jabllokow, Ph.D. (Ohio State) Associate Professor of Mechanical Engineering (Great Valley)
- Seungjin Kim, Ph.D. (Purdue) Associate Professor of Mechanical and Nuclear Engineering
- Anil K. Kulkarni, Ph.D. (Brown) Professor of Mechanical Engineering
- John S. Lamancusa, Ph.D. (Wisconsin, Madison) P.E. Professor of Mechanical Engineering
- A. Scott Lewis, Ph.D. (Penn State) Research Associate, Applied Research Laboratory
- Thomas A. Litzinger, Ph.D. (Princeton) Professor of Mechanical Engineering
- Bruce Logan, Ph.D. (California, Berkeley) Kappe Professor of Environmental Engineering
- Lyle N. Long, Ph.D. (George Washington) Distinguished Professor of Aerospace Engineering
- Eric R. Marsh, Ph.D. (MIT) Professor of Mechanical Engineering
- Matthew M. Mench, Ph.D. (Penn State) Associate Professor of Mechanical Engineering
- Panagiotis Michaleris, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Mechanical Engineering
- Timothy F. Miller, Ph.D. (Penn State) Senior Research Associate, Applied Research Laboratory
- Eric M. Mockensturm, Ph.D. (California, Berkeley) Associate Professor of Mechanical Engineering
- Jason Moore, Ph.D. (Michigan) Assistant Professor of Mechanical Engineering
- Zoubeida Ounaies, Ph.D. (Penn State) Associate Professor of Mechanical Engineering
- Matthew B. Parkinson, Ph.D. (Michigan) Associate Professor of SEDTAPP; Assistant Professor of Mechanical Engineering
- Eric G. Paterson, Ph.D. (Iowa) Senior Research Associate, Applied Research Laboratory
- Laura L. Pauley, Ph.D. (Stanford) P.E. Professor of Mechanical Engineering
- Horacio Perez-Blanco, Ph.D. (Illinois, Urbana-Champaign) Professor of Mechanical Engineering
- Stephen J. Piazza, Ph.D. (Northwestern) Associate Professor of Kinesiology, Bioengineering, and Mechanical Engineering
- Christopher D. Rahn, Ph.D. (California, Berkeley) Professor of Mechanical Engineering
- Asok Ray, Ph.D. (Northeastern) P.E. Distinguished Professor of Mechanical Engineering
- Domenic A. Santavicca, Ph.D. (Princeton) Professor of Mechanical Engineering
- Robert J. Santoro, Ph.D. (Boston College) George L. Guillet Professor of Mechanical Engineering
- Gary S. Settles, Ph.D. (Princeton) Distinguished Professor of Mechanical Engineering
- Alok Sinha, Ph.D. (Carnegie Mellon) Professor of Mechanical Engineering
- H. Joseph Sommer III, Ph.D. (Illinois, Urbana-Champaign) Professor of Mechanical Engineering
- Jelena Srebric, Ph.D. (MIT) Adjunct Professor of Mechanical Engineering; Professor of Architectural Engineering
- Gita Talmage, Ph.D. (Illinois, Urbana-Champaign) Professor of Mechanical Engineering
- Karen A. Thole, Ph.D. (Texas, Austin) Professor of Mechanical Engineering
- Stefan T. Thynell, Ph.D. (North Carolina State) Professor of Mechanical Engineering
- Martin W. Trethewey, Ph.D. (Michigan Tech) Professor of Mechanical Engineering
- Stephen R. Turns, Ph.D. (Wisconsin) Professor of Mechanical Engineering
- Adri van Duin, Ph.D. (Delft U of Tech, The Netherlands) Associate Professor of Mechanical Engineering
- Chao-Yang Wang, Ph.D. (Iowa) Diefenderfer Chair of Mechanical Engineering
- Donghai Wang, Ph.D. (Tulane) Assistant Professor of Mechanical Engineering
- Qian Wang, Ph.D. (Princeton) Assistant Professor of Mechanical Engineering
- David N. Wormley, Ph.D. (MIT) Harold and Inge Marcus Dean of Engineering; Professor of Mechanical Engineering
- John Wyngaard, Ph.D. (Penn State) Professor of Meteorology, Geo-Environmental Engineering, and Mechanical Engineering
- Savas Yavuzkurt, Ph.D. (Stanford) Professor of Mechanical Engineering
- Richard A. Yetter, Ph.D. (Princeton) Professor of Mechanical Engineering

Graduate programs and research facilities are available in combustion, heat transfer, fluid mechanics, energy storage, dynamic system analysis, robotics, mechanical design, energy systems, biomedical applications, and micro-nano applications. Air pollution control, automotive safety, tribology, designing for noise control and for reliability also provide many research and design opportunities.

### Admission Requirements

To maintain a high quality program, it is important that our students are also of a caliber to succeed. As such, the admission requirements for the students enrolling in the online program will not differ from those of our resident students. Online students will only be accepted into the program with approval from the Department's Admissions Committee. Within the Department, the ME Admissions Committee (made up of ME Graduate Faculty) will provide recommendations to the Professor-in-Charge of Graduate Studies on accepting students to the MSME degree program. It is expected that students have a Bachelor of Science degree in a suitable engineering field from an ABET accredited institution. Admission decisions will also be based upon relevant work experience and recommendation letters.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a

college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

## Degree Requirements

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in mechanical engineering. Resident students pursuing an M.S. degree may choose one of two options: completion of 24 course credits and the submission of a thesis (6 credits) to the Graduate School, or 30 course credits and the submission of a scholarly paper to the department. The M.S. degree program is also offered on-line in which only the 30 course credits and the submission of a scholarly paper is permitted. The requirements for the M.S. M E degree program are:

1. Minimum of 30 course credits at the 400 level or higher, of which 20 course credits must be earned at Penn State. Note that 2 additional credits are required by enrolling in the M E 590 Colloquium but these 2 additional credits do not count toward the 30 course credits. The required course credits must be completed with a grade point average of 3.00 or higher.
2. All students must successfully complete two credits of M E 590 Colloquium preferably in their first two semesters in the program. These two colloquium credits do not count toward the 30 course credits in Requirement 1 above.
3. At least 18 credits in 500- and 600-level courses.
4. A minimum of 12 credits in 400- and 500-level courses in Mechanical Engineering, excluding M E 410, 440W, 441W, 442W, 443W, 450, and any other required undergraduate courses. M E 596 cannot be used to fulfill this requirement.
5. The MSME requires three credits of mathematics. These credits must be taken from the following group of courses: E MCH 524A, E MCH 524B, M E 512, M E 550, and all 400- and 500-level MATH courses (MATH 4XX, MATH 5XX) except MATH 419, 427, 428, 435, 451, 455, 456, 461, 470, 471, 475, 475W, 482 and 484. Courses with a specific focus on numerical analysis will not count toward the mathematics requirement.
6. A thesis or paper must be presented to meet the specific requirement of the culminating experience type selected; the paper may take the form of a doctoral research proposal if agreed upon in advance by the student and the graduate adviser. Online students seeking an MSME degree will only be permitted to write a paper.
7. Preparatory course(s) required for teaching assistants (such as ENGR 888), remedial courses, and any courses required in our undergraduate program are not counted toward degree requirements.

### *CULMINATING EXPERIENCE OPTION A - M.S. THESIS*

Candidate registers for a minimum of six credits of M E 600 or M E 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including M E 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

### *CULMINATING EXPERIENCE OPTION B - M.S. PAPER*

Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of M E 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students are admitted to candidacy after passing written and oral examinations. The Ph.D. program is quite flexible, with minimal formal requirements. The Ph.D. is awarded upon completion of a program of advanced study that includes a minimum period of residence, a satisfactory dissertation, and the passing of comprehensive and final oral examinations as determined by the student's doctoral committee.

Generally, a Ph.D. student must have 30 credits above a master's degree before taking the comprehensive examination.

## Integrated B.S. and M.S. in Mechanical Engineering

A limited number of undergraduate students in the B.S M E program will be considered for admission to the integrated undergraduate/graduate program leading to the B.S. M E and the M.S. M E degrees. Students with a junior standing in the B.S. M E degree program may be admitted to the integrated B.S.M.E./M.S.M.E. program, following a positive review of an application specific to this program by the faculty committee on graduate admissions. Students must have attained a GPA of at least 3.0. Students admitted to the integrated program must maintain a GPA in all classes used toward the M.S. M E degree of at least 3.0.

## Student Aid

Graduate students are supported by a variety of government and industry fellowships, traineeships, and research and teaching assistantships. Stipends vary depending on the source. Competition for support is extremely keen; however, outstanding students are considered for attractive offers of support, including various fellowships specifically for new students in the College of Engineering. By completing the department's application for financial assistance, you will automatically be considered for a graduate assistantship. To receive full consideration for financial aid, all application materials should be submitted by December 15.

## Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [MECHANICAL ENGINEERING \(M E\) course list](#)

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-07-005

Review Date: 06/11/2013

Faculty updated: 5/24/13

## Molecular Toxicology

### [Program Home Page](#)

JEFFREY M. PETERS, *Co-Chair*  
Intercollege Graduate Degree Program in Molecular Toxicology  
312 Life Sciences Building  
University Park, PA 16802  
814-863-1387

JONG YUN, *Co-Chair*  
Intercollege Graduate Degree Program in Molecular Toxicology  
College of Medicine, Penn State Milton S. Hershey Medical Center  
500 University Drive  
Hershey, PA 17033

### Degrees Conferred:

Ph. D., M.S.

### The Graduate Faculty

- Shantu Amin, Ph.D. (Stevens Institute of Technology) Professor of Pharmacology and Biochemistry and Molecular Biology
- Anne Andrews, Ph.D. (American University) Assistant Professor of Veterinary and Biomedical Sciences
- Keith Cheng, M.D.; Ph.D. (NYU; U Washington) Associate Professor of Pathology; Adjunct Professor of Biochemistry and Molecular Biology
- Gary Clawson, Ph.D.; M.D., (Michigan State; Miami) Professor of Pathology, and Biochemistry and Molecular Biology
- Dhimant Desai, Ph.D. (Bombay Univ) Associate Professor of Pharmacology
- Kristin Eckert, Ph.D. (Wisconsin, Madison) Associate Professor of Pathology, and Biochemistry and Molecular Biology
- Karam El-Bayoumy, Ph.D. (New York University) Professor of Pharmacology and Biochemistry and Molecular Biology
- Adam Glick, Ph.D. (Yale) Associate Professor of Veterinary and Biomedical Sciences
- Christopher Herzog, Ph.D. (Medical College of Ohio) Assistant Professor of Pharmacology
- Harriet Isom, Ph.D. (Illinois) Assistant Dean and Director of the M.D./Ph.D. Program; Distinguished Professor of Microbiology and Immunology and Professor of Pathology
- Mark Kester, Ph.D. (SUNY, Buffalo) Professor of Pharmacology
- Philip Lazarus, Ph.D. (McGill) Associate Director Penn State Cancer Institute
- Robert Levenson, Ph.D. (SUNY, Stony Brook) Professor of Pharmacology
- Keith Martin, Ph.D. (North Carolina, Greensboro) Assistant Professor of Nutrition
- Andrea M. Mastro, Ph.D. (Penn State) Professor of Microbiology and Cell Biology
- Kathleen Mulder, Ph.D. (SUNY, Buffalo) Professor of Pharmacology
- Chris Mullin, Ph.D. (Cornell) Professor of Insect Toxicology
- Curtis J. Omiecinski, Ph.D. (Univ of Washington) Professor of Veterinary and Biomedical Sciences
- Andrew Patterson, Ph.D. (NCI and George Washington) Assistant Professor of Molecular Toxicology
- Gary Perdew, Ph.D. (Oregon State) Distinguished Professor of Molecular Toxicology
- Jeffrey M. Peters, Ph.D. (California, Davis) Associate Professor of Molecular Toxicology
- C. Channa Reddy, Ph.D. (Indian Inst of Science) Distinguished Professor and Head of Veterinary and Biomedical Sciences
- John Richie, Ph.D. (Louisville) Professor of Health Evaluation Sciences
- Gavin Robertson, Ph.D. (California, Riverside) Assistant Professor of Pharmacology
- Thomas Spratt, Ph.D. (Chicago) Associate Professor of Biochemistry and Molecular Biology
- Chen-Pei David Tu, Ph.D. (Cornell) Professor of Biochemistry and Molecular Biology
- John Vanden Heuvel, Ph.D. (Wisconsin) Associate Professor of Molecular Toxicology
- Kent Vrana, Ph.D. (Louisiana State) Professor and Chair of Pharmacology
- Jong Yun, Ph.D. (Case Western Reserve) Assistant Professor of Pharmacology
- Jiyue Zhu, Ph.D. (Dartmouth Medical School) Assistant Professor of Cellular and Molecular Physiology

The Intercollege Graduate Program in Molecular Toxicology (IGDP in MT) prepares graduates for diverse opportunities in academic institutions, pharmaceutical companies, private research foundations, governmental research, and regulatory programs. The program includes faculty from eight departments in the College of Agricultural Sciences, Health and Human Development and Eberly College of Science at the University Park campus and the College of Medicine at the Penn State Milton S. Hershey Medical Center. The IGDP in MT is also supported by the Huck Institutes of Life Sciences, which provides modern telecommunications facilities and sophisticated equipment for state-of-the-art research applications. Doctoral students not only explore new conceptual connections, but also engage in active group-learning experiences and explore a variety of potential career opportunities before graduation. Two unique aspects are (1) optional dual mentors will expose students to complementary viewpoints and encourage students to pursue problems at the interface between traditional disciplines, and (2) an optional internship will provide a mechanism for students to obtain "real world" experience in future professional settings.

### General Admission Requirements

#### M.S. or Ph.D. degrees

Application deadline is January 10 for priority consideration.

1. Completed official Penn State Graduate School application
2. Paid nonrefundable application fee
3. Two official transcripts from each institution attended
4. Application for a U.S. visa (International applicants only)
5. Graduate Record Examinations (GRE) general test
6. Three letters of recommendation
7. Statement of goals that pertains to the life sciences
8. International applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English, must take the TOEFL (Test of English as a Second Language) and submit the results of that test with the application for admission. A TOEFL score of 550 on the paper test, a score of 213 on the computer-based test, or 80 points on the internet-based test with a minimum of 23 points on the speaking portion is required for admission.
9. Students must have completed a bachelor's degree at an accredited college or university and have a minimum of a 3.0/4.0 junior/senior undergraduate grade-point average.

#### Additional English Requirement for International Students (both M.S. and Ph.D.)

International applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English, whether or not they hold a teaching assistantship, will be required to take the AEOCPT (American English Oral Communicative Proficiency Test) prior to entering the classroom. The AEOCPT is given at the beginning of fall and spring semesters. All international students are required to preregister for this test. This test is administered at the University Park campus, thus students from the Hershey campus are required to take the test at the University Park campus. Below is the course of action for the score ranges:

- Greater than 250 approved for teaching and the ESL (English as a Second Language) requirement will be satisfied.
- 230-249 required to schedule and pass ESL 118G.
- 200-229 required to pass ESL 117G\*. These students will not be permitted to teach in a classroom situation, and may instead be assigned to grading

and/or proctoring duties.

- Less than 200 required to schedule and pass with the grade of A ESL 115G, before ESL 117G\*. These students will not be permitted to teach in a classroom situation, and may instead be assigned to grading and/or proctoring duties.

\* At the end of this course, students are re-tested. Based upon these test results, students are either approved for teaching, placed in a subsequent ESL course, or asked to retake the course. Students who are required to enroll in ESL courses must complete the ESL requirement by the end of the second semester of residency. As noted above, the ESL courses are taught at the University Park campus, thus students from the Hershey campus must attend these courses at the University Park campus, or receive suitable course work at Hershey, if available. Students who fail to satisfy this requirement may be terminated from the IGDP in MT program, at the discretion of the co-chairs.

### Program Requirements

#### M.S. or Ph.D. degrees

1. Foundation of basic knowledge in molecular biology, cell biology, biochemistry, and molecular toxicology. The IGDP in MT requires at least 9 credits in one or more of these disciplines, taken either as an undergraduate or as a part of the graduate curriculum. The following courses are requirements for respective campuses.

#### University Park students

##### BIOCHEMISTRY AND MOLECULAR BIOLOGY (B M B)

400. MOLECULAR BIOLOGY OF THE GENE (3 credits)

##### VETERINARY AND BIOMEDICAL SCIENCES (VB SC)

433. MOLECULAR AND CELLULAR TOXICOLOGY (3 credits)

##### VETERINARY SCIENCE (V SC)

V SC/IBIOS 530. REGULATION OF GENE EXPRESSION (3 credits)

#### Hershey Medical Center Students

##### CELL AND MOLECULAR BIOLOGY (CMBIO)

502. CORE BIOCHEMISTRY (3 credits)

503. MOLECULAR BIOLOGY (3 credits)

##### PHARMACOLOGY (PHARM)

520. PRINCIPLES OF DRUG ACTION (2 credits)

In addition to these required courses, electives must also be taken to fulfill the required number of academic credits for either an M.S. or Ph.D. degrees.

1. **IBIOS 570 MOLECULAR TOXICOLOGY SEMINAR (2 credits, 1 per semester during any of the first four semesters in residence)**, a monthly colloquium that will present molecular toxicology topics of general interest to all faculty and graduate students in the IGDP in MT.
2. **IBIOS 590 COLLOQUIUM (2 credits)** All students are required to enroll for 4 credits of Colloquium. Students typically take this course in the fall and spring semesters of their first year. In Colloquium, students are introduced to a wide variety of topics of contemporary and future importance in the life sciences. A particular focus is placed on topics where science is likely to impact on society (and society on science). Topics are drawn from the area introduced by the speaker and can span the entire spectrum from basic research to the social, legal, moral and ethical implications of the science. A significant challenge in Colloquium is to organize and coordinate a presentation using contemporary presentation software, such as PowerPoint, in an environment in which part of the audience is present at a remote site. Students are required to attend the lectures and the dinners following the lectures. Students also participate in the group presentations during discussion sessions and submit written reports. Reports may be submitted to the co-chairs of the IGDP who may add them to the student's permanent record. Students receive A-F quality grades.
3. **IBIOS 591. ETHICS IN THE LIFE SCIENCES (1 credit)** Usually taken the fall semester of their second year, students exam integrity and misconduct in life sciences research, including issues of data collection, publication, authorship, and peer review. Students receive A-F quality grades.
4. **IBIOS 595. INTERNSHIP (1 credit, optional)** For students interested in exploring academic, government, medical, law, or business corporate approaches to research. This is an external work assignment relevant to individual research or career goals. Students receive an R (satisfactory/passing) or U (unsatisfactory/failing). Only R credits are counted for credit totals. Students typically participate in an internship the summer of their first or second year. Contacts, positions, applications, course registration, course requirements, and grading are processed through the Eberly College of Science Cooperative Education Program (814-865-5000). Additional credits of IBIOS 595 are at the expense of the student. Interested graduate students are to discuss the opportunity with the IGDP in MT chair and/or their faculty adviser.
5. **IBIOS 596. INDEPENDENT STUDIES: LABORATORY ROTATIONS (1-3 credits per semester)** For students exploring potential Ph.D. projects and faculty advisers. Students receive a R (satisfactory/passing) or F (unsatisfactory/failing). Only R credits are counted for credit totals.
6. **IBIOS 597(optional, variable credits) SPECIAL TOPICS**
7. **IBIOS 600. THESIS RESEARCH (1-9 per semester)** For students who have been matched with a faculty adviser AND have not taken/passed their comprehensive exams. Students may receive A-F grades or R/F grades at any time. By the time a student passes his/her comprehensive exam, up to 12 credits worth of IBIOS 600 may have the A-F quality grade.
8. **IBIOS 601. THESIS PREPARATION (0 per semester)** For those students who passed their comprehensive exams. This course appears on the transcript but does not have any grade or credit associated with it.
9. **VB SC 602/IBIOS 602. SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1 credit, optional)** All students are strongly encouraged to enroll for 1 credit (or the equivalent) of Supervised Experience in College Teaching before the beginning of their third year. Students typically take this course during the fall semester of their second year. To encourage teaching experience in toxicological sciences, students will be encouraged to enroll in VSC 602 for supervised experience in college teaching for a toxicology-related courses (VSC 433, VSC 430, ERM 431). As an alternative, after consulting with their respective adviser, students may elect to enroll in IBIOS 602. Teaching at Hershey is arranged by the co-chairs of the IGDP and co-director of graduate education for the IBIOS program. Students receive A-F grades on their transcripts but these grades are not computed in with the overall GPA. International fellows must pass an English proficiency exam before any teaching duties are assigned.
10. The Graduate School requires all graduate students to maintain a 3.0 grade-point average.

#### M.S. Degree Requirements

Masters students must have a minimum of 30 credits and a 3.0 overall grade-point average. For a master's thesis option, up to 6 IBIOS 600 credits may be A-F graded. Eighteen (18) credits must be at the 500 to 600 level, and a minimum of 12 credits need to be in the major at the 400 to 600 level (excluding IBIOS 600). The student selects a thesis committee (upon consultation with faculty adviser), writes a thesis, and defends his/her work. If pursuing a master's nonthesis option, the student must have a first-authored manuscript (based on his/her research) that has been either accepted and/or published in a peer reviewed journal. Additionally, for a master's nonthesis option, 18 credits need to be in the major at the 500 level. The manuscript is given to at least the faculty adviser and the IGDP Chair for evaluation. IBIOS 595 (Internship) and 596 (Rotations) credits count toward the 30 credits. However, the 602 (Teaching) optional credits do not count toward the 30 credits. All IGDP in Molecular Toxicology graduate students must successfully take the following list of required courses and/or electives during the first two years of their graduate education. If all course credits and requirements are met, students do not have to be registered for classes while writing and/or defending his/her work.

Year 1-Fall Semester			
University Park		Hershey	
Course	Credits	Course	Credits
B M B 400 Molecular Biology of the Gene	2-3	CMBIO 502 Core Biochemistry	3

IBIOS 570 Molecular Toxicology Seminar	2	PHARM 590 Pharmacology Colloquium	1
IBIOS 590 Colloquium	2	IBIOS 590 Colloquium	2
IBIOS 596 Independent Studies, Laboratory Rotations	1-2	IBIOS 596 Independent Studies, Laboratory Rotations	1-2
VB SC 430 Principles of Toxicology	3	PHARM 520 Principles of Drug Action	2
Graduate Elective	2-4	Graduate Elective	2-4

**Year 1-Spring Semester**

<i>University Park</i>		<i>Hershey</i>	
Course	Credits	Course	Credits
V SC/IBIOS 530 Regulation of Gene Expression	3	CMBIO 503 Molecular Biology	3
IBIOS 570 Molecular Toxicology Seminar	2	PHARM 590 Pharmacology Colloquium	1
IBIOS 590 Colloquium	2	IBIOS 590 Colloquium	2
IBIOS 600 Thesis Research	1-2	IBIOS 600 Thesis Research	1-2
VB SC 433 Molecular and Cellular Toxicology	3	Graduate Elective	3-6
Graduate Elective	3-6		

**Year 2-Fall Semester**

<i>University Park</i>		<i>Hershey</i>	
Course	Credits	Course	Credits
IBIOS 570 Molecular Toxicology Seminar	2	PHARM 590 Pharmacology Colloquium	1
IBIOS 591 Ethics in Life Sciences	1	IBIOS 591 Ethics in Life Sciences	1
IBIOS 600 Thesis Research	3-6	IBIOS 600 Thesis Research	3-6
IBIOS/VB SC 602* Supervised Teaching	1	IBIOS 602* Supervised Teaching	1
Graduate Electives	3-6	Graduate Electives	3-6

**Year 2-Spring Semester**

<i>University Park</i>		<i>Hershey</i>	
Course	Credits	Course	Credits
IBIOS 570 Molecular Toxicology Seminar	2	PHARM 590 Pharmacology Colloquium	1
IBIOS 600 Thesis Research	3-6	IBIOS 600 Thesis Research	3-6
Graduate Electives	3-6	Graduate Electives	3-6

\*Optional

Students must present their thesis in accordance with the Penn State guidelines as described in the THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses. Current copies may be obtained from the Thesis Information [Web site](#). For more information, contact the Thesis Office, 115 Kern Building, University Park, PA 16802; 814-865-5448.

## Ph.D. Degree Requirements

Ph.D. students must have a minimum of 30 credits and a 3.0 overall grade-point average. For a master's thesis option, up to 6 IBIOS 600 credits may be A-F graded and 12 credits need to be in the major at the 400 to 600 level (excluding IBIOS 600). The course requirements are essentially the same as that required for the M.S. degree listed above, with some discretion left to the student and adviser.

## Grade-Point Average/Unsatisfactory Scholarship

Students are required to maintain an overall 3.0 GPA throughout the program, and, in particular, must have a 3.0 to take the doctoral candidacy, the comprehensive examination, and the final oral examination. One or more failing grades or a cumulative grade-point average below 3.0 may be considered evidence of unsatisfactory scholarship and may be grounds for dismissal from the IGDP in MT.

## English competence

A candidate for the degree of Doctor of Philosophy for the IGDP in MT is required to demonstrate a high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the Ph.D. Programs are expected to establish mechanisms for assessing and improving competence of both domestic and international students. Toward this goal, all students must participate in the IBIOS 590 colloquium, which includes assessment of reading, original writing and speaking skills. International students must also demonstrate proficiency of the English language as part of the Additional English Requirement for teaching described above. During the course work prior to the candidacy examination, candidates will be assessed for communicative competence in reading, writing, and speaking English. Should a higher level of competence be required, the candidate will be directed to the appropriate resources. International students are advised that the passage of the minimum TOEFL requirements does not demonstrate the level of competence required for completion of the Ph.D. program. English competence must be demonstrated before the doctoral comprehensive examination is scheduled. Besides course work, research, and teaching, IGDP Molecular Toxicology doctoral students participate in the following:

## Candidacy Exam

The Candidacy Exam is uniquely designed for each student. The exam should be taken by the end or during the student's third semester in the Integrative Biosciences graduate program. The student will be assigned a scientific paper from the biochemical literature to read and analyze; the paper will be selected based upon the student's background and course work. The analysis should involve exploring the relevant literature as well as the fundamental issues in toxicology, biochemistry, and biology. The student will be given ten days to write a three-page single-spaced review. At the same time the paper is assigned a meeting of the committee should be arranged for a sixty- to ninety-minute oral exam by the committee to review the written assignment and discuss other issues. The committee meeting shall be within twenty-one days of the original assignment of the paper. The student is not required to make a formal oral presentation, but should have overheads of the data for discussion purposes. The student should be able to integrate knowledge about chemical and biological aspects of the paper and understand and evaluate the experimental design, rationale, results, and the authors' interpretation of their work. In the event that the student does not pass this exam, the student's committee will make a recommendation as to whether to offer another opportunity or to terminate the student's enrollment in the program.

## Comprehensive Examination

Evaluation via the Doctoral Committee to determine the feasibility of proposed research and the preparedness of the student. Students must be registered for classes (typically IBIOS 600) the semester they take this exam.

## Doctoral Committee

Upon successful completion of the Candidacy Examination, the student in consultation with the advisor will, as soon as possible, select a doctoral committee. The committee will consist of the advisor, two members of the IGDP in MT and up to two faculty members who are not a member of the IGDP in MT. If the student has selected the option of having dual advisors, then both of the advisors will be on the doctoral committee, along with two members of the IGDP in MT and one faculty member who is not a member of the IGDP in MT. If the faculty members from the IGDP in MT on the committee are also members of the same department, the one faculty member who is not a member of the IGDP in MT must be from a different department. This committee is responsible for supervising the academic program and monitoring the progress of the student towards his/her degree. Doctoral thesis committee composition is based on the Graduate Degree Programs Bulletin prepared by the Graduate School regarding [Doctoral Committees](#) and requires:

- Four-person minimum of approved Penn State Graduate Faculty.
- Two members must be inside the major and one member must be outside the major. Note: The outside member must be member of the approved Penn State Graduate Faculty. The outside member for intercollege graduate programs may be inside the major but committee membership must have representation from more than one department.
- A person not affiliated with Penn State may be added as a special member (beyond the four members of the approved Penn State Graduate Faculty) upon recommendation of the head of the program and approval of the graduate dean.
- Have committee chair or one of the co-chairs be a member of the approved Penn State Graduate Faculty. Typically it's the faculty adviser.
- The doctoral candidate and three committee members must be physically present for the comprehensive exam and defense. No more than one person may be present via telephone. Telephone or video conference arrangements must be approved by the Dean of the Graduate School.
- Need approval of two-thirds of the committee members for passing comprehensive exam and defense dissertation.

## Ph.D. Defense

Evaluation via the Doctoral Committee of the thesis research. Students must present their thesis in accordance with the Penn State guidelines as described in the THESIS GUIDE Requirements for the Preparation of Master's and Doctoral Theses. Current copies may be obtained from the Thesis Information [Web site](#). For more information, contact the Thesis Office, 115 Kern Building, University Park, PA 16802; 814-865-5448.

## Courses

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BIOCHEMISTRY AND MOLECULAR BIOLOGY \(B M B\) course list](#)

[CELL AND MOLECULAR BIOLOGY \(CMBIO\) course list](#)

[INTEGRATED BIOSCIENCES \(IBIOS\) course list](#)

[PHARMACOLOGY \(PHARM\) course list](#)

[VETERINARY AND BIOMEDICAL SCIENCES \(VB SC\) course list](#)

[VETERINARY SCIENCE \(V SC\) course list](#)

Last Revised by the Department: Spring Semester 2007



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Review Date: 10/10/06

Updated by Publications: 12/22/11

## Mass Communications (MASSC)

[Program Home Page](#)

MARIE HARDIN, *Associate Dean for Graduate Studies and Research*  
College of Communications  
201 Carnegie Building  
814-865-3070; [commgpo@psu.edu](mailto:commgpo@psu.edu)

### Degree Conferred:

Ph.D.

### The Graduate Faculty

- Lee Ahern, Ph.D. (Penn State) Assistant Professor of Communications
- Douglas Anderson, Ph.D. (Southern Illinois) Dean; Professor of Communications
- George Anghelcev, Ph.D. (Minnesota) Assistant Professor of Communications
- Robert A. Baukus, Ph.D. (Massachusetts) Associate Professor of Communications
- Ronald Bettig, Ph.D. (Illinois) Associate Professor of Communication
- Barbara Bird, M.F.A. (Northwestern) Associate Professor of Communications
- Denise Bortree, Ph.D. (Florida) Assistant Professor of Communications
- Jeremy Cohen, Ph.D. (Washington) Professor of Communications
- Colleen Connolly-Ahern, Ph.D. (Florida) Associate Professor of Communications
- Frank Dardis, Ph.D. (South Carolina) Associate Professor of Communications
- Dennis K. Davis, Ph.D. (Minnesota) Professor of Communications
- Marcia DiStaso, Ph.D. (Miami) Assistant Professor of Communications
- Michael Elavsky, Ph.D. (Illinois) Assistant Professor of Communications
- Lyn Elliot, Ph.D. (Iowa) Associate Professor of Communications
- Russell Frank, Ph.D. (Pennsylvania) Associate Professor of Communications
- Robert M. Frieden, J.D. (Virginia) Cable TV Pioneers Chair Professor in Telecommunications Studies and Law
- Michel Haigh, Ph.D. (Oklahoma) Associate Professor of Communications
- Jeanne Hall, Ph.D. (Wisconsin) Associate Professor of Media Studies
- Martin E. Halstuk, Ph.D. (Florida) Associate Professor of Communications
- Marie Hardin, Ph.D. (Georgia) Associate Professor of Communications
- R. Dorn Hetzel, M.F.A. (New York) Associate Professor of Film and Video
- Anne Hoag, Ph.D. (Michigan) Associate Professor of Communications
- Matthew Jackson, Ph.D. (Indiana) Associate Professor of Communications
- Krishna Jayakar, Ph.D. (Indiana) Associate Professor of Communications
- Matthew Jordan, Ph.D. (Claremont) Assistant Professor of Communications
- Ann Marie Major, Ph.D. (Southern Illinois) Associate Professor of Communications
- Matthew P. McAllister, Ph.D. (Illinois) Professor of Communications
- John S. Nichols, Ph.D. (Minnesota) Professor Emeritus of Communications
- Mary Beth Oliver, Ph.D. (Wisconsin) Distinguished Professor of Communications
- Anthony A. Olorunnisola, Ph.D. (Howard) Associate Professor of Communications
- Patrick R. Parsons, Ph.D. (Minnesota) Don Davis Professor in Ethics
- Robert D. Richards, J.D. (American) John and Ann Curley Professor of First Admendment Studies
- Ford Risley, Ph.D. (Florida) Professor of Communications
- Michelle Rodino-Colocino, Ph.D. (Pittsburgh) Assistant Professor of Communications
- Amit M. Schejter, Ph.D. (Rutgers) Associate Professor of Communications
- Jorge Reina Schement, Ph.D. (Stanford) Professor of Communications
- Michael Schmierbach, Ph.D. (Wisconsin) Assistant Professor of Communications
- Fuyuan Shen, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Communications
- Richard Sherman, M.F.A. (Ohio) Associate Professor of Communications
- Susan M. Stroh, Ph.D. (Minnesota) Assistant Professor of Communications
- S. Shyam Sundar, Ph.D. (Stanford) Distinguished Professor of Communications and Communication Arts and Sciences
- Richard D. Taylor, J.D. (New York) Palmer Chair of Telecommunications Studies and Law
- Bu Zhong, Ph.D. (Maryland) Assistant Professor of Communications

### Doctoral Degree Requirements

The Ph.D. Program in Mass Communications is administered by the College of Communications. All students seeking admission to the program are required to submit Graduate Record Examination scores, transcripts of all previous undergraduate and graduate work, and three letters of recommendation from individuals qualified to comment on their ability to perform successfully at the doctoral level. Students whose native language is not English must present a minimum TOEFL score of 600 to be considered for admission. In most cases, a completed master's degree is required for admission to the program. In addition, applicants are required to submit a formal statement indicating what they expect to achieve and how their educational background qualifies them for doctoral-level study in mass communications. Admission decisions are made by the college admissions committee.

Requirements listed above are in addition to general Graduate School requirements listed in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Students admitted to the doctoral program must complete a candidacy examination. For students with a master's degree or equivalent, this examination ordinarily will occur before the student has completed 10 credits of doctoral-level work. For individuals admitted with only a baccalaureate degree and no graduate-level work, the candidacy examination will be administered after 30 credits and before 40 credits of graduate-level work, have been completed. The committee designated to conduct the examination will determine whether the student's knowledge of mass communications is adequate for doctoral-level study, specify what deficiencies, if any, must be removed, and pass judgment on a proposed plan of study.

The program requirements include both semesters of the Mass Communications Proseminar (COMM 501.1 and COMM 501.2), a foundation course and other courses selected by the student, with committee approval, that collectively constitute a coherent sequence appropriate to the advanced study of mass communications. Students are expected to take a minimum of 20 credits in communications-related courses. No more than 6 credits can be taken as independent study credits. Students also are required to take at least one course in research methods approved by the doctoral committee. Upon completion of the course work approved for the plan of study, the candidate will take a comprehensive examination. Following the comprehensive examination, doctoral candidates schedule a dissertation proposal meeting at which the research plan for their dissertation is reviewed and approved by their committee. Upon completion of the dissertation, doctoral candidates present a final oral defense of their dissertations before their committees.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by intermediate knowledge of one foreign language or by an equivalent research skill relevant to the student's field of study.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COMMUNICATIONS \(COMM\) course list](#)



## Mathematics (MATH)

### [Program Home Page](#)

SVETLANA KATOK, *In Charge of Graduate Programs in Mathematics*  
 104D McAllister Building  
 814-865-7529  
[gradstudies@math.psu.edu](mailto:gradstudies@math.psu.edu)

### Degrees Conferred:

Ph.D., D.Ed., M.A., M.Ed.

### The Graduate Faculty

- Joel H. Anderson, Ph.D. (Indiana) Professor of Mathematics
- George E. Andrews, Ph.D. (Pennsylvania) Evan Pugh Professor of Mathematics
- Augustin Banyaga, Ph.D. (Geneva) Professor of Mathematics
- Paul F. Baum, Ph.D. (Princeton) Evan Pugh Professor of Mathematics
- Andrew Belmonte, Ph.D. (Princeton) Associate Professor of Mathematics
- Leonid Berlyand, Ph.D. (Kharkov State) Professor of Mathematics
- James Brannick, Ph.D. (Colorado, Boulder) Assistant Professor of Mathematics
- Albert Bressan, Ph.D. (Colorado) Eberly Family Professor of Mathematics
- Nathaniel Brown, Ph.D. (Purdue) Associate Professor of Mathematics
- W. Dale Brownawell, Ph.D. (Cornell) Distinguished Professor of Mathematics
- Dmitri Burago, Ph.D. (St. Petersburg State) Professor of Mathematics
- Christopher C. Byrne, Ph.D. (Penn State) Assistant Professor of Mathematics
- Wenwu Cao, Ph.D. (Penn State) Professor of Mathematics and Materials
- Manfred Denker, Ph.D. (Erlangen) Professor of Mathematics
- Qiang Du, Ph.D. (Carnegie Mellon) Professor of Mathematics
- Anne Kirsten Eisentraeger, Ph.D. (California, Berkeley) Assistant Professor of Mathematics
- Christopher H. Griffin, Ph.D. (Penn State) Research Associate
- Diane M. Henderson, Ph.D. (California, San Diego) Professor of Mathematics
- Federico Rodriguez Hertz, Ph.D. (IMPA) Professor of Mathematics
- Nigel Higson, Ph.D. (Dalhousie) Evan Pugh Professor of Mathematics
- Helge Kristian Jenssen, Ph.D. (Norwegian U of Sci & Tech) Associate Professor of Mathematics
- Anatole Katok, Ph.D. (Moscow State) Raymond N. Shibley Professor of Mathematics
- Svetlana Katok, Ph.D. (Maryland) Professor of Mathematics
- Marc Levi, Ph.D. (Courant) Professor of Mathematics
- Jenny Xiaoe Li, Ph.D. (Cornell) Associate Professor of Mathematics and Economics
- L. C. Li, Ph.D. (Courant) Professor of Mathematics
- W. C. Li, Ph.D. (California, Berkeley) Professor of Mathematics
- Xiantao Li, Ph.D. (Wisconsin, Madison) Associate Professor of Mathematics
- Chun Liu, Ph.D. (Courant) Professor of Mathematics
- Anna Mazzucato, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Mathematics
- Jason R. Morton, Ph.D. (California, Berkeley) Assistant Professor of Mathematics and Statistics
- Gary L. Mullen, Ph.D. (Penn State) Professor of Mathematics
- Victor Nistor, Ph.D. (California, Berkeley) Professor of Mathematics
- Alexei Novikov, Ph.D. (California, Berkeley) Associate Professor of Mathematics
- Adrian Ocneanu, Ph.D. (Warwick) Professor of Mathematics
- Mihran Papikian, Ph.D. (Michigan) Assistant Professor of Mathematics
- Yakov Pesin, Ph.D. (Moscow State) Distinguished Professor of Mathematics
- Anton Petrunin, Ph.D. (Illinois) Associate Professor of Mathematics
- Jan Reimann, Ph.D. (Heidelberg) Assistant Professor of Mathematics
- Tim Reluga, Ph.D. (Washington) Assistant Professor of Mathematics and Biology
- John Roe, D.Phil. (Oxford) Professor of Mathematics
- Karl Schwede, Ph.D. (Washington) Assistant Professor of Mathematics
- James A. Sellers, Ph.D. (Penn State) Professor of Mathematics
- Wen Shen, Ph.D. (Oslo) Associate Professor of Mathematics
- Stephen G. Simpson, Ph.D. (MIT) Professor of Mathematics
- Mathieu P. Stienon, Ph.D. (Universite Libre de Bruxelles) Assistant Professor of Mathematics
- Sergei Tabachnikov, Ph.D. (Moscow State) Professor of Mathematics
- Arkady Tempelman, Ph.D. (Vilnius) Professor of Mathematics and Statistics
- Leonid N. Vaserstein Ph.D. (Moscow State) Professor of Mathematics
- Robert C. Vaughan, Ph.D. (London) Professor of Mathematics
- Aissa Wade, Ph.D. (Montpellier) Associate Professor of Mathematics
- William C. Waterhouse, Ph.D. (Harvard) Professor of Mathematics
- Krzysztof Wysocki, Ph.D. (Rutgers) Professor of Mathematics
- Jinchao Xu, Ph.D. (Cornell) Professor of Mathematics
- Ping Xu, Ph.D. (California, Berkeley) Professor of Mathematics
- Ae Ja Yee, Ph.D. (Korea Advanced Inst of Sci and Tech) Associate Professor of Mathematics
- Yuri G. Zarhin, Ph.D. (Leningrad State) Professor of Mathematics
- Ludmil Zikatanov, Ph.D. (Sofia) Professor of Mathematics

Graduate courses in all the principal branches of mathematics are offered regularly each year. The department is prepared to direct research in a variety of fields, including various branches of analysis, algebra, topology, number theory, applied analysis, and mathematical logic and foundations.

### Admission Requirements

Scores from the Graduate Record Examinations Aptitude Test (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

To be admitted to the Ph.D., D.Ed., or M.A. program without undergraduate deficiency, an applicant should have completed at least 18 credits in mathematics at the advanced undergraduate level (400 series or their equivalents). The undergraduate student is urged to take at least 6 credits in foundations of analysis (MATH 401), 6 in modern algebra (MATH 435 and MATH 436), and 3 in topology (MATH 429) or their equivalents. These courses are essential preparation for the graduate program, and if they are taken after admission, a maximum of 6 credits may be counted toward an advanced degree.

Students with a 3.00 junior/senior average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Students applying to the graduate program in mathematics for whom English is not their native language are required to have a score of at least 550 (paper-based test), 213 (computer-based test), or a total score of 80, with a score of 19 on the speaking section (Internet-based test), on the Test of English as a Foreign Language (TOEFL) examination. The results of this examination must be submitted along with other requested items before the application deadline date.

## Master's Degree Requirements

For the M.A. degree the department offers two options: (1) the thesis option requires 12 credits of approved 500-series course in mathematics, 6 to 9 credits of thesis, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a final oral examination based on the thesis and general course material; and (2) the nonthesis option requires 18 credits of 500-series courses in mathematics, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a term paper on an approved topic in mathematics. No final examination is given in this option. Under this option a student may also elect to take a minor in applied mathematics (9 credits with at least 6 at the 500 level) and may use these credits toward the necessary 30 credits. For both options, a grade of A or B is required in all courses.

To be admitted to the M.Ed. program without undergraduate deficiency, an applicant should have completed at least 15 credits in mathematics at the intermediate level beyond calculus. The M.Ed. program does not require any 500-series courses, but the student is encouraged to select some at this level. Special courses have been instituted for the training of teachers. Among these are MATH 470 and MATH 471. These are acceptable to satisfy credit requirements only for the M.Ed. degree.

## Doctoral Degree Requirements

All doctoral students are required to take three qualifying examinations. Two of these examinations must be completed prior to the beginning of the student's second year of graduate study, and the third prior to the beginning of the third year. The qualifying examinations are in the areas of analysis, algebra, and topology/geometry.

The qualifying examinations are given twice a year--after the end of the spring semester and before the beginning of the fall semester. Basic, one-year sequences are offered in each subject annually to help students prepare for the examinations. Typically, an entering Ph.D. student takes two of the basic sequences in the first year and the third basic sequence in the second year of study, and takes the qualifying examinations in the spring after completing the corresponding courses. If an examination is failed, the student must take it again. Students who fail a qualifying examination in a given subject twice may not continue in the Ph.D. program.

Entering Ph.D. students may take one or more of the qualifying examinations on arrival in August without penalty. If they fail a pre-entrance exam, they still have two more opportunities to pass it. Entering Ph.D. students are advised to take at least two basic sequences (in the subjects they did not pass qualifying exams in on arrival) and the subsequent qualifying exams in the first year of graduate study.

After passing all three qualifying exams, students are expected to select a thesis adviser and form a doctoral committee. The committee administers the comprehensive exam (no later than the end of the seventh semester of study) and offers counsel of the student as his research progresses.

## Other Relevant Information

Students in this program may elect the dual-title degree program in Operations Research for the Ph.D. degree. (See also Operations Research.)

Further information about the graduate program in Mathematics may be found at the following website: [www.math.psu.edu/grad](http://www.math.psu.edu/grad).

## Student Aid

Graduate assistantships available through this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [MATHEMATICS \(MATH\) course list](#)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 40-01-088

Review Date: 08/16/2011

Last updated by Publications: 01/21/10 (link check)

## Intercollege Program in Materials (MATL)

[Program Home Page](#)

BARBARA SHAW, *Chair*  
403A Earth and Engineering Science Building  
814-865-1451

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- James Adair, Ph.D. Professor of Materials Science and Engineering
- Dinish K. Agrawal, Ph.D. Professor of Materials
- David L. Allara, Ph.D. Professor of Materials Science and Chemistry
- Harry L. Allcock, Ph.D. Evan Pugh Professor of Chemistry
- Maurice F. Amateau, Ph.D. Professor of Engineering Science and Mechanics
- S. Ashok, Ph.D. Professor of Engineering Science
- John V. Badding, Ph.D. Assistant Professor of Chemistry
- Andrzej R. Badzian, Ph.D. Professor of Materials
- Charles Bakis, Ph.D. Associate Professor of Engineering Science and Mechanics
- Jayanth R. Banavar, Ph.D. Professor of Physics
- Anthony Baratta, Ph.D. Professor of Nuclear Engineering
- Uma Belegundu, Ph.D. Research Associate in Materials
- Amar S. Bhalla, Ph.D. Professor of Materials and Electrical Engineering
- William R. Bitler, Ph.D. Professor Emeritus of Metallurgy
- Paul R. Blankenhorn, Ph.D. Professor of Wood Technology
- Andre L. Boehman, Ph.D. Associate Professor of Fuel Science
- Susan L. Brantley, Ph.D. Associate Professor of Geosciences
- Paul W. Brown, Ph.D. Professor of Materials Science and Engineering
- Wenwu Cao, Ph.D. Professor of Mathematics, and Materials Research
- Gary L. Catchen, Ph.D. Professor of Nuclear Engineering
- Moses H. W. Chan, Ph.D. Evan Pugh Professor of Physics
- Subhash Chander, Ph.D. Professor of Mineral Processing
- Long-Qing Chen, Ph.D. Professor of Materials Science and Engineering
- Ralph Colby, Ph.D. Professor of Materials Science and Engineering
- Milton W. Cole, Ph.D. Distinguished Professor of Physics
- Lance Collins, Ph.D. Professor of Chemical Engineering
- Robert W. Collins, Ph.D. Professor of Physics and Materials Research
- Joseph C. Conway, Jr., Ph.D. Professor of Engineering Science and Mechanics
- Vincent Crespi, Ph.D. Professor of Physics
- L. Eric Cross, Ph.D. Evan Pugh Professor Emeritus of Electrical Engineering
- Paul H. Cutler, Ph.D. Professor Emeritus of Physics
- Makunda B. Das, Professor Emeritus of Electrical Engineering
- Tarasankar DebRoy, Ph.D. Professor of Materials Science and Engineering
- Elizabeth Dickey, Ph.D. Assistant Professor of Materials Science and Engineering
- Renee D. Diehl, Ph.D. Professor of Physics
- Joseph P. Dougherty, Ph.D. Associate Professor of Materials and Electrical Engineering
- Renata S. Engel, Ph.D. Professor of Engineering Science and Mechanics
- Wolfgang E. Ernst, Ph.D. Professor of Physics and Chemistry
- Kristen A. Fichthorn, Ph.D. Professor of Chemical Engineering and Physics
- Stephen J. Fonash, Ph.D. Kunkle Chair; Professor of Engineering Science
- Barbara J. Garrison, Ph.D. Shapiro Professor of Chemistry
- Randall German, Ph.D. Brush Chair; Professor of Materials
- Venkatraman Gopalan, Ph.D. Assistant Professor of Materials Science and Engineering
- Eark K. Graham, Jr., Ph.D. Professor of Geosciences
- David J. Green, Ph.D. Professor of Ceramic Science and Engineering
- Michael K. Grutzeck, Ph.D. Professor of Materials
- Ruyan Guo, Ph.D. Associate Professor of Electrical Engineering
- Ian R. Harrison, Ph.D. Professor of Polymer Science
- Donald Heaney, Ph.D. Research Associate in Materials
- John R. Hellmann, Ph.D. Associate Professor of Ceramic Science and Engineering
- Paul R. Howell, Ph.D. Professor of Metals Science and Engineering
- Thomas N. Jackson, Ph.D. Professor of Electrical Engineering
- Gerald G. Johnson, Ph.D. Associate Professor Emeritus of Computer Science and Engineering
- Sridhar Komarneni, Ph.D. Professor of Clay Mineralogy
- Iam-Choo Khoo, Ph.D. Professor of Electrical Engineering
- Donald A. Koss, Ph.D. Professor of Metals Science and Engineering
- Sanat Kumar, Ph.D. Professor of Materials Science and Engineering
- Kenneth K. Kuo, Ph.D. Distinguished Professor of Mechanical Engineering
- Peter Labosky, Ph.D. Professor of Wood Science and Technology
- Akhlesh Lakhtakia, Ph.D. Professor of Engineering Science and Mechanics
- Michael Lanagan, Ph.D. Associate Professor of Materials Science and Engineering
- George A. Lesieutre, Ph.D. Professor of Aerospace Engineering
- Qi Li, Ph.D. Associate Professor of Physics
- Ying Liu, Ph.D. Associate Professor of Physics
- Zi-Kiu Liu, Ph.D. Assistant Professor of Materials Science and Engineering
- Digby D. Macdonald, Ph.D. Professor of Materials Science and Engineering
- Thomas E. Mallouk, Ph.D. DuPont Professor of Materials Chemistry
- Harvey Manbeck, Ph.D. Distinguished Professor of Agricultural Engineering
- Evangelos Manias, Ph.D. Virginia and Philip L. Walker Faculty Fellow; Assistant Professor of Materials Science and Engineering
- William D. Mark, Professor of Mechanical Engineering; Senior Scientist
- Theresa S. Mayer, Associate Professor of Electrical Engineering
- Julian D. Maynard, Jr., Distinguished Professor of Physics
- Russell F. Messier, Professor of Engineering Science and Mechanics
- Gary L. Messing, Professor of Ceramic Science and Engineering; Head, Materials Science and Engineering
- Suzanne E. Mohny, Ph.D. Associate Professor of Materials Science and Engineering
- Arthur M. T. Motta, Ph.D. Associate Professor of Nuclear Engineering
- Karl T. Mueller, Ph.D. Associate Professor of Chemistry
- Michael J. Natan, Ph.D. Professor of Chemistry
- Robert N. Pangborn, Ph.D. Professor of Engineering Mechanics; Associate Dean
- Carlo Pantano, Ph.D. Distinguished Professor of Materials Science and Engineering; Director, Materials Research Institute
- Seung-Eek Park, Ph.D. Professor of Materials

- Howard W. Pickering, Ph.D. Distinguished Professor of Metals Science and Engineering
- Lawrence J. Pilione, Ph.D. Professor of Physics
- V. M. Puri, Ph.D. Professor of Agricultural Engineering
- Ljubisa R. Radovic, Ph.D. Associate Professor of Fuel Science
- Clive A. Randall, Ph.D. Professor of Materials Science and Engineering
- Asok Ray, Ph.D. Professor of Mechanical Engineering
- Joan M. Redwing, Ph.D. Assistant Professor of Materials Science and Engineering
- Joseph L. Rose, Ph.D. Paul Morrow Professor of Engineering Science and Mechanics
- Della M. Roy, Ph.D. Professor Emerita of Materials Science
- James P. Runt, Ph.D. Professor of Polymer Science
- Clayton O. Ruud, Ph.D. Professor of Industrial Engineering
- Earle Ryba, Ph.D. Associate Professor of Metallurgy
- Nicholas J. Salamon, Ph.D. Professor of Engineering Science and Mechanics
- Nitin Samarth, Ph.D. Professor of Physics
- Robert J. Santoro, Ph.D. Professor of Mechanical Engineering
- Barry E. Scheetz, Ph.D. Professor of Materials, Civil and Environmental Engineering, and Nuclear Engineering
- Darrell G. Schlom, Ph.D. Associate Professor of Materials Science and Engineering
- Harold Schobert, Ph.D. Professor of Fuel Science
- Barbara Shaw, Ph.D. Associate Professor of Engineering Science and Mechanics; Chair, Intercollege Graduate Program in Materials
- Thomas R. Shrout, Ph.D. Professor of Materials
- Michael R. Silsbee, Ph.D. Associate Professor of Materials
- George Simkovich, Ph.D. Professor Emeritus of Metallurgy
- Jogender Singh, Ph.D. Professor of Metals Science; Senior Scientist
- Deane K. Smith, Ph.D. Professor Emeritus of Mineralogy
- Paul Sokol, Ph.D. Professor of Physics
- Karl E. Spear, Ph.D. Professor Emeritus of Materials Science and Engineering
- Donald B. Thompson, Ph.D. Professor of Food Science
- Bernhard R. Tittmann, Ph.D. Schell Professor of Engineering Science and Mechanics
- Richard E. Tressler, Ph.D. Professor Emeritus of Materials Science and Engineering
- Susan Troller-McKinstry, Ph.D. Corning Faculty Fellow and Professor of Ceramic Science and Engineering
- Kenji Uchino, Ph.D. Professor of Electrical Engineering
- M. Urquidi-Macdonald, Ph.D. Professor of Engineering Science and Mechanics
- Vasundara V. Varadan, Ph.D. Distinguished Alumni Professor of Engineering Science and Mechanics, and Electrical Engineering
- Vijay Varadan, Ph.D. Distinguished Alumni Professor of Engineering Science and Mechanics, and Electrical Engineering
- Robert C. Voight, Ph.D. Professor of Industrial Engineering
- William B. White, Ph.D. Professor of Geochemistry
- Roy F. Willis, Ph.D. Professor of Physics
- Nicholas Winograd, Ph.D. Evan Pugh Professor of Chemistry
- Christopher R. Wronski, Ph.D. Leonhard Professor of Electrical Engineering
- Xiaoxing Xi, Ph.D. Associate Professor of Physics
- Qiming Zhang, Ph.D. Professor of Electrical Engineering
- Gregory R. Ziegler, Ph.D. Associate Professor of Food Science

The aim of the intercollege program in Materials is to provide an opportunity for the student interested in the structure, properties, and behavior of solid materials to obtain an integrated program of courses encompassing both the necessary fundamentals of chemistry, physics, and mathematics and their technological and engineering applications.

The program is designed to encourage graduate study and research that cut across the traditional engineering disciplines and scientific inquiry related to materials. Faculty members associated with the program come from several colleges and many research centers at the University.

In order to maintain focus for the selection of core courses and for the administration of the comprehensive examination, formal options have been established (i.e., Materials Science and Materials Engineering). These options differ in the specification of core courses and in the focus of the research. Other program requirements are common for the two options.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are recommended but not required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Entering students should hold a bachelor's degree in chemistry, physics, mathematics, geological science, engineering, ceramics, or metallurgy, or in a closely related field that will have included in it mathematics at least through integral calculus and a minimum of one year of physics and one year of chemistry. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. Exceptions to the 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. The applicant should be interested specifically in an interdisciplinary program of study and research.

### Master's Degree Requirements

The program for the M.S. degree must include a total of 30 credits as outlined in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. The candidate must prepare a thesis proposal and list of courses for approval by the program faculty constituting the student's M.S. committee. A thesis describing original work performed by the student shall be written and defended before the M.S. committee.

### Doctoral Degree Requirements

Acceptance into the Ph.D. program is based on the student's performance on the Ph.D. candidacy exam administered by a rotating committee of program faculty. The examination is designed to evaluate the student's potential for original and successful Ph.D. research and is composed of a written proposal and oral presentation. Detailed plans for thesis research and course work consistent with the student's declared option are to be presented to the Ph.D. committee following successful completion of the candidacy exam, and the student is to present periodic progress reports to the committee until the thesis is defended. Near the end of the period of formal course work, each student will take a comprehensive exam. The examination consists of a written part administered by a rotating committee of program faculty, based on specific areas of knowledge depending on the chosen option, and an oral part, administered by the candidate's Ph.D. committee, that will emphasize an understanding of both fundamentals and the student's area of specialization. At the culmination of the Ph.D. research experience, each candidate must write a thesis, present it to his/her Ph.D. committee, and defend it at a public, oral presentation, followed by an examination by the committee. All candidates must demonstrate proficiency in English in both written and oral form, which is established formally in conjunction with the candidacy exam.

### Other Relevant Information

Seminar series are offered on various materials topics under the course listing MATL 590 Colloquium, and students are encouraged to enroll in these courses or to take materials-related seminar courses offered by other departments. The program offers instruction on special topics under the designation MATL 597, or students may explore such areas individually under a faculty member's supervision, receiving credit under the designation MATL 596.

Thesis research on various aspects of the solid state may be conducted in the Intercollege Materials Research Laboratory, Applied Research Laboratory, or appropriate departments in the Colleges of Earth and Mineral Sciences, Engineering, or Science. A wide variety of experimental facilities for materials research are available.

### Student Aid

Assistance is provided by the program office in identifying and applying for fellowships and scholarships from internal and external sources, and in

facilitating linkages with faculty and units that can offer support in the form of graduate assistantships for research in specific topical areas. These and other types of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/24/04

Last updated by Publications: 12/7/10



## Materials Science and Engineering (MATSC)

JOAN M. REDWING, *Chair, Intercollege Graduate Degree Program in Materials Science and Engineering; Professor of Materials Science and Engineering*  
101 Steidle Building  
814-865-8665

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Mohammed R. Abidian (College of Engineering)
- James H. Adair (College of Earth and Mineral Sciences)
- Dinesh K. Agrawal (Intercollege Graduate Degree Programs)
- David Allara (Eberly College of Science)
- Harry R. Allcock (Eberly College of Science)
- Douglas D. Archibald (College of Agricultural Sciences)
- S. Ashok (College of Engineering)
- John V. Badding (Eberly College of Science)
- Andrzej R. Badzian (Intercollege Graduate Degree Programs)
- Charles E. Bakis (College of Engineering)
- Jayanth R. Banavar (Eberly College of Science)
- Andre L. Boehman (College of Earth and Mineral Sciences)
- Paul W. Brown (College of Earth and Mineral Sciences)
- Jeffrey Brownson (College of Earth and Mineral Sciences)
- Wenwu Cao (Eberly College of Science)
- A. Welford Castleman, Jr. (Eberly College of Science)
- Gary Lee Catchen (College of Engineering)
- Moses Hung-Wai Chan (Eberly College of Science)
- Long-Qing Chen (College of Earth and Mineral Sciences)
- Tze-Chiang Chung (Mike) (College of Earth and Mineral Sciences)
- Ralph H. Colby (College of Earth and Mineral Sciences)
- Michael M. Coleman (College of Earth and Mineral Sciences)
- Coray Colina (College of Earth and Mineral Sciences)
- Paolo Colombo (College of Earth and Mineral Sciences)
- Vincent H. Crespi (Eberly College of Science)
- Leslie Eric Cross (College of Engineering)
- Tarasankar DebRoy (College of Earth and Mineral Sciences)
- Melik Demirel (College of Engineering)
- Elizabeth C. Dickey (College of Earth and Mineral Sciences)
- Renee D. Diehl (Eberly College of Science)
- Qiang Du (Eberly College of Science)
- Renata S. Engel (College of Engineering)
- Roman Engel-Herbert (College of Earth and Mineral Sciences)
- Kristen Ann Fichthorn (College of Engineering)
- Joseph R. Flemish (College of Earth and Mineral Sciences)
- R. M. Gorman (College of Engineering)
- Enrique Gomez (College of Engineering)
- Venkatraman Gopalan (College of Earth and Mineral Sciences)
- David J. Green (College of Earth and Mineral Sciences)
- Craig A. Grimes (College of Engineering)
- M. Amanul Haque (College of Engineering)
- Donald F. Heaney (College of Engineering)
- John R. Hellmann (College of Earth and Mineral Sciences)
- Michael A. Hickner (College of Earth and Mineral Sciences)
- Paul R. Howell (College of Earth and Mineral Sciences)
- Thomas N. Jackson (College of Engineering)
- John J. Janowiak (College of Agricultural Sciences)
- Robert Allen Kimel (College of Earth and Mineral Sciences)
- Sridhar Komarneni (College of Agricultural Sciences)
- Donald A. Koss (College of Earth and Mineral Sciences)
- Akhlesh Lakhtakia (College of Engineering)
- Michael T. Lanagan (College of Earth and Mineral Sciences)
- Patrick Lenahan (College of Engineering)
- Qi Li (Eberly College of Science)
- Zi-Kui Liu (College of Earth and Mineral Sciences)
- Digby D. Macdonald (College of Earth and Mineral Sciences)
- Thomas Edward Mallouk (Eberly College of Science)
- Evangelos Manias (College of Earth and Mineral Sciences)
- Janna Maranas (College of Engineering)
- William D. Mark (College of Engineering)
- Theresa Stellway Mayer (College of Engineering)
- Russell F. Messier (College of Engineering)
- Gary Lynn Messing (College of Earth and Mineral Sciences)
- Richard J. Meyer (College of Engineering)
- Suzanne Mohnhey (College of Earth and Mineral Sciences)
- Arthur Moses T. Motta (College of Engineering)
- Karl T. Mueller (Eberly College of Science)
- Christopher L. Muhlstain (College of Earth and Mineral Sciences)
- Kwadwo Osseo-Asare (College of Earth and Mineral Sciences)
- Paul C. Painter (College of Earth and Mineral Sciences)
- Carlo G. Pantano (College of Earth and Mineral Sciences)
- Howard W. Pickering (College of Earth and Mineral Sciences)
- Virendra M. Puri (College of Agricultural Sciences)
- Ljubisa R. Radovic (College of Earth and Mineral Sciences)
- Clive A. Randall (College of Earth and Mineral Sciences)
- Joan M. Redwing (College of Earth and Mineral Sciences)
- Guy E. Rindone (College of Earth and Mineral Sciences)
- Joshua Robinson (Intercollege Graduate Degree Programs)
- Della M. Roy (College of Earth and Mineral Sciences)
- James P. Runt (College of Earth and Mineral Sciences)
- Jerzy Ruzyllo (College of Engineering)
- Nitin Samarth (Eberly College of Science)

- Barry Earl Scheetz (College of Engineering)
- Harold H. Schobert (College of Earth and Mineral Sciences)
- Albert E. Segall (College of Engineering)
- Barbara A. Shaw (College of Engineering)
- David L. Shelleman (College of Earth and Mineral Sciences)
- Thomas R. Shrouf (Intercollege Graduate Degree Programs)
- Elzbieta Sikora (College of Engineering)
- Jogender Singh (College of Engineering)
- Ivica Smid (College of Engineering)
- Jorge O. Sofo (Eberly College of Science)
- Chunshan Song (College of Earth and Mineral Sciences)
- Karl E. Spear II (College of Earth and Mineral Sciences)
- Mauricio Terrones (Eberly College of Science)
- Peter A. Throver (College of Earth and Mineral Sciences)
- Bernhard R. Tittmann (College of Engineering)
- Judith A. Todd (College of Engineering)
- Susan Trolier-McKinstry (College of Earth and Mineral Sciences)
- Kenji Uchino (College of Engineering)
- Kenan Unlu (College of Engineering)
- Mirna Urquidi-Macdonald (College of Engineering)
- Adri van Duin (College of Engineering)
- Erwin Vogler (College of Earth and Mineral Sciences)
- Robert C. Voigt (College of Engineering)
- Chao-Yang Wang (College of Engineering)
- Qing Wang (College of Earth and Mineral Sciences)
- Paul S. Weiss (Eberly College of Science)
- William B. White (College of Earth and Mineral Sciences)
- Roy F. Willis (Eberly College of Science)
- Douglas E. Wolfe (Intercollege Graduate Degree Programs)
- Chris R. Wronski (College of Engineering)
- Qiming Zhang (College of Engineering)
- Shujun Zhang (Intercollege Graduate Degree Programs)
- Gregory R. Ziegler (College of Agricultural Sciences)
- Carin T. Zimmerman (Eberly College of Science)

The Intercollege Graduate Degree Program in Materials Science and Engineering offers comprehensive graduate education in the fundamentals of materials science (synthesis-structure-property-performance relationships). Faculty have interests in many research areas including biomaterials, ceramics, composites and hybrids, computational materials science, electronic and photonic materials, materials chemistry and physics, metals, nanostructured and nanoscale materials, piezoelectrics and ferroelectrics, polymers and soft materials. Students may choose to study across the major themes of materials today including materials in energy applications, nanotechnology, materials in medicine, materials in communications, materials for sensor applications, structural materials, etc., by using a combination of MATSE courses and a myriad of materials-related courses offered in the science and engineering departments at Penn State.

### Admission Requirements

Scores for the Graduate Record Examinations (GRE) are required for admission, though this requirement may be waived at the discretion of the departmental graduate admission committee. The best-qualified applicants will be accepted up to the number of spaces available for new students. The degree requirements listed here are in addition to the general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

### Master's Degree Requirements

The graduate program for the M.S. degree must include a total of at least 30 credits. Subject to the approval of the graduate program coordinator, a maximum of 10 credits of high-quality graduate work done at a regionally accredited U.S. institution may be applied toward the requirements for the master's degree. A minimum of 6 research credits (MATSE 600) is required. The minimum number of formal course credits (excluding seminar MATSE 590) required is 18 for all students at the 500-level or higher. The instructional program includes three required graduate core courses in materials including Thermodynamics of Materials (MATSE 501), Kinetics of Materials Processes (MATSE 503) and Principles of Crystal Chemistry (MATSE 512).

The Office of the Vice President for Research/Office of Research Protections requires that all candidates for advanced degrees complete training in Scholarship and Research Integrity (SARI). The SARI requirements include completion of an online Responsible Conduct of Research training program and a 1 credit Professional Development course (MATSE 582).

All candidates for advanced degrees are also expected to attend MATSE 590 colloquium. A thesis describing independent research performed by the student shall be written and defended at an oral examination. Bound copies will be made available for the University Libraries and the thesis adviser. A thesis committee shall administer the final oral examination of the thesis. The committee shall consist of at least three graduate faculty members.

*M. S. Requirements (Summary)*-minimum total credits: 30; minimum research credits: 6; minimum formal graduate-level course credits (500-level or higher): 18; minimum 500-level credits: 12; required graduate core course credits: 9; professional development course credits: 1; minimum credits in the major: 12; seminar: 2 credits per year; minimum GPA: 3.00.

### Doctoral Degree Requirements

The general requirements are based upon a period of residence, the writing of a satisfactory thesis and its acceptance by the doctoral committee and the Graduate School, and the passing of the comprehensive examination. A doctoral program consists of a combination of courses, seminars, and research that fulfills the minimum requirements of the Graduate School and is approved by the doctoral committee for each individual student. A master's degree is not a prerequisite for the doctorate. However, the first year of graduate study leading to the Ph.D. may be the same as that provided for the M. S. degree.

Acceptance into the Ph.D. program is based on the student's performance on the Ph.D. candidacy exam, which is administered by a graduate candidacy exam committee of the department. Although there is no specified requirement by the graduate school for the number of course credits for a Ph.D. degree, the department requires a minimum of 18 credits of 500-level courses for completing a doctoral degree. The instructional program includes three required graduate core courses in materials including Thermodynamics of Materials (MATSE 501), Kinetics of Materials Processes (MATSE 503) and Principles of Crystal Chemistry (MATSE 512). Additional specific courses are determined by the student and the adviser in consultation with the student's doctoral committee. A student with a M. S. degree from Penn State can use the 500-level credits earned during his or her M. S. study to fulfill the course requirements. Upon approval by the doctoral committee and the graduate program coordinator, a student with an M. S. degree from another U.S. institution or officially recognized degree-granting institution.

- Scholarship and Research Integrity: The Office of the Vice President for Research/Office of Research Protections requires that all candidates for advanced degrees complete training in Scholarship and Research Integrity (SARI). The SARI requirements include completion of an online Responsible Conduct of Research training program and a 1 credit Professional Development course (MATSE 582).
- Candidacy exam: (Offered twice a year: at the beginning of spring and fall semesters) Students will write a research proposal and give a presentation on the proposal to three members of the candidacy committee, whose members will ask questions about the proposal and the student's prior course work. The student will choose a topic for the proposal from three provided by the faculty committee, chosen to reflect the interest area(s) of the individual candidate. Students will be given three weeks to write the proposal and turn it into the MATSE graduate office. The oral presentation will take place seven to ten days after the written paper is submitted.
- Minimum formal course requirement (This is not required by the University, but required by the department): 18 credits of 500-level courses after B. S. (The instructional program includes three required graduate core courses in materials including Thermodynamics of Materials (MATSE 501), Kinetics of Materials Processes (MATSE 503) and Principles of Crystal Chemistry (MATSE 512). Additional 500-level courses to be taken are determined by the adviser and a thesis committee, having a minimum of four members with at least one outside of the department.)
- Comprehensive exam: Progress report and thesis proposal (no more than 20 pages in length) provided to the student's doctoral committee. An oral presentation is given to the research committee, followed by questions on the written and oral presentations.

- Seminar: 2 credits of MATSE 590 per year. After the comprehensive exam is passed, students should register to audit MATSE 590.
- Minimum GPA: 3.0
- Thesis: A written thesis and an oral defense administrated by the doctoral committee

### Student Aid

Top graduate applicants will be automatically nominated for a number of graduate fellowships and top-up awards in the department, including the University Graduate Fellowship as well as several industry-sponsored assistantships. Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [MATERIALS SCIENCE AND ENGINEERING \(MATSE\) course list](#)

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## Media Studies (MEDIA)

[Program Home Page](#)

MARIE HARDIN, *Associate Dean for Graduate Studies and Research*  
College of Communications  
201 Carnegie Building  
814-865-3070; [commgpo@psu.edu](mailto:commgpo@psu.edu)

### Degree Conferred:

- [M.A.](#)
- [Integrated B.A/M.A. in Media Studies](#)

### The Graduate Faculty

- Lee Ahern, Ph.D. (Penn State) Assistant Professor of Communications
- Douglas Anderson, Ph.D. (Southern Illinois) Dean; Professor of Communications
- George Anghelcev, Ph.D. (Minnesota) Assistant Professor of Communications
- Robert A. Baukus, Ph.D. (Massachusetts) Associate Professor of Communications
- Ronald Bettig, Ph.D. (Illinois) Associate Professor of Communication
- Barbara Bird, M.F.A. (Northwestern) Associate Professor of Communications
- Denise Bortree, Ph.D. (Florida) Assistant Professor of Communications
- Jeremy Cohen, Ph.D. (Washington) Professor of Communications
- Colleen Connolly-Ahern, Ph.D. (Florida) Associate Professor of Communications
- Frank Dardis, Ph.D. (South Carolina) Associate Professor of Communications
- Dennis K. Davis, Ph.D. (Minnesota) Professor of Communications
- Marcia DiStaso, Ph.D. (Miami) Assistant Professor of Communications
- Michael Elavsky, Ph.D. (Illinois) Assistant Professor of Communications
- Lyn Elliot, Ph.D. (Iowa) Associate Professor of Communications
- Russell Frank, Ph.D. (Pennsylvania) Associate Professor of Communications
- Robert M. Frieden, J.D. (Virginia) Cable TV Pioneers Chair Professor in Telecommunications Studies and Law
- Michel Haigh, Ph.D. (Oklahoma) Associate Professor of Communications
- Jeanne Hall, Ph.D. (Wisconsin) Associate Professor of Media Studies
- Martin E. Halstuk, Ph.D. (Florida) Associate Professor of Communications
- Marie Hardin, Ph.D. (Georgia) Associate Professor of Communications
- R. Dorn Hetzel, M.F.A. (New York) Associate Professor of Film and Video
- Anne Hoag, Ph.D. (Michigan) Associate Professor of Communications
- Matthew Jackson, Ph.D. (Indiana) Associate Professor of Communications
- Krishna Jayakar, Ph.D. (Indiana) Associate Professor of Communications
- Matthew Jordan, Ph.D. (Claremont) Assistant Professor of Communications
- Ann Marie Major, Ph.D. (Southern Illinois) Associate Professor of Communications
- Matthew P. McAllister, Ph.D. (Illinois) Professor of Communications
- John S. Nichols, Ph.D. (Minnesota) Professor Emeritus of Communications
- Mary Beth Oliver, Ph.D. (Wisconsin) Distinguished Professor of Communications
- Anthony A. Olorunnisola, Ph.D. (Howard) Associate Professor of Communications
- Patrick R. Parsons, Ph.D. (Minnesota) Don Davis Professor in Ethics
- Robert D. Richards, J.D. (American) John and Ann Curley Professor of First Admendment Studies
- Ford Risley, Ph.D. (Florida) Professor of Communications
- Michelle Rodino-Colocino, Ph.D. (Pittsburgh) Assistant Professor of Communications
- Amit M. Schejter, Ph.D. (Rutgers) Associate Professor of Communications
- Jorge Reina Schement, Ph.D. (Stanford) Professor of Communications
- Michael Schmierbach, Ph.D. (Wisconsin) Assistant Professor of Communications
- Fuyuan Shen, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Communications
- Richard Sherman, M.F.A. (Ohio) Associate Professor of Communications
- Susan M. Stroh, Ph.D. (Minnesota) Assistant Professor of Communications
- S. Shyam Sundar, Ph.D. (Stanford) Distinguished Professor of Communications, and Communication Arts and Sciences
- Richard D. Taylor, J.D. (New York) Palmer Chair of Telecommunications Studies and Law
- Bu Zhong, Ph.D. (Maryland) Assistant Professor of Communications

The master's degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Students with a 3.00 junior/senior grade-point average are eligible for admission. Three letters of recommendation are required. Applicants must also submit an autobiographical statement of about 1,000 words indicating the nature of the applicant's interest in Media Studies, reasons for wanting to do graduate work, and future aspirations relating to the field of mass communications. Experience shows that most applicants hold a bachelor's degree in a field of the liberal arts or the social and behavioral sciences, including journalism and mass communications. However, this does not preclude applicants with other backgrounds, abilities, and interests such as those whose undergraduate training may have been in a scientific or technical field. In every case, the applicant should explain in the autobiographical statement how his or her undergraduate education relates to the decision to seek admission to graduate study in mass communications.

### Program of Study

The M.A. program seeks to integrate two areas of inquiry and analysis. The "Critical Studies" area centers on the expressive, creative, and linguistic dimensions of media as cultural processes. The "Political Studies" area focuses primarily on the political and economic dimensions of national and international communications systems and processes. The student is encouraged to combine courses from these and possibly other areas into a coherent package of course work culminating in a thesis.

### Degree Requirements

For the M.A. degree, candidates must complete a one-course research core by taking either COMM 506 (quantitative research methods) or COMM 511 (qualitative research methods). The remaining credits are selected by the student in consultation with the adviser from the graduate courses listed in this section. Candidates must complete a minimum of 36 credits, including 6 for the thesis (COMM 600). At least 18 credits must be at the 500 level. Course work offered by departments outside the College of Communications may be scheduled as part of the student's program with prior approval of the student's academic committee. In some cases, students may be required to take additional credits in order to make up deficiencies in undergraduate course work. Students are required to schedule three separate, formal meetings with their advisers and the academic committees for (1) discussion and approval of the general program plan, (2) the thesis proposal, and (3) the defense of the thesis. In most cases, satisfactory completion of course work and thesis requires two

years.

### Integrated B.A./M.A. in Media Studies

The College of Communications offers academically qualified students enrolled in a bachelor of arts program in the College of Communications the opportunity to earn both the B.A. and the M.A. upon completion of five years of study. The Integrated Undergraduate-Graduate Program in Media Studies would facilitate the advanced study of communications research and thesis development through a carefully organized selection of undergraduate courses, graduate seminars and directed research projects. The program would accelerate and enhance undergraduate students' appreciation for graduate level scholarship by involving them in the seminars, research activities, and the scholarly discourse of the college's community of master's- and doctoral-level scholars.

For the IUG Media Studies B.A./M.A. degree, a minimum of 120 credits is required for the B.A. and 36 credits for the M.A. Twelve graduate-level credits, in consultation with the adviser, can apply to both the B.A. and M.A. degrees. Six of these must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirements for the master of arts degree program in Media Studies, the student will be permitted to receive the B.A. degree, assuming all degree requirements have been satisfactorily completed.

### Application Process and Admissions Requirements

Applicants must complete 6 credits from the following lists of courses with a minimum GPA of 3.5 in order to be admitted: 3 credits from COMM 100, COMM 150, COMM 180, COMM 320, or COMM 370 and 3 credits from COMM 205, COMM 250, COMM 381, COMM 401, COMM 403, COMM 304, COMM 405, COMM 407, COMM 408, COMM 409, COMM 410, COMM 411, COMM 413W, COMM 417, COMM 418, COMM 419, COMM 451, COMM 452, COMM 453, COMM 454, COMM 455, COMM 484, or COMM 485. The minimum overall GPA required of applicants is 3.2. Admission to the program is based on the evaluation of the student's transcript, examples of completed writing and research projects, a narrative statement of objectives, and two letters of support from faculty with whom they have worked. One faculty member must be from the College of Communications. Students are expected to apply after completing 60 credits but before the completion of 100 credits. Candidates are expected to present records of outstanding scholarly achievement to qualify. Applications will be reviewed by the appropriate subset of members of the Graduate Committee of the college.

### Applicants to the Integrated program:

1. Must be enrolled in a B.A. program in the College of Communications.
2. Must have completed 60 credits of the undergraduate degree program. (It is recommended that students apply prior to completing 100 credits.)
3. Must provide a narrative statement of objectives and two letters of endorsement from faculty with whom they have worked. One faculty member must be from the College of Communications.
4. Must present an approved plan of study in the application process.

### Program of Study

The Integrated B.A./M.A. degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings. The program is specifically not intended for advanced professional education.

Undergraduate tuition rates will apply as long as the student is in undergraduate status, unless the student receives financial support, such as an assistantship requiring the payment of graduate tuition.

### Degree Requirements

For the IUG Media Studies M.A. degree, a minimum of 120 credits is required for the B.A. and 36 credits for the M.A. At least 18 of the required 36 credits must be at the 500 level. Twelve graduate-level credits, in consultation with the adviser, can apply to both the B.A. and M.A. degrees. Six of these double-counted credits must be at the 500 level. A minimum of 12 credits of course work, as opposed to research credits, must be completed in Communications. COMM 515 and COMM 506 or COMM 511 are required. IUG students will prepare a thesis proposal in consultation with their advisers and are required to present the final thesis in a formal oral defense meeting to a committee of at least three members of graduate faculty, two of whom must be members of the college faculty. It is encouraged that one member of the committee be from outside the college.

### Student Aid

Graduate assistantships and other forms of student aid available to students in this program are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [COMMUNICATIONS \(COMM\) course list](#)

Last Revised by the Department: Summer Session 2005

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## Meteorology (METEO)

[Program Home Page](#)

WILLIAM H. BRUNE, *Head of the Department*  
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814-865-3286  
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### Degrees Conferred:

- [Ph.D., M.S.](#)
- [Integrated B.S./M.S. Program in Meteorology](#)

### The Graduate Faculty

- David M. Babb, Ph.D. (Penn State) Research Associate/Assistant Professor of Meteorology and John A. Dutton e-Education Institute
- Peter R. Bannon, Ph.D. (Colorado) Professor of Meteorology
- William H. Brune, Ph.D. (Johns Hopkins) Professor of Meteorology
- Marcelo Chamecki, Ph.D. (Johns Hopkins) Assistant Professor of Meteorology
- Eugene Clothiaux, Ph.D. (Brown) Associate Professor of Meteorology
- Kenneth J. Davis, Ph.D. (Colorado) Associate Professor of Meteorology
- Jenni L. Evans, Ph.D. (Monash) Professor of Meteorology
- Steven B. Feldstein, Ph.D. (Penn State) Senior Scientist
- Chris E. Forest, Ph.D. (MIT) Associate professor of Climate Dynamics in Meteorology
- Jose D. Fuentes, Ph.D. (Guelph) Professor of Meteorology
- Lee M. Grenci, Ph.D. (Emory, McGill) Senior Lecturer in Meteorology
- Jerry Y. Harrington, Ph.D. (Colorado State) Associate Professor of Meteorology
- Sue Ellen Haupt, Ph.D. (Michigan) Senior Scientist/Professor of Atmospheric and Oceanic Physics-ARL and Meteorology
- Scott A. Isard, Ph.D. (Indiana) Professor of Aerobiology in Plant Pathology and Meteorology
- Timothy J. Kane, Ph.D. (Illinois, Urbana-Champaign) Professor of Electrical Engineering and Adjunct Professor of Meteorology
- Andrew Kleit, Ph.D. (Yale) Professor of Meteorology
- Sukyoung Lee, Ph.D. (Princeton) Professor of Meteorology
- Michael E. Mann, Ph.D. (Yale) Professor of Meteorology and Geosciences
- Paul Markowski, Ph.D. (Oklahoma) Assistant Professor of Meteorology
- Raymond G. Najjar, Ph.D. (Princeton) Associate Professor of Meteorology
- Jon M. Neese, Ph.D. (Penn State) Senior Lecturer in Meteorology
- Scott J. Richardson, Ph.D. (Oklahoma) Senior Research Associate of Meteorology
- Yvette Pamela Richardson, Ph.D. (Oklahoma) Assistant Professor of Meteorology
- Hampton N. Shirer, Ph.D. (Penn State) Associate Professor of Meteorology
- David R. Stauffer, Ph.D. (Penn State) Senior Research Associate and Associate Professor of Meteorology
- Anne M. Thompson, Ph.D. (Bryn Mawr) Professor of Meteorology
- Johannes Verlinde, Ph.D. (Colorado State) Associate Professor of Meteorology
- Joshua M. Wuman, Ph.D. (MIT) Adjunct Professor of Meteorology
- George S. Young, Ph.D. (Colorado State) Professor of Meteorology and Geo-Environmental Engineering
- Fuqing Zhang, Ph.D. (North Carolina State) Professor of Meteorology and Statistics

The graduate program embraces topics that span atmospheric processes from those of the planetary boundary layer to those of the upper atmosphere, that encompass phenomena with molecular to planetary dimensions, and that range from practical to theoretical significance. The program develops and integrates approaches based on observational, computational and analytical techniques.

The major interests of the faculty and graduate students center on (1) analysis, modeling, and prediction of the evolution of synoptic-scale, or mesoscale weather systems, particularly those of significant impact on human activities; (2) observation and theoretical study of processes related to transmission of radiation through the atmosphere, including remote sensing through use of electromagnetic or acoustic systems; (3) laboratory, and theoretical study of trace gases, particulates, and clouds and their consequences for air quality and climate; and (4) observation and theoretical study of atmospheric physics on a variety of scales, including phenomena of weather and climate, boundary layer physics, turbulence, convective systems, and severe storms; (5) weather risk.

The department encourages interdisciplinary studies and is expanding its programs in biometeorology, climate dynamics, atmospheric pollution prediction, atmospheric carbon cycling, forecast reliability and verification, mathematical study of fluid dynamical systems, and integrated atmosphere-ocean studies. The department is affiliated with the Earth and Environmental Sciences Institute, which conducts studies in Earth system science, including climate, large-scale dynamics, oceanography, and regional assessments.

For the M.S. program, a minimum of 34 credits is required. For the Ph.D. program, a minimum of 8 course credits and 1 credit/semester of METEO 590 until passage of the comprehensive exam.

### Admission Requirements

The Meteorology program is open to all students with a baccalaureate degree and a strong interest in the atmospheric sciences. A degree in meteorology, science, mathematics, or engineering provides a particularly good background, although the department has had some students with arts and humanities degrees (such as Art History) who have done well. The minimum course requirements for admission are mathematics at least through differential equations and at least one year of calculus-based physics. Scores from the Graduate Record Examinations (GRE) are required for the evaluation of all applicants. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission to the program, the departmental admission committee considers courses taken, grade-point average, three letters of recommendation, GRE scores, professional experience, and English proficiency. Rather than setting rigid standards in each category, the committee examines the overall record as a whole. The best-qualified applicants are accepted up to the number of spaces that are available for new students.

Generally, additional mathematics and physics beyond the minimum requirements listed above, as well as courses in statistics, chemistry, and computer programming, will strengthen the student's application. Courses in meteorology are not required for admission. Most students admitted to the graduate program have GPA's of 3.50 or higher; particularly good grades in the sciences are desirable. Three recommendations are solicited from persons familiar with the student's academic competence, and the student is required to write a letter summarizing interests and goals. The General Test package containing the Mathematical Reasoning Test of the GRE is required of all applicants. A verbal and quantitative combined score of 1200 or greater is typical for the department's students.

All international applicants must submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT).

International applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires taking the Penn State American English Oral Communicative Proficiency Test (AEOCPT) upon first enrollment and, if necessary, remedial course work (ESL 115G, ESL 117G, and/or ESL 118G). The minimum composite score for the IELTS is 6.5.

International applicants who have received a baccalaureate or masters degree from a college, university, or institution in any of the following countries are exempt from the TOEFL requirement: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, or Wales.

*Note:* All international students, with the exceptions just noted, who matriculate in our program must take the Penn State American English Oral

Communicative Proficiency Test (AEOCPT) upon first enrollment. A score below 250 on the AEOCPT leads to student enrollment in ESL 115G, ESL 117G, and/or ESL 118G, as necessary. For more information regarding the AEOCPT see [http://aplng.la.psu.edu/academicPrograms/ita\\_whatIsAEOCPT.php](http://aplng.la.psu.edu/academicPrograms/ita_whatIsAEOCPT.php)

### Master of Science (M.S.) Degree Requirements

The M.S. degree is offered with thesis or research paper options, both requiring 34 credits.

For both options, a core curriculum is required that is composed of METEO 520 (3 credits), 521 (3 credits), 531 (3 credits), 533 (3 credits), 580 (1 credit), 590 (1 credit/semester; minimum of 2 credits) and 591 (1 credit) that is supplemented by 6 elective credits from 500-level Meteorology courses, for a total of 22 credits.

All students must take a minimum of 12 additional elective credits for a total of 30 credits, which are distributed as follows. Students in the M.S. thesis option must select 6 additional credits from 400- and 500-level course work in Meteorology or related disciplines, and 6 quality-graded credits of METEO 600 (quality-graded credits count toward the grade-point average). Students in the M.S. paper option must select 6 of the additional credits from 400- and 500-level course work in Meteorology, together with 6 additional credits from 400- and 500-level course work in Meteorology or related disciplines if not used as electives above. METEO 600 credits cannot be used to fulfill any portion of these additional paper-option credits.

All M.S. students defend their thesis or paper in a public presentation that is evaluated by, and must be approved by, the students' committee. A minimum of three signatures is required for a M.S. thesis, including the thesis adviser and the department head or program chair.

#### M.S. Minor

For a minor in Meteorology, an M.S. student must select 6 credits of 500-level Meteorology courses in a course plan approved by the department.

### Doctor of Philosophy (Ph.D.) Degree Requirements

Studies for the Ph.D. degree are designed to accommodate the interests and capabilities of the candidate, and they are overseen by a doctoral committee, which also administers comprehensive and final oral examinations. Before being admitted to Ph.D. candidacy, a student must have the academic support of a faculty member and the student must pass the Ph.D. candidacy examination that is typically offered once each year. The exam must be taken within one year of being admitted to the program. If a student does not pass the exam on their first attempt, then a second attempt is allowed at the time the student completes a M.S. degree in our graduate program.

A student must take METEO 591 (1 credit) the first semester it is available upon matriculating in the program. METEO 580 (1 credit) must be taken prior to the department's competency exam in written and spoken technical English. METEO 580 and METEO 591 will be waived as required classes if a student has taken them or equivalent courses before matriculating in the Ph.D. program. A minimum of 6 elective credits from METEO 500-level (other than METEO 501, 520, 521, 531, 533, 580, 590, 591) or RELATED DISCIPLINE 400- or 500-level courses must be taken that do not count toward any other degree requirement and finished by the semester in which the comprehensive exam is passed. One credit of METEO 590 is required each semester until the comprehensive exam is passed. A student must pass the department's competency exam in written and spoken technical English before being admitted to the comprehensive exam. There are no minimal credit requirements for quality-graded METEO 600 (research credits whose grades count toward the grade-point average); students may earn up to 12 quality-graded METEO 600 credits. The student is expected to master the material in the M.S. core courses (METEO 520, 521, 531, and 533), but need not take those courses for credit.

### Dual-Title Graduate Degree in Astrobiology (ABIOL)

Students interested in the emerging field of Astrobiology may wish to obtain a Dual-Title Graduate Degree in Astrobiology and Meteorology. The pursuit of this dual title entails additional course work beyond the degree requirements set forth here (see the *Graduate Bulletin* [http://bulletins.psu.edu/bulletins/whitebook/graduate\\_degree\\_programs.cfm?letter=A&program=grad\\_abiol.htm](http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=A&program=grad_abiol.htm) for further details concerning these course and other program requirements), as well as the participation of at least one Astrobiology program faculty member on the dissertation committee. The Astrobiology representative, who assists with the selection of courses, may be the adviser and have an appointment in Meteorology. The Ph.D. candidacy exam for dual-title students will be administered by Meteorology but with a component of it from the Astrobiology representative, or others related to this dual-title graduate degree, that assesses their potential in the field of Astrobiology. The field of Astrobiology will also be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Astrobiology is required. A public oral presentation of the dissertation is required.

#### Ph.D. Minor

For a minor in Meteorology, Ph.D. students should select 15 credits of 500-level Meteorology courses in a course plan approved by the department.

### Other Relevant Information

The program differentiates between instruction and research topics appropriate for M.S. students seeking positions of advanced responsibility in government or industry, those appropriate for M.S. students anticipating further study, and those appropriate for Ph.D. candidates who will work in advanced research laboratories or academic institutions.

### Student Aid

Graduate assistantships available through this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. Most graduate students are supported with teaching or research assistantships.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [METEOROLOGY \(METEO\) course list](#)

*NOTE: Courses in the use of X-ray diffraction, electron microscopy, and spectroscopy in meteorological studies are listed under [MATERIALS SCIENCE](#).*

### Integrated B.S./M.S. Program in Meteorology

The Department of Meteorology offers an integrated B.S./M.S. program, also called the Integrated Undergraduate-Graduate (IUG) program, that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Meteorology in five years of study. In order to complete the program in five years, students interested in the IUG program in Meteorology must apply for admission to the Graduate School and the IUG program by the end of their junior year.

During the first three years, the student will follow the course scheduling of one of the options in the B.S. degree, normally the Atmospheric Sciences or the General Option (see the *Undergraduate Bulletin*). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG Program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected B.S. Meteorology Option, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S. degree in Meteorology. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree requirements and complete their M.S. theses or papers. Typical scheduling plans for students pursuing the General or Atmospheric Sciences Options are given on the departmental Web site <http://www.met.psu.edu>. If a plan similar to one of these plans is followed, then the student will have completed all requirements for the B.S. in Meteorology by the end of the fourth year. If, for some reason, a student cannot continue in the integrated program, then this student will be able to receive the undergraduate degree upon completion of all of the B.S. requirements. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, via an assistantship requiring the payment of graduate tuition.

## IUG Prgram Admission Requirements

Students who wish to complete the IUG program in Meteorology should apply for admission to both the Graduate School and the IUG program by no later than the end of their junior year. In this case, successful students will be admitted formally into the graduate program in Meteorology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the Associate Head of the Department of Meteorology graduate program, who will determine the necessary criteria for all applicants. These criteria include the setting of the minimum required scores on the GRE and minimum cumulative GPA for consideration, the receipt of recommendation letters from three faculty and a letter of support from the department head, and the identification of an adviser who is willing to oversee the student's research project. Evidence of significant research potential must be provided in the application.

## IUG Program Degree Requirements

The total degree requirements are as follows: The new program will fulfill the present rigorous requirements of the existing M.S. Program. In particular, all IUG students must defend their theses or papers, as do all M.S. students, in a public presentation toward the end of their graduate program.

### **B.S. Degree Portion:**

**TOTAL B.S. REQUIREMENTS:** 121 credits (12 double-counted with the M.S. Requirements)

**General Education:** 45 credits, 24 of which are included in the REQUIREMENTS FOR THE MAJOR

**Requirements for the Major (All Options):** 75 credits

**Prescribed Courses:** 56 credits

**Additional Courses:** 19 credits

**Requirements for the General Option:** 18-19 credits

### **M.S. Degree Portion:**

**TOTAL M.S. REQUIREMENTS:** 34 credits (12 double-counted with the B.S. Requirements)

**Prescribed Courses:** METEO 520, 521, 531, 533, 580, 590, 591 (16 credits)

**Additional Courses:** 18 credits

6 credits of 500-level course work

6 credits of 400- or 500-level course work

6 credits of METEO 600 (thesis option)

or 6 credits of 400- or 500-level course work (paper option)

Last Revised by the Department: Fall Semester 2010

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Last updated by Publications: 01/21/10 (link check)



## Molecular Medicine (M M)

[Program Home Page](#)

### Current Co-Chairs

AVERY AUGUST, Department of Veterinary and Biomedical Sciences, University Park  
CHARLES H. LANG, Department of Cellular and Molecular Physiology, College of Medicine, Penn State Hershey Medical Center

### Degrees Conferred:

Ph. D., M.S.

### The Graduate Faculty

- Avery August , Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- David Antonetti, Ph.D. (Cellular and Molecular Physiology, College of Medicine)
- Rebecca Bascom, M.D. (Medicine, College of Medicine)
- Sarah Bronson, Ph.D. (Cellular and Molecular Physiology, College of Medicine)
- Craig E. Cameron, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Margherita Cantorna , Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Douglas R. Cavener, Ph.D. (Biology, ECoS)
- Gary Clawson, M.D., Ph.D. (Pathology, Molecular Biology and Biochemistry, and Gittlen Cancer Center, College of Medicine)
- James Connor, Ph.D. (Neural and Behavioral Sciences, College of Medicine)
- Pamela Correll, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Richard Courtney, Ph.D. (Microbiology and Immunology, College of Medicine)
- Kristen Eckert, Ph.D. (Pathology, Molecular Biology and Biochemistry, and Gittlen Cancer Center, College of Medicine)
- Nina Federoff, Ph.D. (Biology, ECoS)
- Richard Frisque, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Robert Gabbay, M.D., Ph.D. (Medicine, College of Medicine)
- Thomas Gardner, M.D. (Molecular Biology and Physiology, College of Medicine)
- Santhosh Giriirajan, Ph.D. (Medical College of Virginia, Virginia Commonwealth U) Assistant Professor of Biochemistry and Molecular Biology, and Anthropology
- Adam Glick, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Channe Gowda, Ph.D. (Molecular Biology and Biochemistry, College of Medicine)
- Eric Harvill, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Biao He, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Andrew Henderson, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Jianming Hu, Ph.D. (Microbiology and Immunology, College of Medicine)
- Harriet Isom, Ph.D. (Microbiology and Immunology, College of Medicine)
- Leonard Jefferson, Ph.D. (Cellular and Molecular Physiology , College of Medicine)
- Vandana Kahlia, Ph.D. (Pittsburgh) Assistant Professor of Veterinary and Biomedical Sciences
- Michael Katzman, M.D. (Medicine, College of Medicine)
- Ralph Keil, Ph.D. (Molecular Biology and Biochemistry, College of Medicine)
- Mark Kester, Ph.D. (Pharmacology, College of Medicine)
- Kouacou Konan , Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Zhi-Chun Lai, Ph.D. (Biology and Biochemistry & Molecular Biology, ECoS)
- Charles H. Lang, Ph.D. (Cellular and Molecular Biology, College of Medicine)
- Kathryn LaNoue, Ph.D. (Cellular and Molecular Physiology, College of Medicine)
- Philip Lazarus, Ph.D. (Pharmacology, College of Medicine)
- Robert Levenson, Ph.D. (Pharmacology, College of Medicine)
- Thomas Loughran, M.D. (Penn State Cancer Institute, College of Medicine)
- Bernhard Luscher, Ph.D. (Biology and Biochemistry & Molecular Biology, ECoS)
- Christopher Lynch, Ph.D. (Cellular and Molecular Physiology, College of Medicine)
- Andrea M. Mastro, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Patricia McLaughlin, Ph.D. (Neural and Behavioral Sciences, College of Medicine)
- Jan McAllister, Ph.D. (Cellular and Molecular Physiology, College of Medicine)
- Craig Meyers, Ph.D. (Microbiology and Immunology, College of Medicine)
- David Mu, Ph.D., (Pathology, and Biochemistry and Molecular Biology, College of Medicine)
- Kathleen Mulder, Ph.D. (Pharmacology, College of Medicine)
- Christopher Norbury, Ph.D. (Microbiology and Immunology, College of Medicine)
- Curt Omiecinski, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Leslie Parent, M.D. (Medicine, College of Medicine)
- Robert Paulson, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Gary Perdew, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Jeffrey M. Peters, Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Joseph Reese, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Ira Ropson, Ph.D. (Molecular Biology and Biochemistry, College of Medicine)
- Carl Barth Roundtree, Ph.D. (Pediatrics and Pharmacology, College of Medicine)
- Jeffery Sample, Ph.D. (Microbiology and Immunology, College of Medicine)
- Lorraine Santy, Ph.D. (Harvard) Assistant Professor of Biochemistry and Molecular Biology
- Surojit Sarkar, Ph.D. (Pittsburgh) Assistant Professor of Veterinary and Biomedical Sciences
- Robert A. Schlegel, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Cara-Lynn Schengrund, Ph.D. (Molecular Biology and Biochemistry, College of Medicine)
- Yuguang "Roger" Shi, Ph.D. (Australian National U and California, Davis) Professor of Cellular and Molecular Physiology
- Ian Simpson, Ph.D. (Neural and Behavioral Sciences, College of Medicine)
- Jill Smith, M.D. (Medicine, College of Medicine)
- Michael Smith, Ph.D. (Radiology, College of Medicine)
- Shao-Cong Sun, Ph.D. (Microbiology and Immunology, College of Medicine)
- Song Tan, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Michael Teng, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Diane Thiboutot, M.D. (Medicine, College of Medicine)
- Thomas Vary, Ph.D. (Cellular and Molecular Physiology, College of Medicine)
- Kent Vrana, Ph.D. (Pharmacology, College of Medicine)
- Yanming Wang, Ph.D. (Biochemistry and Molecular Biology, ECoS)
- Na Xiong , Ph.D. (Veterinary and Biomedical Sciences, College of AgSci)
- Ian Zagon, Ph.D. (Neural and Behavioral Sciences, College of Medicine)
- Jiyue Zhu, Ph.D. (Cellular and Molecular Physiology, College of Medicine)

The Intercollege Graduate Program in Molecular Medicine (IGDP in MM) prepares graduates for diverse opportunities in academic institutions, pharmaceutical companies, private research foundations, governmental research and regulatory programs. The program includes faculty from 14 academic units in the College of Agricultural Sciences and Eberly College of Science at the University Park campus and the College of Medicine at the Penn State Milton S. Hershey Medical Center. The IGDP in MM is also supported by the Huck Institutes of Life Sciences which provides modern telecommunications facilities and sophisticated equipment for state-of-the-art research applications. Doctoral students not only explore new conceptual connections, but also engage in active group learning experiences and explore a variety of potential career opportunities before graduation. Two unique aspects are (1) optional dual mentors

will expose students to complementary viewpoints and encourage students to pursue problems at the interface between traditional disciplines, and (2) an optional internship will provide a mechanism for students to obtain practical experience in future professional settings.

## General Admission Requirements

### Ph.D. degrees

Application deadline is December 1 for priority consideration.

1. Completed official Penn State Graduate School application for the IGDP in Molecular Medicine
2. Paid nonrefundable application fee
3. Two official transcripts from each institution attended
4. Application for a U.S. visa (International applicants only)
5. Graduate Record Examinations (GRE) general test
6. Three letters of recommendation
7. Statement of goals that pertains to the life sciences
8. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) examination. A minimum TOEFL score of 550 on the paper test, a score of 213 on the computer-based test, or a score of 80 on the internet-based test is required.
9. Students must have completed a bachelor's degree at an accredited college or university and have a minimum of a 3.0/4.0 junior/senior undergraduate grade-point average.

## Program Requirements

### Ph.D. degrees

1. Foundation of basic knowledge in cancer biology, toxicology, immunology, infectious diseases, molecular biology, cell biology, biochemistry. The IGDP in MM requires at least 9 credits in one or more of these disciplines. Students may request a waiver of a required if they have taken the specific course as an undergraduate or a similar course at another institution. The request will be made in writing to the campus curriculum committee after consultation with the co-chair. The following courses are to fulfill this requirement.

#### University Park

##### BIOCHEMISTRY AND MOLECULAR BIOLOGY (B M B)

464. Molecular Medicine (3 credits)

##### BIOCHEMISTRY, MICROBIOLOGY & MOLECULAR BIOLOGY (BMMB)

501. Biochemistry & Molecular Biology (5 credits)

##### INTEGRATIVE BIOSCIENCES (IBIOS)

VBS/IBIOS 511. Molecular Immunology (2 credits)

590. Colloquium (1 credit)

591. Ethics in Life Sciences (1 credit)

596. Independent Studies: 3 Laboratory Rotations (1 credit)

#### Penn State Hershey

##### College of Medicine Core Curriculum

##### BIOMEDICAL SCIENCE (BMS)

501. Regulation of Cellular and Systemic Energy Metabolism (3 credits)

502. Cell and Systems Biology (3 credits)

503. Flow of Cellular Information (3 credits)

##### Molecular Medicine Core Curriculum

##### INTEGRATIVE BIOSCIENCES (IBIOS)

590. Colloquium (1 credit)

591. Ethics in Life Sciences (1 credit)

596 Independent Studies: 3 Laboratory Rotations (1 credit)

#### Electives

Five additional credits from the College of Medicine Selective Courses

To augment the core sequences of courses, students and their research committees will formulate an individualized advanced curriculum. Additionally, opportunities to participate in an internship (IBIOS 595) or supervised college teaching experiences (IBIOS 602/VBS 602) are available. Interested graduate students are to discuss the opportunity with a MM IGDP Co-Chair and/or their faculty advisor.

IBIOS 595. INTERNSHIP (1 credit). For students interested in exploring academic, government, medical, law, or business corporate approaches to research. This is an external work assignment relevant to individual research or career goals. Interested graduate students are to discuss the opportunity with the IGDP in MM co-chair and/or their faculty advisor.

IBIOS 602/VBS 602. SUPERVISED EXPERIENCE IN COLLEGE TEACHING (1 credit). All students are strongly encouraged to enroll for 1 credit (or the equivalent) of Supervised Experience in College Teaching before the beginning of their third year. International fellows from non-English speaking countries must pass an English proficiency exam before any teaching duties are assigned.

## M.S. Degree Requirements

Although the graduate program in Molecular Medicine generally gives admission to students who seek the Ph.D. degree, on occasion, the program may allow candidates to pursue the Master of Science (M.S.) degree. This degree can also serve as an alternative for students who do not proceed to the Ph.D. for any number of reasons. It should be noted that an M.S. degree is not required for entry into the Ph.D. program of the Molecular Medicine IGDP. Masters students must have a minimum of 30 credits and a 3.0 overall GPA. IBIOS 595 (Internship), 596 (Rotations), and 602 (Teaching) credits all count toward the 30 credits. 18 credits need to be in the major at the 500-600 level.

## Student Aid

Graduate assistantships available in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Under normal circumstances, all students admitted and continuing in good standing are provided with graduate assistantship support from University sources, research grants, or fellowships. Financial support is usually not provided for work toward a M.S. degree.

## Courses

Graduate courses carry numbers from 500-599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

For course descriptions see the corresponding URLs.

[INTEGRATED BIOSCIENCES \(IBIOS\) course list](#)

[BIOCHEMISTRY, MICROBIOLOGY & MOLECULAR BIOLOGY \(BMMB\) course list](#)

[VETERINARY AND BIOMEDICAL SCIENCES \(VBS\) course list](#)

[BIOCHEMISTRY AND MOLECULAR BIOLOGY \(BCHEM\) course list](#)

[MICROBIOLOGY AND IMMUNOLOGY \(MICRO\) course list](#)

[CELL AND MOLECULAR BIOLOGY \(CMBIO\) course list](#)

[BIOLOGY \(BIOL\) course list](#)

[MICROBIOLOGY \(MICRB\) course list](#)

[STATISTICS \(STAT\) course list](#)

[HEALTH EVALUATION SCIENCES \(HES\) course list](#)

[PHYSIOLOGY \(PSIO\) course list](#)

[PHARMACOLOGY \(PHARM\) course list](#)

[PATHOLOGY \(PATH\) course list](#)

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-443

Review Date: 6/12/07

Faculty updated: 6/7/13

## Master of Professional Studies in Community and Economic Development (MPS CEDEV)

The Master of Professional Studies in Community and Economic Development (MPS CEDEV) is a 30-credit terminal master's degree program that emphasizes an interdisciplinary approach to community and economic development. The program balances theory and practice. Courses taught in MPS CEDEV use a blend of Web technology, print, and other media to provide an effective balance of flexibility and interaction. Individuals who currently work with, or are interested in working with communities, community organizations and stakeholders, or on a range of community and economic development issues at the state or national levels would benefit from this program. The MPS CEDEV program requires the completion of seven core courses (21 credits) in which students learn and apply sociological and economic concepts to issues in community and economic development. The courses offer examples and opportunities to apply these concepts to real issues facing communities and rural regions. Two of the core courses (6 credits) emphasize statistical methods and tools and techniques useful to practitioners in community and economic development. Students then can take from 3 to 6 credits of elective coursework to focus on their particular interests within community and economic development, or to work toward additional certifications. All students are required to complete a project, paper or internship (3 to 6 credits) that integrates theory and practice.

Instruction in the MPS CEDEV program emphasizes key themes that include economic planning and development; municipal finance, land use and population change; community structure, organization and process; leadership; tools and techniques in community development; community decision-making and capacity building. Students also may complete 12 credits in the core and a professional paper and earn a Post-baccalaureate Certificate in Community and Economic Development.

### Degree Requirements

The professional Master's degree requires 30 credits including a final integrative assessment/experience. All students complete the required MPS CEDEV core program of community and economic development courses, statistics, and methods. The MPS CEDEV courses consist of CEDEV 430, CEDEV 452, CEDEV 500, CEDEV 505, and CEDEV 509. The statistics, methods, and techniques requirement includes STAT 500 (or the equivalent) and CEDEV 575. CEDEV 576 is an optional summer institute focusing on applications and practices for community and economic development. An integrative paper, project, or internship is required where the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques and interpretation skills learned in the program to a real problem faced by a community or community organization. Choice of electives will be based on a plan of study worked out between the student and faculty adviser. There is no foreign language requirement for the degree, however, students planning to work in multi-cultural or international settings are encouraged to gain competency in an appropriate language(s). A total of 18 credits must be 500 level or higher, with at least 6 credits of 500-level course work. This Graduate School requirement is met through the required courses and the project, internship or paper credits.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

DATE LAST REVIEWED BY PUBLICATIONS: 02/01/07

Last Revised by the Department: Summer Session 2007

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Review Date: 4/10/07

## Music (MUSIC and MU ED)

[Program Home Page](#)

SUE HAUG, *Director, School of Music*  
233 Music Building  
814-865-0431

### Degrees Conferred:

- [M.A., M.Mus., M.M.E.](#)
- [Ph.D.](#)
- [D.M.A.](#)
- [Music: Integrated Undergraduate-Graduate Degrees](#)

### The Graduate Faculty

- Sue Haug, D.Mus.A. (Iowa) Professor of Music
- Dan C. Armstrong, M.Mus. (Michigan) Professor of Music
- Mark Ballora, Ph.D. (McGill) Associate Professor of Music
- Paul Barsom, Ph.D. (Eastman) Associate Professor of Music
- Vincent Benitez, Ph.D. (Indiana) Associate Professor of Music
- Lisa J. Bontrager, M.Mus. (Michigan) Distinguished Professor of Music
- Velvet Brown, M.Mus. (Boston) Professor of Music
- O. Richard Bundy, D.Ed. (Penn State) Professor of Music Education
- Maureen A. Carr, Ph.D. (University of Wisconsin) Distinguished Professor of Music
- Edward Christopher, D.Mus.A. (Eastman) Assistant Professor of Music
- Ann Clements, Ph.D. (Washington, Seattle) Associate Professor of Music Education
- Kim Cook, M.Mus. (Yale) Professor of Music
- Anthony Costa, D.Mus.A. (Ohio State) Assistant Professor of Music
- Timothy Deighton, D.Mus.A. (Kansas) Professor of Music
- Lynn Drafall, D.Ed. (Illinois) Professor of Music
- Daryl Durran, M.Mus. (Wisconsin, Milwaukee) Professor of Music
- Gerardo Edelstein, M.Mus. (Rice) Associate Professor of Music
- Langston Fitzgerald III, D.Mus.A. (Catholic) Professor of Music
- Robert Gardner, Ph.D. (Eastman) Associate Professor of Music Education
- Dennis Glocke, M.Mus. (Northwestern) Professor of Music
- Taylor Greer, Ph.D. (Yale) Associate Professor of Music
- Christopher Guzman, D.Mus.A. (Texas, Austin) Assistant Professor of Music
- Stephen Hopkins, Ph.D. (Florida State) Assistant Professor of Music
- Timothy Hurtz, B.Mus. (Southern California) Associate Professor of Music
- Lisa Jenkins, Ph.D. (Michigan) Instructor in Music
- Richard Kennedy, M.Mus. (Indiana) Professor of Music
- Christopher Kiver, D.Mus.A. (Michigan) Associate Professor of Music
- Anthony Leach, Ph.D. (Penn State) Professor of Music and Music Education
- Mark Lusk, M.Mus. (Eastman) Professor of Music
- James Lyon, M.Mus. (West Texas) Professor of Music
- Eric J. McKee, Ph.D. (Michigan) Associate Professor of Music
- Robert Nairn, Dipl.Mus. (Berlin Musikhochschule) Professor of Music
- Joanne Rutkowski, Ph.D. (SUNY, Buffalo), Professor of Music Education
- Mary Saunders, M.A. (Middlebury College/Sorbonne, Paris) Professor of Music
- Naomi Seidman, D.Mus.A. (Texas, Austin) Assistant Professor of Music
- Timothy Shafer, D.Mus. (Indiana) Professor of Music
- Steven H. Smith, D.Mus.A. (Eastman) Professor of Music
- Norman Spivey, D.Mus.A. (Michigan) Professor of Music
- David Stambler, D.Mus.A. (Maryland) Associate Professor of Music
- Marica Tacconi, Ph.D. (Yale) Professor of Music
- Darrin H. Thornton, Ph.D. (Penn State) Assistant Professor of Music Education
- Linda Thornton, Ph.D. (Missouri) Associate Professor of Music Education
- Jennifer Trost, M.Mus. (Michigan State) Associate Professor of Music
- M. Daniel Yoder, M.Mus. (Idaho) Professor of Music
- Charles Youmans, Ph.D. (Duke) Associate Professor of Music
- Max Zorin, D.Mus.A. (Eastman) Associate Professor of Music

### Admission Requirements

In addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin, the School of Music requires the completion of a recognized baccalaureate degree in music or music education, with a junior/senior grade-point average of 2.80 or higher (on a 4.00 scale), but admission to the Doctor of Musical Arts (D.M.A.) requires a grade point average of 3.00. Admission to the M.Mus. program requires an audition or the submission of compositions, or a list of works studied in preparation for conducting (depending on the specific degree); admission to the M.M.E. program requires the completion of 12-15 credits in music education methods at the undergraduate level and successful teaching or student teaching experience; admission to the Ph.D. requires an interview, submission of videotapes of teaching or conducting, scores from the Miller Analogies Test, and a portfolio of requested documents; admission to the M.A. program requires scores from the Graduate Record Examinations (GRE General Test), and evidence of scholarly writing on a musical topic. Information on additional requirements for entrance to the various degree programs can be obtained from the School of Music office. Admission to the D.M.A. (major in piano performance) requires an audition in person or by video recording of an extensive memorized program; students admitted to this program must perform musically at least at the level required to complete the degree Master of Music at Penn State, and must show potential ability to perform professionally. Additional requirements include an interview in person or by interactive video to assess language skills in addition to the University's requirement of specific performance on the TOEFL (550 on the paper test, 213 on the computer-based test, or 80 points on the new Internet test with a minimum of 20 on the new speaking portion) or alternatively, the International English Language Testing System (IELTS) with a minimum of 6.5.

### Master's Degree Requirements

The School of Music offers three master's degrees; the Master of Arts, the Master of Music Education, and the Master of Music.

The Master of Arts in Music offers three tracks, in Music Theory (32 credits), Musicology (32 credits), and Music Theory and History (34 credits). All three tracks provide an interdisciplinary approach to the field of music scholarship, a hallmark of our program, and all tracks require a thesis. The track in Music Theory offers preparation in current modes of research and analysis from a music theoretical perspective. The track in Musicology emphasizes the development of a broad knowledge of music of all periods and, at the same time, cultivates one or more areas of specialization. The track in Music Theory and History provides greater breadth by integrating theoretical analytical, and historical approaches to musical styles and works. A reading knowledge of German or another appropriate language must be demonstrated before thesis credit may be scheduled. In the Master of Arts degree program, at least 18 credits must be at the 500 level or higher, and a comprehensive examination is required.

The Master of Music Education degree provides the opportunity for advanced study in music, music learning and teaching, and teaching as reflective practice.

The program requires one full-time year of residency at the University Park campus, and is designed to be completed in one academic year plus two summer semesters. Fulfillment of degree requirements includes successful completion of 30 credits of course work that includes a final action research project and resultant substantial article-length paper, followed by an oral presentation focusing on the candidate's projects and course work. This presentation, including questions posed by the faculty committee, serves as the final comprehensive examination. (Twenty credits must be earned at the University Park campus and 18 credits must be at the 500-level or higher, with at least 6 credits at the 500 level.)

The Master of Music degree (36 credits) offers four majors: Performance, Composition/Theory, Conducting, Pedagogy and Performance (piano and voice tracks). The M.Mus. in Performance offers three separate curricula with areas of emphasis in Voice, Keyboard, or Orchestral Instruments. Depending on the area of emphasis, a recital, a composition project, or a conducting project is required. For the M.Mus. in Performance with emphasis in voice or keyboard, a master's recital is required, in addition to either a master's paper or lecture-recital. For the M.Mus. in Performance (orchestral instruments), a master's recital is required. For the M.Mus. in Composition/Theory, a composition project and a master's paper are required. The M.Mus. in Conducting offers three areas of emphasis: Orchestral, Choral, or Band/Wind Ensemble. A performance project and a master's paper are required. For the M.Mus. in Pedagogy and Performance, a master's recital is required, in addition to either a master's paper or lecture-recital. In the Master of Music degree program, at least 18 credits must be at the 500 level or higher, with at least 6 credits at the 500 level, and a comprehensive examination is required.

### Doctoral Degree Requirements: Ph.D. in Music Education

The Ph.D. in Music Education is designed to provide opportunities for the highest level of scholarly study in the processes of teaching and learning music. Candidates are expected to develop and test new knowledge in the field of music education while preparing themselves for positions in higher education or other leadership roles within the profession. A candidacy exam, a doctoral thesis, and comprehensive written and oral examinations are required.

### Doctoral Degree Requirements: D.M.A. major in Piano Performance

The Doctor of Musical Arts is offered with a major in Piano Performance. Four semesters in residence are required. The degree is designed to provide students with a thorough background of preparation and experience in professional-level performance and in the literature of the instrument, while becoming sufficiently knowledgeable about the discipline of music as a whole, in order to teach at the collegiate or university level. This background knowledge would include, but not be limited to, music theory, analysis, and history. Sixty credits are required beyond the Master of Music; if an exceptional student is admitted before completion of a prior Master of Music degree, the student will complete a total of 30 credits in categories equivalent to those required for the M.Mus., in addition to the 60 required for the D.M.A. A candidacy examination will follow upon two semesters completed in residence. Minimum course requirements (post-Master's degree) include sixteen credits (four semesters at 4 credits/semester) of Keyboard 580J applied music instruction; four credits of advanced ensembles; 10 credits of literature and pedagogy in the major area; and 18 credits in the broader discipline of music. The comprehensive examination will occur upon the completion of course work, before the final recital. The culminating experience of the D.M.A. degree is public performance: three memorized solo recitals are required (the final recital is prepared independently), and two recitals of chamber music. Although no written thesis is required, a lecture-recital is required, with a pre-approved monograph text.

### Other Relevant Information

The School of Music sponsors many musical ensembles, and candidates for performance degrees are required to participate in positions of responsibility. All candidates for degrees are expected to be in residence for a minimum of two semesters, except that D.M.A. candidates must be in residence for at least four semesters.

The School of Music is a regionally accredited institutional member of the National Association of Schools of Music.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Music: Integrated Undergraduate-Graduate Degrees

The School of Music offers two Integrated Undergraduate-Graduate degree programs: one that combine the B.A. in Music with the M.A. in Music, and one that combines the B.M. in performance with the M.A. in Music. This enables a select number of students to further their research interests at the undergraduate and graduate levels. By the end of the five-year program students receive two degrees, a B.A. in Music and an M.A. in Music, or a B.M. in Performance and an M.A. in Music.

Candidates for these Integrated Undergraduate-Graduate degrees must demonstrate a high level of aptitude and achievement in academic core courses and be highly motivated to pursue research projects with faculty.

Modeled after a similar program in the Schreyer Honors College, this IUG program enables gifted music students to double count credits in two degree programs. As a result they will have developed a research focus during their fourth and fifth years, which will help them prepare for entry into doctoral programs at other institutions.

For further information about the two Integrated Undergraduate-Graduate degree programs, including application procedures and degree requirements, see the [School of Music Web site](#) and click on the "Prospective Students" link.

### MUSIC COURSES

Individualized instruction is offered in six categories covering eighteen instruments:

Brass (BRASS)	Trumpet, french horn, trombone, euphonium, tuba
Keyboard (KEYBD)	Piano, organ
Strings (STRNG)	Violin, viola, violoncello, double bass
Woodwinds (WWNDS)	Flute, oboe, clarinet, bassoon, saxophone
Percussion (PERCN)	
Voice (VOICE)	

Instruction is offered for each instrument in three different modes: Secondary for 1 credit, Secondary for 2 credits, and Performance for 4 credits.

The Performance mode is available only to M.Mus. (Performance) students in their major areas. All other students take Secondary for 1 or 2 credits.

Applied music fees are required for individual instruction: \$175 per instrument for a 1-credit course, \$250 per instrument for a 2-, 3-, or 4-credit course. A complete list can be obtained from the School of Music office.

### MUSIC (MUSIC)

\*503. CONCERT CHOIR (1 per semester, maximum of 4)

\*504. CHAMBER SINGERS (1 per semester, maximum of 4)

\*505. SYMPHONIC WIND ENSEMBLE (1 per semester, maximum of 4)

\*506. SYMPHONIC BAND (1 per semester, maximum of 4)

\*507. PHILHARMONIC ORCHESTRA (1 per semester, maximum of 4)  
\*508. CHAMBER ORCHESTRA (1 per semester, maximum of 4)  
\*509. CENTRE DIMENSIONS (1 per semester, maximum of 4)  
\*510. BRASS CHOIR (1 per semester, maximum of 4)  
\*511. PERCUSSION ENSEMBLE (1 per semester, maximum of 4)  
\*520. CHAMBER MUSIC FOR STRINGS (1-4)  
\*521. CHAMBER MUSIC FOR WOODWINDS (1-4)  
\*522. CHAMBER MUSIC FOR BRASS (1-4)  
\*523. SONATA DUOS (1)  
560. CHORAL CONDUCTING (2-4 per semester, maximum of 16)  
561. ORCHESTRAL CONDUCTING (2-4 per semester, maximum of 8)  
562. BAND/WIND ENSEMBLE CONDUCTING (2-4 per semester, maximum of 16)  
\*\*565. STUDIO AND RECITAL ACCOMPANIMENT (1)

\*Admission by audition.

\*\*Course may be scheduled only after consultation with the director of the School of Music.

### Course Descriptions

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [MUSIC \(MUSIC\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-025

Review Date: 06/12/2012

Faculty updated: 7/22/12

## Neuroscience (NEURS)

### [Program Home Page](#)

ROBERT L. SAINBURG, *Co-Director of Neuroscience Program*  
29 Recreation Building  
University Park, PA 16802  
814-865-7938

ROBERT J. MILNER, *Co-Director of Neuroscience Program*  
College of Medicine, University Hospital  
Penn State Milton S. Hershey Medical Center  
Hershey, PA 17033  
717-531-1045

[Neuro-grad-hmc@psu.edu](mailto:Neuro-grad-hmc@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Kevin D. Alloway, Ph.D. (Indiana) Professor of Neural and Behavioral Sciences
- Anne Andrews, Ph.D. (American U) Associate Professor of Molecular Toxicology
- Alistair J. Barber, Ph.D. (Open University, Milton Keynes, UK) Assistant Professor of Ophthalmology, and Cellular and Molecular Physiology
- Colin Barnstable, Ph.D. (Wolfson College, Oxford, UK) Professor and Chair, Neural and Behavioral Sciences
- Paul Bartell, Ph.D. (Virginia) Assistant Professor of Avian Biology
- Sheri Berenbaum, Ph.D. (California, Berkeley) Professor of Psychology
- Melvin L. Billingsley, Ph.D. (George Washington) Professor of Pharmacology
- Edward O. Bixler, Ph.D. (New Mexico) Professor of Psychiatry; Vice Chair of Research
- Robert H. Bonneau, Ph.D. (Penn State) Professor of Microbiology and Immunology
- Douglas Cavener, Ph.D. (Georgia) Professor and Head of Biology
- Sonia Cavigelli, Ph.D. (Duke) Assistant Professor of Biobehavioral Health
- John Collins, Ph.D. (Cambridge) Professor of Physics
- James R. Connor, Ph.D. (California, Berkeley) Distinguished Professor and Vice Chair of Neurosurgery
- Rebecca Corwin, Ph.D. (Chicago) Associate Professor of Psychology
- Nancy Dennis, Ph.D. (Catholic U of America) Assistant Professor of Psychology
- Min Ding, Ph.D. (Pennsylvania); Ph.D. (Ohio State) Associate Professor of Marketing
- Barry R. Dworkin, Ph.D. (Rockefeller) Professor of Neural and Behavioral Sciences
- John Ellis, Ph.D. (Rochester) Professor of Psychiatry and Pharmacology; Director, Molecular Neuropharmacology Laboratory
- Paul J. Eslinger, Ph.D. (Texas Christian) Professor of Neurology
- Andrew G. Ewing, Ph.D. (Indiana) Professor of Chemistry, and Neural and Behavioral Sciences; J. Lloyd Huck Chair in Natural Sciences
- Jidong Fang, M.D./Ph.D. (CUNY) Associate Professor of Psychiatry
- Willard M. Freeman, Ph.D. (Wake Forest) Associate Professor of Pharmacology
- Thomas W. Gardner, M.D. (Thomas Jefferson) Professor of Ophthalmology, and Cellular and Molecular Physiology
- Charles Geier, Ph.D. (Pittsburgh) Assistant Professor of Human Development
- Rick Gilmore, Ph.D. (Carnegie Mellon) Associate Professor of Psychology
- Santhosh Giriirajan, Ph.D. (Medical College of Virginia, Virginia Commonwealth U) Assistant Professor of Biochemistry and Molecular Biology, and Anthropology
- Bruce Gluckman, Ph.D. (Pennsylvania) Associate Professor of Engineering Science and Mechanics, and Neurosurgery; Associate Director, Penn State Center for Neural Engineering
- Jinger Gottschall, Ph.D. (Colorado) Assistant Professor of Kinesiology
- Patricia S. Grigson, Ph.D. (Rutgers) Associate Professor of Neural and Behavioral Sciences
- Andras Hajnal, M.D., Ph.D. (Pécs U Medical School, Hungary) Assistant Professor of Neural and Behavioral Sciences
- Kyung-An Han, Ph.D. Associate Professor of Biology
- Frank Hillary, Ph.D. (Drexel) Assistant Professor Psychology
- Xuemei Huang, M.D. (Beijing Medical U) Assistant Professor of Neurology
- Dezhe Jin, Ph.D. Assistant Professor of Physics
- Byron C. Jones, Ph.D. (Arizona) Professor of Biobehavioral Health and Pharmacology
- Uhnoh Kim, Ph.D. (Duke) Associate Professor of Neurosurgery
- Laura Klein, Ph.D. (Uniformed Services U of Health Sci) Associate Professor of Biobehavioral Health
- Lisa Kopp, Ph.D. (USC) Assistant Professor of Human Development
- Alexay Kozhevnikov, Ph.D., Assistant Professor of Physics
- J. Kyle Krady, Ph.D. Assistant Professor of Neural and Behavioral Sciences
- Zhi-Chun Lai, Ph.D. (Albert Einstein College of Med) Professor of Biology, Biochemistry and Molecular Biology
- Kathryn F. LaNoue, Ph.D. (Yale) Professor of Cellular and Molecular Physiology
- Alphonse E. Leure-duPree, Ph.D. (U of London, England) Professor of Neural and Behavioral Sciences
- Robert Levenson, Ph.D. (SUNY, Stony Brook) Professor of Pharmacology
- Aimin Liu, Ph.D. (NYU Medical Center) Assistant Professor of Biology
- David X. Liu, Ph.D. (CUNY) Assistant Professor of Neural and Behavioral Sciences
- Lyle N. Long, D.Sc. (George Washington) Distinguished Professor of Aerospace Engineering and Mathematics
- Richard B. Mailman, Ph.D. (North Carolina) Professor of Pharmacology; Distinguished Senior Scholar in Pharmacology and Neurology
- Patricia J. McLaughlin, D.Ed. (Penn State, Harrisburg) Professor of Neural and Behavioral Sciences
- Robert J. Milner, Ph.D. (Rockefeller) Professor of Neural and Behavioral Sciences; Co-Director, Graduate Program in Neuroscience
- Gregory Moore, M.D. (Wayne State School of Med), Ph.D. (MIT) Professor of Psychiatry, and Neural and Behavioral Sciences; Director, Behavioral Neuroimaging Research Division
- Ralph Norgren, Ph.D. (Michigan) Professor of Neural and Behavioral Sciences
- Richard W. Ordway, Ph.D. (UMass Medical School) Professor of Biology; Chair, Intercollege Graduate Degree Program in Genetics
- Ann Ouyang, M.B., B.S. (London) Professor of Medicine
- Charles Palmer, M.D. (U of Cape Town, South Africa) Professor of Pediatrics
- Randen Patterson, Ph.D. (Maryland) Assistant Professor of Biology
- Blaise Peterson, Ph.D. (U of Washington) Associate Professor of Cellular and Molecular Physiology
- Thomas G. Pritchard, Ph.D. (Delaware) Associate Professor of Neural and Behavioral Sciences
- Chester A. Ray, Ph.D. (Georgia) Professor of Medicine and Cellular and Molecular Physiology
- William Ray, Ph.D. (Vanderbilt) Professor of Psychology
- Frank Ritter, Ph.D. (Carnegie Mellon) Associate Professor of Information Sciences and Technology
- Victor J. Ruiz-Velasco, Ph.D. (Tulane) Assistant Professor of Anesthesiology
- Robert L. Sainburg, Ph.D. (Rutgers) Associate Professor of Kinesiology and Neurology; Co-Director, Graduate Program in Neuroscience
- Russell C. Scaduto, Jr., Ph.D. (Indiana) Associate Professor of Cellular and Molecular Physiology
- Cara-Lynne Schengrund, Ph.D. (Seton Hall) Professor of Biochemistry and Molecular Biology
- K. Suzanne Scherf, Ph.D. (Pittsburgh) Assistant Professor of Psychology
- Steven Schiff, M.D., Ph.D. (Duke) Brush Chair Professor of Engineering; Professor of Neurosurgery, and Engineering Science and Mechanics; Director, Penn State Center for Neural Engineering,
- Zachery Simmons, M.D. (Florida) Professor of Neurology
- Ian A. Simpson, Ph.D. (U of London, England) Professor of Neural and Behavioral Sciences



- Semyon Slobounov, Ph.D. (Illinois); Ph.D. (U of Leningrad) Associate Professor of Kinesiology
- Thyagarajan Subramanian, Professor of Neurology and Neural and Behavioral Sciences; Director, Movement Disorders Program
- Joan Y. Summy-Long, Ph.D. (Penn State) Professor of Pharmacology
- Xiaorui Tang, Ph.D., Assistant Professor of Neural and Behavioral Sciences
- Richard B. Tenser, M.D. (SUNY, Syracuse) Professor of Neurology, and Microbiology and Immunology
- Joyce Tombran-Tink, Ph.D. Professor of Neural and Behavioral Science
- David Vandenberg, Ph.D. (Penn State) Associate Professor of Biobehavioral Health
- Kent Vrana, Ph.D. (Louisiana State) Elliot S. Vesell Professor and Chair of Pharmacology
- Andrew Webb, Ph.D. (Cambridge) Professor of Bioengineering and Director, Magnetic Resonance Center
- Paul Weiss, Ph.D. (California, Berkeley) Distinguished Professor of Chemistry and Physics
- Judith Weisz, M.B., B.Chir. (Cambridge, England) Professor of Obstetrics and Gynecology
- Michael Wenger, Ph.D. (SUNY, Binghamton) Associate Professor of Psychology; Director, Human Electrophysiology Facility
- Matthew Whim, Ph.D. (Cambridge) Assistant Professor of Biology
- Qing Yang, Ph.D. (Georgia Inst of Tech) Associate Professor of Radiology
- Ian S. Zagon, Ph.D. (Colorado) Distinguished Professor of Neural and Behavioral Sciences; Director, Program on Education in Human Structure
- Samuel (Sam) Shao-Min Zhang, M.D. (Henan Med College, China), Ph.D. (U of Tokyo) Assistant Professor of Neural and Behavioral Sciences

The Neuroscience graduate program is an interdepartmental program within the College of Medicine. The goal of the program is to provide academic and research training leading to the Ph.D. or M.S. degree in Neuroscience. Graduates are prepared for future careers in academic research, teaching, industry or government service. Doctoral students are expected to graduate with the following competencies: (1) the conceptual and technical skills necessary to conduct a research project in an area of neuroscience; (2) a broad general knowledge of neuroscience and detailed knowledge of one or more specialized areas; (3) the ability to appraise scientific evidence; (4) effective oral and written communication skills; (5) a commitment to professional responsibilities and adherence to ethical principles; and (6) an understanding of the external structures that govern biomedical research and the career pathways available to graduates. These competencies are delivered and/or assessed through formal course work (required and elective courses), candidacy and comprehensive examinations, mentored laboratory research, public presentations, publication of research papers, and defense of a written dissertation.

Although the program focuses on doctoral education; the M.S. degree in Neuroscience can be granted to students who request it. Master's students are expected to complete the same course requirements as doctoral students and to write a research thesis.

### Admission Requirements

Prospective applicants should have a bachelor's degree in a biological, physical, or behavioral science and are expected to have taken courses in biology, chemistry, physics, and mathematics. Candidates are expected to have a 3.0 (B) grade-point average or better. Neuroscience courses are desirable but not essential and research experience is an advantage. The General Test of the Graduate Record Examinations (GRE), or a comparable substitute examination accepted by a graduate program and authorized by the dean of the graduate school, is required for all applicants. Foreign applicants whose native language is not English must provide evidence of proficiency in English with a minimum Test of English as a Foreign Language (TOEFL) score of 550 on the paper test or 213 on the computer-based test.

A complete application should include: completed application form with personal statement of purpose; GRE scores; undergraduate transcripts; three letters of recommendation; and TOEFL scores (if applicable).

The application deadline is February 1 for admission in the following fall.

Qualified applicants generally will be requested to visit Hershey for an interview. Admission is based on evaluation of the undergraduate transcript, GRE scores, personal statement of purpose, letters of recommendation and performance on interview.

### Graduate Degree Requirements

#### Ph.D. degree in Neuroscience

During the first year of study, Ph.D. candidates in neurosciences receive a broad education in the breadth of neuroscience through three core neuroscience courses covering cellular and molecular neuroscience (which includes developmental neuroscience and neuropharmacology), systems neuroscience, and neuroanatomy. Students must also demonstrate competency in biostatistics. This requirement is satisfied by passing the course HES 515 or another similar course with the approval of the program director. This requirement may be waived with the approval of the program director for students who can demonstrate prior course work in biostatistics. In addition, 3 credits of elective courses offered at Penn State; course selection for this elective is with the approval of the program director.

The Language and Communication Requirement is satisfied by a grade of at least 3.0 in NEURO 530. A research thesis and thesis defense are required.

#### M.S. Degree in Neuroscience

*Core or Required Courses:* NEURO 511, 520, 521, 522, 523, 530, 597; CMBIO 540; IBIOS 591.  
*Language and Communication Requirement:* Satisfied by a grade of at least 3.0 in NEURO 530  
*Thesis or Paper Requirement and Course(s)/Credits Required:* A research thesis is required.

### Student Aid

Graduate research assistantships are provided for qualified doctoral students; full tuition is also provided. All support is continuous for the first year from the Neuroscience program. Support in years two and above, when the student is conducting thesis research, must be acquired from either the basic science department in which the candidate elects to pursue his/her minor or from funds available from the thesis adviser. These funds must be secured by the student in conjunction with his/her adviser.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [NEUROSCIENCE \(NEURO\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-446

Review Date: 6/12/07

Faculty updated: 6/7/13

## Nuclear Engineering (NUC E)

[Program Home Page](#)

ARTHUR T. MOTTA, *Chair of Nuclear Engineering*  
138 Reber Building  
814-863-6384

### Degrees Conferred:

Ph.D., M.S., M.Eng.

### The Graduate Faculty

- Maria Avramova, Ph.D. (Penn State) Assistant Professor of Nuclear Engineering
- Yousry Y. Azmy, Ph.D. (Illinois, Urbana-Champaign) Adjunct Professor of Nuclear Engineering
- Anthony J. Baratta, Ph.D. (Brown) Professor Emeritus of Nuclear Engineering
- Jack S. Brenizer, Jr., Ph.D. (Penn State) Professor of Mechanical and Nuclear Engineering
- Gary L. Catchen, Ph.D. (Columbia) Professor of Nuclear Engineering
- Fan-Bill Cheung, Ph.D. (Notre Dame) Professor of Mechanical and Nuclear Engineering
- Ward S. Diethorn, Ph.D. (Carnegie Tech) Professor Emeritus of Nuclear Engineering
- Robert M. Edwards, Ph.D. (Penn State) Professor of Nuclear Engineering
- Kostadin N. Ivanov, Ph.D. (Bulgarian Academy of Sciences) Professor of Nuclear Engineering
- Edward S. Kenney, Ph.D. (Penn State) Professor Emeritus of Nuclear Engineering
- Seungjin Kim, Ph.D. (Purdue) Assistant Professor of Mechanical and Nuclear Engineering
- Edward H. Klevans, Ph.D. (Michigan) Professor Emeritus of Nuclear Engineering
- Samuel H. Levine, Ph.D. (Pittsburgh) Professor Emeritus of Nuclear Engineering
- Thomas F. Lin, Senior Research Associate
- Arthur T. Motta, Ph.D. (California, Berkeley) Professor of Nuclear Engineering
- Gordon E. Robinson, Ph.D. (Penn State) Professor Emeritus of Nuclear Engineering
- Barry E. Scheetz, Ph.D. (Penn State) Professor of Materials; Senior Scientist, Materials Research Laboratory; Professor of Civil Engineering and Nuclear Engineering
- Kenan Unlü, Ph.D. (Michigan) Professor of Nuclear Engineering; Director, Radiation Science and Engineering Center

Graduate programs and research facilities are available in thermal-hydraulics, neutronics, computational methods, advanced controls with applications of artificial intelligence, materials, radiation monitoring and effects, fuel management, and radioactive waste management. Application areas include advanced reactor design, safety analysis, radiation instrumentation development, neutron imaging, and plant life extension.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with a 3.00 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. General aptitude GRE test results are required. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

To qualify for admission, an international student must achieve a minimum score on the Test of English as a Foreign Language (TOEFL) of 550 on the paper-based test, 213 on the computer-based test, and 80 on the Internet-based test with a 19 in the speaking section. This requirement is waived if the student's native language is English or if the student received a baccalaureate or master's degree from an institution in which the language of instruction was English. Letters of recommendation and a statement of purpose written by the applicant are also required to complete the application package.

### Degree Requirements

The M.Eng. degree is a nonthesis professional master's degree. In the M.Eng. degree program, 30 course credits are required. Twelve of those credits must be in Nuclear Engineering with at least 18 credits at the 500 level. No thesis is required for the M.Eng. degree. Instead, the student must take 3 credits of NUC E 597C Professional Topics in Nuclear Engineering, which represents formal recognition of the student's effort spent on writing a paper about an engineering subject. It must be approved by the adviser, a faculty reader, and the program chair.

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in nuclear engineering. Student pursuing an M.S. degree must complete 24 course credits and submit an acceptable thesis (6 research credits) to the Graduate School.

Continuous registration is required of all Ph.D. students until the thesis is approved.

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students are admitted to candidacy after passing written and oral examinations. The Ph.D. program is quite flexible, with minimal formal requirements. The Ph.D. degree is awarded upon completion of a program of advanced study that includes a minimum period of residence, a satisfactory thesis, and the passing of comprehensive and final oral examinations as determined by the student's doctoral committee.

Generally, a Ph.D. student must have 30 credits above a master's degree before taking a comprehensive examination.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

NATIONAL ACADEMY FOR NUCLEAR TRAINING FELLOWSHIPS-Available to graduate students in nuclear engineering; stipend plus tuition.

U.S. DEPARTMENT OF ENERGY-NUCLEAR SCIENCE AND ENGINEERING FELLOWSHIPS-Available to graduate students interested in engineering and engineering support related to nuclear technology; stipend plus tuition.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level will not count. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[NUCLEAR ENGINEERING \(NUC E\) course list](#)

Last reviewed by Graduate School: 5/6/04

Last updated by Publications: 9/14/10



## Nursing (NURS)

[Program Home Page](#)

PAULA MILONE-NUZZO, *Dean, School of Nursing*

JUDITH E. HUPCEY, *Associate Dean for Graduate Education*

201 Health and Human Development East Building  
814-863-0245

### Degrees Conferred:

Ph.D., M.S., M.S.N.

Dual-Title Ph.D. in Nursing and Bioethics (BIOET)

### The Graduate Faculty

- Kesha Baptiste-Roberts, Ph.D. (Johns Hopkins) *Assistant Professor of Nursing*
- Raymonde A. Brown, Ph.D. (Maryland) *Assistant Professor of Nursing; Associate Dean for Undergraduate Programs and Outreach in Nursing*
- Harleah G. Buck, Ph.D. (Southern Florida) *Assistant Professor of Nursing*
- Mary Beth Clark, Ed.D. (Temple) *Assistant Professor of Nursing*
- Mona M. Counts, Ph.D. (Texas, Austin) *Associate Professor of Nursing; Elouise Ross Eberly Professor of The School of Nursing*
- Margaret (Peg) Cushman, Ph.D. (UMass, Boston) *Assistant Professor of Nursing*
- Donna Fick, Ph.D. (California) *Professor of Nursing*
- Janet Fogg, Ph.D. (Villanova) *Assistant Professor of Nursing; Professor in Charge, Professional Graduate Programs*
- Marianne Hillemeier, Ph.D. (Michigan) *Associate Professor of Health Policy and Administration, and Nursing Health Policy*
- Judith E. Hupcey, Ed.D. (Columbia) *Associate Professor of Nursing; Associate Dean for Graduate Education in Nursing*
- Lisa A. Kitko, Ph.D. (Penn State) *Assistant Professor of Nursing; Coordinator, Clinical Nurse Specialist Option*
- Ann M. Kolanowski, Ph.D. (New York) *Professor of Nursing; Elouise Ross Eberly Professor of The School of Nursing*
- Susan Loeb, Ph.D. (Penn State) *Associate Professor of Nursing*
- Kathleen G. Mastrian, Ph.D. (Kent State) *Assistant Professor of Nursing*
- Paula Milone-Nuzzo, Ph.D. (Connecticut) *Professor and Dean, School of Nursing*
- Janice L. Penrod, Ph.D. (Penn State) *Professor of Nursing*
- Amy M. Sawyer, Ph.D. (Pennsylvania) *Assistant Professor of Nursing*
- Carol A. Smith, D.S.N. (Alabama) *Associate Professor of Nursing*
- Elizabeth J. Susman, Ph.D. (Penn State) *Jean Phillips Shibley Professor of Biobehavioral Health; Professor of Nursing*
- Patricia Sweeney, Ph.D. (Penn State) *Assistant Professor of Nursing; Director, Nurse Practitioner Program*

The graduate programs emphasize productive scholarship and research in the development of nursing knowledge and the translation of knowledge into practice. Advanced study is in human health and development throughout the life span, and in nursing's role in providing health services to individuals, families, and communities.

The Ph.D. program and the dual-title Ph.D. program in nursing and bioethics prepares nurse scientists and clinical scholars to provide leadership in nursing education, practice and research. Individualized curricula prepare nursing graduates to assume positions as faculty, advanced clinicians, clinical researchers and leadership positions in community, governmental, or institutional settings.

The M.S. degree program with a major in nursing prepares nurse scientists and clinical scholars who plan to complete a Ph.D. in nursing or dual-title Ph.D. in nursing and bioethics.

The M.S.N. degree in Nursing consists of a base program with two emphasis areas and six options. The Base Program emphasis areas are: Clinical Trials Research or Community Health Policy and Management. The options include: Clinical Nurse Specialist, Family Nurse Practitioner, Adult Gerontology Primary Care Nurse Practitioner, Adult Gerontology Acute Care Nurse Practitioner, Nurse Administrator, and Nurse Educator.

The master's degree program in Nursing is accredited by the National League for Nursing Accrediting Commission and the Commission on Collegiate Nursing Education.

The Clinical Trials Research emphasis area enables the student to acquire advanced knowledge of clinical trials research methods, data management and analysis, and ethical considerations. The program is designed to prepare graduates for a variety of roles in clinical trials research, including coordinators, educators, or consultants. The curriculum will assist graduates in preparing for national certification as a clinical research professional.

The Community Health Policy and Management area emphasis enables the student to acquire advanced knowledge of management principles, epidemiology, public health, and health care economics. The program is designed to prepare graduates for leadership roles in community and public health nursing. The curriculum will assist graduates in preparing for national certification as an advanced public health nurse.

The Nurse Practitioner option is designed to help prepare the professional nurse to function in an expanded nursing role providing direct care to specific groups of clients in a variety of health care settings. Since that practice is inherently interdisciplinary in nature, advanced knowledge and research from nursing is combined with knowledge from science, medicine, and related disciplines. The Nurse Practitioner may also function in supervisory, consultative, education, and research roles.

The Clinical Nurse Specialist option prepares advanced practice nurses in Adult Gerontology or Community Health to plan, implement, and evaluate care in a variety of settings. They function in direct care, supervisory, consultative, education, and research roles serving individuals, families, and communities.

The Nurse Administrator option enables the student to acquire advanced knowledge of organizational leadership, health policy, and evidence-based health care delivery. The program is designed to prepare students for leadership and administrative roles in a variety of health care settings.

The Nurse Educator option enables the student to acquire advanced knowledge of evidence-based teaching and learning principles, curriculum development, and evaluative techniques. The program is designed to prepare students for educator roles in a variety of academic and health care settings.

### Admission Requirements for M.S., M.S.N. and Ph.D. Programs

1. For admission to the Nursing program, an applicant must hold either (1) a bachelor's degree in Nursing from a U.S. regionally accredited institution or (2) a postsecondary degree in Nursing that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Students entering the doctoral program via the traditional post-master's route must have earned a master's degree with a major in nursing from a program accredited by a national accrediting agency for nursing. Well-qualified doctoral applicants with a baccalaureate degree in nursing and master's degree in a related discipline (e.g., public health) will be evaluated individually to assess the need for prerequisite master's-level course work in nursing for doctoral program admission.
2. Applicants must submit transcripts of all previous course work from institutions of higher learning. For M.S.N. applicants, a cumulative grade-point average of 3.3 (on a 4.0 scale) for junior/senior baccalaureate degree is expected with a B or better in all science and nursing courses. For M.S. applicants, a cumulative grade-point average of 3.5 (on a 4.0 scale) for junior/senior baccalaureate degree is expected with a B or better in all science and nursing courses. College chemistry and statistics are also required. For doctoral applicants, a cumulative grade-point average 3.5 (on a 4.0 scale) for master's and subsequent course work is expected.
3. Two letters of reference are required for the M.S.N. degree program and three letters of reference are required for the M.S. and Ph.D. degree programs. The letters should be solicited from professional colleagues who can attest to the applicant's ability.
4. All applicants must submit a statement of purpose. In addition, M.S. and Ph.D. degree applicants must also submit a published or unpublished scientific paper, thesis, or other scholarly writing sample and a complete curriculum vitae.
5. GRE scores are required for admission to the M.S. and Ph.D. programs. GRE scores are not required for the M.S.N. applicants, but if the scores are submitted to Penn State they will be reviewed as part of the application.

6. The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirements who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.
7. Applicants to the M.S.N. options offered online via the World Campus must hold a current license to practice professional nursing in at least one U.S. state. All other applicants to the M.S. and M.S.N. degree programs must hold a current Pennsylvania license to practice professional nursing. Applicants to the Ph.D. degree program must be licensed to practice professional nursing in at least one state or in a foreign country.
8. Applicants to the Adult Gerontology Acute Care Nurse Practitioner Option are required to have two years of acute care hospital experience.
9. Applicants to the M.S.N. degree program are encouraged to discuss program options with the faculty; however, an interview is not required. Doctoral (M.S. - Ph.D. and Ph.D.) applicants will be contacted by the School of Nursing to schedule a required interview (either in person or via telephone).

### M.S. and M.S.N. Degree Requirements

A core of courses including nursing issues, theory, and research is required of all master's students. Candidates in M.S. degree program (M.S. - Ph.D.) are required to complete a minimum of 43 credits to be awarded a M.S. degree. The Clinical Nurse Specialist option must earn a minimum of 41-42 credits, Family Nurse Practitioner option, the requirement is a minimum of 45 credits, Adult Gerontology Primary Care Nurse Practitioner, is a minimum of 41-44 credits, Adult Gerontology Acute Care Nurse Practitioner, is a minimum of 43 credits, Nurse Administrator is a minimum of 37 credits, and Nurse Educator is a minimum of 37 credits. Students in M.S.N. degree program are required to complete a scholarly paper, which demonstrates the application of theory and research to a clinical problem based on review of literature and research utilization for that problem. Students in the M.S. degree program may choose to do either a thesis for 6 credits or a scholarly paper for 3 credits.

### Ph.D. Degree Requirements

Students may enter the program directly from a B.S. in nursing (receiving a M.S. degree en route to the Ph.D.) or following completion of a Master's degree (nursing or non-nursing). A dual-title Ph.D. degree in nursing and bioethics and a minor in nursing are also available.

Students entering with a M.S. degree in nursing will complete a minimum of 41-50 credits. In addition to coursework, all students are required to complete a series of examinations, Candidacy; Comprehensives (written and oral components); Dissertation Proposal Defense; and Final Oral Examination. Students also are required to fulfill a residency requirement. This entails being registered as a full-time student (9 credits minimum) engaged in academic work over the courses of two semesters within a twelve-month period (summer sessions are not included).

**Candidacy Examination:** All students must satisfactorily complete the candidacy examination, which is designed to confirm the student's mastery of basic nursing theory and research methods. For students entering the doctoral program with a master's degree, the candidacy examination must be taken at the end of the first year of full-time study or the equivalent. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

**Comprehensive Examination:** The comprehensive examination is designed to test the student's mastery of and ability to synthesize and integrate the theoretical basis for nursing science, advanced research methods and the chosen specialty area. This examination is taken upon completion of all course work. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

**English Competency:** All students will be assessed for deficiencies in reading, writing and speaking of English during the core nursing courses prior to the candidacy examination; should remedial work be necessary, the student will be directed to the appropriate sources. International students will be advised that the passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. in nursing.

**Communication and Language Requirement:** A foreign language will not be required. However, all students are required to be computer literate in word processing and use of statistical packages, as determined by their dissertation committee, and will be assessed for communication skills during core nursing courses.

**Dissertation:** Each student is required to conduct an original and independent research project which, adds to nursing's body of knowledge, and to communicate the research report in a written dissertation. A written dissertation proposal is required and must be approved at a proposal hearing by a majority vote of the student's dissertation committee. A majority vote is also required for approval of the completed written dissertation at the final oral defense.

### Dual-Title Ph.D. in Bioethics Degree Requirements

Nursing Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. To qualify for the dual-title degree, students must satisfy the requirements of the Nursing Ph.D. program. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their Nursing advisor and their Bioethics program advisor.

#### Additional coursework

The dual-title Ph.D. in Nursing and Bioethics requires a minimum of 2 credits of coursework beyond the requirements for the Ph.D. in Nursing (16 credits of the 18 Bioethics credits are part of the current degree requirements in Nursing), as follows:

- Seven required credits (BIOET 501, BIOET 502, and BIOET 590), plus at least three additional BIOET credits at the 500 level. These credits can be applied to the 9 credits of specialty coursework for the Nursing PhD.
- Eight additional credits from a list of approved electives at the 400 or 500 level, at least two of which must be at the 500 level (many of the available electives that students may wish to take are 3-credit courses, so 9 additional credits may be a more typical number for most students). The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. (The Nursing Science core constitutes seven of these elective credits).

**Candidacy.** In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by Nursing; a single candidacy examination will be administered that includes assessment of both Nursing and Bioethics. At least one member of the candidacy committee must come from the Bioethics program. Unless the Associate Dean for Graduate Education in the School of Nursing and the Director of the Bioethics Program agree to waive the requirement, this person should not be a member of the Nursing faculty.

**Comprehensive exam.** The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their nursing.

**Dissertation and dissertation defense.** A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

#### U.S. PUBLIC HEALTH SERVICE TRAINEESHIPS IN NURSING

Open to selected registered nurse, full-time students in nursing; stipend may be available plus tuition. Apply to Associate Dean for Graduate Education, School of Nursing.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students but courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[NURSING \(NURS\) course list](#)

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-06-101

Review Date: 04/09/2013

Faculty updated: 10/3/12

## Nutritional Sciences (NUTR)

[Program Home Page](#)

GORDON JENSEN, *Head of the Department of Nutritional Sciences*  
 SHELLY NICKOLS-RICHARDSON, *Professor-in-Charge of Graduate Program in Nutrition*  
 323 Chandlee Laboratory  
 814-863-2920

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Craig R. Baumrucker, Ph.D. (Purdue) Professor of Animal Nutrition and Physiology
- Cheston M. Berlin, Jr., M.D. (Harvard) University Professor of Pediatrics and Pharmacology
- Leann Lipps Birch, Ph.D. (Michigan) Distinguished Professor of Human Development and Family Studies
- Dorothy A. Blair, Ph.D. (Cornell) Assistant Professor of Nutritional Sciences
- J. Lynne Brown, Ph.D. (MIT) Associate Professor of Food Science
- James R. Connor, Ph.D. (California, Berkeley) Professor of Neuroscience and Anatomy
- Rebecca L. Corwin, Ph.D., R.D. (Chicago) Associate Professor of Nutritional Sciences
- Terry D. Etherton, Ph.D. (Minnesota) Distinguished Professor of Animal Nutrition
- Gary J. Fosmire, Ph.D. (California, Berkeley) Associate Professor Emeritus of Nutritional Sciences
- Michael H. Green, Ph.D. (California, Berkeley) Professor of Nutrition Science and Physiology
- Andras Hajnal, M.D., Ph.D. (Univ Medical School Pecs, Hungary) Associate Professor of Neural/Behavioral Sciences
- Okhee Han, Ph.D. (North Carolina) Assistant Professor of Nutritional Sciences
- Terry J. Hartman, Ph.D., R.D. (Minnesota) Professor of Nutritional Sciences
- Kevin J. Harvatine, Ph.D. (Cornell) Assistant Professor of Nutritional Physiology
- Leonard S. Jefferson, Jr., Ph.D. (Vanderbilt) Professor and Head, Department of Cellular and Molecular Physiology; Associate Dean for Research and Graduate Studies
- Gordon L. Jensen, M.D., Ph.D. (Cornell) Professor and Department Head of Nutritional Sciences, Professor of Medicine, Hershey School of Medicine
- Byron C. Jones, Ph.D. (Arizona) Professor of Biobehavioral Health
- Shannon L. Kelleher, Ph.D. (California, Davis) Assistant Professor of Nutritional Sciences
- Kathleen L. Keller, Ph.D. (Rutgers) Assistant Professor of Nutritional Sciences and Food Science
- Katarzyna (Kasia) Kordas, Ph.D. (Johns Hopkins) Assistant Professor of Nutritional Sciences
- Penny M. Kris-Etherton, Ph.D., R.D. (Minnesota) Distinguished Professor of Nutritional Sciences
- Barbara Lohse, Ph.D., R.D. (Wisconsin, Madison) Associate Professor of Nutritional Sciences
- Andrea M. Mastro, Ph.D. (Penn State) Professor of Microbiology and Cell Biology
- Edward W. Mills, Ph.D. (Purdue) Associate Professor of Dairy and Animal Science
- Laura E. Murray-Kolb, Ph.D. (Penn State) Assistant Professor of Nutritional Sciences
- Sharon M. (Shelly) Nickols-Richardson, Ph.D., R.D. (Georgia) Professor of Nutritional Sciences
- Jill Patterson, Ph.D. (Wisconsin, Madison) Assistant Professor of Nutritional Sciences
- Jeffrey Peters, Ph.D. (California, Davis) Associate Professor of Veterinary Science
- Claudia K. Probart, Ph.D. (Oregon) Associate Professor of Nutritional Sciences
- K. Sandeep Prabhu, Ph.D. (Mysore, India) Associate Professor of Veterinary and Biomedical Sciences
- Connie J. Rogers, Ph.D. (Pittsburgh) Assistant Professor of Nutritional Sciences
- Barbara J. Rolls, Ph.D. (Cambridge) Helen A. Guthrie Chair and Professor of Nutritional Sciences
- A. Catharine Ross, Ph.D. (Cornell) Dorothy Foehr Huck Chair and Professor of Nutritional Sciences
- Ian Simpson, Ph.D. (University College, London) Professor of Neuroscience and Anatomy
- Donald B. Thompson, Ph.D. (Illinois, Champaign-Urbana) Professor of Food Science
- Jack Vanden Heuvel, Ph.D. (Wisconsin, Madison) Associate Professor of Veterinary Science
- Regina Vasilatos-Younken, Ph.D. (Penn State) Professor of Poultry Science
- Sheila G. West, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Biobehavioral Health
- Nancy I. Williams, Sc.D. (Boston) Associate Professor of Kinesiology

Graduates are prepared for careers in basic and applied research in nutrition and in college teaching. The course of study is planned to meet the professional objectives of the individual student. Students may emphasize molecular and cellular nutritional sciences, nutritional biochemistry, applied human nutrition, applied animal nutrition, nutrition education, and nutrition in public health. Supporting courses are available in biochemistry, physiology, genetics, microbiology, biophysics, food science, health policy and administration, human development and family studies, anthropology, sociology, psychology and statistics.

Current research emphasizes minerals, vitamin A, lipid metabolism, metabolic disorders, nutrition and behavior, nutrition education strategies, evaluation of dietary intake and nutritional status, nutrition policy and health promotion and disease prevention across the life cycle.

Facilities include well-equipped nutrition science laboratories with animal facilities supervised by a University laboratory animal resource staff. The Diet Assessment Center and the metabolic kitchens serve as a laboratories for students in community nutrition, nutrition education, and metabolic nutrition.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *General Bulletin*.

College graduates with an undergraduate degree in nutrition, animal sciences, food science, dietetics, or a related biological or social science will be considered for admission. Applicants should have a minimum grade-point average of 3.00 (on a 4.00 scale), an acceptable score on the GRE (an average quantitative and verbal score above the fiftieth percentile), and three supporting recommendations. Exceptions may be made for students with special backgrounds, abilities, and interests. When openings are limited, the best-qualified candidates are given priority.

The basic expectations for admission from undergraduate studies include 6 credits in chemistry (organic and inorganic); 3 credits each in physiology, biochemistry, and nutrition; and physics, calculus, and analytical chemistry for some research areas in nutrition science and social science for public health and community nutrition. Students with more than 9 credits of deficiency and a superior record may be admitted as provisional students until they qualify for consideration for regular degree status. Deficiencies are expected to be made up with a 3.00 grade-point average or better within the first two semesters.

### Master's Degree Requirements

The graduate program in Nutritional Sciences offers the M.S. degree with an emphasis in basic nutritional sciences, applied human nutrition, or nutrition in public health.

The M.S. degree requires 30 credits of course work, including 6 credits in research (NUTR 600). The M.S. degree with an emphasis on nutrition in public health includes a 4-credit field experience (NUTR 555).

### Doctoral Degree Requirements

Students are admitted on a provisional basis pending satisfactory completion of the candidacy examination designed to assess the student's potential and academic preparation for doctoral study. Candidacy examinations must be scheduled by students with a master's degree after they have completed 10

credits in doctoral work but before the end of the second semester following admission to the graduate program. The candidacy examination is administered and evaluated by the Graduate Candidacy Committee.

**Communication and Language Requirement:** Doctoral students must demonstrate competency in spoken English as judged by the program faculty and in technical writing by completion of ENGL 418 with a grade of B or better. Students also must complete satisfactorily 2 to 3 credits at the 400 or 500 level from any one of the following areas: (1) college teaching; (2) logic or philosophy of science; (3) foreign language; or (4) computer science. There are no specific course requirements; however, the academic program is developed by the student in consultation with his or her adviser to develop doctoral-level competence in nutrition and one or more supporting areas. Students are expected to participate in a colloquium each semester and enroll in a seminar on a regular basis.

**Nutritional Sciences Option within the IBIOS program:** This option in Nutritional Sciences is proposed to promote excellence in graduate education in nutritional sciences by capitalizing on the expertise existing within the biological, biomedical, behavioral, and social sciences at Penn State. Students can choose an area of focus within this option that emphasizes biomolecular nutrition, human nutrient requirements, or ingestive behavior and nutrition intervention. The educational goal of this option is to create a stimulating and diverse environment in which students will develop the critical thinking skills needed to tackle complex issues in nutrition. Students will be expected to develop a foundation of basic knowledge in molecular biology, cell biology, biochemistry and computational methodology. In addition, students are required to complete 2 credits of IBIOS 590. Students are required to complete a course in professional developmental ethics. All students are required to assist in teaching/resident instruction for at least two semesters during their degree program.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[FOOD SCIENCE \(FD SC\) course list](#)

[NUTRITION \(NUTR\) course list](#)

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-105

Review Date: 01/10/2012

Faculty updated: 3/4/13



## Operations Research (O R)

[Program Home Page](#)

SUSAN H. XU, *Chair of the Committee on Operations Research*  
335 Beam Building  
814-863-0531

### Degrees Conferred:

Students electing this option through participating programs earn a degree with a dual title at both the Ph.D. and the M.S., M.A., or M.Eng. levels, i.e., Ph.D. in (graduate program name) and Operations Research, or M.S., M.A., or M.Eng. in (graduate program name) and Operations Research.

The following graduate programs offer dual degrees in Operations Research: Agricultural, Environmental and Regional Economics; Agricultural and Biological Engineering; Animal Science; Business Administration; Civil Engineering; Chemical Engineering; Computer Science and Engineering; Electrical Engineering; Economics; Educational Leadership; Energy and Mineral Engineering; Entomology; Forest Resources; Geography; Geosciences; Hotel, Restaurant and Institutional Management; Industrial Engineering; Mathematics; Mechanical Engineering; Statistics; and Workforce Education and Development.

### The Graduate Faculty

- William P. Andrew, Ph.D. (Penn State) Associate Professor of Hotel, Restaurant, and Institutional Management
- Steven E. Arnold, Ph.D. (Stanford) Professor of Statistics
- Russell R. Barton, Ph.D. (Cornell) Professor of Industrial Engineering
- Tom M. Cavalier, Ph.D. (Virginia Tech) Professor of Industrial Engineering
- M. Jeya Chandra, Ph.D. (Syracuse) Professor of Industrial Engineering
- Kalyan Chatterjee, Ph.D. (Harvard) Distinguished Professor of Management Science and Information Systems
- David P. Christy, Ph.D. (Georgia) Associate Professor of Management Science and Information Systems
- N. Edward Coulson, Ph.D. (California, San Diego) Associate Professor of Economics
- Lily (Ageliki) Elefteriadou, Ph.D. (Polytechnic U, Brooklyn) Associate Professor of Civil Engineering
- Turgay Ertekin, Ph.D. (Penn State) Professor of Petroleum and Natural Gas Engineering
- Jill L. Findeis, Ph.D. (Washington State) Professor of Agricultural Economics
- Duncan K. H. Fong, Ph.D. (Purdue) Professor of Management Science and Information Systems
- Natarajan Gautam (North Carolina) Associate Professor of Industrial Engineering
- Vikash V. Gayah, Ph.D. (California, Berkeley) Assistant Professor of Civil Engineering
- Catherine Harmonosky, Ph.D. (Purdue) Associate Professor of Industrial Engineering
- Terry P. Harrison, Ph.D. (Tennessee) Professor of Supply Chain and Information Systems
- Paul H. Heinemann, Ph.D. (Florida) Associate Professor of Agricultural Engineering
- George B. Kleindorfer, Ph.D. (Carnegie Mellon) Professor of Management Science and Information Systems
- Joseph M. Lambert, Ph.D. (Purdue) Associate Professor of Computer Science
- Holly S. Lewis, Ph.D. (South Carolina) Associate Professor of Management Science and Information Systems
- Gary L. Lilien, D.E.S. (Columbia) Distinguished Research Professor of Management Science
- Costas Maranas (Princeton) Associate Professor of Chemical Engineering
- John I. McCool, Ph.D. (Temple) Associate Professor of Industrial Engineering
- Elise D. Miller-Hooks, Ph.D. (Texas, Austin) Assistant Professor of Civil Engineering
- Jan M. Mutmanský, Ph.D. (Penn State) Professor of Mineral Engineering
- David Passmore, Ph.D. (Minnesota) Professor of Education
- Raja V. Ramani, Ph.D. (Penn State) P.E. Professor of Mining Engineering
- A. Ravindran (Berkeley) Professor of Industrial Engineering
- William J. Rothwell, Ph.D. (Illinois) Professor of Education
- Michael Saunders, Ph.D. (Georgia) Associate Professor of Entomology
- James S. Shortle, Ph.D. (Iowa State) Associate Professor of Agricultural Economics
- Timothy W. Simpson, Ph.D. (Georgia Tech) Associate Professor of Mechanical Engineering and Industrial Engineering
- Spiro Stefanou, Ph.D. (California State) Professor of Agricultural Economics
- Joseph V. Terza, Ph.D. (U of Pittsburg) Associate Professor of Economics
- Leonid N. Vaserstein, Ph.D. (Moscow State) Professor of Mathematics
- Jose A. Ventura, Ph.D. (Florida) Professor of Industrial Engineering
- Paul N. Walker, Ph.D. (Massachusetts) P.E. Professor of Agricultural Engineering
- Robert D. Weaver, Ph.D. (Wisconsin) Professor of Agricultural Economics
- Anthony V. Williams, Ph.D. (Michigan State) Associate Professor of Geography
- Susan H. Xu, Ph.D. (Rensselaer) Associate Professor of Management Science and Information Systems

The Operations Research dual-title degree program option is administered by an Operations Research committee, which is responsible for management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the option, and recommends policy and procedures for its operation to the dean of the Graduate School. This dual-title degree program is offered as an option through graduate major programs in eight colleges. The option enables students from diverse graduate programs to attain and be identified with the tools, techniques, and methodology of operations research, while maintaining a close association with areas of application. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency. To pursue a dual-title degree under this program option the student must apply to the Graduate School and register through one of the approved graduate programs.

### Admission Requirements

Scores from the Graduate Record Examination (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements listed in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For the M.S., M.A., M.Eng. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 140, MATH 141, MATH 220; CMPSC 101; and 3 credits of probability and statistics.

For the Ph.D. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 401, MATH 436; CMPSC 101; and 3 credits of probability and statistics.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements, or their equivalent, in the Operations Research program. Students must enroll in O R 590 Colloquium for at least 1 credit in each year enrolled in the program and in residence.

For the M.S. or M.A. dual-title degree in Operations Research, the minimum requirements are: 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 6 credits in optimization, including a minimum of 3 credits in linear programming; 3 credits in computational methods; and 3 credits in applications/specialization. (Application courses are those that involve problem solving through the use of decision methods.) A minimum of 9 credits must be in the 500 series. Particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.

A thesis may be required, the supervisor of which must be a member of the graduate faculty recommended by the chair of the program granting the degree and approved by the Operations Research committee as qualified to supervise thesis work in operations research. A paper or report may be written in lieu of the M.S. or M.A. thesis upon approval of the student's graduate major program. An M.Eng. student or a student selecting the paper or report must take an additional 6 credits in the Operations Research program. It is the prerogative of the graduate major program to assign these credits to one or more of the following categories: stochastic/statistical methods, optimization, computational methods, or applications.

The minimum requirements for the Ph.D. dual-title degree in Operations Research are: 9 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 9 credits in optimization, including a minimum of 3 credits in linear programming; 6 credits in computational methods, including a minimum of 3 credits in simulation; and 12 credits in applications/specialization. A minimum of 18 credits must be in the 500 series, and particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.

A Ph.D. minor program in Operations Research is available for doctoral students who find it advantageous to include advanced quantitative methods of systems analysis in their programs of study and have been approved to do so by their doctoral committees. To qualify for a minor in Operations Research, students must satisfy the requirements of their graduate major programs, meet the same prerequisites as the M.S. dual-title degree, and meet the following minimum requirements: 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 6 credits in optimization; and 3 credits in computational methods. A minimum of 6 credits must be taken at the 500 level.

The doctoral committee for a Ph.D. dual-title degree student is recommended by the graduate major program granting the degree. The chair and at least two members of a doctoral committee must be members of the graduate faculty and approved by the Operations Research committee as qualified to supervise doctoral theses in operations research. The Operations Research committee is responsible for administering an examination in operations research that constitutes a portion of the comprehensive examination administered to the doctoral students in the program option, as well as to the candidate who chooses operations research as a minor field.

#### **STOCHASTIC/STATISTICAL METHODS**

##### *Statistical Methods*

MATH/STAT 414, MATH/STAT 415, MATH/STAT 418

IE 511

MS&IS 501, MS&IS 533

STAT 460, STAT 501, STAT 502, STAT 503

ECON 501

AG EC/ECON 510, AG EC/ECON 511

##### *Stochastic Processes*

IE /SC&IS 516

IE 517

MATH/STAT 416, MATH/STAT 516, MATH/STAT 519

STAT 515

#### **OPTIMIZATION**

##### *Linear Programming*

IE 405 or MS&IS 451 or MATH 484

IE 505

##### *Nonlinear Programming*

MS&IS 452

IE 521

##### *Integer Programming*

IE 510

##### *Dynamic Programming*

IE/SC&IS 519

##### *Mathematical Programming*

IE 512, IE 520

CMPSC/MATH 555

SC&IS 525, MS&IS 550

#### **COMPUTATIONAL METHODS**

##### *Numerical Methods*

CMPSC/MATH 451, CMPSC/MATH 455, CMPSC/MATH 456, CMPSC/MATH 550

##### *Simulation Methods*

IE 453 or MS&IS 432

IE 522

MSIS 532

#### **APPLICATION/SPECIALIZATION**

Includes courses in the above areas as well as courses in quality control, scheduling, inventory, queuing, decision analysis, game theory, logistics, expert systems, econometrics, forecasting, and others.

#### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [OPERATIONS RESEARCH \(O R\) course list](#)

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/24/04

Faculty updated: 1/3/13

## Public Administration (P ADM)

[www.hbg.psu.edu](http://www.hbg.psu.edu)

JEREMY F. PLANT, MPA *Coordinator*  
Penn State Harrisburg  
777 W. Harrisburg Pike  
W-160 Olmsted Building  
Middletown, PA 17057

### Degrees Conferred:

M.P.A., Ph.D.

### The Graduate Faculty

- Beverly A. Cigler, Ph.D. (Penn State) *Professor of Public Policy and Administration*
- Cynthia Massie Mara, Ph.D. (Virginia Tech) *Associate Professor of Health Care Administration and Policy*
- Goktug Morcol, Ph.D. (Virginia Polytechnic Institute and State University) *Associate Professor of Public Administration*
- Jeremy F. Plant, Ph.D. (Virginia) *Professor of Public Policy and Administration*
- Bing Ran, Ph.D. (Waterloo) *Assistant Professor of Public Administration*
- Odd J. Stalebrink, Ph.D. (George Mason) *Associate Professor of Public Administration*
- Triparna Vasavada, Ph.D. (SUNY-Albany) *Assistant Professor of Public Administration*
- James T. Ziegenfuss, Jr., Ph.D. (Pennsylvania/Wharton) *Professor of Management and Health Care Systems*

### MPA Program

The Master of Public Administration (MPA) program is intended for those with career interests in public management, health and human services, government, and other public service and nonprofit organizations. The curriculum blends theoretical and applied concepts and assures "real-world" experiences for the novice administrator. In addition, it requires that students devote attention to general professional development. The MPA program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

FULL-TIME OR PART-TIME--Students may begin the program in any semester. Three courses (or 9 credits) per semester are considered a normal course load for full-time students. Part-time students typically take one or two 3-credit courses each semester and one or two courses during the summer session to maintain steady progress toward the degree. The program, including an internship in a public agency or nonprofit organization for those without three years of managerial, supervisory, or professional experience, requires eighteen to twenty-four months of full-time study, or three to five years on a part-time basis.

### Admission Requirements

Applicants must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution prior to starting the graduate program. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate School conditional on the awarding of the baccalaureate degree.

Admission to the MPA program is based on clear suitability for the program as demonstrated by the application as a whole, including the following: a completed application with the application fee; evidence of a bachelor's degree from a regionally accredited college; a statement of career and educational goals; a successful undergraduate record with a grade-point average of 3.00 (either as the cumulative GPA or for the last 60 hours of relevant course work); satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), or Law School Admission Test (LSAT) if the GPA is less than 3.0; and three references willing to provide recommendations.

### Degree Requirements

The MPA degree program requires 36 graduate credits—18 in core courses, 15 in electives, and 3 for the research project. Up to 6 credits of 400-level courses may be taken as electives, with the approval of an adviser. In addition, a 3-credit internship is required of students who do not have at least two years of full-time relevant work experience that consists of supervisory, managerial, or professional work. The internship is waived for students with this experience before they enter the program or who gain it during the program.

#### REQUIRED CORE COURSES (18 credits)

P ADM 500, P ADM 502, P ADM 503, P ADM 505, P ADM 506, P ADM 510

#### ELECTIVE CONCENTRATION AREA (15 credits)

With the faculty adviser's approval, a student selects 15 credits of electives from the courses list. Students also have the option of taking elective courses from one of the following concentrations: Government Administration, Health Care Management and Policy, Human Resources Management, Information Resource Management, Policy Analysis, and Criminal Justice, as well as the general Public Administration degree.

Examples of suitable elective courses: P ADM 507, P ADM 511, P ADM 512, P ADM 514, P ADM 515, P ADM 516, P ADM 522, P ADM 523, P ADM 524, P ADM 531, P ADM 532, P ADM 533, P ADM 534, P ADM 535, P ADM 550, P ADM 556, P ADM 557, P ADM 558, CRIMJ 563, CRIMJ 564, and CRIMJ 565. Courses listed under the Master of Health Administration program may also be taken: H ADM 539, H ADM 540, H ADM 541, H ADM 542, H ADM 543, H ADM 545, H ADM 546, H ADM 548, H ADM 551, H ADM 552.

RESEARCH PROJECT--P ADM 594

INTERNSHIP IN PUBLIC ADMINISTRATION--P ADM 595 (if required)

### Ph.D. Program

The Doctor of Philosophy in Public Administration provides a broad-based academic program combining conceptual foundations with research and analytical skills. The goal of the program is to educate professionals with the ability to create and apply knowledge through teaching, research, consulting, and management.

Graduates of the program work in such occupations as:

- university or college professor
- president of community hospital
- senior positions in state and federal government
- senior training officer national executive development institute
- health care consultant
- president, non-profit organization

The Program retains the traditional requirements of the Ph.D. degree--advanced coursework, comprehensive examinations, residency, a research dissertation, final oral examination, and standards of excellence--in a program that allows students to combine study and work. Students may pursue the program on a full- or part-time basis. The emphasis is placed in critical thinking, research, writing, and mastery of a broad body of literature. In the emerging "information age," public administrators are both producers and consumers of research. The roles of administrator and scholar are increasingly blurred, as scientific reasoning and data gathering increasingly permeates public managerial decision making. Creating and accessing knowledge that is useful to address organizational and policy issues is increasingly important.

## Application for Admission

To assure course availability and maximize progress, applicants should carefully consider when to apply to the Program and begin study. In general, students should plan to begin taking P ADM 570 (Scope and Methods of Public Administration) and other doctoral seminars during the Fall Semester.

The following information should also help applicants decide when to apply to the Program:  
Fall Admission:

- Applicants for fellowships and assistantships must complete and submit materials by January 30.
- Applicants who must take one or more prerequisite courses typically should apply by October 31.  
This will enable them to take the necessary prerequisite courses during the Spring Semester and/or Summer Term and begin doctoral seminars the next Fall. If in doubt about the need for prerequisites, an applicant should meet the October 31 deadline.
- Students who are not required to take prerequisite courses may submit their application materials by October 31 or March 15. However, we encourage students to apply at the earliest possible date.  
The Program Coordinator can answer individual applicant questions about application and entrance dates.

## Admission Requirements

Applicants for the Doctor of Philosophy in Public Administration should hold a master's degree in public administration, public policy, or a related field such as business, economics, political science, or sociology. Applicants with master's degrees in other fields also will be considered. Students may be required to take additional courses after admission to the program to make up for any deficiencies.

A student must have taken the following graduate courses as program prerequisites or co-requisites: Public Organization and Management (P ADM 500), Introduction to Public Policy Analysis (P ADM 507), Research Methods (P ADM 503), and Organization Behavior (P ADM 510).

In addition, most applicants should have five years of relevant professional work experience.

Students are required to submit the following:

- a completed application, with the application fee
- two official transcripts of all undergraduate and graduate course work scores from the Graduate Record Exam (GRE), with official verification
- three letters of reference attesting to both academic and professional capabilities (at least two of the three letters should be from academic sources, such as prior professors or academic advisors)
- a letter of approximately 500 words outlining significant work experience, career goals, and academic objectives
- a recent personal vita
- a substantial academic paper written for a previous graduate course (e.g. seminar paper)

Interviews: The Admissions Committee interviews individuals whose application material indicates they qualify for entry into the Program. These interviews may be face-to-face or by telephone. Interviews help assure a good fit between individual interests and the Program.

## International Students

Application deadlines: International student application materials must meet the following deadlines:

January 30 for Fall, September 30 for Spring, February 28 for Summer.\*

\*Applications received after the deadlines will be processed for the following semester.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

## Degree Requirements

Students progress through the following phases and take the required courses indicated as part of their study for the Ph.D.

**Precandidacy and Provisional Admission**--Applicants who do not have necessary background, but otherwise meet the criteria for admission may be admitted provisionally and must (1) make up any deficiencies in graduate courses in public administration noted in the letter of acceptance, (2) complete P ADM 570 (Scope and Methods), P ADM 575 (Research Design), and at least one course from the P ADM 571, P ADM 572, P ADM 573, and P ADM 574 seminar series, with an average of 3.5 or better, and (3) pass a candidacy exam. Students who must make up deficiencies are considered to be provisionally admitted into the program. A student may remain in this temporary classification for a period of no longer than two semesters following admission. Upon successful completion of the requisite courses noted in the letter (with a 3.5 grade point average), the student will be removed from provisional status and be regularly enrolled. It is to be emphasized that the provisional condition must be met before a student reaches an academic benchmark (doctoral candidacy, comprehensive, and final oral examination). A student will not be permitted to graduate with a provisional status remaining on his or her record.

**Comprehensive Examination**--Candidates take additional course work to prepare for comprehensive examinations in three subfields of study, complete a period of residency, and write the Ph.D. dissertation. The three formal subfields of specialization are: organization theory and behavior, policy analysis and governance, and public management. Additional subfields of study, such as Health Care Management and Policy, Criminal Justice, Management Information Systems, and Training and Development may be selected with the approval of the student's doctoral committee.

**Residency**--A period of two consecutive semesters of concentrated study and research as a full-time student--9 credits per semester.

## The Dissertation

Under guidance from the dissertation committee, the candidate prepares a detailed research proposal that serves as the basis for the written dissertation. The writing and defense of this original contribution to the theory of public administration is the capstone to the Ph.D. program.

## Grade Point Average and Time Limit

Part-time students can complete the program in approximately seven to eight years of continuous study. Full time students may complete the Program in four to five years. Students must have a 3.50 grade-point average to graduate.

## Financial Aid

There are a limited number of scholarships, fellowships, and research grants available, as well as graduate assistantships. Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact the Financial Aid Office at 717-948-6307.

## [PUBLIC ADMINISTRATION \(P ADM\) course list](#)

## PUBLIC ADMINISTRATION, JURIS DOCTOR AND MASTER OF PUBLIC ADMINISTRATION (J.D./M.P.A.)

JEREMY F. PLANT, *Program Coordinator*  
Penn State Harrisburg  
777 W. Harrisburg Pike  
Middletown, PA 17057-4898  
717-948-6050  
[www.hbg.psu.edu](http://www.hbg.psu.edu)

**Degrees Conferred:**

J.D./M.P.A.

The Dickinson School of Law of The Pennsylvania State University and the School of Public Affairs of Penn State Harrisburg, the Capital College, offer a cooperative program leading to the degrees of Juris Doctor, to be granted by Dickinson, and Master of Public Administration, to be granted by Penn State Harrisburg.

**Admission Requirements**

In order to be admitted to the program, students must first be admitted to The Dickinson School of Law under its regular admission procedures. Dickinson need not forward applications of all DSL admittees who have expressed interest in the MPA program and can withhold support for some admittees until they have demonstrated proficiency in their legal studies and a capacity for dual degree study. Penn State Harrisburg will make independent admissions decisions as to all dual degree applicants.

The Dickinson Admissions Office requires: application forms for DSL and PSH Graduate School, the Law School Admission Test (LSAT), a completed LSDAS report, a one-page personal statement, employment record since high school, and two recommendations.

The Penn State Harrisburg Admissions Office requires: completed applications (Graduate School and MPA), with the application fee; evidence of either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution; a statement of career and educational goals; a successful undergraduate record with a grade-point average of 3.0 (either as the cumulative GPA or for the last 60 hours of relevant course work); satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), or Law School Admission Test (LSAT) if junior-senior or cumulative GPA is less than 3.0; and three names of references willing to provide recommendations.

**Degree Requirements**

To be eligible to earn the Juris Doctor degree, a candidate must: earn credit for 88 semester hours of course work, have a cumulative average of at least 70.00, complete all required courses (currently totaling 41 semester hours) plus at least one seminar, and complete six semesters in residence.

The MPA degree program requires 36 graduate credits—18 in core courses, 15 in electives, and 3 for the Research Project.

A maximum of 9 credits for Dickinson School of Law course work may be transferred for credit toward the MPA degree at Penn State Harrisburg, subject to Harrisburg's approval based on relevance to the MPA program.

A maximum of 9 credits for MPA course work with a grade of B or better may be transferred for credit toward the J.D. degree at Dickinson. Courses for which such credit may be applied shall be subject to approval by the Dickinson faculty.

It is anticipated that students will complete a minimum of 79 credits from Dickinson and 27 credits (not including the internship) from Penn State Harrisburg in order to earn the J.D. and M.P.A. degrees. A student in the program, however, may obtain either degree prior to completing all requirements for the other degree. Students must earn at least a 3.0 grade-point average to be eligible for the M.P.A. degree.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-06-255

Review Date: 04/10/2012

Date last updated by Publications: 5/23/11

## Public Health Preparedness (P H P)

### [Program Home Page](#)

Robert A. Cherry, *Medical Director*, Penn State Shock Trauma Center; *Chief*, Section of Trauma and Critical Care, Penn State Milton S. Hershey Medical Center  
College of Medicine, C1524  
717-531-6066

### Degrees Conferred:

M.H.S., Master of Homeland Security (Penn State University Park)

### The Graduate Faculty

- Robert A. Cherry, M.D. (Columbia) *Assistant Professor of Surgery*
- Elizabeth Carney, DVM (Iowa State) *Assistant Professor of Comparative Medicine*
- Peter K. Forster, Ph.D. (Penn State) *Instructor of Political Science*
- Kevin P. Furlong, Ph.D. (Utah) *Professor of Geosciences*
- Jim Holliman, M.D. (Washington) *Professor of Emergency Medicine*
- Gretchen A. Kuldau, Ph.D. (California) *Assistant Professor of Plant Pathology*
- Eugene J. Lengerich VMD, MS (U of Penn), *Associate Professor of Health Evaluation Sciences*
- Craig Meyers, Ph.D. (UCLA) *Professor of Microbiology and Immunology*
- Kevin R. Murphy, Ph.D. (Penn State) *Professor and Head of Psychology*
- Roxanne Parrott, Ph.D. (Penn State) *Professor of Communication Arts and Sciences and Health Policy Administration*
- Zhengmin Qian, M.D., Ph.D. (Rutgers) *Assistant Professor of Health Evaluation Services*

The M.H.S. in Public Health Preparedness is designed to provide both science and nonscience postbaccalaureate students with broad training in public health preparedness as it relates to issues surrounding homeland security. The curriculum will be delivered in a distance education format to accommodate the needs and careers of professionals who are already working in or wish to transition into the field of homeland security. The program's target audience may include federal, state, and local public health officials, public affairs administrators, emergency management professionals, health care professionals, first responders, criminal justice and law enforcement personnel, military staff, and members of corporate security.

Graduates of the program will have a fundamental understanding of disaster communication, the principles of hazard analysis and incident management with respect to chemical, biological, radiological, and nuclear incidents, disaster planning and coordination, agricultural safety and security, critical infrastructure protection, and the political, legal, psychological and social aspects of terrorism.

### Admission Requirements

The objective of the admissions process is to identify and admit qualified graduate students who have the capacity, motivation and intellect to protect and serve local, state, and national interests with respect to the occurrence of or threat of a natural disaster or terrorist attack.

Qualified candidates will have a baccalaureate degree from a regionally accredited institution and are expected to have a 3.0 or higher undergraduate grade point average on a 4.0 scale. Scores on the General Test of the Graduate Record Examination (GRE) are generally required for all applicants. GRE requirements may be waived in selected cases for those with advanced degrees who have demonstrated the ability to perform graduate level work and have submitted scores for consideration on comparable standardized tests, such as the GMAT, MCAT, or LSAT. A statement of professional experience and goals (up to 500 words) and the candidate's CV must accompany the application. Three letters of recommendation that attest to the applicant's readiness for graduate study are also required.

Applicants whose native language is not English must provide evidence of proficiency in English with a minimum TOEFL score of 550 (paper-based test) or 220 (computer-based test). Special backgrounds, abilities, and interests related to homeland security are desirable. Students will be required to possess a suitably configured personal computer and Internet connections.

### Transfer Credit

A maximum of 10 credits of high-quality graduate work done at a regionally accredited institution may be applied toward the requirements for the master's degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree program at Penn State. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of an accredited university. Pass-fail grades are not transferable to an advanced degree program unless the "Pass" can be substantiated by the former institution as having at least B quality.

### Funding Sources

World Campus students who are enrolled in a degree program and meet all other federal student aid eligibility requirements may be eligible for federal aid programs. Students must complete the Free Application for Federal Student Aid (FAFSA) to be considered for student aid.

### Other Financing Options

- **Tuition Assistance Programs:** Students should check with their employer on the availability of tuition assistance programs to help cover graduate school costs.
- **Veterans Programs:** Veterans enrolled in degree programs may be eligible for reimbursement when they successfully complete a World Campus course. Students should contact their local Office of Veterans Programs, or Penn State's Office of Veteran's Programs.
- **Alternative Loans:** World Campus students who need to explore additional financing options are encouraged to review the following private educational lenders:
  - Citassist
  - TERI Continuing Education Loans--for World Campus students who are non-degree or taking continuing education units (CEUs)
- **World Campus Student Fund:** This scholarship is funded annually by World Campus staff members and students who understand that financial aid is not always available to distance learners--and when it is, the eligibility requirements are often difficult to meet. All scholarship monies awarded will be deposited directly into the recipients' student accounts at Penn State.
- **Trustee Scholarship Program:** Eligible students demonstrating financial need as determined by the Free Application for Federal Student Aid (FAFSA) will be contacted.

### Degree Requirements

To be awarded a Master of Homeland Security degree in Public Health Preparedness, the student must successfully earn a total of 30 credit hours, of which at least 18 must be in 500-level courses. Students are expected to maintain a B (3.0) or better average in academic courses to be retained in the program. Each candidate must complete a project report on a topic related to public health preparedness in homeland security.

### Faculty Advisers

All graduate students will be assigned a faculty adviser to encourage and mentor students in their educational pursuits, and to provide students with advice on research projects and career opportunities. Interactive communication is available through telephone sessions and video conferencing. On-site campus visits are encouraged, but not required.

**Library Resources**

The Penn State University Libraries provide an extraordinary array of collections and services to students who participate in classes through the World Campus. Students will have a Penn State Access Account that will allow them to access the online catalog, databases, digital library projects, and the growing number of full-text resources. The Libraries are able to service requests to scan print documents and deliver PDF documents at no charge through the University network. Students can also utilize the "ASK" reference service, which allows students to seek assistance through phone, e-mail, or synchronous online chats. Materials not owned by Penn State can be obtained through Interlibrary Loan services. ILLIAD, a service available through the Libraries' Web site, allows students to make and track their interlibrary loan requests without the need for an intermediary. The Libraries also operate an Electronic Reserves service that allows faculty members to make electronic materials available to students enrolled in a particular course. Students are always welcome to contact one of the Libraries' subject specialists for personalized assistance with their information needs.

**PRESCRIBED COURSES:** 27 credits**HOMELAND SECURITY (HLS)**

- 410. Public Health Preparedness for Disaster and Bioterrorism Emergencies I (3)
- 510. Public Health Preparedness for Disaster and Bioterrorism Emergencies II (3)
- 520. Agricultural Biosecurity (3)
- 527. Public Health Evaluation of Disasters and Bioterrorism (3)
- 530. Critical Infrastructure Protection of Health Care Delivery Systems (3)
- 553. Disaster Communication (3)
- 558. Disaster Psychology (3)
- 594. Research Project (3)

**GEOSCIENCES (GEOSC)**

- 402Y. Natural Disasters (3)

**POLITICAL SCIENCE (PL SC)**

- 439. The Politics of Terrorism (3)

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[GEOSCIENCES \(GEOSC\) course list](#)

[HOMELAND SECURITY \(HLS\) course list](#)

[POLITICAL SCIENCE \(PL SC\) course list](#)

Date last reviewed by Publications: 01/08/08

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-07-011

Review Date: 6/17/08

## Pathobiology (PATHB)

[Program Home Page](#)

ROBERT PAULSON, *Director of the Graduate Program in Pathobiology*  
104 Henning Building

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Anne Andrews, Ph.D. (American U) Assistant Professor of Molecular Toxicology
- Avery August, Ph.D. (Cornell) Associate Professor of Immunology
- Margherita Cantorna, Ph.D. (Wisconsin, Madison) Associate Professor of Nutrition and Immunology
- Pamela H. Correll, Ph.D. (George Washington) Associate Professor of Veterinary Science and Biomedical Sciences
- Richard Frisque, Ph.D. (Wisconsin) Professor of Molecular Virology
- Lester C. Griel, Jr., M.S., V.M.D. (Pennsylvania) Professor of Veterinary Science and Biomedical Sciences
- Eric Harvill, Ph.D. (California, Los Angeles) Associate Professor of Immunology
- Arthur L. Hattel, D.V.M. (Colorado) Senior Research Associate in Veterinary Science and Biomedical Sciences
- Biao He, Ph.D. (New York, Brooklyn) Assistant Professor of Veterinary Science and Biomedical Sciences
- Andrew J. Henderson, Ph.D. (California, Riverside) Associate Professor of Veterinary Science and Biomedical Sciences
- Bhushan Jayarao, Ph.D. (Univ of Vet Sci, Budapest) Associate Professor of Veterinary Science and Biomedical Sciences
- Mary Kennett, D.V.M., Ph.D. (Missouri, Columbia) Associate Professor of Veterinary Science and Biomedical Sciences
- Brenda Love, D.V.M., Ph.D. (California, Davis) Research Associate in Veterinary Science and Biomedical Sciences
- Andrea M. Mastro, Ph.D. (Penn State) Professor of Microbiology and Cell Biology
- Curtis Omiecinski, Ph.D. (Washington) Professor of Veterinary Science and Biomedical Sciences
- Robert Paulson, Ph.D. (California, San Francisco) Associate Professor of Veterinary Science and Biomedical Sciences
- Gary H. Perdew, Ph.D. (Oregon) Professor of Veterinary Science and Biomedical Sciences
- Jeffrey Peters, Ph.D. (California, Davis) Associate Professor of Environmental Toxicology
- K. Sandeep Prabhu, Ph.D. (Mysore, India) Associate Professor of Veterinary and Biomedical Sciences
- Ramesh Ramachandran, D.V.M., Ph.D. (Maryland) Assistant Professor of Poultry Science
- Robert Van Saun, D.V.M., Ph.D. (Cornell) Professor of Veterinary Science and Biomedical Sciences
- Anthony Schmitt, Ph.D. (UCLA) Assistant Professor of Molecular Immunology and Infectious Disease
- Michael Teng, Ph.D. (Chicago) Assistant Professor of Biochemistry and Molecular Biology
- Jack Vanden Heuvel, Ph.D. (Wisconsin) Professor of Veterinary Science and Biomedical Sciences
- Na Xiong, Ph.D. (Case Western Reserve) Assistant Professor of Veterinary Science and Biomedical Sciences

The graduate program in Pathobiology is designed to provide flexibility in graduate work while providing opportunities to study immunology, microbiology, nutrition, biochemistry, virology, veterinary pathology, physiology, or toxicology, usually as related to problems seen in domestic animals and humans.

Graduate instruction is directed by graduate faculty members from the Department of Veterinary Science and related units including dairy and animal science, biochemistry, biology, biophysics, immunology, nutrition, physiology, zoology, and others. The Ph.D. program is designed for completion in three to four academic years. Doctoral candidates usually complete certain required courses and obtain laboratory experience before selecting an area of specialization and completing an original research problem, including the defense of the Ph.D. dissertation.

Facilities for departmental research include laboratories in the Agricultural Sciences and Industries Building, Henning Building, Poultry Disease Laboratory, Animal Diagnostic Laboratory, Centralized Biological Laboratory, and Environmental Resources Research Institute. Opportunities to utilize specialized research equipment exist in other related facilities. The University has an extensive, modern library. A large University computer center and consultation service are available.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants with a 3.00 or better grade-point average (on a 4.00 scale) in undergraduate science courses and appropriate course backgrounds will be considered for admission. Applicants should have a baccalaureate degree in biological science or a degree as a graduate veterinarian or equivalent. Undergraduate preparation should include biology, chemistry, physics, mathematics through calculus, and preferably biostatistics and biochemistry.

### Master's Degree Requirements

A minimum of 30 graduate credits is required for the M.S. degree, of which 18 credits must be taken in 500- and 600-level courses.

Satisfactory completion of the following courses or their equivalent is required of all degree candidates: statistics, 3 credits; biochemistry or molecular and cell biology (usually chosen from B M B 400, B M B 401, B M B 402, B M B 437, and BMBB 514), 6 credits; and pathobiology (V SC 520), 3 credits.

All graduate students are required to complete one semester of VB SC 590 Colloquium each year as well as 8 credits from a list of courses.

Pathobiology requires no program-specific qualifying examinations, and there is no communication/language requirement for the M.S.

A thesis is required of all candidates for the M.S. degree.

### Doctoral Degree Requirements

The doctor of philosophy degree places a strong emphasis on research. It is conferred in recognition of the capacity to carry out independent research and the attainment of a high level of scholarship. General requirements for the doctorate specify a minimum period of residence, the passing of candidacy, comprehensive and final oral examinations, and the writing of a satisfactory thesis. The particular combination of courses, seminars, individual study, and research that constitutes an individual student's program is arranged by the doctoral committee and should include the courses that have been designated in the Pathobiology graduate curriculum, subject to the general policies of the Graduate School.

The Graduate School requires no specified number of courses for the attainment of the doctorate. However, the Pathobiology graduate program requires that all graduate students complete the course requirements outlined. A total of 21 graduate credits is required for the Ph.D. degree. A minimum grade-point average of 3.00 for work done at the University is required.

There are formal communications requirements for the Ph.D. degree in Pathobiology which are required by the Graduate School. The doctoral committee will assess the technical writing and oral communication skills of the candidate and may require that formal course work or other means to improve these skills be undertaken.

The graduate program requires that each graduate student have 3 credits in statistics. However, Ph.D. candidates are expected to have statistical skills equivalent to those learned in STAT 501 and STAT 502. The candidacy examination committee and the doctoral committee will assess the student's competence in statistics and may require that additional course work be taken.

A candidacy examination is given to students entering the Ph.D. program and after they complete at least twelve hours of postbaccalaureate course work.



After being admitted to candidacy, each doctoral candidate is guided by a doctoral committee consisting of four or more members of the graduate faculty. At least one member and preferably two are from other departments. These committees are appointed through the Office of Graduate Student Programs, upon recommendation of the department head, after the student is admitted to candidacy.

**Other Relevant Information**

After a student has been admitted to graduate study in the department, an adviser will be appointed by the program director. This person may be a member of the eventual M.S. committee or someone else assigned the responsibility for directing the student's scheduling of course work. In the case of a doctoral candidate, the person may be a member of the eventual doctoral committee or someone else designated the responsibility for directing the student's scheduling of course work. The adviser is also responsible for initiating the scheduling of the candidacy examination.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**[VETERINARY SCIENCE \(V SC\) course list](#)**

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/30/04

DATE LAST REVIEWED BY PUBLICATIONS: 11/16/06

## Public Health (PH)

[Program Home Page](#)

VERNON M. CHINCHILLI, *Chair of the Department of Public Health Sciences*  
College of Medicine, Penn State Milton S. Hershey Medical Center  
Hershey, PA 17033  
717-531-7178

**Degree Conferred:** M.P.H.

### The Graduate Faculty

Kwangmi Ahn, Ph.D. (SUNY Stony Brook) Assistant Professor of Public Health Sciences  
Roger T. Anderson, Ph.D. (Johns Hopkins) Professor of Public Health Sciences; Chief, Health Services Research Division  
Sonia A. Cavigelli, Ph.D. (Duke) Assistant Professor of Biobehavioral Health  
Vernon M. Chinchilli, Ph.D. (North Carolina) Professor of Biostatistics; Department Chair  
J. Douglas Coatsworth, Ph.D. (Minnesota) Associate Professor of Human Development and Family Studies and Professor-in-Charge, Human Development and Family Studies Undergraduate Program  
Kathryn Dansky, Ph.D. (Ohio State) Associate Professor of Health Policy and Administration  
Janice L. Dreachslin, Ph.D. (Wayne State) Professor of Health Policy and Administration  
Ping Du, Ph.D. (SUNY Albany) Assistant Professor of Public Health Sciences  
Lori A. Francis, Ph.D. (Penn State) Assistant Professor of Biobehavioral Health and Center for Human Development and Family Research in Diverse Contexts  
Scott D. Gest, Ph.D. (Minnesota) Associate Professor of Human Development and Family Studies  
Kevin Gleeson, M.D. (Georgetown) Professor of Medicine  
Jennifer E. Graham, Ph.D. (Stony Brook) Assistant Professor of Biobehavioral Health  
Marianne Hillemeier, Ph.D. (Michigan) Associate Professor of Health Policy and Administration  
Christopher S. Hollenbeak, Ph.D. (Washington U) Associate Professor of Public Health Sciences  
John Hustad, Ph.D. (Syracuse) Assistant Professor of Public Health Sciences  
Wenke Hwang, Ph.D. (Johns Hopkins) Associate Professor of Public Health Sciences  
Byron C. Jones, Ph.D. (Arizona, Tucson) Professor of Biobehavioral Health; Professor in Charge of the Graduate Program  
Kyoungrae Jung, Ph.D. (Minnesota) Assistant Professor of Health Policy and Administration  
Shannon L. Kelleher, Ph.D. (California, Davis) Assistant Professor of Nutrition  
Tonya S. King, Ph.D. (North Carolina) Associate Professor of Public Health Sciences  
Kristen H. Kjerulff, Ph.D. (Illinois) Professor of Public Health Sciences  
Laura Cousino Klein, Ph.D. (Uniformed Services University of the Health Sciences) Associate Professor of Biobehavioral Health  
Katarzyna Kordas, Ph.D. (Johns Hopkins) Assistant Professor of Nutrition  
Eugene J. Lengerich, V.M.D., M.S. (Pennsylvania) Professor of Public Health Sciences  
Douglas L. Leslie, Ph.D. (Yale) Professor of Public Health Sciences  
Duanping Liao, M.D., Ph.D. (North Carolina) Professor of Public Health Sciences  
Jiangang (Jason) Liao, Ph.D. (Johns Hopkins) Professor of Public Health Sciences  
Thomas A. Lloyd, Ph.D. (Harvard) Professor of Public Health Sciences; Chief, Epidemiology Division  
Cynthia Z.M. Mara, Ph.D. (Virginia Tech) Associate Professor of Health Care Administration and Policy, School of Public Affairs  
David T. Mauger, Ph.D. (Michigan) Professor of Public Health Sciences; Chief, Biostatistics Division  
Gerald E. McClearn, Ph.D. (Wisconsin) Evan Pugh Professor of Health and Human Development and Biobehavioral Health  
Michael R. Meacham, J.D., M.P.H. (Kansas) Associate Professor of Health Policy and Administration  
Joshua Muscat, Ph.D. (NYU) Professor of Public Health Sciences  
Rosanne M. Pogash, M.P.A. (Penn State) Affiliate Professor of Public Health Sciences  
John Richie, Ph.D. (Louisville) Professor of Public Health Sciences  
Liza S. Rovniak, Ph.D., M.P.H. (Virginia Tech) Assistant Professor of Public Health Sciences  
Jill S. Rumberger, Ph.D. (Penn State) Assistant Professor of Health Administration, School of Public Affairs  
Christopher N. Sciamanna, M.D., M.P.H. (Johns Hopkins) Professor of Medicine and Public Health Sciences  
Michele L. Shaffer, Ph.D. (Penn State) Associate Professor of Public Health Sciences  
Li Wang, Ph.D. (Penn State) Assistant Professor of Public Health Sciences  
Carol S. Weisman, Ph.D. (Johns Hopkins) Distinguished Professor of Public Health Sciences and OB/GYN  
Robin Taylor Wilson, Ph.D. (Iowa) Assistant Professor of Public Health Sciences  
Linda A. Wray, Ph.D. (U Southern California) Associate Professor of Biobehavioral Health  
Chuntao Wu, M.D., Ph.D. (SUNY Albany, North China Coal Medical College) Assistant Professor of Public Health Sciences  
Rongling Wu, Ph.D. (U Washington) Professor of Public Health Sciences and Statistics  
Jeffrey D. Yanosky, Sc.D. (Harvard) Assistant Professor of Public Health Sciences  
James T. Ziegenfuss Jr., Ph.D. (Pennsylvania-Wharton) Professor of Management and Health Care Systems, School of Public Affairs  
Junjia (Jay) Zhu, Ph.D. (Penn State) Assistant Professor of Public Health Sciences

The Master of Public Health (M.P.H.) Program includes graduate-level course work in five core areas of knowledge – health services administration, biostatistics, epidemiology, social and behavioral sciences, and environmental health sciences – and provides knowledge and insight required in the interpretation and utilization of health related research in public health practice. Students learn population-based health research methods, methods for evaluating and improving health care practices, and first-hand real-world working experience in the practice of public health.

The M.P.H. degree can lead to careers in a wide variety of fields and settings, including academic health centers; the health insurance industry; health services networks; local, state, and federal government agencies; and the pharmaceutical industry.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

### M.P.H. Degree Requirements

Each student must complete a total of 47 credits of graduate level course work, the majority of which are 500 level courses, specifically:

- 26 credits in prescribed courses, with a 6 credit Public Health Practice Internship,
- 18 credits in elective courses, plus
- 3 research credits.

**Prescribed Courses:** 26 credits

PHS 500(1), PHS 504(3) or BB H 504(3), PHS 520(3), PHS 536(3), PHS 542(3), PHS 550(3), PHS 571(3) or HPA 520, PHS 595(6), PHS 801(1)

**Required Research Courses:** 3 credits

PHS 594(3)

**Additional Courses:** 18 credits

PHS 501(3), PHS 502(3), PHS 503(3), PHS 510(3), PHS 511(1), PHS 516(3), PHS 518(1), PHS 519(1), PHS 521(3), PHS 522(3), PHS 535(3), PHS 541(3), PHS 535(3), PHS 551(3), PHS 552(3), PHS 570(3), PHS 580(3), PHS 581(1), PHS 596(1-9), BB H 501(3), BB H 502(3), BB H 503(3), HDFS 503(3), HDFS 508(3), HPA 503(3), HPA 541(3), HPA 597C(3), NUTR 456(3), NUTR 497C(3), NUTR 511(3), H ADM 542(3), H ADM 543(3), H ADM 526(3), P ADM 516(3), BUSAD 530(3),

BUSAD 835(3).

[PUBLIC HEALTH \(PH\) course list](#)

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 39-04-593

Review Date: 01/11/2011

Faculty updated: 1/10/12

## Philosophy (PHIL)

[Program Home Page](#)

SHANNON SULLIVAN, *Head of the Department*  
240 Sparks Building  
814-865-6397  
[sws10@psu.edu](mailto:sws10@psu.edu)

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- Robert Bernasconi, Ph.D. (Sussex U) Edwin Erle Sparks Professor of Philosophy
- Brady Bowman, Ph.D. (Freie Universität Berlin) Assistant Professor of Philosophy
- John P. Christman, Ph.D. (Illinois, Chicago) Professor of Philosophy, Political Science, and Women's Studies
- Vincent M. Colapietro, Ph.D. (Marquette) Liberal Arts Research Professor of Philosophy
- Véronique M. Fôti, Ph.D. (Boston College) Professor of Philosophy
- Kathryn Gines, Ph.D. (Memphis) Assistant Professor of Philosophy
- Emily R. Grosholz, Ph.D. (Yale) Liberal Arts Research Professor of Philosophy and African American Studies; Fellow of the Institute for the Arts and Humanities
- Irene E. Harvey, Ph.D. (York) Associate Professor of Philosophy and Women's Studies
- Leonard Lawlor, Ph.D. (SUNY at Stony Brook) Edwin Erle Sparks Professor of Philosophy
- Christopher P. Long, Ph.D. (New School, New York) Professor of Philosophy and Classics; Associate Dean for Undergraduate Studies, College of the Liberal Arts
- Jonathan H. Marks, M.A., B.C.L. (Oxford) Associate Professor of Bioethics, Humanities, Law, and Philosophy
- Evelyn B. Pluhar-Moravetz, Ph.D. (Michigan) Professor of Philosophy
- Dennis J. Schmidt, Ph.D. (Boston College) Liberal Arts Research Professor of Philosophy, German, and Comparative Literature
- Shannon Sullivan, Ph.D. (Vanderbilt) Head; Professor of Philosophy, Women's Studies, and African American Studies
- Paul C. Taylor, Ph.D. (Rutgers) Associate Professor of Philosophy; Head, Department of African American Studies
- Nancy Tuana, Ph.D. (California, Santa Barbara) DuPont/Class of '49 Professor of Philosophy and Women's Studies; Director, Rock Ethics Institute

Graduate education in the Penn State Department of Philosophy is characterized by a focus on, and commitment to, the history of philosophy, conceived as a basis for study in diverse areas of special interest. In addition, the graduate program includes special emphases on both contemporary Continental philosophy (including phenomenology, existentialism, hermeneutics, social theory, and postmodernism) and Classical American philosophy (including transcendentalism, semiotics, pragmatism, and contemporary cultural issues). All students' programs are arranged to facilitate preparation in the systematic fields of their interests, such as aesthetics, ethics, political philosophy, metaphysics, philosophy of religion, epistemology, philosophy of science, and mathematical logic, and there is a provision for directed research, collaboration, and in-depth consultation by students with member of the faculty.

Interdisciplinary study is also possible across the humanities, the social sciences, the arts, the natural sciences, and interdisciplinary programs such as Women's Studies, Classics and Ancient Mediterranean Studies, and Science Technology, and Society. The Philosophy department offers students the opportunity to earn a dual-title doctoral degree in Philosophy and Women's Studies. Doctoral minors are available in social thought and in literary theory, criticism, and aesthetics. Study abroad is possible as well, through exchange programs or individual arrangements with leading departments of philosophy.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Undergraduate preparation is advisable.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests.

### Degree Requirements

The department may waive the requirement of a thesis for an M.A. candidate. The foreign language requirement for the Ph.D. degree is satisfied by passing department translation examinations in two languages other than English, and by completing a course in philosophy in one of the these languages. The logic requirement for the Ph.D. degree is satisfied by passing a department logic examination.

### Student Aid

Every student admitted to the department's Ph.D. program receives full assistantship or fellowship funding (stipend and tuition waiver) for five years (assuming reasonable progress). In addition to the many fellowships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the Graduate Bulletin, the department awards annually an Edwin Erle Sparks Fellowship in the Humanities. In the last several years, Philosophy graduate students have received numerous external national and international fellowships and awards (such as DADD, Fulbright, Javits, Mellon). Many Philosophy graduate students have received assistantship support for interdisciplinary teaching assignments in programs such as American Studies, Classics and Ancient Mediterranean Studies, Religious Studies, and Women's Studies.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PHILOSOPHY \(PHIL\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Faculty last updated: 7/24/12

## Public Health Sciences (PHS)

[Program Home Page](#)

VERNON M. CHINCHILLI, *Chair of the Department of Public Health Sciences*  
College of Medicine, Penn State Milton S. Hershey Medical Center  
Hershey, PA 17033  
717-531-7178

### Degree Conferred:

M.S.

### The Graduate Faculty

Roger T. Anderson, Ph.D. (Johns Hopkins) Professor of Public Health Sciences, Chief, Health Services Research Division  
Arthur S. Berg, Ph.D. (California, San Diego) Assistant Professor of Public Health Sciences  
Vernon M. Chinchilli, Ph.D. (North Carolina) Professor of Biostatistics; Department Chair  
Ping Du, Ph.D. (SUNY Albany) Assistant Professor of Public Health Sciences  
Elana Farace, Ph.D. (Virginia) Associate Professor of Public Health Sciences  
Christopher S. Hollenbeak, Ph.D. (Washington U) Associate Professor of Public Health Sciences  
Wenke Hwang, Ph.D. (Maryland) Associate Professor of Public Health Sciences  
Tonya S. King, Ph.D. (North Carolina) Associate Professor of Public Health Sciences  
Kristen Kjerulff, Ph.D. (Illinois) Professor of Public Health Sciences  
Eugene J. Lengerich, V.M.D. (Pennsylvania) Professor of Public Health Sciences  
Douglas Leslie, Ph.D. (Yale) Professor of Public Health Sciences  
Duanping Liao, Ph.D. (North Carolina) Professor of Public Health Sciences  
Jiangang (Jason) Liao, Ph.D. (Johns Hopkins) Professor of Public Health Sciences  
Thomas A. Lloyd, Ph.D. (Harvard) Professor of Public Health Sciences; Chief, Epidemiology Division  
David T. Mauger, Ph.D. (Michigan) Professor of Public Health Sciences; Chief, Biostatistics Division  
Joshua Muscat, Ph.D. (NYU) Professor of Public Health Sciences  
Rosanne M. Pogash, M.P.A. (Penn State) Affiliate Instructor of Public Health Sciences  
John Richie, Ph.D. (Louisville) Professor of Public Health Sciences  
Christopher N. Sciamanna, M.D., M.P.H. (Johns Hopkins) Professor of Medicine and Public Health Sciences  
Michele L. Shaffer, Ph.D. (Penn State) Associate Professor of Public Health Sciences  
Li Wang, Ph.D. (Penn State) Assistant Professor of Public Health Sciences  
Carol S. Weisman, Ph.D. (Johns Hopkins) Distinguished Professor of Public Health Sciences and OB/GYN  
Robin Taylor Wilson, Ph.D. (Iowa) Assistant Professor of Public Health Sciences  
Chuntao Wu, Ph.D. (SUNY Albany) Assistant Professor of Public Health Sciences  
Rongling Wu, Ph.D. (U Washington) Professor of Public Health Sciences and Statistics  
Jeff D. Yanosky, Sc.D. (Harvard) Assistant Professor of Public Health Sciences  
Junjia (Jay) Zhu, Ph.D. (Penn State) Assistant Professor of Public Health Sciences

The Master's Program in Public Health Sciences includes graduate-level course work in biostatistics, epidemiology, and health services research, and provides knowledge and insight required in health related research. Students learn population-based methods for planning, executing, analyzing, and disseminating research results, and methods for evaluating and improving health care practices.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Prospective applicants for this program should have at least a bachelor's degree in a biological, physical, or behavioral science. Please see the program [Web page](#) for specific program application requirements.

### Master's Degree Requirements

Each student in Public Health Sciences is expected to acquire breadth of knowledge in the disciplines of Biostatistics, Epidemiology and Health Services Research, and skills in the areas of experimental design, data collection and quantitative analysis. The PHS Master of Science degree can lead to careers in a wide variety of fields and settings, including academic health centers; the health insurance industry; health services networks; local, state, and federal government agencies; and the pharmaceutical industry. Each student must complete at least 30 credits at the 500 level or higher. Each student must submit an original Master's thesis according to the guidelines outlined by the Graduate School.

#### Prescribed Courses: 16 credits

PHS 500(1), PHS 520(3), PHS 521(3), PHS 536(3), PHS 550(3), PHS 551(3)

#### Additional Courses: 11 credits

PHS 510(3), PHS 511(1), PHS 518(1), PHS 519(2), PHS 522(3), PHS 535(3), PHS 540(1), PHS 541(1), PHS 552(3), PHS 560(1), PHS 561(1), PHS 570(3), PHS 580(3), PHS 581(1)

#### Research Courses: 3 credits

PHS 594(3)

#### Thesis Research: 6 credits

PHS 600 (6)

Courses in Health Policy and Administration (HPA) and Statistics (STAT) may be taken as elective courses and will be considered on an individual basis in consultation with the student's academic adviser.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PUBLIC HEALTH SCIENCES \(PHS\) course list](#)

[HEALTH ADMINISTRATION \(H ADM\) course list](#)

[STATISTICS \(STAT\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-021

Review Date: 06/21/2011



## Physiology (PHSIO)

[Program Home Page](#)

DONNA KORZICK, *Chair of Program*  
Associate Professor of Kinesiology

Penn State University Park  
814-865-5679  
Fax: 814-865-4602

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Steven F. Abcouwer, Ph.D. (Houston) Associate Professor of Surgery and Cellular and Molecular Physiology
- David A. Antonetti, Ph.D. (Penn State) Associate Professor of Cellular and Molecular Physiology and Ophthalmology
- Craig R. Baumrucker, Ph.D. (Purdue) Professor of Animal Nutrition/Physiology
- Aziz Ben-Jebria, Ph.D. (Paris) Professor of Chemical Engineering
- Sarah K. Bronson, Ph.D. (Washington University) Associate Professor of Cellular and Molecular Physiology
- C. Randall Brown, Ph.D. (Texas) Associate Professor of Cellular and Molecular Physiology
- Margherita Cantorna, Ph.D. (Wisconsin-Madison) Professor of Molecular Immunology
- Douglas Cavener, Ph.D. (Georgia) Professor and Head, Biology
- Vincent Chau, Ph.D. (Virginia) Professor of Cellular and Molecular Physiology
- Hui-Ling Chiang, Ph.D. (Harvard) Professor of Cellular and Molecular Physiology
- Pamela H. Correll, Ph.D. (George Washington) Associate Professor of Veterinary Science
- Catherine Coleman, Ph.D. (Aberdeen) Assistant Professor of Cellular and Molecular Physiology
- Robert N. Cooney, MD. (Vermont) Professor and Chief of General Surgery and Professor of Cellular and Molecular Physiology
- Rebecca L. Corwin, Ph.D. (Chicago) Associate Professor of Nutrition
- Henry J. Donahue, Ph.D. (California) Professor of Orthopaedics and Rehabilitation, and Cellular and Molecular Physiology; Director, Musculoskeletal Research
- Terry D. Etherton, Ph.D. (Minnesota) Professor of Animal Nutrition
- David J. Feith, Ph.D. (Penn State) Assistant Professor of Cellular and Molecular Physiology
- Robert A. Frost, Ph.D. (SUNY, Stony Brook) Associate Professor of Cellular and Molecular Physiology
- Thomas W. Gardner, M.D., Ph.D. (Jefferson/Penn State) Professor of Ophthalmology, and Cellular and Molecular Physiology
- Carol V. Gay, Ph.D. (Penn State) Professor of Molecular and Cell Biology
- Michael H. Green, Ph.D. (California, Berkeley) Professor of Nutrition Science and Physiology
- Daniel R. Hagen, Ph.D. (Illinois) Professor of Animal Science
- William O. Hancock, Ph.D. (Washington) Associate Professor of Bioengineering
- Leonard S. Jefferson, Jr., Ph.D. (Vanderbilt) Evan Pugh Professor of Physiology and Chair, Cellular and Molecular Physiology
- Vandana Kahlia, Ph.D. (Pittsburgh) Assistant Professor of Veterinary and Biomedical Sciences
- Sreenivas Kanugula, Ph.D. (Hyderabad) Assistant Professor of Cellular and Molecular Physiology
- Gordon L. Kauffman, M.D. (Michigan) Professor of Surgery and Cellular and Molecular Physiology
- Mary Kennett, D.V.M., Ph.D. (Missouri, Columbia) Associate Professor of Veterinary Science and Biomedical Sciences
- W. Larry Kenney, Ph.D. (Penn State) Professor of Physiology and Kinesiology
- Ronald S. Kensinger, Ph.D. (Florida) Professor of Animal Nutrition/Physiology
- Gary J. Killian, Ph.D. (Penn State) Distinguished Professor of Reproductive Physiology
- Scot R. Kimball, Ph.D. (Vermont) Professor of Cellular and Molecular Physiology
- Donna H. Korzick, Ph.D. (Penn State) Associate Professor of Kinesiology and Physiology
- Charles H. Lang, Ph.D. (Hahnemann) Distinguished Professor and Vice Chair of Cellular and Molecular Physiology, and Surgery
- Kathryn F. LaNoue, Ph.D. (Yale) Distinguished Professor of Cellular and Molecular Physiology
- Roland M. Leach, Jr., Ph.D. (Cornell) Walther H. Ott Professor in Avian Biology
- Richard S. Legro, M.D. (Mount Sinai) Professor of Obstetrics and Gynecology
- Herbert Lipowsky, Ph.D. (California, San Diego) Professor and Head, Bioengineering
- Christopher J. Lynch, Ph.D. (Northeastern) Professor of Cellular and Molecular Physiology
- James H. Marden, Ph.D. (Vermont) Professor of Biology
- Magdi M. Mashaly, Ph.D. (Wisconsin) Associate Professor of Poultry Science
- Robert B. Mitchell, Ph.D. (Penn State) Professor of Biology
- Jon Oatley, Ph.D. Assistant Professor of Reproductive Physiology and Physiology
- James A. Pawelczyk, Ph.D. (North Texas) Associate Professor of Physiology and Kinesiology
- Anthony E. Pegg, Ph.D. (Cambridge) Evan Pugh Professor of Cellular and Molecular Physiology and Pharmacology; J. Lloyd Huck Professor of Cell and Molecular Biology
- Blaise Peterson, Ph.D. (Washington) Associate Professor of Cellular and Molecular Physiology
- Lisa S. Poritz, MD. (Northwestern) Assistant Professor of Surgery and Cellular and Molecular Physiology
- David N. Proctor, Ph.D. (Kent State) Associate Professor of Kinesiology and Physiology
- Stephen R. Rannels, Ph.D. (Penn State) Associate Professor of Cellular and Molecular Physiology
- Chester A. Ray, Ph.D. (Georgia) Professor of Medicine, and Cellular and Molecular Physiology
- Gavin Robertson, Ph.D. (California) Associate Professor of Pharmacology, Pathology, and Dermatology
- Barbara J. Rolls, Ph.D. (Cambridge, England) Professor and Guthrie Chair in Nutrition
- Surojit Sarkar, Ph.D. (Pittsburgh) Assistant Professor of Veterinary and Biomedical Sciences
- Russell C. Scaduto, Jr., Ph.D. (Indiana) Associate Professor of Cellular and Molecular Physiology
- Lisa M. Shantz, Ph.D. (Johns Hopkins) Associate Professor of Cellular and Molecular Physiology
- Neil A. Sharkey, Ph.D. (California, Davis) Professor of Kinesiology, Orthopaedics, and Rehabilitation
- Cooduvalli S. Shahikant, Ph.D. (Hyderabad, India) Associate Professor of Molecular and Developmental Biology
- Jeffrey S. Shenberger, MD (Penn State Hershey) Associate Professor of Pediatrics and Cellular and Molecular Physiology
- Yuguang (Roger) Shi, Ph.D. (Australian National University & UC-Davis) Associate Professor of Cellular and Molecular Physiology
- Ian Simpson, Ph.D. (London) Professor of Neural and Behavioral Sciences and Cellular and Molecular Physiology
- Jill P. Smith, M.D. (Florida) Professor of Medicine, Division of Gastroenterology
- Diane M. Thiboutot, MD. (Penn State Hershey) Professor of Dermatology
- James Ultman, Ph.D. (Delaware, Newark) Distinguished Professor of Chemical Engineering and Bioengineering
- Thomas C. Vary, Ph.D. (Penn State) Distinguished Professor of Cellular and Molecular Physiology
- Regina Vasiliatos-Younken, Ph.D. (Penn State) Professor of Endocrine Physiology and Nutrition
- Nancy I. Williams, Sc.D. (Boston) Associate Professor of Kinesiology
- Jiyue Zhu, Ph.D. (Dartmouth) Associate Professor of Cellular and Molecular Physiology

This is an intercollege program designed to enable students to obtain an integrated series of courses encompassing both the fundamentals of physiology and advanced training in a specialized area. Courses can be taken either at the College of Medicine or at University Park campus.

Graduate instruction in physiology is under the direction of the program committee, composed of graduate faculty from several departments at University Park—including the areas of animal science, biochemistry, bioengineering, biology, kinesiology, microbiology, and nutrition, as well as the Department of Cellular and Molecular Physiology at the College of Medicine. The master's program, including courses, laboratory experience, and original research, is designed for completion in approximately two years, while the doctoral degree requires approximately five years.

## Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

## Degree Requirements

Deficiencies in chemistry, biological science, mathematics (through a second course in calculus), and physics must be made up early in the student's graduate program. All candidates must complete a general basic laboratory course in physiology (combined cellular, mammalian, and comparative) before choosing an area of specialization. Possible areas of specialization are cardiovascular and respiratory physiology; cellular and subcellular physiology; comparative physiology; environmental physiology; exercise physiology; physiology of nutrition and metabolism; neurophysiology; renal physiology; and reproductive physiology. The graduate committee shall be appropriately represented by members of the physiology program committee and those of the area of specialization who shall have the responsibility and jurisdiction for determining the course program and research acceptable in satisfying degree requirements. The nonthesis option is available for the M.S. degree on a limited basis.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by one of several options including intermediate knowledge of one foreign language.

## Other Relevant Information

The following courses, among others, are available for physiology majors, and their descriptions may be found under the offerings of several departments: AGRO 545; AN SC 420, AN SC 423, AN SC 431W, AN SC 502, AN SC 514, AN SC 515; B M B 400, B M B 401, B M B 402, B M B 437; BIOE 402, BIOE 501, BIOE 502, BIOE 503, BIOE 504, BIOE 505, BIOE 506, BIOE 507, BIOE 552, BIOE 553, BIOE 570; BIOL 409, BIOL 428, BIOL 429, BIOL 437, BIOL 446, BIOL 465, BIOL 466, BIOL 467, BIOL 472, BIOL 473, BIOL 477, BIOL 479, BIOL 538, BIOL 539, BIOL 544, BIOL 550; CMPSC 412; EDPSY 400, EDPSY 406, EDPSY 450, EDPSY 506, EDPSY 507; KINES 456, KINES 457, KINES 484, KINES 530, KINES 565, KINES 567, KINES 577, KINES 587; MICRB 400, MICRB 401, MICRB 410, MICRB 412; NUC E 405, NUC E 420; NURS 503; NUTR 452, NUTR 515, NUTR 581, NUTR 582; PHSIO 503, PHSIO 506, PHSIO 507; PHYS 400, PHYS 402, PHYS 420; PTYSC 424, PTYSC 455; PSYCH 453, PSYCH 404, PSYCH 462, PSY 527; STAT 460, STAT 462, STAT 464, STAT 500, STAT 501, STAT 502, STAT 503, STAT 505; V SC 405, V SC 420.

The following courses are offered at the College of Medicine: ANAT 503, ANAT 505, ANAT 510, ANAT 512, ANAT 515, ANAT 535, ANAT 542, ANAT 543, ANAT 544, ANAT 545, ANAT 550; BCHEM 505, BCHEM 523, BCHEM 528, BCHEM 551, BCHEM 553; L A M 501, L A M 503, L A M 507, L A M 510, L A M 515; MICRO 552, MICRO 554, MICRO 555, MICRO 559; NEURO 509, NEURO 510, NEURO 515, NEURO 526, NEURO 527, NEURO 528, NEURO 550; PHARM 505, PHARM 511, PHARM 515, PHARM 520, PHARM 540, PHARM 550. Descriptions of these courses can be found under the designated program.

## Physiology Minor

The objective of the doctoral minor in Physiology is to augment the training of doctoral students with a coordinated group of courses that provide an integrated perspective of physiology from the molecular to the organismal level. It is expected that most students pursuing the minor will be graduate degree candidates in basic biological sciences, health sciences, or bioengineering.

The graduate minor in Physiology requires the following. (1) BIOL 472. If the student took a one-semester, upper-level undergraduate mammalian physiology course as an undergraduate, then this requirement may be waived with approval by the chair of the Physiology program. (2) PHSIO 571 and PHSIO 572. If these courses are required for the major, then substitute an equal number of credits in 500-level Physiology elective courses. (3) A 3-credit, 500-level Physiology elective course. (4) Select additional credits from 500-level Physiology courses or a relevant 400- or 500-level course so that the total course credits for the minor is 15. These 15 credits cannot include course work that is used to fulfill requirements in the student's major. (5) Elective courses for the minor must be approved by the chair of the Physiology program. For a list of suggested courses, see "Other Relevant Information" in the Physiology section of this bulletin. (6) Students must earn a grade of C or better in each course in the minor and maintain an overall average of 3.00 in the minor. (7) One member of the doctoral committee must be a faculty member in the Intercollege Graduate Degree Program in Physiology.

## Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

MRS. A. ROBERT NOLL GRADUATE FELLOWSHIP IN APPLIED PHYSIOLOGY

For graduate research in applied physiology, especially in environmental or exercise physiology; stipend variable.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[BIOLOGICAL CHEMISTRY \(BCHEM\) course list](#)

[CELL AND MOLECULAR BIOLOGY \(CMBIO\) course list](#)

[NEUROSCIENCE \(NEURO\) course list](#)

[PHYSIOLOGY \(PSIO\) course list](#)

[PHYSIOLOGY \(PHSIO\) course list -- University Park Campus](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/27/04

UCA Revision #1: 9/1/06

Faculty updated: 2/19/13



## Physics (PHYS)

[Program Home Page](#)

NITIN SAMARTH, *George A. and Margaret M. Downsbrough Department Head*  
104 Davey Laboratory  
814-865-7533

### Degrees Conferred:

Ph.D., M.S., M.Ed.

### The Graduate Faculty

- Reka Albert, Ph.D. (Notre Dame) Professor of Physics
- Stephon Alexander, Ph.D. (Brown) Adjunct Associate Professor of Physics
- Abhay V. Ashtekar, Ph.D. (Chicago) Eberly Professor of Physics
- Lu Bai, Ph.D. (Cornell) Assistant Professor of Biochemistry and Molecular Biology, and Physics
- Jayanth R. Banavar, Ph.D. (Pittsburgh) Distinguished Professor of Physics
- Martin Bojowald, Ph.D. (RWTH Aachen Univ) Professor of Physics
- Welford A. Castleman, Ph.D. (Polytechnic Inst of New York) Evan Pugh Professor of Chemistry and Physics
- Moses H. W. Chan, Ph.D., (Cornell) Evan Pugh Professor of Physics
- Milton W. Cole, Ph.D. (Chicago) Distinguished Professor of Physics
- John C. Collins, Ph.D. (Cambridge) Distinguished Professor of Physics
- Stephane Coutu, Ph.D. (Cal Tech) Professor of Physics
- Douglas Cowen, Ph.D. (Wisconsin, Madison) Professor of Physics
- Vincent H. Crespi, Ph.D. (California, Berkeley) Distinguished Professor of Physics
- James P. Crawford, Ph.D. (Colorado) Associate Professor of Physics
- Renee D. Diehl, Ph.D. (Washington) Professor of Physics
- Kristen Fichthorn, Ph.D. (Michigan) Professor of Chemical Engineering and Physics
- Lee Samuel Finn, Ph.D. (Cal Tech) Professor of Physics
- Nathan Gemelke, Ph.D. (Stanford) Assistant Professor of Physics
- Kurt Gible, Ph.D. (Colorado) Professor of Physics
- Gabriela I. Gonzalez, Ph.D. (Syracuse) Adjunct Assistant Professor of Physics
- Murat Günaydin, Ph.D. (Yale) Professor of Physics
- M. Abul Hasan, Ph.D. (Lehigh) Associate Professor of Physics
- Steven F. Heppelmann, Ph.D. (Minnesota) Professor of Physics
- Eric Hudson, Ph.D. (California, Berkeley) Associate Professor of Physics
- Jainendra Jain, Ph.D. (SUNY, Stony Brook) Mueller Professor of Physics
- Dezhe Jin, Ph.D. (California, San Diego) Associate Professor of Physics
- Daniel J. Larson, Ph.D. (Harvard) Professor of Physics
- Qi Li, Ph.D. (Peking) Professor of Physics
- Ying Liu, Ph.D. (Minnesota) Professor of Physics
- Gerald Mahan, Ph.D. (California, Berkeley) Distinguished Professor of Physics
- Julian D. Maynard, Ph.D. (Princeton) Distinguished Professor of Physics
- Peter Mészáros, Ph.D. (California, Berkeley) Distinguished Professor of Astronomy and Astrophysics, and Physics
- Irina Mocioiu, Ph.D. (SUNY Stony Brook) Associate Professor of Physics
- Kenneth O'Hara, Ph.D. (Duke) Assistant Professor of Physics; Downsbrough Professor
- Benjamin Owen, Ph.D. (Cal Tech) Associate Professor of Physics
- Lawrence J. Pilonie, Ph.D. (Penn State) Professor of Physics
- Jorge A. Pullin, Ph.D. (Instituto Balseiro) Adjunct Professor of Physics
- Radu Roiban, Ph.D. (C. N. Yang Inst for Theoretical Physics) Professor of Physics
- Richard W. Robinett, Ph.D. (Minnesota) Professor of Physics
- Nitin Samarth, Ph.D. (Purdue) Professor of Physics
- Peter E. Schiffer, Ph.D. (Stanford) Professor of Physics
- Sarah Shandera, Ph.D. Assistant Professor of Physics
- Jorge Sofo, Ph.D. (Instituto Balseiro) Professor of Physics
- Mark Strikman, Ph.D. (Leningrad) Professor of Physics
- Mauricio Terrones, Ph.D. (Sussex, England) Professor of Physics
- Brian L. J. Weiner, Ph.D. (Leicester) Professor of Physics
- David Weiss, Ph.D. (Stanford) Professor of Physics
- Roy F. Willis, Ph.D. (Cambridge) Professor of Physics
- Thomas Winter, Ph.D. (Wisconsin) Professor of Physics
- Xiaoxing Xi, Ph.D. (Peking) Adjunct Professor of Physics; Associate Professor of Materials Science and Engineering

Graduate instruction and research opportunities are available in atomic and molecular physics, laser physics, experimental and theoretical condensed matter and materials physics, surface physics, low-temperature physics, statistical physics, acoustics, nuclear physics, experimental and theoretical particle physics, quantum field theory, general relativity, cosmology and relativistic astrophysics and quantum gravity. Work in some areas is conducted in cooperation with the Materials Research Institute, the Applied Research Laboratory, and other interdisciplinary research facilities.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School Requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

A bachelor's degree in physics or an allied field is required for admission to the M.S., and Ph.D. programs. Students with a 2.50 or higher junior/senior grade-point average (on a 4.00 scale) in physics and mathematics will be considered, and the best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 GPA may be made for students with special backgrounds, abilities, and interests. Exceptions may also be made for applicants for doctoral programs who have completed master's degrees at other institutions.

Admission and study programs for the M.Ed. degree are handled on an individual basis.

### Master's Degree Requirements

**M.S. program:** Required courses include PHYS 530, PHYS 557, PHYS 559 (2 credits), PHYS 561, or PHYS 410. There are two options. Thesis option: The thesis must be based on at least 6 credits of PHYS 600 and must conform to Graduate School regulations. Nonthesis option: An additional 6 credits of 500-level physics courses beyond the required ones must be taken, and a short paper must be submitted to, and accepted by, the department. There is no degree examination for either option.

**M.Ed. program:** At least 18 credits in physics are required, of which up to 6 credits may be for research. Six additional nonresearch science credits (which may be in physics) and a 6-credit minor in a field of professional education also must be included. A thesis or term paper must be submitted and accepted by the department.

### Doctoral Degree Requirements

**Ph.D. program:** Required courses include PHYS 517, PHYS 525, PHYS 530, PHYS 557, PHYS 559 (2 credits), PHYS 561, PHYS 562, and a first-year seminar

series. Courses required beyond these depend on the Ph.D. option. Students take at least four additional 3-credit, 500-level physics courses.

A candidacy examination is given at the end of the first year, a comprehensive examination approximately two years after the candidacy examination, and a final thesis defense takes place after the completion of the thesis. There is no departmental foreign language requirement, although a reading knowledge of one foreign language may be needed in some areas of research.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

HOMER F. BRADDOCK GRADUATE FELLOWSHIPS Available to exceptional Ph.D. candidates in several departments of the Eberly College of Science. They carry stipends of \$3,500 to \$7,500 per year for each of the first three years.

WHEELER P. DAVEY MEMORIAL FELLOWSHIPS Carry stipend of variable amount and are available to a limited number of qualified graduate students in the Eberly College of Science.

DAVID C. DUNCAN GRADUATE FELLOWSHIPS Available to first- and second-year graduate students in physics and carry a stipend of approximately \$2,000 per year for each of the first two years.

FRYMOYER SCHOLARSHIP

W. DONALD MILLER GRADUATE FELLOWSHIP

DAVID H. RANK MEMORIAL PHYSICS AWARD

THE NELLIE AND OSCAR L. ROBERTS FELLOWSHIPS Available to graduate students majoring in the physical sciences and in biochemistry and molecular biology. Each award is for \$4,000 per year for one or two years.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PHYSICS \(PHYS\) course list](#)

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-07-008

Review Date: 06/22/2010

Faculty updated: 2/19/13

## Political Science (PL SC)

[Program Home Page](#)

SCOTT BENNETT, *Head of the Department*  
219 Pond Laboratory  
814-865-7515; Graduate Program: 814-863-1595

### Degrees Conferred:

Ph.D., M.A.  
Dual-Title Graduate Degree (Ph.D.) in Political Science and Asian Studies  
Dual-Title Graduate Degree (Ph.D.) in Political Science and African Studies

### The Graduate Faculty

- Donna Bahry, Ph.D. (Illinois) Professor of Political Science
- Lee Ann Banaszak, Ph.D. (Washington U) Associate Professor of Political Science
- D. Scott Bennett, Ph.D. (Michigan) Head; Professor of Political Science
- Michael B. Berkman, Ph.D. (Indiana, Bloomington) Professor of Political Science
- Xun Cao, Ph.D. (Washington, Seattle) Assistant Professor of Political Science
- David B. Carter, Ph.D. (U of Rochester) Assistant Professor of Political Science
- Gretchen G. Casper, Ph.D. (Michigan) Associate Professor of Political Science
- John Christman, Ph.D. (Illinois, Chicago) Associate Professor of Philosophy, Political Science, and Women's Studies
- Stephen J. Cimbala, Ph.D. (Wisconsin) Professor of Political Science
- C. Michael Comiskey, Ph.D. (Princeton) Associate Professor of Political Science
- Matthew Golder, Ph.D. (New York) Associate Professor of Political Science
- Sona Golder, Ph.D. (New York) Associate Professor of Political Science
- Peter Hatemi, Ph.D. (Nebraska, Lincoln) Associate Professor
- Errol Henderson, Ph.D. (Michigan) Associate Professor of Political Science
- Marie E. Hojnacki, Ph.D. (Ohio State) Associate Professor of Political Science
- Zaryab Iqbal, Ph.D. (Emory) Assistant Professor of Political Science
- Luke Keele, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Political Science
- Douglas Lemke, Ph.D. (Vanderbilt) Associate Professor of Political Science
- Suzanna Linn, Ph.D. (Iowa) Professor of Political Science
- David Lowery, Ph.D. (Michigan State) Bruce R. Miller and Dean D. LaVigne Professor of Political Science
- Burt Monroe, Ph.D. (Oxford) Associate Professor of Political Science
- Subhanan Mukherjee, Ph.D. (Columbia) Associate Professor of Political Science
- David J. Myers, Ph.D. (California, Los Angeles) Associate Professor of Political Science
- Glenn Palmer, Ph.D. (Michigan) Professor of Political Science
- James Piazza, Ph.D. (New York) Associate Professor of Political Science
- Eric Plutzer, Ph.D. (Washington U) Professor of Political Science
- Philip Schrod, Ph.D. (Indiana) Professor of Political Science
- Susan Welch, Ph.D. (Illinois, Urbana-Champaign) Professor of Political Science
- Joseph G. Wright, Ph.D. (California, Los Angeles) Assistant Professor of Political Science
- Boliang Zhu, Ph.D. (Columbia) Assistant Professor of Political Science
- Christopher Zorn, Ph.D. (Ohio State) Professor of Political Science

The purpose of the graduate program in Political Science is to train professional political scientists who intend to pursue careers in research, teaching, and public service. The department offers programs leading to the M.A. and Ph.D. degrees. The programs are designed to enable students to acquire both methodological sophistication and substantive knowledge in a variety of fields.

The graduate program in Political Science encourages the study of a variety of substantive concerns, methodological approaches, and research skills. Among the department's special areas of strength are United States politics and political behavior (legislative politics, public opinion and voting, parties and interest groups, and judicial process); political and social theory; international relations and peace science; and the politics of western and eastern Europe, Latin America, and South Asia; international conflict; international political economy; democratization; social movements; political culture; gender and politics. A dual-degree program with Women's Studies is also available.

### Admission Requirements

Entrance to the Political Science graduate program occurs in the fall semester. Applications must be received by the department not later than January 15 for fall admission. However, the department will begin accepting applications as of September 1.

The Department of Political Science requires M.A. and Ph.D. program applicants to submit transcripts, Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical), a statement of career plans and proposed emphasis in political science, at least three letters of recommendation from persons familiar with the applicant's academic performance, and a writing sample demonstrating research and/or analytical skills.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for IELTS is 6.5. Specific graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students can be admitted to the master's program or, after passing a Ph.D. candidacy exam, can be admitted to the Ph.D. program with a master's degree.

### Master's Degree Requirements

Depending on the student's previous methodological training, 30 credits of course work, including an essay, are required for a master's degree. The course work includes a methodological core of 9 credits (PL SC 501, 502, and 503); 12 credits in a primary field (including the survey seminar in the field); 6 credits in a secondary field; and 3 credits for the M.A. essay. Students also take a seminar on teaching and professional development in political science. There are no language requirements for the degree. Every master's candidate is required to pass an examination of their master's essay.

In the case of transfer students, a maximum of 10 credits earned in an advanced degree program at another university or in another department at Penn State will count toward the 30-credit requirement.

### Doctoral Degree Requirements

The Department of Political Science requires a minimum total of 60 post baccalaureate credits for the Ph.D. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of the dissertation, must be in political science.

In the case of transfer students, a maximum of 30 credits earned in an advanced degree program at another university or in another department at Penn State will count toward the 60-credit requirement.

The department requires that a student complete the designated "core" courses in methodology (PL SC 501, 502, and 503) and a seminar on teaching and professional development in political science. Ph.D. degree candidates must present three fields for the purposes of comprehensive examinations. The major and one of the minor fields must be selected from the department's recognized fields, and one of the minor fields may be outside political science. The major field requires a minimum of 15 credits; each minor field requires a minimum of 9 credits.

The communication and foreign language requirement for the Ph.D. may be satisfied by advanced course work and competence developed in foreign languages, statistics, or other research methods.

### Dual-Title Graduate Degree in Political Science and Asian Studies

Graduate students with research and educational interests in international education may apply to the Political Science/Asian Studies Degree Program. The goal of the dual-title degree Political Science and Asian Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Asian Studies as well. The dual-title degree Political Science and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see <http://asian.la.psu.edu/graduate.shtml>).

### Admission Requirements

For admission to the Dual-Title Ph.D. degree, a student must first apply and be admitted to the Political Science graduate program. After admission to the Political Science graduate program, a student must then apply for admission to the Asian Studies Program. The Asian Studies admissions committee reviews applications and recommends student for admission to the Asian Studies program to the Graduate School. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background. Students already in their first and second years of the Political Science graduate program may also apply to the dual-title program.

In addition to the requirements of the Graduate School and Political Science, applicants interested in the dual-title program should also make their interest in the dual-degree program known clearly on their applications and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in interdisciplinary and Asian Studies-related research.

General Graduate School requirements are state in the GENERAL INFORMATION section of the Graduate Bulletin.

### Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies advisor, and their Political Science program advisor.

Upon a student's acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic advisor in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their advisor. The student and advisor will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Political Science department and the Asian Studies program.

### Requirements for the Political Science/Asian Studies Ph.D.

The doctoral degree in Political Science and Asian Studies is awarded only to students who are admitted to the Political Science doctoral program and admitted to the dual-title Ph.D. degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and Asian Studies are as follows:

- A minimum total of 60 postbaccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation, must be in political science.
- Completion of course work in two major fields (the first of which is a political science sub field as detailed in the Political Science graduate handbook, and the second of which is Asia-related) and one minor field (in a regular political science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two, 1.5 credit seminars on teaching, writing, and professional development in political science.
- Completion of introductory field seminars appropriate to one's three fields of study.
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Political Science, as approved by the student's doctoral advisor and the Asian Studies Program director of graduate studies. The remaining 3 credits can be taken in ASIA or in any department other than Political Science.
- All-skills proficiency is one Asian Language AND two years' college study (or equivalent knowledge) of another Asian language OR alternative proficiency appropriate to the student's field.

Particular courses may satisfy both the Political Science requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisors and their major program advisors.

### Dual-Title Graduate Degree in Political Science and African Studies

Political Science doctoral students, who have research and educational interests in comparative policy analyses, environmental change and livelihood systems, socio-economic and political change, and other aspects of African Studies may apply to the Dual-Title Doctoral Degree Program in Political Science and African Studies. The goal of the program is to enable graduate students from Political Science to complement their knowledge and skills in a major area of specialization in Political Science with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual-Title Doctoral Degree Program provides interested Political Science doctoral students with a multidisciplinary approach that enhances their analytical capabilities for addressing key issues in African development and adds value to their Political Science degree by increasing their competitiveness in the job market. The well-rounded, regional specialist who graduates from this program, is likely to be employed in an international setting. The program, therefore, enhances the reputation of the Political Science department, the College of the Liberal Arts, and Penn State.

### Admission Requirements

Students must apply and be admitted to the graduate program in Political Science and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an interest in African Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Political Science.

General Graduate Council requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

### Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Final course selection is determined by the student in consultation with the Political Science and African Studies academic advisors.

Upon acceptance by the African Studies admissions committee, the student will be assigned an African Studies academic advisor in consultation with the African Studies director and the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies advisor from the one assigned by the African Studies admissions committee. The student and Political Science and African Studies academic advisors are to establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Political Science graduate program and the African Studies Program.

### Requirements for the Political Science-African Studies Ph.D.

The Ph.D. in Political Science and African Studies is awarded to students who are admitted to the Political Science doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and African Studies are as follows.

- A minimum of 60 post-baccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Political Science.
- Completion of coursework in two major fields (the first of which is a Political Science subfield as detailed in the Political Science graduate handbook, and the second of which is in African Studies) and one minor field (in a regular Political Science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two 1.5-credit seminars on teaching, writing, and professional development in Political Science.
- Completion of introductory field seminars appropriate to one's two political science fields of study.
- AFR 501 (3)
- 15 credits of Africa-related coursework at the 400 or 500-level; minimum of 3 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- As many as 6 of the 15 credits may come from Political Science, as approved by the student's Political Science and African Studies Program academic advisors.
- The remaining credits can be taken in AFR or in any department other than Political Science. Of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.
- Communication and foreign language requirements, which will be determined by the student, the Political Science and African Studies Program advisors in accordance with the existing Political Science language requirements.

### Language Requirement

The language requirement for a student in the Dual-Title Doctoral Degree Program will be determined by the student and the Political Science and African Studies Program advisors in accordance with the existing Political Science language requirements. The Political Science Foreign Language/Research Skills Competency requirement, contained in the Political Science Graduate Handbook, indicates that Doctoral students must satisfy one of the following four options to demonstrate proficiency in foreign language and/or research skills:

- 1) Reading proficiency and translation skills in two foreign languages. Proficiency is certified by the School of Languages and Literatures at Penn State. The School's website details the procedures that students must follow to obtain certification (see <http://sll.la.psu.edu/langprof.htm>).
- 2) Superior command of one foreign language. Superior command is defined as the ability to use the language to conduct field research abroad. This may include the ability to live and work in the relevant foreign country; the ability to converse with librarians, government officials, and other gatekeepers of documents and information; and the ability to conduct interviews with citizens or officials. There is no single test or criterion for demonstrating superior command of a foreign language. Rather, the student must provide to the doctoral committee letters from language instructors, faculty who have conducted fieldwork in the language in question, and similar documents so that its members can determine if the language skill is sufficient given the student's specialization and subfield.
- 3) Reading and translation proficiency in one foreign language plus a grade of B or higher in an advanced statistics course (i.e., material beyond that covered in PL SC 503) which has been approved by the student's doctoral advisor and the Director of Graduate Studies.
- 4) A statistical methods specialization consisting of three advanced statistics courses (each covering material beyond what is covered in PL SC 503). Students must receive a grade of B or higher in each class. The selection of courses must be approved by the student's doctoral advisor and the Director of Graduate Studies. These advanced courses may overlap with the advanced courses used if methodology is chosen as the student's first or second minor field.

### Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 post-baccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and African Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the African Studies program.

### Committee Composition

The doctoral committee of a dual-title doctoral degree student must include a minimum of four Graduate Faculty members, i.e., the chair and at least three additional members. The committee must include at least one member of the African Studies graduate faculty.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies should be appointed as co-chair.

### Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's major Political Science subfield and African Studies. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national or regional area of interest and specialization in African Studies.

### Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and African Studies.

### Other Relevant Information

Penn State is a member of the Committee on Institutional Cooperation (CIC), an association of the Big Ten universities and the University of Chicago. The CIC sponsors the Traveling Scholars program, which provides doctoral-level students with an opportunity to study at another CIC university. In addition to participating in CIC programs, the department sponsors attendance at the ICPSR Summer program at the University of Michigan.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[POLITICAL SCIENCE \(PL SC\) course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-027

Review Date: 06/12/2012

Faculty updated: 01/03/13

## Plant Biology (PLBIO)

[Program Home Page](#)

TEH-HUI KAO, *Head of the Graduate Program in Plant Biology*  
 Plant Biology Program Office  
 101 Life Sciences Building  
 814-865-8165  
[plantbiology@psu.edu](mailto:plantbiology@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Charles T. Anderson, Ph.D. (Stanford) Assistant Professor of Biology
- Richard N. Arteca, Ph.D. (Washington State) Professor of Horticultural Physiology
- Sarah M. Assmann, Ph.D. (Stanford) Waller Professor of Biology
- Michael Axtell, Ph.D. (California, Berkeley) Associate Professor of Biology
- Robert D. Berghage, Ph.D. (Michigan State) Associate Professor of Horticulture
- Philip C. Bevilacqua, Ph.D. (Rochester) Professor of Chemistry
- Kathleen M. Brown, Ph.D. (Florida) Professor of Postharvest Physiology
- Nicole R. Brown, Ph.D. (Virginia Tech) Associate Professor of Wood Chemistry
- Donald A. Bryant, Ph.D. (California, Los Angeles) Ernest C. Pollard Professor of Biotechnology and Professor of Biochemistry and Molecular Biology
- John E. Carlson, Ph.D. (Illinois) Professor of Molecular Genetics (Forest Resources)
- Jeffrey Catchmark, Ph.D. (Lehigh) Associate Professor of Agricultural and Biological Engineering
- Surinder Chopra, Ph.D. (Vrije U, Brussels) Associate Professor of Maize Genetics
- Daniel Cosgrove, Ph.D. (Stanford) Eberly Chair and Professor of Biology
- Wayne R. Curtis, Ph.D. (Purdue) Professor of Chemical Engineering and Biotechnology
- Richard J. Cyr, Ph.D. (California, Irvine) Professor of Biology
- Consuelo DeMoraes, Ph.D. (Georgia) Professor of Entomology
- Claude DePamphillis, Ph.D. (Georgia) Professor of Biology
- David M. Eissenstat, Ph.D. (Utah State) Professor of Woody Plant Physiology
- Majid Foolad, Ph.D. (California, Davis) Professor of Plant Genetics
- John H. Golbeck, Ph.D. (Indiana) Professor of Biochemistry and Biophysics
- Ying Gu, Ph.D. (California, Riverside) Assistant Professor of Biochemistry and Molecular Biology
- Mark J. Gultinan, Ph.D. (California, Irvine) Professor of Plant Molecular Biology
- David Huff, Ph.D. (California, Davis) Associate Professor of Turfgrass Breeding and Genetics
- Seogchan Kang, Ph.D. (Wisconsin) Professor of Plant Pathology
- Teh-hui Kao, Ph.D. (Yale) Professor of Biochemistry and Molecular Biology
- Roger Koide, Ph.D. (California, Berkeley) Professor of Horticultural Ecology
- Dawn S. Luthe, Ph.D. (Wisconsin-Madison) Professor of Plant Stress Biology
- Jonathan P. Lynch, Ph.D. (California, Davis) Professor of Plant Nutrition
- Hong Ma, Ph.D. (MIT) Distinguished Professor of Biology
- Timothy McNellis, Ph.D. (Yale) Associate Professor of Plant Pathology
- Mark C. Mescher, Ph.D. (Georgia) Assistant Professor of Entomology
- Gabriele B. Monshausen, Ph.D. (Bonn) Assistant Professor of Biology
- Christopher A. Mullin, Ph.D. (Cornell) Professor of Entomology
- B. Tracy Nixon, Ph.D. (MIT) Professor of Biochemistry and Molecular Biology
- Andrew G. Stephenson, Ph.D. (Michigan) Professor of Biology
- Ming Tien, Ph.D. (Michigan) Professor of Biochemistry and Molecular Biology
- James Tumlinson, Ph.D. (Mississippi State) Ralph O. Mumma Professor of Entomology
- Yinong Yang, Ph.D. (U Florida) Associate Professor of Plant Pathology

The Intercollege Graduate Degree Program in Plant Biology includes faculty from nine departments in the College of Agricultural Sciences, College of Engineering, and Eberly College of Science. Each student becomes associated with the adviser's department, which may provide financial support, research facilities, and office space. Applicants are encouraged to explore opportunities by contacting faculty who may be prospective advisers.

The objective of this program is to educate and train plant biologists using the most modern techniques available today. Graduates from this program have gone on to a diverse range of careers, including positions in colleges and universities, research institutes, industry, and government. Research interests of the program faculty span the breadth of scientific areas ranging from molecular, cell, and evolutionary biology, biochemistry, biophysics, genetics, and functional genomics to whole-plant physiology and ecology. Student training includes a comprehensive set of team-taught courses that reflect this breadth of scientific approaches.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, analytical) are required for admission. At the discretion of the graduate program officers, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course background will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Students entering this program should have had a strong foundation in the biological sciences, including biochemistry, general physics, and college mathematics through calculus. Students with limited deficiencies may be admitted but must make up their deficiencies concurrently with their graduate studies. B.S.-level applicants with good academic records who have had strong training in plant biology and related courses, including research experience, are generally admitted directly into the Ph.D. program and bypass the M.S. degree.

### Master's Degree Requirements

Candidates for the M.S. must take a written diagnostic examination during the first academic year in the program. The functions of this test are to (1) determine the areas of expertise and deficiency in the student's academic preparation and (2) serve as an early screening system to eliminate students with too great an academic deficiency to continue in the program.

As part of the core courses for any degree in the Plant Biology program, all students must enroll in the two tutorial courses, PLBIO 512 and PLBIO 513, and an ethics course, IBIOS 591. Students are presented with advanced lectures in various areas of plant biology and must prepare approximately three written solutions to problems per semester. This dossier of papers constitutes the written diagnostic examination for the M.S. degree and is also used for evaluation of English writing competency. At the end of the respective semesters, the faculty coordinator will present a summary and evaluation of the student's progress to the Candidacy Examination Committee. The committee will then decide if the student has passed the written diagnostic examination and satisfied English writing competency.

All M.S. degree candidates will be required to complete 30 credits of course work. In addition to the courses mentioned previously, students must include two biochemistry courses, 1 credit of colloquium (PLBIO 590), and at least 6 credits of thesis research (PLBIO 600 or PLBIO 610) in their program and they must complete a thesis. Upon recommendation of the advisory committee, equivalent courses taken at another university may be substituted for the above requirements.

## Doctoral Degree Requirements

Students in the Ph.D. program must successfully pass the candidacy, comprehensive, and final examinations required by the Graduate School. One of the main goals of the candidacy examination is to determine the potential of a student to successfully obtain a Ph.D. degree and is intended to be a vigorous test of a student's abilities, prior to the major investment in time and effort necessary to pass the comprehensive examination.

As in the M.S. program, students enrolled in the Ph.D. program must pass a written English competency evaluation based on the dossier of papers written for PLBIO 512 and PLBIO 513. This evaluation is done at the end of the student's first year. The oral candidacy examination is based on two of the papers, jointly chosen by the student and the Candidacy Examination Committee, and must be passed by the end of the student's third semester.

Ph.D. candidates must complete the core courses required for the M.S. plus three 2-credit courses dealing with theory and techniques of plant ecophysiology, plant cell biology, and plant molecular biology (PLBIO 514, PLBIO 515, PLBIO 516) and 2 credits of colloquium (PLBIO 590). Upon recommendation of the candidacy committee, equivalent courses taken at another university may be substituted for some of the above requirements. Based on the results of the candidacy examinations, the major professor and the student's advisory committee will determine other course requirements.

### Other Relevant Information

The following courses are some of the courses available for Plant Biology majors, in addition to the required courses. Their descriptions may be found under the offerings of several departments: AGRO 517, AGRO 518; BIOL 407, BIOL 431, BIOL 441, BIOL 448, BIOL 510, BIOL 513; BMMB 514, BMMB 520, BMMB 525; HORT 402W, HORT 407, HORT 412W, HORT 420, HORT 440W, HORT 444, HORT 445, HORT 517, HORT 520; PPATH 405, PPATH 516, PPATH 543; any course offered by the Plant Biology program.

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. In most participating departments, Plant Biology applicants are eligible for departmental teaching or research assistantships, and other assistantships supported by grant funds of individual faculty who make these award decisions.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PLANT BIOLOGY \(PLBIO\) course list](#)

[PLANT PHYSIOLOGY \(PLPHY\) course list](#)

Last Revised by the Department: Fall Semester 2006

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Date last reviewed by Graduate School: 5/24/04

Faculty updated: 7/9/13



## Plant Pathology (PPATH)

[Program Home Page](#)

Fred Gildow, Head of the Department of Plant Pathology  
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814-865-7448

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Paul A. Backman, Ph.D. (California) Professor of Plant Pathology
- David M. Beyer, Ph.D. (Penn State) Professor of Plant Pathology
- Barbara J. Christ, Ph.D. (British Columbia) Senior Associate Dean; Professor of Plant Pathology
- Donald D. Davis, Ph.D. (Penn State) Professor of Plant Pathology
- David M. Geiser, Ph.D. (Georgia) Professor of Plant Pathology
- Frederick E. Gildow, Ph.D. (Cornell) Department Head; Professor of Plant Pathology
- Beth K. Gugino, Ph.D. (Penn State) Assistant Professor of Plant Pathology
- John M. Halbrendt, Ph.D. (Missouri) Associate Professor of Plant Pathology
- Scott A. Isard, Ph.D. (Indiana) Professor of Aerobiology
- Maria del Mar Jimenez Gasco, Ph.D. (Cordoba, Spain) Assistant Professor of Plant Pathology
- Seogchan Kang, Ph.D. (Wisconsin) Professor of Plant Pathology
- Gretchen A. Kuldau, Ph.D. (California) Associate Professor of Plant Pathology
- Timothy W. McNellis, Ph.D. (Yale) Associate Professor of Plant Pathology
- Gary W. Moorman, Ph.D. (North Carolina State) Professor of Plant Pathology
- C. Peter Romaine, Ph.D. (Cornell) Professor of Plant Pathology
- Marilyn Roossinck, Ph.D. (Colorado School of Medicine) Professor of Plant Pathology and Biology
- Daniel J. Royse, Ph.D. (Illinois) Professor of Plant Pathology
- Wakar Uddin, Ph.D. (Georgia) Associate Professor of Plant Pathology
- Yinong Yang, Ph.D. (Florida) Associate Professor of Plant Pathology

Plant pathology is the study of disease in plants and concerns the dynamic interaction between the plant, the causal agent (bacteria, fungi, viruses, nematodes, etc.), and their environments. A student prepares for a professional career in research, teaching, extension, or industry through advanced studies of the principles of plant infection, the physiology of disease in plants, the ecology of root diseases, the nature and inheritance of disease resistance in plants, epidemiology, ecology and physiology of air pollution injury to plants, or plant disease control by biological or chemical means. A student also may specialize in the nature and control of the diseases of forest trees, agronomic or horticultural crops, and commercial mushrooms. Advanced studies in molecular systematics of fungi and applied mycology, related to the production of the commercial mushroom, also may be taken. Modern, well-equipped laboratories, controlled environment facilities and greenhouses, and well-developed field research areas are available for graduate study.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Students scoring in the fiftieth percentile or above on each section of the GRE will be given preference. The best-qualified applicants will be accepted up to the number of spaces and advisers that are available for new students. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Students are expected to have a strong foundation in biological and physical sciences. Generally, students with B.S. degrees in biology, microbiology, plant science, molecular biology, or biochemistry are well prepared.

### Degree Requirements

#### M.S. DEGREE

The master of science degree program in Plant Pathology leads students either to the development of special proficiencies in Plant Pathology, which will allow the individual to directly enter a professional career, or to the development of a basic knowledge of the discipline, allowing for advancement to the Ph.D. degree. M.S. degree students will be introduced to the broad aspects of the field of plant pathology, including exposure to the various causal agents of plant disease and the diseases they incite; diseases of current and classical importance affecting a wide range of crop plants; a variety of techniques used to isolate, characterize, and identify causal agents of plant disease; and an appreciation for the relationship between plant pathology and other biological and physical sciences.

Required Courses for the M.S. Degree are: PPATH 405, 416, 417, 425, 502, and 590. Candidates are required to take a minimum of 6 additional credits of Plant Pathology courses from a list provided by the department.

Candidates for the M.S. degree in Plant Pathology must present a thesis to their graduate advisory committee.

#### Ph.D. DEGREE

Students earning a Ph.D. degree from Penn State should have a thorough understanding of the complex interaction between the pathogen and its host. They should know how representative pathogens are dispersed and enter hosts and how the environment mediates these processes. They should understand the role that the pathogen, host genes, and metabolic products play in pathogenesis. They must be aware of the mechanisms the host has to defend it and how these are breached by a successful pathogen. They must know the parameters involved in disease development and with this knowledge be able to apply measures of control.

Candidates for the Ph.D. degree in Plant Pathology are required to have an M.S. in plant pathology or a closely related field, or equivalent educational background. In addition, all students must enroll in PPATH 505 and other courses tailored to the individual by the candidate's doctoral advisory committee. Ph.D. candidates must prepare a thesis and present seminars in the departmental colloquium (PPATH 590), through which English communication skills will be evaluated. During their studies, Ph.D. students will have an opportunity to assist in teaching a disciplinary subject.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[PLANT PATHOLOGY \(PPATH\) course list](#)**Dual-Title Graduate Degree in Plant Pathology (PPATH) and International Agriculture and Development (INTAD)**

Graduate students with research and educational interests in international education may apply to the Plant Pathology/INTAD Dual-Title Degree Program. The goal of the dual-title degree Plant Pathology and INTAD graduate program is to enable graduate students from Plant Pathology to acquire the knowledge and skills of their primary area of specialization in Plant Pathology, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of plant-microbe interactions, plant disease biology and epidemiology, environmental microbiology, mycology, plant virology, mushroom biology, genomics and disease management. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

**Admission Requirements**

For admission to the dual-title doctoral degree under this program, a student must first apply and be admitted to the Plant Pathology graduate program. Once accepted into the Plant Pathology program, the student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. The application consists of a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title PPATH/INTAD degree. Requirements listed here are in addition to the admission requirements for the Plant Pathology graduate program.

**Degree Requirements**

To qualify for this dual-title degree, students must satisfy the requirements of the Plant Pathology program. In addition, they must satisfy the requirements described below, determined by the student, the INTAD advisor, and the Plant Pathology program advisor.

**Degree Requirements for PPATH/INTAD Dual-Title M.S.**

The master's in Plant Pathology and INTAD is a dual-title degree awarded only to students who are admitted to the Plant Pathology master's program and admitted to the dual-title degree in INTAD and who complete all requirements for the degrees. In addition to the requirements of the Plant Pathology degree, dual-title degree students must:

**Course Requirements**

Complete a minimum of 12 INTAD course credits (400, 500, or 800 level) as follows:

- 9 credits from the core curriculum:
  - Program Design and Delivery (AEE 450, 3 credits)
  - Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
  - International Agricultural Development Seminar (INTAD 820, 3 credits)
- 3 credits of internship or applied courses/independent studies with international development content

**Thesis**

Write a master's thesis on a topic that reflects both the graduate program in plant pathology and the dual-title offering in INTAD. Thesis research credits (SUBJ 600) must be taken in the major program.

All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Candidates for the dual-title master's degree in Plant Pathology and INTAD will also be required to pass a final oral examination covering the general field of plant pathology and INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the students in consultation with their INTAD advisors and their Plant Pathology program advisors. Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. Students and advisors should maintain the INTAD Master's Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

**Degree Requirements for PPATH/INTAD Dual-Title Ph.D.**

The doctoral degree in Plant Pathology and INTAD is a dual-title degree awarded only to students who are admitted to the Plant Pathology doctoral program and admitted to the dual-title degree in INTAD and who complete all requirements for the degrees. The minimum requirements for the dual-title Ph.D. degree in PPATH/INTAD, in addition to the Plant Pathology requirements, are as follows.

**Course Requirements**

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

- - 9 credits from the core curriculum
    - International Agricultural Development Seminar (INTAD 820, 3 credits)
    - International Rural Social Change (R SOC 517, 3 credits)
    - Sociology of Agriculture (R SOC 508, 3 credits) or Human Dimensions of Natural Resources (R SOC 555, 3 credits)
  - 9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course. Particular courses may satisfy both the Plant Pathology Department requirements and those in the INTAD program. Final course selection is determined by the student in consultation with the INTAD advisor and the Plant Pathology program advisors.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

**Candidacy**

Candidacy procedures will be based on the procedures of Plant Pathology and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student's Plant Pathology advisor in consultation with the INTAD program coordinators.

**Committee Composition**

The doctoral committee of the Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program

faculty. The chair of the committee can be a member of both Plant Pathology and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside field member" also must be appointed to the committee, in accordance with the requirements outlined in the Graduate Bulletin.

**Comprehensive Exam**

At the end of the coursework, candidates for the dual-title doctoral degree in Plant Pathology and INTAD will be required to pass an oral comprehensive examination based on their dissertation proposal and area of specialization in plant pathology, while reflecting their dual-title curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the comprehensive exam and the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive examination.

**Dissertation and Dissertation Defense**

Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both Plant Pathology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400-499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[INTAD course list](#)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-080

Review Date: 02/21/2012

Faculty updated: 7/31/12

## Project Management (PRMGT)

JEFFREY PINTO, Program Chair  
Penn State Erie, The Behrend College  
Station Road  
Erie, PA 16563

The Master of Project Management (MPM) is a 30-credit graduate degree program that emphasizes all aspects of project management theory and practice. The MPM is interdisciplinary and utilizes problem-based learning as well as a combination of face-to-face and Web-based instructional methods to transcend time and space, and to support effective teaching and learning. The key themes of the MPM include: planning, cost, and value management; project control; human issues in project management; strategic issues in project management; and commercial and procurement law as it relates to project management.

### Degree Requirements

Students complete eight required courses (24 credits) in which they apply course concepts to project management scenarios through the use of cases, simulations or actual situations in their employing organizations. The required corpuses are:

#### MANAGEMENT (MANGT)

- 510. Project Management (3)
- 515. Cost and Value Management (3)
- 520. Planning and Resource Management (3)
- 525. Commercial Law and Project Management (3)
- 531. Organizations (3)
- 535. Interpersonal and Group Behavior (3)
- 540. Strategy: Corporate, Business, and Project (3)
- 575. Management of Projects (3)
- 596. Independent Studies (6)

In addition, students take 6 credits of elective courses. Electives may include additional program-approved courses or an applied research project focusing on some aspect of project management completed as an independent study. All students must attend a minimum of one on-site residency experience for two to three days in order to complete the graduation requirements of the program. Attendance at additional annual residency events is encouraged but optional.

### Admission Requirements

Only candidates who demonstrate high promise of success for graduate work are admitted to the MPM program. All applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions that are deemed substantially equivalent to those currently required by Penn State. Admission decisions are based on undergraduate grade-point average, Graduate Management Admission Test (GMAT) scores, and a personal essay.

Applicants must achieve a minimum GMAT score of 450. When this score is added to the applicant's undergraduate grade-point average, multiplied by 200, the total must be at least 1,050 in order to meet minimum requirements for admission to the MPM program. Either the applicant's cumulative undergraduate grade-point average or the junior/senior grade-point average can be used for this calculation. Applicants must also demonstrate proficiency in writing by obtaining at least a 4.0 on the analytical writing assessment portion of the GMAT, or by earning a grade of B or higher in a college English composition course. The MPM program emphasizes application of course concepts to actual project management opportunities and problems. Therefore, students who currently are, or previously were, employed as project managers or project team members will derive the greatest benefit from the program. All applicants must provide evidence of sufficient current or previous work experience that will enable them to successfully complete course assignments requiring the application of course concepts to real project management situations. This evidence may be provided in either the form of three letters of recommendation from individuals who know the applicant in a professional capacity or through nomination to participate in the program by an appropriate official within the applicant's employing organization. Those who write letters of recommendation or submit nominations on behalf of the candidate will be asked to attest to the nominee's suitability for the program of study considering factors such as the applicant's length of employment, level and areas of work responsibility, personal qualities, career goals, maturity of purpose, and program requirements to apply course concepts to work-related issues. Applicants are encouraged to consult with the program chair concerning the suitability of their work experiences in relationship to program requirements.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

All students must be computer literate and have ready and reliable access to a computer and the Internet to successfully complete the MPM program. They must know how to use word processing software, log on to an Internet provider, and use e-mail. Additionally, MPM students will use Microsoft Office in their coursework that will require they have a working knowledge of Microsoft Office programs such as Word, Excel, Power Point, and Access. Access to fax facilities may be needed as an additional form of communications between student and instructor or between students.

### Course Scheduling Considerations

The recommended maximum course load is 6 credits per semester for students working full-time. MANGT 510 must be taken in the first semester of study and is a prerequisite or co-requisite for all other courses in the program. MANGT 575, Management of Projects, is a problem-based capstone course that integrates the themes necessary to appreciate the overall challenge of project management. The course includes a final, integrative and comprehensive project based on the identification and analysis of real project management problems from the students' work organizations. This written assignment requires the integration of theory from previous courses along with significant library and literature searches to analyze and propose solutions to these problems. MANGT 575 must be taken following completion of at least 18 credits. No more than one of the required courses may be taken concurrently with MANGT 575.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-096

Review Date: 01/12/2010

## Psychology (PSY)

[Program Home Page](#)

MELVIN M. MARK, *Head of the Department*  
Department office: 111 Moore Building  
814-865-9514

### Degrees Conferred:

Ph.D., M.S.  
Dual-Title Doctoral Degree in Psychology and Language Science

### The Graduate Faculty

- Reginald B. Adams Jr., Ph.D. (Dartmouth) Assistant Professor of Psychology
- Peter A. Arnett, Ph.D. (Wisconsin, Madison) Associate Professor of Psychology
- Sandra T. Azar, Ph.D. (Rochester) Professor of Psychology
- Sheri Berenbaum, Ph.D. (California) Professor of Psychology
- Karen L. Bierman, Ph.D. (Denver) Distinguished Professor of Psychology
- Alysia Y. Blandon, Ph.D. (Michigan) Assistant Professor of Psychology
- Frederick M. Brown, Ph.D. (Virginia) Associate Professor of Psychology
- Kristen A. Buss, Ph.D. (Wisconsin) Associate Professor of Psychology
- Richard A. Carlson, Ph.D. (Illinois) Professor of Psychology
- Mark A. Casteel, Ph.D. (Nebraska) Associate Professor of Psychology
- Louis G. Castonguay, Ph.D. (SUNY, Stony Brook) Professor of Psychology
- Jeanette Cleveland, Ph.D. (Penn State) Professor of Psychology
- Pamela M. Cole, Ph.D. (Penn State) Professor of Psychology
- Peter B. Crabb, Ph.D. (Temple) Associate Professor of Psychology
- Nancy A. Dennis, Ph.D. (Catholic U of America) Assistant Professor of Psychology
- James L. Farr, Ph.D. (Maryland) Professor of Psychology
- Karen Gasper, Ph.D. (Illinois) Associate Professor of Psychology
- Mary Gergen, Ph.D. (Temple) Professor of Psychology
- Rick O. Gilmore, Ph.D. (Carnegie Mellon) Associate Professor of Psychology
- Alicia A. Grandey, Ph.D. (Colorado State) Associate Professor of Psychology
- Monica E. Gregory, Ph.D. (Oklahoma) Associate Professor of Psychology
- Frank G. Hillary, Ph.D. (Drexel) Assistant Professor of Psychology
- Cynthia L. Huang-Pollock, Ph.D. (Michigan State) Assistant Professor of Psychology
- Sam Hunter, Ph.D. (Oklahoma) Assistant Professor of Psychology
- Rick R. Jacobs, Ph.D. (California) Professor of Psychology
- John A. Johnson, Ph.D. (Johns Hopkins) Professor of Psychology
- Alexay Kozhevnikov, Ph.D. (Yale) Assistant Professor of Physics and Psychology
- Judith F. Kroll, Ph.D. (Brandeis) Liberal Arts Research Professor of Psychology and Linguistics
- Kenneth N. Levy, Ph.D. (CUNY) Assistant Professor of Psychology
- Ping Li, Ph.D. (Leiden U) Professor of Psychology and Linguistics
- Lynn S. Liben, Ph.D. (Michigan) Distinguished Professor of Psychology
- Melvin M. Mark, Ph.D. (Northwestern) Professor of Psychology
- Amy D. Marshall, Ph.D. (Indiana) Assistant Professor of Psychology
- Gerald E. McClearn, Ph.D. (Wisconsin) Evan Pugh Professor of Health and Human Development and Psychology
- Michael D. McNeese, Ph.D. (Vanderbilt) Associate Professor of Information Sciences and Technology, and Psychology
- Susan Mohammed, Ph.D. (Ohio) Associate Professor of Psychology
- Ginger Moore, Ph.D. (Pittsburgh) Assistant Professor of Psychology
- Kevin R. Murphy, Ph.D. (Penn State) Professor of Psychology
- Jenae Neiderhiser, Ph.D. (Penn State) Professor of Psychology
- Keith E. Nelson, Ph.D. (Yale) Professor of Psychology
- Michelle G. Newman, Ph.D. (SUNY, Stony Brook) Associate Professor of Psychology and Psychiatry
- Aaron L. Pincus, Ph.D. (British Columbia) Associate Professor of Psychology
- Brian Rabian, Ph.D. (George Washington) Clinical Associate Professor of Psychology
- Richard J. Ravizza, Ph.D. (Vanderbilt) Associate Professor of Psychology
- William J. Ray, Ph.D. (Vanderbilt) Professor of Psychology
- Frank E. Ritter, Ph.D. (Carnegie Mellon) Associate Professor of Information Sciences and Technology, and Psychology
- David A. Rosenbaum, Ph.D. (Stanford) Distinguished Professor of Psychology
- Stephanie A. Shields, Ph.D. (Penn State) Professor of Women's Studies and Psychology
- Margaret L. Signorella, Ph.D. (Penn State) Professor of Psychology
- José Soto, Ph.D. (California, Berkeley) Assistant Professor of Psychology
- Janet Swim, Ph.D. (Minnesota) Professor of Psychology
- Hoben Thomas, Ph.D. (Claremont) Professor of Psychology
- Theresa K. Vescio, Ph.D. (Kansas) Associate Professor of Psychology and Women's Studies
- Daniel J. Weiss, Ph.D. (Harvard) Associate Professor of Psychology
- Michael Wenger, Ph.D. (Binghamton) Associate Professor of Psychology
- Stephen Wilson, Ph.D. (Pittsburgh) Assistant Professor of Psychology

The graduate Psychology program is characterized by highly individualized study leading to the Ph.D. degree. Emphasis is placed on research, teaching, and professional career development. Each student is associated with one of the six program areas offered in the department: *Clinical* (including *Child Clinical*; *Cognitive*; *Developmental*; *Psychobiology*; *Industrial/Organizational*; and *Social*. An individual's particular pattern of interests dictates in part the course of study followed. Within all areas, research is an integral part of study; usually, the research is empirical in focus, but it may be applied or basic, depending on the problem of interest.

The department has laboratories, computer facilities, darkroom, and shop, and students have access to the large resources of the University, which include excellent computation facilities and a large open-stack library. Opportunities for practicum experience are available; e.g., clinical students find practicum in local mental health centers, while industrial students find placement in appropriate business or industrial settings.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) verbal and quantitative portions are required; scores from the Miller Analogies Test (MAT) are optional. All applicants who were psychology majors as undergraduates should provide scores from the advanced psychology (subject) GRE test. Applicants with superior undergraduate (particularly junior and senior years) or graduate grade-point averages will be considered for admission. Although a major in psychology is not required, applicants should have a broad undergraduate background that includes 12 credits in psychology. Undergraduate study in psychology should include a course in statistics and a psychological methodology course. Requirements listed above are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

### Master's Degree Requirements

The psychology department does not have a graduate program designed for students seeking only the master's degree. A master's thesis, or the department's equivalent (an acceptable published journal article), is required for advancement to candidacy for the Ph.D. degree in psychology. Usually, but not always, the

master's thesis centers on an empirical research topic. The typical thesis involves a literature review, data collection, analysis, and discussion. A master's degree is not awarded unless a thesis is submitted to the Graduate School. Students must successfully propose a thesis study by the end of the second year and have a successfully defended a thesis by the end of their third year in the program.

### Doctoral Degree Requirements

All students in their first year of residency must satisfactorily complete the department's English proficiency requirement (PSY 501).

Students must complete (within their first 60 graduate credits for students without previous graduate credit) 6 departmentally approved graduate credits in statistics with a grade of B or better. Students must complete 18 credits in a suitably selected major area; majors usually are defined by one of the six program areas noted above. In addition to the major area credits, students must complete a minimum of 12 credits outside the major area. Two options exist for completing these 12 credits: (1) completing four courses in APA-recommended breadth areas, or (2) completing course work in a particular area of expertise outside the major. Some areas may have additional recommended or required courses as well. The Ph.D. comprehensive examination must be taken by the time 70 graduate credits are earned, or prior to the student's fourth year in residency, whichever comes first. The department has no foreign language requirement.

### Applied Linguistics Option

The program offers an option in Applied Linguistics which includes 18 credits in APLNG/LING offered in the Linguistics and Applied Language Studies program. Underpinning the option is the synthesis of knowledge related to how language is acquired, understood, and spoken by children and adults who use one or more languages.

### Other Relevant Information

The Department of Psychology makes every effort to recruit and train minority psychologists. Support for minority students is coordinated by the department, the Graduate School Minority Graduate Scholars Award Program, and the American Psychological Association Minority Fellowship Program. In addition, the department often has funded minority students through minority training programs and special minority research programs.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Dual-Title Graduate Degree in Psychology and Language Science

Graduate students with research and educational interests in Psychology and Language Science may apply to Psychology and Language Science PH.D. Graduate Program. The goal of the dual-title degree Psychology and language Science graduate program is to enable graduate students from Psychology to acquire the knowledge and skills of their major area of specialization in Psychology, while at the same time gaining the perspective and methods of the Language Sciences.

### Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through the Psychology Department (see below for admission requirements for the Graduate Program in Psychology). Upon admission to the Psychology Program and with a recommendation from a Language Science program faculty member in the Department of Psychology, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

### Admission Requirements for Incoming Graduate Students in Psychology

Most incoming graduate students have earned an undergraduate degree in psychology. In some cases, students from other majors are also admitted, but it is expected that applicants will have a background in psychology before applying. Graduate Record Exam (GRE) is required; however, the subject exam is not required. The TOEFL exam is required for international students except for those applicants who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States and Wales. All international students will be required to take the English Proficiency Exam upon arrival at the Penn State campus. Students are asked to complete a departmental application form, write a statement of purpose, and include a writing sample in the application materials.

### Requirements for the Dual-Title Ph.D. Degree in Psychology and Language Science

Two Language Science proseminar courses (Ling 521 and Ling 522; 6 credits). One 3 credit research internship with a Language Science faculty mentor from an outside area. The 3 credit internship required by the Psychology program may satisfy both the Psychology requirement and the Language Science requirement (for 6 total credits of internship to be completed with two faculty members from the Language Science program). Students will choose one course among the following: CSD 596, GER 596, LING 596, PSY 596, SPAN 596.

Final course selection is determined by the student in consultation with their dual-title program advisors and their major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-097

Review Date: 1/12/2010

Last updated by Publications: 9/21/09

## Quality and Manufacturing Management (QMM)

[Program Home Page](#)

RUSSELL BARTON, *Co-Director; Professor of Management Science and Information Systems*  
ROBERT VOIGT, *Co-Director; Professor of Industrial and Manufacturing Engineering*  
344 Leonhard Building  
814-863-5802  
[gmm@psu.edu](mailto:gmm@psu.edu)

### Degree Conferred:

M.M.M.

Penn State's Master of Manufacturing Management (M.M.M.) degree is offered by the Quality and Manufacturing Management (QMM) program. The degree is conferred by both the College of Engineering and the Smeal College of Business. This interdisciplinary graduate program is designed to prepare students for careers in manufacturing, consulting, services, and operations. The program is offered on a full-time basis only and requires nine months of continuous study during a normal academic year. An appropriate internship experience is a precondition for entrance to the program if the applicant does not have sufficient work experience to waive the internship requirement. Students take 32 credits of work in eleven core courses.

The program develops future executives who possess in-depth, relevant manufacturing knowledge bridging engineering and management. Graduates are afforded a life-changing experience that provides them with a unique set of engineering, business, and quality skills combined with a suite of communication skills critical to management success. Students fuse Six Sigma certification with corporate social responsibility and emotional intelligence to become well-rounded leaders. M.M.M. students develop business plans and analyze and predict corporate financial performance in a global marketplace. They emerge from Penn State as international leaders understanding the fundamentals of materials and processes and project confidence in product and manufacturing system design.

### Admission Requirements

The program draws its students from two groups: practicing professionals from industry and individuals who have graduated from, or are currently enrolled in, a business administration, science, or engineering program. Applicants who expect to graduate with a B.S. in engineering, science, or business administration may apply for admission to the program in their senior year.

All applicants must submit scores from the GRE or the GMAT. International students must also submit TOEFL scores. However, the TOEFL requirement is waived for international students who have successfully completed undergraduate work in an American college or university. The average grade-point average is 3.0; the average GRE score is 1100 on the verbal and quantitative sections and 4.0 on the analytical section. The average GMAT score is 580.

All applicants must have taken the prerequisite mathematics, computer science, and statistics courses or equivalents **prior to** starting the program. Applicants **cannot** register until they have completed these courses. For a listing of the prerequisite courses, visit [www.mmmdegree.psu.edu](http://www.mmmdegree.psu.edu)

### Degree Requirements

The M.M.M. degree requires 32 credits of graduate work on a full-time basis. The courses are as follows: QMM 491 or QMM 492; QMM 552, QMM 561, QMM 562, QMM 581, QMM 582, QMM 593, QMM 851, QMM 871, QMM 872, and QMM 891.

In some instances, course changes are being considered and prospective students should consult with the M.M.M. degree program to determine what new requirements might be in effect. The program co-directors are authorized to make suitable substitutions in the above curriculum in consultation with the faculty steering committee.

### Student Aid

A limited number of partial scholarships are available for students in the program.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[QUALITY AND MANUFACTURING MANAGEMENT \(QMM\) course list](#)

*Only students enrolled in the M.M.M. degree program may take the 500- and 800-level courses.*

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/24/04

Last updated by Publications: 8/20/09

## Rural Sociology (R SOC)

[Program Home Page](#)

ANN R. TICKAMYER, *Head of the Department of Agricultural Economics and Rural Sociology*  
103 Armsby Building  
814-865-5461

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Kathryn J. Brasier, Ph.D. (Wisconsin--Madison) Assistant Professor of Rural Sociology
- Gretchen T. Cornwell, Ph.D. (Penn State) Assistant Professor of Rural Sociology
- Leland L. Glenna, Ph.D. (Missouri) Assistant Professor of Rural Sociology, and Science, Technology, and Society
- Clare Hinrichs, Ph.D. (Cornell) Associate Professor of Rural Sociology
- Leif I. Jensen, Ph.D. (Wisconsin) Professor of Rural Sociology
- Albert E. Luloff, Ph.D. (Penn State) Professor of Rural Sociology
- Diane K. McLaughlin, Ph.D. (Penn State) Associate Professor of Rural Sociology
- Anouk Patel-Campillo, Ph.D. (Cornell) Assistant Professor of Rural Sociology
- Carolyn E. Sachs, Ph.D. (Kentucky) Professor of Rural Sociology
- Joan S. Thomson, Ph.D. (Wisconsin) Professor of Agricultural Communications
- Ann R. Tickamyer, Ph.D. (North Carolina, Chapel Hill) Professor of Rural Sociology
- James Van Horn, Ph.D. (Ohio State) Professor of Rural Sociology
- Fern K. Willits, Ph.D. (Penn State) Distinguished Professor of Rural Sociology

All degree programs emphasize a comprehensive understanding of the various facets of societal organization pertinent to the rural sector. While breadth is encouraged, areas of special interest and research include rural social change, community structure, population, rural community development, the structure of agriculture, natural resources, and the environment.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Prerequisites for the master's program include 3 credits in rural sociology or sociology, and additional credits in either field. If the entering student does not have these prerequisites, they must be made up at the University during the early part of the master's program.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Degree Requirements

All students are required to have training in sociological theory, statistics, and research methods.

There is no foreign language requirement for the Ph.D. degree; the student is expected to substitute such courses and instruction necessary to generate superior capabilities of inquiry into an analysis of basic and/or applied rural sociological problems.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[RURAL SOCIOLOGY \(R SOC\) course list](#)

### Dual-Title Degree in Rural Sociology (R SOC) and International Agriculture and Development (INTAD)

Graduate students with research and educational experiences in rural sociology may apply to the Rural Sociology/INTAD Dual-Title Master's Degree Program. The goal of the dual-title degree R SOC/INTAD degree program is to enable graduate students from R SOC to acquire the knowledge and skills of their major area of specialization in R SOC, while at the same time gaining the perspective and methods needed to work internationally. Graduate study in this program seeks to prepare students to assume leadership roles in professions in international agriculture and development requiring state-of-the-art methodological training, as well as of conceptual expertise in rural sociology and in one or more of R SOC's four signature areas: (1) agriculture and food systems, (2) community and international development, (3) natural resources and environment, (4) rural social demography.

This dual-title graduate degree program does not duplicate any other degree program at the University.

### Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Rural Sociology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, determined by the student, their INTAD advisor, and their Rural Sociology program advisor.

### Degree Requirements for R SOC/INTAD Dual Title M.S.

The Master's in Rural Sociology and INTAD is a dual-title degree awarded to students who are admitted to the Rural Sociology master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the Rural Sociology degree, dual-title degree students must:

### Courses

Complete a minimum of 12 INTAD course credits (400, 500, or 800 level) as follows:

9 credits from the core curriculum:

- Program Design and Delivery (AEE 450, 3 credits)
- Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
- International Agricultural Development Seminar (INTAD 820, 3 credits)



3 credits of internship or applied courses/ independent studies with international development content

### Master's Thesis & Final Oral Examination

Write a master's thesis on a topic that reflects both the graduate program in Rural Sociology and the dual-title offering in INTAD.

All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Candidates for the dual-title master's degree in R SOC and INTAD will also be required to pass a masters' thesis defense covering the general field of Rural Sociology and INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate major program requirements and those of the INTAD program. Students and advisors should maintain the INTAD Master's Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

### Degree Requirements for R SOC/INTAD Dual-Title Ph.D.

The doctoral degree in R SOC and INTAD is a dual-title degree awarded only to students who are admitted to the R SOC doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in R SOC and INTAD, in addition to the R SOC requirements, are as follows.

### Courses

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

9 credits from the core curriculum, which includes:

- International Agricultural Development Seminar (INTAD 820, 3 credits)
- International Rural Social Change (R SOC 517, 3 credits)
- Sociology of Agriculture (R SOC 508, 3 credits)
- OR
- Human Dimensions of Natural Resources (R SOC 555, 3 credits)

9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Courses totaling a minimum of 18 credits must be taken at the 500-level or above; particular courses may satisfy both the R SOC requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisors and their major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

### Candidacy

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student advisor in consultation with the INTAD program coordinators.

### Committee Composition

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

### Comprehensive Exam

Each Ph.D. candidate must pass a comprehensive (combined written and oral) examination in rural sociology, research methods and statistics, and two or more chosen areas of specialization. It is expected that one of these areas will be INTAD. A separate comprehensive examination is not required by the INTAD program, but the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive examination.

### Doctoral Thesis & Final Oral Examination

Ph.D. students enrolled in the dual-title degree program are required to write a doctoral thesis on a topic that reflects their original research and education in both Rural Sociology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. Upon completion of the student's doctoral thesis, a final oral examination is scheduled. The exam is administered by the student's doctoral committee and focuses on the student's thesis research. A public oral presentation of the dissertation is also required.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 or 899. Advanced undergraduate courses numbered between 400-499 may be used to meet some graduate degree requirements when taken by graduate students but courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-106

Review Date: 01/10/2012

Last updated by Publications: 7/23/10

## Recreation, Park, and Tourism Management (RPTM)

[Program Home Page](#)

GARRY CHICK, *Department Head, Recreation, Park, and Tourism Management*

DEBORAH KERSTETTER, *Professor-in-Charge*

801D Ford Building

814-863-8988

[debk@psu.edu](mailto:debk@psu.edu)

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Christine Buzinde, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Recreation, Park, and Tourism Management
- Linda L. Caldwell, Ph.D. (Maryland) Professor of Recreation, Park, and Tourism Management
- Garry Chick, Ph.D. (Pittsburgh) Professor of Recreation, Park, and Tourism Management
- John Dattilo, Ph.D. (Illinois, Urbana-Champaign) Professor of Recreation, Park, and Tourism Management
- Shawna Doerkson, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Recreation, Park, and Tourism Management
- Alan R. Graefe, Ph.D. (Texas A&M) Associate Professor of Recreation, Park, and Tourism Management
- Ben D. Hickerson, Ph.D. (North Carolina State) Assistant Professor of Recreation, Park, and Tourism Management
- Deborah L. Kerstetter, Ph.D. (Penn State), Professor of Recreation, Park, and Tourism Management
- Andrew J. Mowen, Ph.D. (Penn State), Associate Professor of Recreation, Park, and Tourism Management
- George Vahoviak, Ph.D. (Penn State) Affiliate Associate Professor of Recreation, Park, and Tourism Management; Program Director, Shaver's Creek Center
- Careen Yarnal, Ph.D. (Penn State), Associate Professor of Recreation, Park, and Tourism Management
- Harry C. Zinn, Ph.D. (Colorado State), Associate Professor of Recreation, Park, and Tourism Management

The graduate program is designed to prepare students for administrative, supervisory, research, and teaching positions in public and private recreation and park systems, in colleges and universities, in voluntary agencies and institutions, and in commercial ventures.

The program is oriented to meet the specific needs and research interests of the candidate. Students may pursue interests in the community, including public park and recreation systems, voluntary agencies, and private commercial enterprises; tourism; institution and community-oriented therapeutic settings concerned with many different disabilities and utilizing a variety of activity modalities; park planning, resource management, interpretive services, outdoor education, and outdoor recreation services.

### Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission to the master's and doctoral programs. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission to the graduate program, a bachelor's or master's degree is required. Candidates from majors other than recreation and parks are welcome to apply; however, additional course work is required. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. All students must write a thesis.

### Degree Requirements

The master's program is designed for students who wish to continue their studies at the doctoral level at Penn State. Students who wish to pursue a Ph.D. degree but do not have an M.S. degree will complete a thesis and earn a master's degree in the process of working toward the doctorate.

The M.S. program requires a minimum of 30 graduate credits and a 3.00 (B) grade-point average for graduation. The master's degree must be completed within eight years from matriculation as a degree candidate.

The doctoral program builds on the master's program to achieve depth in scholarship and research. Students who have not completed a data-based thesis as part of their master's degree will be required to do so during the first three semesters as a doctoral student. The general requirements of the degree, sequentially, are (1) course work, (2) candidacy examination by the third semester,\* (3) comprehensive examination (written and oral), (4) thesis proposal presentation, and (5) final defense of thesis. Between the candidacy examination and completion of the degree program, a Ph.D. candidate must have attended Penn State in residence a minimum of two semesters over a twelve-month period. (This may include the semester in which the candidacy exam is taken.) Students have a limit of eight years after candidacy to complete the doctoral program. A 3.00 (B) average is required for graduation.

Prerequisites for graduate students who do not have an undergraduate degree in RPTM typically range from 3 to 9 credits, depending on the student's background and experience. Prerequisites for incoming graduate students with undergraduate majors in RPTM range from 0 to 6 credits. Incoming graduate students with undergraduate degrees in Recreation, Park, and Tourism Management from Penn State are assumed to have met all prerequisite requirements. The graduate program director determines prerequisites for all incoming students.

\*The master's thesis and oral defense may be used for the candidacy examination for continuing students.

### Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[RECREATION, PARK AND TOURISM MANAGEMENT \(RPTM\) course list](#)

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/21/04

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-07-448

Review Date: 6/12/07

Faculty updated: 7/9/13

## Russian and Comparative Literature

B. RICHARD PAGE, *Associate Professor of German and Linguistics; Head, Department of Germanic and Slavic Languages and Literatures*  
427 Burrowes Building  
814-865-5481

CAROLINE D. ECKHARDT, *Head, Department of Comparative Literature*  
427 Burrowes Building  
814-863-0589

### Degree Conferred:

M.A. in Russian and Comparative Literature

The Department of Germanic and Slavic Languages and Literatures and the Department of Comparative Literature offer a joint master's degree in Russian and Comparative Literature. The program enables students to concentrate in Russian literature at the graduate level while having the advantages of a comparative context. Students completing this M.A. will acquire an in-depth understanding of Russian literature and culture and will be proficient in Russian and one other foreign language. Graduates should be prepared for service with the U.S. government or an international corporation, or to continue graduate study either in Russian or comparative literature.

### Admission Requirements

Requirements listed here are in addition to the general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*. Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. Scores from the Graduate Record Examination (GRE) are required. It is expected that students entering this degree program will have proficiency in Russian language and will have completed the B.A. in Russian or Comparative Literature. Students in other humanistic fields such as philosophy or history who have studied some literature and are proficient in Russian are welcome to apply.

### Master's Degree Requirements

Candidates for the M.A. degree must earn a minimum of 33 credits of which at least 18 must be at the 500 level. Required courses in Russian include RUS 530 (Seminar in Nineteenth-Century Russian Literature), RUS 525 (Pushkin), and RUS 560 (History of the Russian Language) or RUS 542 (Seminar in Russian Literature in the Twentieth Century) plus an additional 6 credits. Required courses in comparative literature include CMLIT 501 plus an additional 12 credits in comparative literature. Also required are an additional 3 credits in Russian, comparative literature, or another approved area; passing of a proficiency examination in Russian; demonstration of reading knowledge of one other foreign language; and the completion of an acceptable M.A. paper.

### Student Aid

A number of teaching assistantships are available in the Departments of Comparative Literature and Germanic and Slavic Languages and Literatures for students taking advanced degrees in these disciplines. There is also a graduate assistant position for an editorial assistant. See also the fellowships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Last updated by Publications: 8/20/09

## School Psychology (S PSY)

[Program Home Page](#)

JAMES C. DiPERNA, *Program Coordinator*

105 CEDAR Building  
814-863-2405  
[icd12@psu.edu](mailto:icd12@psu.edu)

### Degrees Conferred:

Ph.D., M.S., M.Ed.

### The Graduate Faculty

- Teresa Clark, Ph.D. (Michigan State) Assistant Professor of Education
- James C. DiPerna, Ph.D. (Wisconsin) Associate Professor of Education
- Robert L. Hale, Ph.D. (Nebraska) Professor of Education
- Diane K. McLaughlin, Ph.D. (Penn State) Professor of Rural Sociology and Demography
- Bonnie J. F. Meyer, Ph.D. (Cornell) Professor of Educational Psychology
- Barbara A. Schaefer, Ph.D. (Pennsylvania) Associate Professor of Education
- Beverly J. Vandiver, Ph.D. (Ball State) Associate Professor of Education
- Shirley A. Woika, Ph.D. (Penn State) Associate Professor of Education

This intercollege program is based primarily on courses in educational psychology, psychology, and special education. In addition, courses are often drawn from counselor education, human development and family studies, educational theory and policy, educational administration, and curriculum and instruction. The objective is to develop a psychologist capable of providing health care who is interested in and knowledgeable about education and psychology in the school setting. The school psychologist must utilize professional skill and knowledge about children and youth to make contributions that are meaningful to and utilized by teachers, other school personnel, and parents. The development of competencies needed by a fully qualified school psychologist requires at least the education represented by a doctoral degree.

Practicum facilities, in addition to those in nearby public schools, include the Center for Educational Diagnosis and Remediation, the School Psychology Clinic, the Communication Disorders Clinic, the Reading Center, and the Psychology Clinic. Facilities for work with children are also available through other academic units, as well as through assistantship assignments.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Only those students who anticipate a doctoral degree will be admitted. Students are selected within the limitations of program facilities. Priority is given to applicants with work experience with children.

An undergraduate major emphasizing work in psychology and/or education is preferred, but students with fewer than 20 upper-division credits in psychology, educational psychology, or special education may be admitted with limited deficiencies to be fulfilled concurrently with their graduate work. Requirements for admission include a minimum of one-third of graduate credits of A quality; undergraduate GPA of B or higher; satisfactory recommendations from two or more professors, preferably psychologists; and a score of 1000 or higher on the two general sections or a score of 1500 or higher, including the analytical or an advanced test, of the Graduate Record Examination. Exceptions may be made for students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

Students entering the program with a bachelor's degree complete the M.S. as prescribed by the Graduate School.

Students qualifying for a certificate to practice in the schools must meet standards specified by the Pennsylvania Department of Education. These include, but are not limited to, a master's degree, about 60 graduate credits, practicum experiences, and successful completion of precertification tests.

### Doctoral Degree Requirements

Students may be admitted with a master's degree from school psychology programs from other institutions or from related programs in this or other universities. The doctoral program includes a predissertation research requirement; the core program described here (which qualifies the candidate for a school psychology certificate); a special proficiency of 6 to 18 credits; an internship; and a dissertation.

Students completing the School Psychology Core Program will have courses in the biological bases of behavior, the cognitive bases of behavior, the social bases of behavior, personality theory or abnormal psychology, human development, professional ethics and standards, research design and methodology, statistics, psychometrics, counseling theory, educational foundations, educational administration, the education of exceptional children, and curriculum.

### Other Relevant Information

The program has been accredited by the American Psychological Association, the National Commission for Accreditation in Teacher Education (NASP), and the Pennsylvania Department of Education.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[SCHOOL PSYCHOLOGY \(S PSY\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/12/04

Faculty updated: 11/27/12

## Supply Chain Management (SCM)

Department of Supply Chain and Information Systems, via Penn State Online

[Program Home Page](#)

JOHN E. TYWORTH, *Chair*  
 Department of Supply Chain and Information Systems  
 454B Business Building  
 814-865-1866  
[jet@psu.edu](mailto:jet@psu.edu)

GARY L. GITTINGS, *Director*  
 Master of Professional Studies in Supply Chain Management Program  
 440 Business Building  
 814-865-1875  
[glg@psu.edu](mailto:glg@psu.edu)

### Degrees Conferred:

M.P.S., S.C.M.

### The Graduate Faculty

- Norman A. Aggon, M.B.A. (James Madison) Instructor of Operations and Supply Chain Management; Assistant Department Chair
- Francis (Frank) L. Chelko, M.M.M. (Penn State) Instructor of Operations and Supply Chain Management
- Gary L. Gittings, Ph.D. (Penn State) Instructor of Supply Chain Management
- Daniel Guide, Ph.D. (Georgia) Associate Professor of Operations and Supply Chain Management
- Terry P. Harrison, Ph.D. (Tennessee) Professor of Supply Chain and Information Systems
- C. John Langley, Ph.D. (Penn State) Clinical Professor of Supply Chain Management
- Douglas J. Thomas, Ph.D. (Georgia Tech) Associate Professor of Supply Chain Management
- Evelyn A. Thomchick, Ph.D. (Clemson) Associate Professor of Supply Chain Management
- John E. Tyworth, Ph.D. (Oregon) Professor of Supply Chain Management

The Master of Professional Studies in Supply Chain Management (MPS/SCM) is awarded to students who demonstrate mastery of the knowledge, problem-solving competencies, and leadership skills that are critical to leading business transformation through integrated supply chain planning and execution. The program emphasizes problem-based learning coupled with integrative, collaborative learning experiences to develop the requisite knowledge, skills, and abilities for effective supply chain management. Instruction is delivered on line and in a short course at an on- or off-campus location, so that working professionals will complete the degree as part-time students working largely or entirely, off campus.

### Admission Requirements

Students applying to the professional MPS/SCM degree program must be admitted by both the MPS/SCM program and the Graduate School at The Pennsylvania State University. The Graduate School requires applicants to have earned a baccalaureate degree from a regionally accredited institution earned under residence and credit conditions substantially equivalent to those required by Penn State. Applicants whose first language is not English or who have received a baccalaureate or master's degree from an institution in which the language of instruction is not English must take either the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) module and submit the results of that test with the application for admission. The TOEFL test is offered in different formats depending on location. A score of at least 600 on the paper-based TOEFL or 250 on the computer-based TOEFL must be attained. A minimum total score of 80, along with a minimum score of 23 on the speaking portion, is required for the Internet-based test (iBT). Information about the TOEFL can be obtained by writing to the Educational Testing Service, Box 6155, Princeton, NJ 08541-6155 or visiting their web site at [www.toefl.org](http://www.toefl.org). Alternatively, a minimum composite score of 6.5 on the IELTS test is required for admission. Information about the IELTS can be obtained by contacting IELTS International, 100 East Corson Street, Suite 200, Pasadena, CA 91103 or visiting its Web site at [www.ielts.org](http://www.ielts.org).

Additionally, the graduate program in Supply Chain Management requires:

- A completed application for graduate study, including Graduate School application fee
- A current resume, along with a statement of professional experience and goals. This statement of approximately two pages must describe the applicant's professional goals, experience, and responsibilities. The statement must also indicate why the applicant is applying to the professional MPS/SCM program at Penn State
- One letter of recommendation relevant to the applicant's professional capabilities, such as preferably from the employee's immediate supervisor, which should address the applicant's readiness for graduate study
- Official transcripts from all completed graduate and undergraduate coursework
- An undergraduate GPA of at least 3.0, or grade average of "B": or better in graduate courses completed since the first bachelor's degree, with at least 6 credits of graduate courses completed to qualify under this option
- Official Graduate Management Admission Test scores reported directly from the testing center to Penn State

A committee consisting of three SC&IS Department faculty meet once annually to review applications and identify applicants qualified for admission. Admissions decisions are based on a review of a complete admission portfolio, including an application, the statement of professional experience and goals, a current resume, official transcripts from each undergraduate and graduate institution attended, the letter of recommendation, and GMAT scores. An applicant's credentials are compared to the standards set by other candidates in the current application pool. Approved applicants are admitted in time to enroll for the fall semester offerings that begin in early August.

### Degree Requirements

Students earn the professional MPS/SCM degree by successfully completing 30 graduate credits in supply chain management courses and a high-quality professional paper as a culminating experience. All MPS/SCM credits must be earned in courses at the 500 level or above, including at least 6 credits at the 500 level. The professional paper demonstrates the student's ability to apply advanced supply chain management knowledge to a supply chain-related problem or situation in a way that makes a substantial contribution to the student's professional development. The program requires a cumulative grade point average of at least 3.00 and no course grade below a C. All requirements for the professional MPS/SCM degree, including acceptance of the professional paper, must be met within four years of admission to degree status. Students are expected to make continuous progress toward the degree. Leaves of absence, however, may be granted under exceptional circumstances on a case-by-case basis.

A maximum of 10 credits of high-quality graduate work completed at other accredited institutions may be applied toward the requirements for the professional MPS/SCM degree. However, credits earned to complete a previously completed professional or academic postbaccalaureate degree, whether at Penn State or elsewhere, may not be applied to a second postbaccalaureate degree program at Penn State. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser or program and the Graduate School. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of an accredited university.

### Prescribed Courses

SUPPLY CHAIN MANAGEMENT (SCM)  
 530. Supply Chain Analysis (3)  
 594. Research Topics (3)  
 800. Supply Chain Management (4)

810. Transportation and Distribution (4)  
820. Strategic Procurement (4)  
840. Supply Chain Project Management (4)  
850. Supply Chain Design and Strategy (4)  
860. Supply Chain Transformation and Innovation (4)

### **Student Aid**

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[SUPPLY CHAIN MANAGEMENT \(SCM\) course list](#) Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-06-541

Review Date: 4/10/07

Faculty updated: 4/26/12

## Sociology (SOC)

[Program Home Page](#)

JOHN ICELAND, *Head of the Department of Sociology, and Crime, Law, and Justice*  
211 Oswald Tower  
814-863-8260

### Degrees Conferred:

M.A., Ph.D.

### The Graduate Faculty

- Duane Alwin, Ph.D. (Wisconsin) McCourtney Professor of Sociology, Demography, and Human Development and Family Studies
- Paul Amato, Ph.D. (James Cook, Australia) Professor of Sociology and Demography
- Roy L. Austin, Ph.D. (Washington) Associate Professor of Sociology and Justice
- Alan A. Block, Ph.D. (California, Los Angeles) Professor of Crime, Law, and Justice, and Jewish Studies
- Alan Booth, Ph.D. (Nebraska) Distinguished Professor Emeritus of Sociology, Human Development, and Demography
- Richard Bord, Ph.D. (Iowa) Professor Emeritus of Sociology
- Lori Burrington, Ph.D. (Ohio State) Assistant Professor of Crime, Law, and Justice
- Frank Clemente, Ph.D. (Tennessee) Professor of Sociology
- Stephen R. Couch, Ph.D. (SUNY) Professor of Sociology
- Gordon F. De Jong, Ph.D. (Kentucky) Distinguished Professor of Sociology and Demography; Director, Graduate Program in Demography
- Francis Doodoo, Ph.D. (Pennsylvania) Professor of Sociology and Demography
- James Eisenstein, Ph.D. (Yale) Professor Emeritus of Political Science and Crime, Law, and Justice
- Richard Felson, Ph.D. (Indiana) Professor of Crime, Law, and Justice, and Sociology
- Roger Finke, Ph.D. (Washington) Professor of Sociology and Religious Studies
- Glenn Firebaugh, Ph.D. (Indiana) Professor of Sociology and Demography
- Michelle Frisco, Ph.D. (Texas) Assistant Professor of Sociology and Demography
- Emily Greenman, Ph.D. (Michigan) Assistant Professor of Sociology
- Melissa Hardy, Ph.D. (Indiana) Distinguished Professor of Human Development and Family Studies, Sociology, and Demography
- Michael Hecht, Ph.D. (Illinois) Distinguished Professor of Speech Communication, and Crime, Law, and Justice
- Julie Horney, Ph.D. (California, San Diego) Professor of Crime, Law, and Justice; Graduate Officer
- Craig Humphrey, Ph.D. (Brown) Professor Emeritus of Sociology
- John Iceland, Ph.D. (Brown) Professor of Sociology and Demography
- David R. Johnson, Ph.D. (Vanderbilt) Professor of Sociology, and Human Development and Family Studies; Director, Survey Research Center
- Kurt Johnson, Ph.D. (Nebraska) Research Associate, Social Science Research Institute
- Michael P. Johnson, Ph.D. (Michigan) Professor Emeritus of Sociology, Women's Studies, and African and African American Studies
- Valarie King, Ph.D. (Pennsylvania) Associate Professor of Sociology, Demography, and Human Development and Family Studies
- John H. Kramer, Ph.D. (Iowa) Professor of Sociology, and Crime, Law, and Justice
- Derek Kreager, Ph.D. (Washington) Assistant Professor of Crime, Law, and Justice
- Nancy S. Landale, Ph.D. (Washington) Professor of Sociology and Demography
- Barrett A. Lee, Ph.D. (Washington) Professor of Sociology and Demography
- Doris MacKenzie, Ph.D. (Penn State) Professor of Crime, Law, and Justice
- Molly Martin, Ph.D. (Wisconsin) Assistant Professor of Sociology and Demography
- Michael Massoglia, Ph.D. (Minnesota) Assistant Professor of Crime, Law, and Justice
- Jennifer Mastroski, Ph.D. (Penn State) Associate Professor of Administration of Justice
- Stephen Matthews, Ph.D. (Wales) Associate Professor of Sociology, Anthropology, and Demography
- John D. McCarthy, Ph.D. (Oregon) Professor of Sociology
- Hart Nelsen, Ph.D. (Vanderbilt) Professor Emeritus of Sociology
- R. Salvador Oropesa, Ph.D. (Washington) Professor of Sociology and Demography
- D. Wayne Osgood, Ph.D. (Colorado) Professor of Crime, Law, and Justice, and Sociology
- William Parsonage, Ph.D. (South Dakota) Professor Emeritus of Crime, Law, and Justice
- Evelyn Patterson, Ph.D. (Pennsylvania) Assistant Professor of Crime, Law, and Justice, Sociology, and Demography
- Roland Pellegrin, Ph.D. (North Carolina) Professor Emeritus of Sociology
- Eric Plutzer, Ph.D. (Washington-St. Louis) Associate Professor of Political Science and Sociology
- Suet-Ling Pong, Ph.D. (Chicago) Associate Professor of Education and Sociology
- Richard Ritti, Ph.D. (Cornell) Professor Emeritus of Crime, Law, and Justice
- R. Barry Ruback, Ph.D. (Pittsburgh) Professor of Crime, Law, and Justice, and Sociology
- Eric Silver, Ph.D. (SUNY, Albany) Associate Professor of Crime, Law, and Justice, and Sociology
- Graham B. Spanier, Ph.D. (Northwestern) Professor of Human Development, Sociology, and Family, and Community Medicine
- Jeremy Staff, Ph.D. (Minnesota) Assistant Professor of Crime, Law, and Justice, and Sociology
- Darrell J. Steffensmeier, Ph.D. (Iowa) Professor of Sociology and Crime, Law, and Justice
- C. Shannon Stokes, Ph.D. (Kentucky) Professor of Rural Sociology, Sociology, and Demography
- Marylee C. Taylor, Ph.D. (Harvard) Associate Professor of Sociology
- George Theodorson, Ph.D. (Cornell) Professor Emeritus of Sociology
- Kevin J. A. Thomas, Ph.D., (Pennsylvania) Assistant Professor of African and African American Studies, Sociology, and Demography
- Jenny Trinitapoli (Texas) Assistant Professor of Sociology, Demography, and Religious Studies
- Jeffery T. Ulmer, Ph.D. (Penn State) Associate Professor of Crime, Law, and Justice, and Sociology
- Jennifer Van Hook, Ph.D. (Texas) Associate Professor of Sociology and Demography
- Edward Walsh, Ph.D. (Michigan) Professor Emeritus of Crime, Law, and Justice
- Susan Welch, Ph.D. (Illinois) Professor of Political Science and Crime, Law, and Justice

The graduate program in Sociology offers advanced education for students who intend to pursue academic careers in sociology or who aspire to nonacademic research positions.

The M.A. and Ph.D. programs provide training in general social theory, research methodology, statistics, and a number of traditional and developing substantive specialties. In consultation with faculty advisers, students select two specialties that are among the department's strengths, such as classical and contemporary theory; community and environment; demography; family, life course, and aging; quantitative methods; social psychology; and stratification and social change.

Alternate specialty areas not listed above may be selected as the major or the minor, with the approval of the graduate committee. Students may elect to pursue a dual-title degree in Sociology and Demography. For details, refer to the Demography program description. A separate Ph.D. program in Crime, Law, and Justice is also housed within the department. Please see the CLJ program description for details.

All students who intend to pursue doctoral work are expected to earn an M.A. degree in their normal progress to the Ph.D.

Course work outside the department is encouraged. Areas of study related to sociology, such as rural sociology, geography, economics, business administration, statistics, cultural anthropology, political science, and human development and family studies are available at the University.

Special department-related research and training facilities include on-site computer laboratories and the Social Science Research Center, the Population Research Institute, the Center for Research on Crime and Justice, and the Pennsylvania Commission on Sentencing. Additional University facilities used by sociology faculty and graduate students include the Computation Center (containing information about the extensive databases provided through the Inter-University Consortium for Political and Social Research) and the Gerontology Center.

## Admission Requirements

Applications will be accepted through January 1 for fall admission the following year. Selection is based on undergraduate grades (and where applicable, record of previous graduate work); letters of recommendation; statement of purpose; a sample of written work, such as a term paper; and Graduate Record ExaminationS (GRE) verbal and quantitative scores. The best-qualified applicants will be accepted up to the number of spaces available. Students with limited prior training in sociology may be accepted, with the provision that they make up background deficiencies in the early part of their graduate program.

## Degree Requirements

Required courses for the M.A. include a two-semester proseminar, one seminar each in research methods and social theory, and two seminars in social statistics. Students complete an M.A. thesis during their second year of the program.

A candidacy examination is required of all students seeking the Ph.D. This evaluation by the departmental Graduate Committee is based on the student's seminar papers, research proposal, and record of course performance and on faculty assessments of the student's ability to complete a high-quality Ph.D. program. For those admitted to the Ph.D. candidacy, a lab in teaching sociology is required, along with substantive courses in the student's major and minor areas of concentration. A comprehensive examination must be passed before the period of intensive dissertation research begins.

The Department of Sociology has no formal foreign language or communication requirement. However, students are encouraged to pursue additional training in statistics, computer science, foreign language, technical writing, specialized methods, or specialized theory that will further dissertation and career plans.

## Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, teaching assistantships support many students admitted to the program. Research assistantships also are available to qualified students through individual faculty members' grants and contracts. A number of federal agencies also offer fellowships for graduate study in sociology.

## Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[SOCIOLOGY \(SOC\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Last updated by Publications: 12/2/11



## Soil Science (SOILS)

### [Program Home Page](#)

D. M. SYLVIA, *Head of the Department of Crop and Soil Sciences*  
116 Agricultural Sciences and Industries Building  
814-865-2025

R. C. STEHOUWER, *Chair of the Graduate Program in Soil Science*  
417 Agricultural Sciences & Industries Building  
814-863-7640

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Douglas B. Beegle, Ph.D. (Penn State) Professor of Agronomy
- Mary Ann Bruns, Ph.D. (Michigan) Assistant Professor of Soil Microbial Ecology
- Ray B. Bryant, Ph.D. (Purdue) Adjunct Professor of Soil Science
- Edward J. Ciolkosz, Ph.D. (Wisconsin) Professor of Soil Genesis and Morphology
- Rick L. Day, Ph.D. (Penn State) Associate Professor of Science and Environmental Information Systems
- Jerzy Dec, Ph.D. (Warsaw, Poland) Research Associate
- Curtis J. Dell, Ph.D. (Kent State) Adjunct Assistant Professor of Soil Science
- Patrick J. Drohan, Ph.D. (Penn State) Assistant Professor of Pedology
- Sjoerd W. Duiker, Ph.D. (Ohio State) Associate Professor of Soil Management and Applied Soil Physics
- William E. Easterling, Ph.D. (UNC, Chapel Hill) Professor of Geography and Agronomy
- Daniel D. Fritton, Ph.D. (Iowa State) Professor of Soil Physics
- Peter J. A. Kleinman, Ph.D. (Cornell) Adjunct Assistant Professor of Soil Science
- Sridhar Komarneni, Ph.D. (Wisconsin) Professor of Clay Mineralogy
- Hangsheng Lin, Ph.D. (Texas A&M) Associate Professor of Hydropedology/Soil Hydrology
- Carmen Enid Martinez, Ph.D. (Rutgers) Assistant Professor of Environmental Soil Chemistry
- Andrew S. McNitt, Ph.D. (Penn State) Assistant Professor of Turfgrass Science
- Gary W. Petersen, Ph.D. (Wisconsin) Distinguished Professor of Soil and Land Resources
- Andrew S. Rogowski, Ph.D. (Iowa State) Adjunct Professor of Soil Physics
- Maxim J. Schlossberg, Ph.D. (Georgia) Assistant Professor of Turfgrass Nutrition and Soil Fertility
- Andrew N. Sharpley, Ph.D. (Massey, New Zealand) Adjunct Professor of Soil Science
- Richard C. Stehouwer, Ph.D. (Ohio State) Assistant Professor of Environmental Soil Science
- David M. Sylvia, Ph.D. (Cornell) Professor of Soil Microbiology
- John E. (Jack) Watson, Ph.D. (Arizona) Professor of Soil Science
- Ann M. Wolf, Ph.D. (Penn State) Affiliate Assistant Professor of Soil Science

The Soil Science program is administered in the Department of Crop and Soil Sciences, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Soil Science including: soil genesis, soil classification, soil morphology, soil mapping, soil physics, soil chemistry, soil mineralogy, soil microbiology, soil fertility, soil conservation, geographic information systems, computer mapping, watershed analysis, soil hydrology, soil and water management, resource inventory and assessment, remote sensing, land evaluation, land waste disposal, and land management.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission. At the discretion of the graduate standards committee, a student may be admitted provisionally for graduate study in the program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Prerequisites for major work in Soil Science vary with the area of specialization and the degree sought, but courses in chemistry, mathematics, physics, geology, basic and applied biological sciences, and English communication skills are required. Applicants for the M.S. degree should have a baccalaureate degree including 76 credits of basic and applied natural sciences. Admission to the Ph.D. program usually requires an M.S. or equivalent degree with a minimum cumulative grade-point average of 3.25 (on a 4.00 scale). Applicants for the Ph.D. program will be evaluated on the quality of work completed in all previous degree programs. Students who lack some of the prerequisite courses may be admitted but are required to take these courses without degree credit. The best-qualified applicants will be accepted up to the number of spaces available for new students.

### Master's Degree Requirements

In addition to the general requirements for the M.S. degree as defined by the Graduate School, the department requires 12 credits of 400- or 500-level formal courses in the major field of which 6 must be 500-level. Participation in at least one colloquium course each semester is required and students must complete at least 1 credit of colloquium (SOILS 590), as well as 1 credit of Teaching Experience (SOILS 602). An advisory committee will be appointed for each student and additional courses and requirements may be determined by this advisory committee.

A thesis based on field or laboratory research is required for the M.S. degree. M.S. candidates must pass a final examination.

### Doctoral Degree Requirements

Beyond the general requirements for the Ph.D. defined by the Graduate School, the department has a number of specific requirements regarding course level and distribution that are defined in the departmental publication "Graduate Degrees in Soil Science." While a minimum number of courses for the degree is not specified, the doctoral advisory committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of Soil Science and to have a perspective of the general field. Normally, 55 to 60 credits in formal course work beyond the B.S. degree are required.

Doctoral candidates are required to participate regularly in a departmental colloquium and to register for at least 2 credits of Colloquium (SOILS 590) during the Ph.D. program. A teaching experience, consisting of two separate semesters, is also required of all Ph.D. students.

The communication and foreign language requirement for the Ph.D. degree may be met either by demonstrating a knowledge of at least one foreign language or by completing at least 6 credits of course work in an area of English communications approved by the student's advisory committee.

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of

biogeochemistry is required.

**Other Relevant Information**

Every student has a close professional relationship with his or her faculty adviser. While research that is done for the thesis will be on subjects that fall within the ongoing research program of the adviser, students are encouraged to propose research projects that are of interest to them. For the most part, all costs relative to the research program will be covered by the department. The department encourages professional development of students through participation in meetings of relevant professional societies and organizations.

**Student Aid**

Graduate assistantships and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[SOIL SCIENCE \(SOILS\) course list](#)

DATE LAST REVIEWED: 5/11/04

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185F

Review Date: 4/15/08

Faculty updated: 7/31/12

## Spanish (SPAN)

[Program Home Page](#)

HENRY J. GERFEN, *Head of the Department of Spanish, Italian, and Portuguese*  
237 Burrowes Building  
814-865-4252

### Degrees Conferred:

Ph.D., M.A.  
Dual-Title Graduate Degree in Spanish and Language Science

### The Graduate Faculty

- Mary E. Barnard, Ph.D. (Michigan) Associate Professor of Spanish and Comparative Literature
- William R. Blue, Ph.D. (Penn State) Professor of Spanish
- Paola G. Dussias, Ph.D. (Arizona) Associate Professor of Spanish, Linguistics, and Psychology
- Nicolas Fernandez-Medina, Ph.D. (Stanford) Assistant Professor of Spanish
- Henry J. Gerfen, Ph.D. (Arizona) Associate Professor of Linguistics and Spanish Linguistics
- Marie Speicher, Ph.D. (Penn State) Senior Lecturer in Spanish
- Julia Cuervo Hewitt, Ph.D. (Vanderbilt) Associate Professor of Spanish and Portuguese
- James P. Lantolf, Ph.D. (Penn State) Professor of Spanish and Applied Linguistics
- John M. Lipski, Ph.D. (Alberta) Edwin Erle Sparks Professor of Spanish
- Matthew Marr, Ph.D. (Virginia) Assistant Professor of Spanish
- Guadalupe Martí-Peña, Ph.D. (Washington) Assistant Professor of Spanish
- Sophia McClennen, Ph.D. (Duke) Associate Professor of Comparative Literature, Spanish, and Women's Studies
- John Ochoa, Ph.D. (Yale) Associate Professor of Spanish and Comparative Literature
- Laurence E. Prescott, Ph.D. (Indiana) Associate Professor of Spanish and African/African American Studies
- Sherry Roush, Ph.D. (Yale) Associate Professor of Italian
- Nuria Sagarra, Ph.D. (Illinois) Assistant Professor of Spanish and Applied Linguistics
- Maria R. Truglio, Ph.D. (Yale) Associate Professor of Italian

The program offers M.A. options in literature and linguistics, as well as doctoral emphasis in either of these two areas.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required of all students educated (high school and college) in the continental United States. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The minimum requirement for admission normally will be 24 credits of post intermediate work in Spanish language and literature.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

### Degree Requirements

A candidate for the M.A. degree must take a minimum of 30 credits at the graduate level including 6 credits in a related minor field. An M.A. essay and a comprehensive written examination also are required. The M.A. degree (or equivalent) is normally a prerequisite to doctoral candidacy.

For the Ph.D. degree, a student must complete at least 60 credits (including M.A. credits) of graduate-level work, including a 15-credit minor. Other requirements include (1) a doctoral candidacy examination and written area examinations; (2) reading knowledge of two foreign languages or a comprehensive knowledge of one foreign language; and (3) a doctoral dissertation.

### Dual-Title Graduate Degree in Spanish and Language Science

Graduate students with research and educational interests in Spanish may apply to the Spanish and Language Science Dual-Title Degree Program. The goal of the dual-title Spanish and Language Science is to enable graduate students from Spanish to acquire the knowledge and skills of their major area of specialization in Linguistics while at the same time gaining depth and methodological expertise in the areas associated with the language sciences.

### Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through the Department of Spanish, Italian and Portuguese (see above for admission requirements for the Graduate Program in Spanish). Upon admission to the Spanish Program and with a recommendation from a Language Science program faculty member in the Department of Spanish, Italian and Portuguese, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

### Requirements for the Dual-Title Ph.D. Degree in Spanish and Language Science

The doctoral degree in Spanish and Language Science is awarded only to students who are admitted to the Spanish doctoral program and admitted to the dual-title degree in Language Science. The minimum course requirements for the dual-title Ph.D. degree in the Spanish and Language Science, in addition to the Spanish Program requirements, are described below.

#### Spanish/Language Science Proposed Requirements

Total number of required credits: 60

The minimum course requirements for the dual-title Ph.D. degree in Spanish and Language Science, in addition to the Spanish Program requirements, are as follows:

- Language Science proseminar courses (LING 521 and LING 522; 6 credits)
- Research Methods/Statistics (LING 525 or equivalent; 3 credits)
- Theoretical Linguistics (LING 500 or LING 504; 3 credits)
- Cognitive Neuroscience or Psycholinguistics (LING/PSY 520, PSY 511 or equivalent; 3 credits)
- Research internships with two different Language Science faculty mentors (CSD 596, GER 596, LING 596, PSY 596, SPAN 596; 6 credits)

Particular courses may satisfy both the Spanish requirements and those in the Language Science program. Final course selection is determined by the student in consultation with the dual-title program advisors and the major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

The department awards annually an Edwin Erle Sparks Fellowship in the Humanities. In the past several years, graduate students have received external NSF fellowships and awards such as Doctoral Dissertation Research Improvement grants.

### **Courses**

\*SPAN 001G. ELEMENTARY SPANISH FOR GRADUATE STUDENTS (3)

\*SPAN 002G. ELEMENTARY SPANISH FOR GRADUATE STUDENTS (3)

\*No graduate credit given for this course.

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [SPANISH \(SPAN\) course list](#)

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-07-010

Review Date: 06/22/2010

Date last updated by Publications: 9/15/09

## Communication Arts and Sciences (CAS)

[Program Home Page](#)

THOMAS W. BENSON, *Head of the Department*  
234 Sparks Building  
814-865-3461

### Degrees Conferred:

Ph.D., M.A.

### The Graduate Faculty

- Deborah F. Atwater, Ph.D. (SUNY, Buffalo) Associate Professor Emerita of Communication Arts and Sciences, and African and African American Studies
- Thomas W. Benson, Ph.D. (Cornell) Edwin Erle Sparks Professor of Rhetoric
- Stephen H. Browne, Ph.D. (Wisconsin) Professor of Communication Arts and Sciences
- J. Louis Campbell III, Ph.D. (Minnesota) Associate Professor of Speech Communication
- James P. Dillard, Ph.D. (Michigan State) Professor of Communication Arts and Sciences
- Rosa Eberly, Ph.D. (Penn State) Associate Professor of Communication Arts and Sciences, and English
- Jeremy Engels, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of Communication Arts and Sciences
- Dennis S. Gouran, Ph.D. (Iowa) Professor of Communication Arts and Sciences, and Labor Studies and Industrial Relations
- Michael L. Hecht, Ph.D. (Illinois) Professor of Communication Arts and Sciences, and Crime, Law, and Justice
- J. Michael Hogan, Ph.D. (Wisconsin) Professor of Communication Arts and Sciences
- Lisa S. Hogan, Ph.D. (Indiana) Lecturer in Communication Arts and Sciences, and Women's Studies
- Christopher L. Johnstone, Ph.D. (Wisconsin) Associate Professor of Communication Arts and Sciences
- Tony M. Lentz, Ph.D. (Michigan) Assistant Professor of Communication Arts and Sciences
- Wayne J. McMullen, Ph.D. (Penn State) Associate Professor of Communication Arts and Sciences
- Michelle Miller-Day, Ph.D. (Arizona State) Associate Professor of Communication Arts and Sciences
- Mary K. Mino, Ph.D. (Penn State) Associate Professor of Communication Arts and Sciences
- Jon F. Nussbaum, Ph.D. (Purdue) Professor of Communication Arts and Sciences
- Mary Beth Oliver, Ph.D. (Wisconsin) Professor of Communications, and Communication Arts and Sciences
- Roxanne L. Parrott, Ph.D. (Arizona) Professor of Communication Arts and Sciences
- Rachel A. Smith, Ph.D. (Michigan State) Assistant Professor of Communication Arts and Sciences
- Denise Solomon, Ph.D. (Northwestern) Professor of Communication Arts and Sciences
- Judith L. Stephens, Ph.D. (Kent State) Professor of Humanities and Theatre
- S. Shyam Sundar, Ph.D. (Stanford) Distinguished Professor of Communications, and Communication Arts and Sciences
- Jane Sutton, Ph.D. (Colorado) Associate Professor of Communication Arts and Sciences
- Molly Wertheimer, Ph.D. (Penn State) Professor of Communication Arts and Sciences
- Nancy J. Wyatt, Ph.D. (Penn State) Associate Professor Emerita of Communication Arts and Sciences, and Women's Studies

Students may specialize in communication theory (communication sciences) or rhetoric (communication arts).

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The minimum undergraduate preparation is 12 credits in communication studies/speech communication. Students who cannot meet this requirement in full may be admitted but must make up their deficiencies without credit toward the graduate degree.

Additionally, students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. A student must have completed the master's degree before being admitted as a doctoral candidate.

### Master's Degree Requirements

Students pursuing the M.A. degree in Communication Arts and Sciences must schedule a review of their program of courses during the first year of residence and receive approval by a duly constituted advisory committee.

A total of 30 credits, including 6 for the master's thesis and at least 12 other 500-level credits, is required. Candidates must schedule a proposal meeting in which their research plan for their thesis is approved by their committee. They are also required to present an oral defense before their committee.

Although typically discouraged, students in unique circumstances may apply to complete a nonthesis track. Students must apply in advance for acceptance in the nonthesis track and additional course credits will be required, among other differences from the thesis track.

### Doctoral Degree Requirements

The communication and foreign language requirement for the Ph.D. degree may be satisfied by options selected from designated areas including, but not restricted to, foreign languages. Doctoral candidates must schedule a candidacy evaluation during their first year. Following completion of the language requirement and all courses from the program of study, doctoral candidates must take a comprehensive examination to determine their mastery and competence in the discipline of communication. After successful completion of the written and oral component of the comprehensive exam, doctoral candidates must schedule a proposal meeting at which the research plan for their dissertation is approved by their committee. Doctoral candidates must present a final oral defense of their dissertation before their committee.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

#### EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)

Available to beginning and continuing graduate students in one of the following graduate programs: Communication Arts and Sciences, Comparative Literature, English, French, German, History, Linguistics, Philosophy, and Spanish; stipend \$15,340 plus waiver of tuition. Apply to department before February 1.

### Dual-Title Ph.D. in Bioethics (BIOET)

Degree Conferred Students electing to pursue this program will earn a degree with a dual-title at the Ph.D. level, i.e. Ph.D. in CAS and Bioethics.

### Admission Requirements

Dual-title bioethics graduate students will first be admitted to their primary programs in accordance with the requirements stipulated by the Graduate School and the primary program. They will then be admitted to graduate study in the Bioethics program by an admissions committee consisting of faculty affiliated with the Bioethics program. Applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional

goals reflect an interest in interdisciplinary bioethics research. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

## Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the CAS program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their CAS and Bioethics advisors.

### Additional Required Coursework

Seven required credits (BIOET 501, BIOET 502, and BIOET 590). At least three additional BIOET credits at the 500 level.

Eight additional credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level.

### Courses Available to Fulfill Requirements

#### BIOETHICS Courses (BIOET)

- 501. PERSPECTIVES AND METHODS IN BIOETHICS (3)
- 502. PERSPECTIVES IN MACRO-BIOETHICS (3)
- 503. ETHICS AND THE RESPONSIBLE CONDUCT OF BIOMEDICAL RESEARCH (3)
- 590. BIOETHICS COLLOQUIUM (1)
- 594. RESEARCH TOPICS (1-15)
- 595. INTERNSHIP (1-3)
- 596. INDEPENDENT STUDY (1-9)
- 597. SPECIAL TOPICS IN BIOETHICS (1-9)

#### Elective Courses

The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. The list currently includes the following courses:

- ANTH/BIOL 460 HUMAN GENETICS (3)
- ANTH/BIOL 460H HUMAN GENETICS (4)
- ANTH 471H BIOLOGY, EVOLUTION AND SOCIETY (3)
- BB H 501 BIOBEHAVIORAL SYSTEMS IN HEALTH AND DEVELOPMENT: THEORY AND PROCESSES (3)
- BB H 504 BEHAVIORAL HEALTH INTERVENTION STRATEGIES (3)
- BB H 551 WORLD HEALTH PROMOTION (3)
- BMH 490 BIOETHICS AND MEDICAL HUMANITIES CAPSTONE (3)
- BMMB 509 ETHICS IN BIOMEDICAL SCIENCE (1)
- CAS 453 HEALTH COMMUNICATION THEORY AND RESEARCH (3)
- CAS 557 HEALTH COMMUNICATION (3)
- CAS 562 QUALITATIVE METHODS (3)
- FRNSC 561 ETHICS IN FORENSIC SCIENCE (1)
- H ADM 539 HEALTH SYSTEMS ORGANIZATION (3)
- H ADM 540 HEALTH ADMINISTRATIVE POLICY FORMULATION (3)
- H ADM 541 HEALTH ECONOMICS AND POLICY (3)
- H ADM 542 HEALTH CARE POLITICS AND POLICY (3)
- H ADM 543 LONG-TERM CARE ADMINISTRATION AND POLICY (3)
- H ADM 551 HEALTH CARE LAW (3)
- H P A 401 (IL) COMPARATIVE HEALTH SYSTEMS (3)
- H P A 510 HEALTH SERVICES FINANCING AND POLICY (3)
- H P A 511 RESEARCH SEMINAR ON HEALTH SERVICES FINANCING AND POLICY (3)
- H P A 520 INTRODUCTION TO HEALTH SERVICES ORGANIZATION AND DELIVERY (3)
- H P A 521 RESEARCH SEMINAR ON HEALTH SERVICES ORGANIZATION AND DELIVERY (3)
- H P A 540 EPIDEMIOLOGICAL APPLICATIONS IN HEALTH SERVICES RESEARCH (3)
- H P A 541 POVERTY, RACE, ETHNICITY AND CHILD HEALTH (3)
- H P A 545 INTRODUCTION TO HEALTH ECONOMICS (3)
- H P A 822 CLINICAL ISSUES FOR HEALTH SERVICES MANAGEMENT (3)
- H P A 836 HEALTH LAW (3)
- HLHED 516 EVALUATION OF HEALTH EDUCATION AND PROMOTION PROGRAMS (3)
- HLHED 552 CURRENT HEALTH EDUCATION ISSUES (3)
- HLHED 553 MULTICULTURAL HEALTH ISSUES (3)
- IBIOS 591 ETHICS IN THE LIFE SCIENCES (1)
- NURS 464 (US;IL) DYING AND DEATH (3)
- NURS 501 ISSUES IN NURSING AND HEALTH CARE (3)
- NURS 580 EPISTEMOLOGY OF NURSING SCIENCE (3)
- NURS 581 DEVELOPING THEORETICAL CONSTRUCTS RELEVANT TO NURSING (3)
- NURS 587 ETHICS IN NURSING RESEARCH (1)
- NUTR/S T S 430 (IL) GLOBAL FOOD STRATEGIES: PROBLEMS AND PROSPECTS FOR REDUCING WORLD HUNGER (3)
- PHIL 403 ENVIRONMENTAL ETHICS (3)
- PHIL 418 ETHICS (3)
- PHIL/STS 432: MEDICAL AND HEALTH CARE ETHICS (3)
- PHS 570 HEALTH ECONOMICS AND ECONOMIC EVALUATION (3)
- S T S 555 HUMAN DIMENSIONS OF NATURAL RESOURCES (3)
- S T S 589 ETHICS AND VALUES IN SCIENCE AND TECHNOLOGY (3)
- WMNST/BB H 458: CRITICAL ISSUES IN REPRODUCTION (3)

## Candidacy

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the CAS program. During the candidacy process, the student will also be assessed for candidacy to the Bioethics program, and at least one member of the candidacy committee must come from the Bioethics program. Faculty members who hold appointments in both programs may serve in a combined role.

## Committee Composition

In accordance with the Graduate Council's requirements, the doctoral committee shall contain at least four members. At least one of the committee members must be a faculty-member affiliated with the Bioethics Program, but graduate students are encouraged to have a second committee member so qualified. Faculty members who hold appointments in both programs may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the Bioethics Program must be designated as co-chair of the committee. The Bioethics program representative(s) will be expected to participate in constructing and grading comprehensive examination questions that cover the secondary area of study. The outside member will be appointed in accordance with the Graduate School's Graduate Student Committee Procedures. The Graduate Council's current policy is that the Outside Member cannot have more than a 25% budgetary connection with either the graduate major program or the dual-title degree program.

## Comprehensive Exam

The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

**Dissertation and dissertation defense**

A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COMMUNICATION ARTS AND SCIENCES \(CAS\) course list](#)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-011

Review Date: 06/21/2011

Last updated by Publications: 8/20/09

## Special Education (SPLED)

[Program Home Page](#)

RICHARD M. KUBINA, Jr., *Program Coordinator*  
209 CEDAR Building  
814-863-2400  
[rmk11@psu.edu](mailto:rmk11@psu.edu)

### Degrees Conferred:

Ph.D., M.S., M.Ed.

### The Graduate Faculty

- Elizabeth Benedek-Wood, Ph.D. (Penn State) Assistant Professor of Education
- Douglas Dexter, Ph.D. (Penn State) Assistant Professor of Education
- Katie Hoffman, Ph.D. (Penn State) Assistant Professor of Education
- Charles A. Hughes, Ph.D. (Florida) Professor of Special Education
- Richard M. Kubina, Jr., Ph.D. (Ohio State) Professor of Education
- David Lee, Ph.D. (Purdue) Associate Professor of Special Education
- Linda Mason, Ph.D. (Maryland) Associate Professor of Special Education
- James K. McAfee, Ph.D. (Georgia State) Associate Professor of Special Education
- Kathleen M. McKinnon, Ph.D. (Pittsburgh) Associate Professor of Education
- David McNaughton, Ph.D. (Penn State) Professor of Education
- Paul L. Morgan, Ph.D. (Vanderbilt) Associate Professor of Education
- Paul J. Riccomini, Ph.D. (Penn State) Associate Professor of Education
- Kathy L. Ruhl, Ph.D. (Florida) Professor of Special Education
- Frank R. Rusch, Ph.D. (Washington U) Professor of Special Education
- Mary Catherine Scheeler, Ph.D. (Penn State) Associate Professor of Education
- Pamela S. Wolfe, Ph.D. (Virginia) Associate Professor of Special Education

Exceptional children are those who deviate so far from average in physical, intellectual, emotional, or social characteristics that they require highly specialized instruction and related services. The purpose of the M.Ed. program in Special Education is to prepare teachers of exceptional children. M.Ed. students are trained in behavior management and instructional design, implementation, and evaluation appropriate for effective work with children and youth who qualify for services for mental or physical disabilities at all age levels and degrees of severity. The purpose of the M.S. and Ph.D. programs is to prepare researchers and college and university teachers in areas encompassing the education of the children and youth who qualify for services for mental or physical disabilities. The former program is professional in nature; the latter two, academic.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) (verbal and quantitative) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Highest admission priorities are given to applicants who possess certification in special education or elementary education. Applicants for master's and doctoral programs must present evidence of superior academic achievement, complete a personal statement, present GRE verbal and quantitative test scores, and provide professional references. Minimum GPA for master's and doctoral applicants are, respectively, 3.00 for M.Ed. and M.S., and 3.50 for Ph.D. Minimum GRE test scores of master's and doctoral applicants, respectively, are (verbal and quantitative combined): 800 for M.Ed., 900 for M.S., and 1000 for Ph.D. Applicants for doctoral study must have had at least three years of relevant experience with special-needs children or youth. Applicants from foreign countries whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores. Exceptions to the admissions criteria may be made only for highly qualified students with special backgrounds, abilities, and interests.

### Master's Degree Requirements

Prerequisites for the M.Ed. program include 26 credits basic to the education of exceptional children (courses comparable to SPLED 401, SPLED 425, SPLED 454, and SPLED 495E). Of the 30 credits required for the M.Ed. degree, 6 must be taken from fields outside of special education; at least 18 must be taken in special education; and 18 credits must be taken at the 500 level. SPLED 411, SPLED 412, and SPLED 573 are required along with two practica: SPLED 595A and SPLED 595B. M.Ed. students must submit a master's paper. M.Ed. students must submit a master's paper and meet all of the eligibility criteria for Pennsylvania certification at the completion of their programs.

Of the 30 credits required for the M.S. degree, 6 must be taken from one discipline outside of education; 18 must be taken in special education; and 18 must be taken at the 500 level or above. SPLED 573 and EDPsy 400 are required as are 6 credits of thesis research, SPLED 600. M.S. students must submit a master's thesis and pass a comprehensive examination.

All requirements for either the M.Ed. or the M.S. degree must be met within six years or a period spanning seven consecutive summers.

### Doctoral Degree Requirements

The communication and foreign language requirement for the Ph.D. degree is prescribed by each student's committee. The requirements include the successful completion of a philosophy of science course (e.g., PHIL 421) and additional language and communication abilities such as foreign language competence, computer programming skills, expertise with alternative communication systems, research publication, etc. Minimum requirements for the Ph.D. degree include 24 credits of research methods; 18 credits in a cognate area such as psychology, sociology, or child development; and 36 credits in education. The student also must enroll in SPLED 500 each semester prior to successful completion of the comprehensive examinations. A candidacy examination is required no later than the second semester of full-time study; written and oral comprehensive examinations are required following the satisfactory completion of the language requirement. A student is required to complete the program within seven years from the date of acceptance as a candidate.

### Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following award typically has been available to graduate students in this program:

U.S. OFFICE OF EDUCATION ASSISTANTSHIPS OR TRAINEESHIPS IN SPECIAL EDUCATION. Open to graduate students being prepared as leadership personnel in special education; stipend varies, depending on conditions of existing grants. Other graduate assistantships also may be available. Apply to the Graduate Admissions Committee, 227 CEDAR Building.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[SPECIAL EDUCATION \(SPLED\) course list](#)



Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-028

Review Date: 06/12/2012

Faculty updated: 11/27/12

## Statistics (STAT)

[Program Home Page](#)

DAVID HUNTER, *Head of the Department*  
326 Thomas Building  
814-865-1348

### Degrees Conferred:

- [M.A.S.](#)
- [M.S., M.A.](#)
- [Ph.D.](#)
- [Integrated B.S. in Statistics and Master of Applied Statistics \(M.A.S.\)](#)

### The Graduate Faculty

- Michael G. Akritas, Ph.D. (Wisconsin) Professor of Statistics
- Naomi S. Altman, Ph.D. (Stanford) Associate Professor of Statistics
- Charles E. Antle, Ph.D. (Oklahoma State) Professor Emeritus of Statistics
- Steven F. Arnold, Ph.D. (Stanford) Professor of Statistics
- Gutti Jogesh Babu, Ph.D. (ISI-Calcutta, India) Professor of Statistics
- Jesse L. Barlow, Ph.D. (Northwestern) Professor of Computer Science and Engineering, and Statistics
- Ottar N. Bjørnstad, Ph.D. (Oslo, Norway) Professor of Biology, Entomology, and Statistics
- Marilyn T. Boswell, Ph.D. (California, Riverside) Associate Professor Emeritus of Statistics
- Francesca Chiaromonte, Ph.D. (Minnesota) Associate Professor of Statistics and Public Health Sciences
- Vernon M. Chinchilli, Ph.D. (North Carolina) Distinguished Professor of Biostatistics and Statistics
- Mosuk Chow, Ph.D. (Cornell) Associate Professor of Statistics; Senior Research Associate
- Linda M. Collins, Ph.D. (USC) Professor of Human Development and Family Studies, and Statistics
- Enrique del Castillo, Ph.D. (Arizona State) Associate Professor of Industrial Engineering and Statistics
- Manfred Denker, Ph.D. (Nürnberg) Professor of Statistics and Mathematics
- Eric D. Feigelson, Ph.D. (Harvard) Professor of Astronomy and Astrophysics
- Duncan Fong, Ph.D. (Purdue) Professor of Marketing and Statistics
- John Fricks, Ph.D. (North Carolina) Assistant Professor of Statistics
- Debashis Ghosh, Ph.D. (Washington) Associate Professor of Statistics and Public Health Sciences
- Murali Haran, Ph.D. (Minnesota) Assistant Professor of Statistics
- William L. Harkness, Ph.D. (Michigan State) Professor Emeritus of Statistics
- Thomas P. Hettmansperger, Ph.D. (Iowa) Professor Emeritus of Statistics
- Robert A. Hultquist, Ph.D. (Oklahoma State) Professor Emeritus of Statistics
- David R. Hunter, Ph.D. (Michigan) Associate Professor of Statistics
- Bing Li, Ph.D. (Chicago) Professor of Statistics
- Jia Li, Ph.D. (Stanford) Associate Professor of Statistics and Computer Science and Engineering
- Runze Li, Ph.D. (North Carolina) Professor of Statistics
- John C. Liechty, Ph.D. (Cambridge) Associate Professor of Marketing and Statistics
- Dennis K. J. Lin, Ph.D. (Wisconsin) University Distinguished Professor of Statistics and Supply Chain Management
- Bruce G. Lindsay, Ph.D. (Washington) Willaman Professor of Statistics
- David T. Mauer, Ph.D. (Michigan) Associate Professor of Public Health Sciences and Statistics
- Ganapati P. Patil, Ph.D., D.Sc. (Michigan) Distinguished Professor Emeritus of Mathematical Statistics
- Calyampudi R. Rao, Sc.D. (Cambridge) Eberly Professor Emeritus of Statistics
- Donald St. P. Richards, Ph.D. (UWI) Professor of Statistics
- James L. Rosenberger, Ph.D. (Cornell) Professor of Statistics
- Thomas A. Ryan, Jr., Ph.D. (Cornell) Associate Professor Emeritus of Statistics
- Joseph L. Schafer, Ph.D. (Harvard) Associate Professor of Statistics
- Michele L. Shaffer, Ph.D. (Penn State) Associate Professor of Public Health Sciences and Statistics
- Damla Sentürk, Ph.D. (California, Davis) Assistant Professor of Statistics
- Durland L. Shumway, Ph.D. (Penn State) Assistant Professor of Statistics; Research Associate
- Laura B. Simon, Ph.D. (Penn State) Lecturer in Statistics
- Aleksandra B. Slavkovic, Ph.D. (Carnegie Mellon) Assistant Professor of Statistics
- Linda C. Strauss, Ph.D. (Penn State) Assistant Professor of Statistics; Research Associate
- Arkady A. Tempelman, D.Sc. (Vilnius, Lithuania) Professor of Statistics and Mathematics
- Rongling Wu, Ph.D. (U of Washington) Professor of Public Health Sciences and Statistics
- Fuqing Zhang, Ph.D. (North Carolina State) Professor of Meteorology and Statistics
- Yu Zhang, Ph.D. (Southern California) Assistant Professor of Statistics
- Zhibiao Zhao, Ph.D. (Chicago) Assistant Professor of Statistics

Graduate instruction and research opportunities are available in most areas of statistics and probability, including linear models, nonparametric statistics, robustness, statistical computing, analysis of count data, multivariate analysis, experimental design, reliability, stochastic processes and probability (applied and theoretical), distribution theory, statistical ecology, and biometrics.

Graduate students can gain practical experience in the application of statistical methodology through participation in the department's statistical consulting center and collaborative research activities. In addition, collaborative projects with other departments provide longer term experience and support for selected students. Most students gain valuable teaching experience by assisting in the teaching and grading of courses. In addition, Ph.D. candidates with proper qualifications can receive support for teaching undergraduate courses.

The Master of Applied Statistics (M.A.S.) program is a professional degree designed to provide training in statistics focused on developing data analysis skills, and exploration of all core areas of applied statistics, without going deeply into the mathematical statistics foundations. It aims to provide its graduates with broad knowledge in a wide range of statistical application areas.

The Doctor of Philosophy (Ph.D.), Master of Arts (M.A.), and Master of Science (M.S.) degrees in Statistics are designed for advanced studies in applied and theoretical statistics. Special emphases include biostatistics, statistical ecology, environmental statistics, genometrics, biometrics and statistical computation. The M.S. degree is appropriate preparation for the department's Ph.D. degree.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. Entering graduate students in statistics for whom English is not the first language are required to take the TOEFL (Test of English as a Foreign Language) examination. The results of this examination must be received by the Department of Statistics at least six months prior to the requested date of admission to the Graduate School and must pass the PSU test of spoken English in the first year of the program. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). Applicants with lower scores may be considered for provisional admission.

While applications from all students (including those who already have done graduate work) are reviewed, completion of a standard calculus sequence is regarded as a prerequisite. Students with a 3.00 or better junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students hoping to earn a Ph.D. in statistics may apply directly to the Ph.D. program without need for a master's degree.

## Degree Requirements

### Professional Master of Applied Statistics Requirements

For the M.A.S. degree, a minimum of 30 credits and a minimum grade-point average of 3.0 are required for graduation. Of the 30 credits, 24 must be courses from the Statistics department and 21 must be at the 500 level. The candidate must complete 6 credits in applied statistics (STAT 501, STAT 502), 6 credits in mathematical statistics (STAT 414, STAT 415) and 3 credits in statistical consulting (STAT 580-581). For all M.A.S. students, the Stat 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience. To complete the remaining credit requirements, a candidate can select 9-15 credits from the following applied statistics courses: STAT 464, STAT 480, STAT 500, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, and STAT 510. In addition, students with suitable backgrounds may choose up to 6 credits from a departmental list of additional courses with approval from their adviser.

### Master of Arts and Master of Science Degree Requirements

For the M.A. and M.S. degrees, a candidate must complete at least 30 credits, including at least 27 at the 500 or 600 level; 21 of the 27 500-level credits must be formal course work from the department of Statistics. A candidate must complete 6 credits in applied statistics (STAT 511, STAT 512), 6 credits in mathematical statistics (STAT 513, STAT 514), 3 credits in stochastic processes (STAT 515) and 3 credits in statistical consulting (STAT 580-581). The student must also pass a written master's qualifying examination taken at the end of the first year. Finally, an M.A. candidate must submit an acceptable master's paper to the department, and an M.S. candidate must submit a thesis.

### Doctoral Degree Requirements

In addition to the course requirements for the M.A. and M.S. degrees given above, a Ph.D. candidate in Statistics must complete further courses in linear models (STAT 551), asymptotic tools (STAT 553), statistical inference (STAT 561), and advanced probability (STAT 517), as well as 15 credits of electives taken from STAT 518, STAT 544, STAT 545, STAT 552, STAT 562, STAT 564, STAT 565, and STAT 572, or other courses suggested by the Ph.D. committee and approved by the Graduate Studies Committee. The student also must pass a written Ph.D. qualifying exam, typically during the second year, and a comprehensive exam given at the end of the third year. The comprehensive exam will have a written component, whose content will be determined and administered by the student's Ph.D. graduate committee, and an oral component, which includes the presentation of a thesis research proposal. The candidate then must submit an acceptable Ph.D. thesis and defend it.

The Ph.D. in Statistics offers options in Biometrics, Biostatistics, Environmental Statistics, and Genometrics. The course and the examination requirements remain the same under these options, however, the candidate must take 15 credits from a list of courses identified by the option.

### Minor in Statistics Requirements

The Department of Statistics has three possible options for a Graduate Minor in Statistics:

- **Option 1:** STAT/MATH 414-415 and at least three 500-level courses from the department.
- **Option 2:** Five or more courses totaling 15 credits at the 500-level from the department. Stat 464 may also count toward the 15 credits.
- **Option 3:** Four 500-level courses totaling 12 credits from the department and one additional course of 3 credits approved by the department head or graduate studies chairman.

Please note: STAT 500 will not be counted toward the Graduate Minor in Statistics under any option.

For all options, a 3.5 GPA is required in the courses to be counted toward the minor. Completion of one of the options listed above, with the specified grade-point average, and the signature on the Graduate Minor Program form [www.stat.psu.edu/grad/degrees/Minor/Graduate\\_Minor\\_Application\\_Form.pdf](http://www.stat.psu.edu/grad/degrees/Minor/Graduate_Minor_Application_Form.pdf) constitutes approval of the Minor in Statistics. The candidate must indicate the wish to have a Graduate Minor in Statistics when the diploma card is filed and indicate the semester the Ph.D. degree is expected.

### Other Relevant Information

Students in the Statistics program may elect the dual-title degree program option in Operations Research for the Ph.D. and M.S. degrees. (See also Operations Research.)

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*. GRE scores are required for consideration for assistantships.

### Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master's degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analyst. Research divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

### Application Process

The number of openings in the integrated B.S./M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Statistics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program, including the two courses: STAT 414 and STAT 415 and the students must apply to the program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of the department's undergraduate program committee.
- Must be accepted into the M.A.S. program in Statistics.

For the IUG B.S./M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate-level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

#### STATISTICS (STAT)

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 501. Regression Methods (3)
- 502. Analysis of Variance and Design of Experiments (3)

Assuming all requirements for the B.S. are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. Degree if they desire.

## Degree Requirements

IUG Statistics B.S. prescribed Statistics courses (25 credits)

**STATISTICS (STAT)**

220. Basic Statistics (3)  
 414. Introduction to Probability Theory (3)  
 415. Introduction to Mathematical Statistics (3)  
 416. Stochastic Modeling (3)  
 464. Applied Nonparametric Statistics (3)  
 470W. Problem Solving and Communication in Applied Statistics (3)  
 480. Introduction to Statistical Analysis System (SAS) (1)  
 501. Regression Methods (3)  
 502. Analysis of Variance and Design of Experiments (3)

Note that students in IUG Statistics B.S. take STAT 501 and STAT 502 instead of STAT 460 and STAT 462 for the regular Statistics B.S.

**IUG Statistics M.A.S. requirement** (30 credits)

**STATISTICS (STAT)**

414. Introduction to Probability Theory (3)  
 415. Introduction to Mathematical Statistics (3)  
 501. Regression Methods (3)  
 502. Analysis of Variance and Design of Experiments (3)  
 580.\*\* Statistical Consulting Practicum (2)  
 581.\*\*Statistical Consulting Practicum II (1)

**Electives** (15 credits)

Select from STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, STAT 510 and the departmental list of additional courses for the M.A.S program with the approval of the adviser.

\*\*For all students in the M.A.S. program, the STAT 581 courses will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

**Integrated B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.)**

The Integrated Undergraduate-Graduate (IUG) degree with B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

**Application Process**

The number of openings in the integrated B.A./B.S. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A./B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department's undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.A./B.S. in Mathematics and M.A.S. degree, 120 credits are required for the B.A./B.S. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.A./B.S. and M.A.S. degrees, six of these are at the 500 level:

**STATISTICS (STAT)**

414. Introduction to Probability Theory (3)  
 415. Introduction to Mathematical Statistics (3)  
 501. Regression Methods (3)  
 502. Analysis of Variance and Design of Experiments (3)

Assuming all requirements for the B.A./B.S. in Mathematics are completed, students in the program can complete the B.A./B.S. degree and not advance to the M.A.S. degree if they desire.

**Degree Requirements**

IUG Math B.A./B.S. students must fulfill the Math B.A./B.S. requirement while counting these prescribed Statistics courses (15 credits)

**STATISTICS (STAT)**

220.\* Basic Statistics (3)  
 414. Introduction to Probability Theory (3)  
 415. Introduction to Mathematical Statistics (3)  
 501. Regression Methods (3)  
 502. Analysis of Variance and Design of Experiments (3)

**IUG M.A.S. Requirements** (30 credits)

**STATISTICS (STAT)**

414. Introduction to Probability Theory (3)  
 415. Introduction to Mathematical Statistics (3)  
 501. Regression Methods (3)  
 502. Analysis of Variance and Design of Experiments (3)  
 580. Statistical Consulting Practicum (2)  
 581.\*\* Statistical Consulting Practicum II (1)

**Electives:** (15 credits)

Select from STAT 464, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, STAT 510 and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

For the IUG B.A./B.S. in Mathematics and M.A.S. degree, the four courses: STAT 414, STAT 415, STAT 501 and STAT 502 can apply to both the B.A./B.S. and M.A.S. degrees.

\*Can be waived for students with an equivalent course, e.g., STAT 250 or STAT 301.

\*\* For all students in the M.A.S. program, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves

as the culminating experience.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[STATISTICS \(STAT\) course list](#)

LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

IUG PROGRAM - B.S. in Statistics and Master of Applied Statistics

Last Revised by the Department: Summer Session 2003

Blue Sheet Item #: 31-05-138

IUG PROGRAM - B.A./B.S. in Mathematics and Master of Applied Statistics

Last Revised by the Department: Fall Semester 2006

Blue Sheet Item #: 34-06-361 and 34-06-361A

Review Date: 4/11/06

REVISED BY SENATE: 1/5/06 [course number update]

Faculty updated: 5/20/13

## Software Engineering (SWENG)

[Program Home Page](#)

JAMES A. NEMES, *Professor and Division Head, Engineering*  
 School of Graduate Professional Studies  
 Penn State Great Valley  
 30 East Swedesford Road  
 Malvern, PA 19355-1443  
 610-648-3335  
[avenqin@psu.edu](mailto:avenqin@psu.edu)

### The Graduate Faculty

- Adrian Barb, Ph.D. (University of Missouri) *Assistant Professor of Information Science*
- Joanna DeFranco, Ph.D. (New Jersey Institute of Technology) *Assistant Professor of Information Science*
- Nil H. Ergin, Ph.D. (University of Missouri-Rolla), *Assistant Professor of Systems Engineering*
- Kathryn Jablokow, Ph.D. (Ohio State) *Associate Professor of Mechanical Engineering*
- Phillip A. Laplante, Ph.D. (Stevens Institute of Tech) P.E. *Associate Professor of Software Engineering*
- John I. McCool, Ph.D. (Temple) *Distinguished Professor of Industrial and Manufacturing Engineering*
- Colin J. Neill, Ph.D. (Wales) *Associate Division Head and Professor of Software Engineering*
- James A. Nemes, D.Sc. (George Washington University) *Professor and Division Head*
- Michael J. Piovoso, Ph.D. (Delaware) *Professor of Electrical Engineering*
- Robin G. Qui, Ph.D. (Penn State) *Associate Professor of Information Science*
- David W. Russell, Ph.D. (CNAA, London) *Professor of Electrical Engineering*
- Raghvinder Sangwan, Ph.D. (Temple) *Associate Professor of Software Engineering*
- Kailasam Satyamurthy, Ph.D. (Clemson) *Assistant Professor of Engineering and Management*

This professional master's degree program, available at Penn State Great Valley, focuses on various aspects of software engineering. The primary goal of the program is to prepare students to develop the next generation of software products and services for consumers, industry, and government. The curriculum includes comprehensive, intensive coverage of modern software concepts and techniques, and emphasizes a holistic approach, encompassing financial, legal, and presales issues; technical concepts; software design techniques; methods; and project management.

The program is constituted by four, 9-credit modules of study. Each module is designed for in-depth coverage of a specific area of study (e.g., modem software methods, algorithms, information science). Two of the modules are required; one centers on professional, skill-based topics such as software project management or business communications, and includes the option to select a professional paper or the advanced software studio. The second required module comprises 9 credits of advanced software engineering course work. Graduate instruction is under the direction of a faculty committee.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The Master of Software Engineering (M SE) program is designed for students with technical backgrounds. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Candidates lacking in a modem programming language can meet that requirement by scheduling the 400-level software engineering studio. Scores from the Graduate Record Examinations (GRE) are not an entrance requirement unless the applicant has a junior/senior grade-point average below 3.00 (on a 4.00 scale).

Students with a 3.00 junior/senior average in an appropriate technical degree program will be considered for admission. The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Entering graduate students for whom English is not their first language are required to have a score of at least 550 on the TOEFL (Test of English as a Foreign Language).

### Program Requirements

All candidates must complete two required 9-credit core modules, for a total core curriculum of 18 credits, and two other 9-credit modules. At least 15 credits of selected courses must be at the 500 level.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Last updated by Publications: 8/20/09

## Systems Engineering (SYSEN)

### [Program Home Page](#)

JAMES A. NEMES, *Professor and Division Head, Engineering*  
 School of Graduate Professional Studies  
 Penn State Great Valley  
 30 Swedesford Road  
 Malvern, PA 19355-1443  
 610-648-3335  
[avnegin@psu.edu](mailto:avnegin@psu.edu)

### Degree Conferred:

M.Eng. in Systems Engineering

### The Graduate Faculty

- Adrian Barb, Ph.D. (University of Missouri) *Assistant Professor of Information Science*
- Joanna DeFranco, Ph.D. (New Jersey Institute of Technology) *Assistant Professor of Information Science*
- Nil H. Ergin, Ph.D. (University of Missouri-Rolla), *Assistant Professor of Systems Engineering*
- Kathryn Jabllokow, Ph.D. (Ohio State) *Associate Professor of Mechanical Engineering*
- Phillip A. Laplante, Ph.D. (Stevens Institute of Tech) P.E. *Associate Professor of Software Engineering*
- John I. McCool, Ph.D. (Temple) *Distinguished Professor of Industrial and Manufacturing Engineering*
- Colin J. Neill, Ph.D. (Wales) *Associate Division Head and Professor of Software Engineering*
- James A. Nemes, D.Sc. (George Washington University) *Professor and Division Head*
- Michael J. Piovoso, Ph.D. (Delaware) *Professor of Electrical Engineering*
- Robin G. Qui, Ph.D. (Penn State) *Associate Professor of Information Science*
- David W. Russell, Ph.D. (CNA, London) *Professor of Electrical Engineering*
- Raghvinder Sangwan, Ph.D. (Temple) *Associate Professor of Software Engineering*
- Kailasam Satyamurthy, Ph.D. (Clemson) *Assistant Professor of Engineering and Management*

This professional master's degree program, available at Penn State Great Valley, deals with the various aspects of systems engineering. The primary goal of the program is to prepare engineers to develop the next generation of engineering products, systems, and services for industry and government.

The curriculum integrates the traditional engineering disciplines in a synergistic manner. Course work includes four 9-credit modules of study with each module designed for in-depth coverage of a specific area of study (e.g., systems and control, robotics). Two of the four modules, the Skill-Based module and the Systems Engineering module, are required and constitute an 18-credit core. To complete the program, students choose an additional 18 credits of electives in two modules of professional interest. As part of the 18-credit core curriculum, students who are nearing the end of their program complete a capstone research experience. Graduate instruction is under the direction of an interdisciplinary faculty committee and the departments participating in the program. The graduate faculty consists of members who have teaching and research interests in the area of systems engineering. Maximum flexibility is maintained by the program in an effort to meet both the professional needs of the individual students and academic quality standards.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

The M.Eng. in Systems Engineering program is designed for students with backgrounds in science or engineering. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Normal admission requirements include mathematics through differential equations. Scores from the Graduate Record Examinations (GRE) are not an entrance requirement unless the junior/senior grade-point average is below 3.00 (on a 4.00 scale). There is no foreign language requirement.

Students with a 3.00 junior/senior GPA in an appropriate technical degree program will be considered for admission. The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests. Entering graduate students for whom English is not their first language are required to have a score of at least 550 (paper) or 213 (computer) on the Test of English as a Foreign Language (TOEFL).

### Degree Requirements

All candidates must take two required 9-credit core modules for a total core curriculum of 18 credits and two other 9-credit elective modules. At least 15 credits of selected courses must be at the 500 level.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### [SYSTEMS ENGINEERING \(SYSEN\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Last updated by Publications: 8/20/09

## Teaching and Curriculum (T & C)

### [Program Home Page](#)

DENISE G. MEISTER, *Coordinator of the Graduate Program in Teaching and Curriculum*  
Penn State Harrisburg  
Middletown, PA 17057  
717-948-6213

### Degree Conferred:

M.Ed.

The Master of Education in Teaching and Curriculum is designed to enhance the skills of teachers for public and private schools. The program focuses on three essential components--curriculum, instruction, and assessment--that contribute to the organization's philosophy of learning. The Teaching and Curriculum program is unified by its vision of critical thinking, democracy, diversity, lifelong learning, nurturance, and scholarship. Courses are designed to reflect the standards of the National Council for Accreditation of Teacher Education (NCATE) and the National Board for Professional Teaching Standards (NBPTS). The program is offered at Penn State Harrisburg and other selected Penn State campuses.

Specifically, the goals of the program are to develop in students (1) the ability to communicate effectively either with school-age students and their parents or with co-workers and/or clients; (2) the ability to conduct an instructional program that provides a sound intellectual and emotional climate for learning; (3) competence in a variety of teaching methods and in the utilization of materials and content appropriate for an effective instructional program; (4) the ability to interpret and to evaluate educational literature and research; and (5) the ability to describe and to evaluate major issues and current trends in instructional curriculum practice and development.

Certification programs are also available in the areas of early childhood education, English as a second language, and principalship.

### Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The M.Ed. Program in Teaching and Curriculum has four important admission requirements.

First, candidates must have achieved an overall junior/senior grade point average of 3.00 or higher. For candidates applying for admission who have completed credits beyond the baccalaureate degree, we will evaluate the last (approximately) 60 credits completed.

Second, candidates must submit two letters of recommendation. These letters must be from former professors or professionals who can attest to the academic ability and potential of the candidate.

Third, candidates must submit a 200-300 word personal statement that addresses their career goals and reasons for pursuing a graduate degree.

Fourth, candidates must submit test scores from one of the following: Graduate Record Examination, Miller Analogies Test, or Praxis examinations completed for certification.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### Retention

Candidates must maintain a minimum 3.00 grade point average in courses approved by the program, satisfactorily complete all required key assessments, attain a grade "C" or better in all required core courses. Candidates who do not make satisfactory progress will be notified in writing noting the specific deficiencies and requesting that they meet with the program coordinator to develop a remediation plan. Failure to meet or to satisfactorily complete the remediation plan will result in termination from the program.

In compliance with the National Council for the Accreditation of Teacher Education (NCATE) requirements, all persons enrolled in Teacher Education Programs at Penn State Harrisburg are expected to demonstrate the professional dispositions that are aligned with the unit's vision statement. The faculty shall evaluate the approved dispositions demonstrated by the candidates in class and during field experiences. Candidates may be rated as exemplary, acceptable, or unacceptable. Candidates are expected to attain acceptable or exemplary ratings in order to graduate.

### Degree Requirements

The Master of Education degree in Teaching and Curriculum provides students with two alternatives to meet the required culminating or capstone experience: (1) course work with a master's project (EDUC 587) or (2) course work that includes a capstone course (EDUC 591). Students may complete the degree requirements for either of the two alternatives with the approval of their adviser.

A total of 30 credits must be completed: 18 credits in core courses and 12 credits in electives. At least 18 credits must be at the 500 level or higher. A minimum grade-point average of 3.00 for work done at the University and acceptable or higher ratings on the professional dispositions are required for graduation.

### Prescribed Core Course Requirements (18 credits)

Learning Theory: EDUC 520(3)  
Curriculum Development and Instructional Design: EDUC 506(3) or EDUC 403(3) (Early Childhood only)  
Educational Assessment: EDUC 539(3) or EDUC 404(3) (Early Childhood only)  
Educational Foundations: EDUC 505(3)  
Educational Research Designs: EDUC 586(3)  
Culminating Course: EDUC 587 Master's Project or EDUC 591 Education Seminar

### Electives

Students are required to take up to 12-15 credits of elective course work. Students may take all of those credits in education or, with the approval of their adviser, select up to 9 credits of electives in a field other than education.

### Options

*Language Arts Option:* The goal of the language arts option is to provide students an in depth understanding of how research in theory in the language arts are related to language acquisition and growth; the knowledge and skills necessary for conducting informal assessments in the language arts and required to



implement a variety of instructional procedures for the language arts; and an awareness of the role that literature can have in an effective language arts program at any level.

*Mathematics Education Option:* The objective of the mathematics education option is to provide courses that will emphasize current research and curriculum shifts related to the teaching of mathematics in K - 12 classrooms. This option requires completion of four EDMTH courses (a total of 12 credits): EDMTH 441, 442, 443, 444 in addition to the other program requirements.

### **Transfer Credits**

Subject to the limitations given below, a maximum of 10 credits of high-quality graduate work done at a regionally accredited institution may be applied toward the requirements for the master's degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree program at Penn State. The student should distinguish carefully between the transferability of credit and its applicability in a particular degree program. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. Transferred academic work must have been completed within five years prior to the date of the first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of an accredited university. Pass-fail grades can be substantiated by the former institution as having at least B quality.

A maximum of 15 graduate credits taken as a nondegree student prior to admission to a graduate degree program may be applied to a graduate program, with departmental approval. The credits must have been earned within five years preceding entry into the degree program.

Forms for transfer of credit can be obtained from the graduate program office.

### **Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit courses below the 400 level in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[EDUCATION \(EDUC\) course list](#)

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-107

Review Date: 01/10/2012

Editorial updates: 11/27/12

## Telecommunications Studies (TELEC)

[Program Home Page](#)

MARIE HARDIN, *Associate Dean for Graduate Studies and Research*  
College of Communications  
201 Carnegie Building  
814-865-3070; [commqpo@psu.edu](mailto:commqpo@psu.edu)

### Degree Conferred:

M.A.

### The Graduate Faculty

- Lee Ahern, Ph.D. (Penn State) Assistant Professor of Communications
- Douglas Anderson, Ph.D. (Southern Illinois) Dean; Professor of Communications
- George Anghelcev, Ph.D. (Minnesota) Assistant Professor of Communications
- Robert A. Baukus, Ph.D. (Massachusetts) Associate Professor of Communications
- Ronald Bettig, Ph.D. (Illinois) Associate Professor of Communication
- Barbara Bird, M.F.A. (Northwestern) Associate Professor of Communications
- Denise Bortree, Ph.D. (Florida) Assistant Professor of Communications
- Jeremy Cohen, Ph.D. (Washington) Professor of Communication
- Colleen Connolly-Ahern, Ph.D. (Florida) Assistant Professor of Communications
- Frank Dardis, Ph.D. (South Carolina) Associate Professor of Communications
- Dennis K. Davis, Ph.D. (Minnesota) Professor of Communications
- Marcia DiStaso, Ph.D. (Miami) Assistant Professor of Communications
- Michael Elavsky, Ph.D. (Illinois) Assistant Professor of Communications
- Lyn Elliot, Ph.D. (Iowa) Associate Professor of Communications
- Russell Frank, Ph.D. (Pennsylvania) Associate Professor of Communications
- Robert M. Frieden, J.D. (Virginia) Cable TV Pioneers Chair Professor in Telecommunications Studies and Law
- Michel Haigh, Ph.D. (Oklahoma) Associate Professor of Communications
- Jeanne Hall, Ph.D. (Wisconsin) Associate Professor of Media Studies
- Martin E. Halstuk, Ph.D. (Florida) Associate Professor of Communications
- Marie Hardin, Ph.D. (Georgia) Associate Professor of Communications
- R. Dorn Hetzel, M.F.A. (New York) Associate Professor of Film and Video
- Anne Hoag, Ph.D. (Michigan) Associate Professor of Communications
- Matthew Jackson, Ph.D. (Indiana) Associate Professor of Communications
- Krishna Jayakar, Ph.D. (Indiana) Associate Professor of Communications
- Matthew Jordan, Ph.D. (Claremont) Assistant Professor of Communications
- Ann Marie Major, Ph.D. (Southern Illinois) Associate Professor of Communications
- Matthew P. McAllister, Ph.D. (Illinois) Professor of Communications
- John S. Nichols, Ph.D. (Minnesota) Professor Emeritus of Communications
- Mary Beth Oliver, Ph.D. (Wisconsin) Distinguished Professor of Communications
- Anthony A. Olorunnisola, Ph.D. (Howard) Associate Professor of Communications
- Patrick R. Parsons, Ph.D. (Minnesota) Don Davis Professor in Ethics
- Robert D. Richards, J.D. (American) John and Ann Curley Professor of First Admendment Studies
- Ford Risley, Ph.D. (Florida) Professor of Communications
- Michelle Rodino-Colocino, Ph.D. (Pittsburgh) Assistant Professor of Communications
- Amit M. Schejter, Ph.D. (Rutgers) Associate Professor of Communications
- Jorge Reina Schement, Ph.D. (Stanford) Professor of Communications
- Michael Schmierbach, Ph.D. (Wisconsin) Assistant Professor of Communications
- Fuyuan Shen, Ph.D. (North Carolina, Chapel Hill) Associate Professor of Communications
- Richard Sherman, M.F.A. (Ohio) Associate Professor of Communications
- Susan M. Stroh, Ph.D. (Minnesota) Assistant Professor of Communications
- S. Shyam Sundar, Ph.D. (Stanford) Distinguished Professor of Communications, and Communication Arts and Sciences
- Richard D. Taylor, J.D. (New York) Palmer Chair of Telecommunications Studies and Law
- Bu Zhong, Ph.D. (Maryland) Assistant Professor of Communications

The M.A. in Telecommunications Studies program offers a systematic approach to understanding the globalization of information technologies and the convergence of electronic media and telecommunications. It includes history, technology, policy, economics, industrial structures, and e-commerce issues. The program is for both recent undergraduates in communications and related fields seeking advanced study, as well as for individuals currently associated with the media information and telecommunications industries wishing to advance themselves professionally. Applicants without an undergraduate degree or professional connection to the field may be required to acquire a basic background as a condition of admission, based on a case-by-case evaluation.

### Admission Requirements

Scores for the Graduate Record Examinations (GRE) are required for admission. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the Test of English as a Foreign Language (TOEFL) and submit the results of that test with the application for admission. The minimum TOEFL admittance score is 600. Applicants with an undergraduate 3.00 junior/senior grade-point average (on a 4.00 scale) are eligible for admission. Also required are three letters of recommendation and an autobiographical statement of 750 to 1,000 words indicating the nature of the applicant's interest in undertaking graduate study in telecommunications.

### Program of Study

The M.A. in Telecommunications Studies program is a one-calendar year, 30-credit program that requires a 3-credit master's paper. A student must enter the program in the fall semester.

### Degree Requirements

Candidates must complete a minimum of 30 credits (including master's paper preparation); no more than 9 credits at the 400 level and no more than 6 credits in independent study (in addition to 3 credits researching and writing a master's paper). Candidates must complete a 9-credit core. The remaining credits are selected by the student in consultation with the adviser. Course work offered by departments outside the College of Communications may be scheduled as part of the student's program with prior approval of the student's academic committee. A candidate must maintain 3.00 grade-point average and complete a significant research paper (master's paper) under the direction of a faculty adviser. This paper shall be reviewed and approved by a faculty committee of at least three members. Students are required to schedule three separate, formal meetings with their advisers and academic committees for (1) discussion and approval of the general program plan, (2) the paper proposal, and (3) a formal presentation and defense of the paper at the final meeting of the student's advisory committee.

### Student Aid

Graduate assistantship and other forms of student aid available to students in the program are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[COMMUNICATIONS \(COMM\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/15/04

Last updated by Publications: 5/31/11

## Teaching English as a Second Language (TESL)

[Program Home Page](#)

JOAN KELLY HALL, *Department Head*  
305 Sparks Building  
814-865-7365

### Degree Conferred:

M.A.

### The Graduate Faculty

- Gabriela Appel-Lantolf, Ph.D. (Delaware) Senior Lecturer in German and Applied Linguistics
- Suresh Canagarajah, Ph.D. (Texas, Austin) Edwin Erle Sparks Professor of Applied Linguistics, English, and Asian Studies
- Joan Kelly Hall, Ph.D. (SUNY Albany) Professor of Applied Linguistics
- Karen E. Johnson, Ph.D. (Syracuse) Kirby Professor in Language Learning and Applied Linguistics
- Professor of Applied Linguistics
- Celeste Kinginger, Ph.D. (Illinois, Urbana-Champaign) Associate Professor of Applied Linguistics
- James Lantolf, Ph.D. (Penn State) Greer Professor of Language Acquisition and Applied Linguistics
- Xiaofei Lu, Ph.D. (Ohio State) Assistant Professor of Applied Linguistics
- Sinfree Makoni, Ph.D. (Edinburgh, Scotland) Associate Professor of Applied Linguistics and African Studies
- Mark A. Ouellette, Ph.D. (Pennsylvania) Senior Lecturer in Applied Linguistics
- Sandra J. Savignon, Ph.D. (Illinois, Urbana-Champaign) Professor of Applied Linguistics
- Robert Schrauf, Ph.D. (Case Western) Associate Professor of Applied Linguistics
- Susan Strauss, Ph.D. (California, Los Angeles) Associate Professor of Applied Linguistics
- Steve Thorne, Ph.D. (California, Berkeley) Assistant Professor of Applied Linguistics

The master's program in English as a Second Language is designed to provide professional development for teachers and administrators in English as a second or foreign language. The program is problem focused, integrating theory and practice from the fields of applied linguistics and teaching English as a second language to address issues of second language acquisition/teaching and program development, with special focus on English in a wide range of both domestic and international contexts. Requirements include 36 credit hours, a master's paper, and a teaching portfolio.

Completion of this degree program does not automatically provide teacher certification in the Commonwealth of Pennsylvania. Further information on teaching certification is available from the College of Education. Students who desire to continue their studies in ESL at Penn State may be admitted to the Ph.D. program in Applied Linguistics through the program in Linguistics and Applied Language Studies.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Applicants whose native language is not English must take the TOEFL examination and attain a score greater than 600. All applicants are also required to arrange for three letters of reference to be submitted along with a one- to two-page statement of the applicant's goals and professional objectives.

### Degree Requirements

The M.A. in TESL requires 36 credits, of which 18 credits must consist of 500-level courses. In lieu of a thesis, students must prepare a master's paper and compile a teaching portfolio. The following courses are required: APLNG 484, APLNG 493, APLNG 591, APLNG 595; 9 credits of electives from the following APLNG courses: APLNG 410, APLNG 482W, APLNG 572, APLNG 573, APLNG 581, APLNG 583, APLNG 593, APLNG 597; and 6 credits of approved electives.

### Student Aid

Graduate Assistantships that may be available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[APPLIED LINGUISTICS \(APLNG\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Last updated by Publications: 5/23/11

## Theatre (THEA)

[Program Home Page](#)

BARRY KUR, *Head of the Graduate Program in Theatre*  
116C Arts Building  
814-863-1453

### Degree Conferred:

M.F.A.

### The Graduate Faculty

- Dan Carter, M.F.A. (Florida State) Professor of Theatre; Director, School of Theatre
- Travis DeCastro, M.F.A. (Utah) Associate Professor of Theatre
- Suzanne S. Elder, M.F.A. (Texas) Associate Professor of Theatre
- John C. Franceschina, M.F.A. (Catholic U) Distinguished Professor of Theatre
- Barry M. Kur, M.A. (SUNY) Professor of Theatre
- Cary Libkin, M.F.A. (Carnegie Mellon) Professor of Theatre
- Annette K. McGregor, Ph.D. (Oregon) Associate Professor of Theatre
- Richard Nichols, Ph.D. (Washington) Professor of Theatre
- Brant Pope, Ph.D. (Michigan State) Professor of Theatre
- Jane Ridley, M.F.A. (Ohio State) Professor of Theatre
- Daniel Robinson, M.F.A. (Missouri, Kansas City) Associate Professor of Theatre
- James Wise, M.F.A. (Purdue) Professor of Theatre

### Faculty Emeriti

- Douglas N. Cook, M.A. (Stanford) Professor Emeritus of Theatre
- Charles Firmin, M.F.A. (Penn State) Associate Professor Emeritus of Theatre
- Anne A. Gibson, M.F.A. (Carnegie Mellon) Professor Emerita of Theatre
- Robert E. Leonard, M.F.A. (Goodman School of Drama) Professor Emeritus of Theatre
- Helen A. Manfull, Ph.D. (Minnesota) Professor Emerita of Theatre
- Douglas R. Marmee, M.F.A. (Brandeis) Associate Professor Emeritus of Theatre

The master of fine arts degree program in Theatre pursues the following objectives: (1) to assist each student in acquiring discriminating taste and critical judgment in theatre; (2) to help each student attain skills and proficiencies in theatre; (3) to provide the training, discipline, and opportunities essential to the development of a professional ability in at least one area of theatre; and (4) to prepare each student for an active career in academic and/or professional theatre or other areas within the entertainment industry.

Facilities include the Playhouse, a 450-seat proscenium theatre; the Pavilion, a 249-seat thrust theatre; a 150-seat proscenium theatre in the heart of downtown State College; theatre production studios for scenic, property, and costume preparation; two computer-assisted design laboratories; a lighting laboratory; a sound and media studio; and rehearsal and dance studios.

### Admission Requirements

Graduate Record Examination (GRE) scores, or comparable examination scores, are not required for admission to the School of Theatre. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Requirements for admission to the M.F.A. program are (1) a broad undergraduate preparation in theatre, including 3 credits each in acting, directing, stagecraft, and theatre history; and 6 credits of dramatic literature; (2) 12 credits in related subject areas such as communications, oral interpretation, art, business, music, and dance; and (3) submission of a vita and at least three letters of recommendation.

Additional requirements for M.F.A. candidates are (1) submission of evidence of professional potential in the proposed area of specialization-auditions, prompt books, portfolios, manuscripts, and other appropriate presentations-to the applicable study program(s) by arrangement with the department; and (2) a personal interview to be arranged by the student.

### Master of Fine Arts Degree Requirements

The program entails specialized professional training in one of the following areas: acting, directing, scene design, costume design, costuming, lighting design, and technical direction. Six semesters in residence are normally required to complete the minimum 60-credit degree.

Students are evaluated on a semester-by-semester basis on academic progress, creative achievement, and professional potential. The M.F.A. is a professional degree and is granted by the Graduate Faculty on the basis of academic and creative excellence over and above the fulfillment of requirements. Satisfactory academic progress does not guarantee continuance in the program, nor does continuance in the program imply the automatic granting of a degree. M.F.A. candidates are required to participate in the School of Theatre productions in positions of responsibility. Additionally, each student must complete a committee-approved monograph project in the area of specialization. An international residency is required and is funded by the school.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[THEATRE \(THEA\) course list](#)

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/17/04

Last updated by Publications: 8/28/06

## Training and Development (TRDEV)

### [Program Home Page](#)

WILLIAM D. MILHEIM, *Coordinator*  
Penn State Harrisburg  
777 West Harrisburg Pike  
Middletown, PA 17057  
717-948-6215

### Degree Conferred:

M.Ed.

### The Graduate Faculty

- Doris Lee, Ph.D. (U of Texas) *Professor of Instructional Systems*
- Margaret Lohman, Ph.D. (Ohio State) *Associate Professor of Training and Development*
- Jo Tyler, Ed.D. (Columbia) *Associate Professor of Training and Development*
- William D. Milheim, Ph.D. (Kent State) *Professor of Education*

The master of education degree program in Training and Development at Penn State Harrisburg helps students prepare for professional careers in training and development in diverse organizational settings, including business and industry, government, and health care. Graduates of the Training and Development Program frequently assume positions such as trainers, instructional designers, program evaluators, performance analysts, career development specialists, and organization developers.

The overarching goal of the Training and Development Program is to help students develop the ability to assess and improve employee learning and performance. Accordingly, specific goals of the program include developing the ability to: analyze employee performance; design a broad range of performance improvement interventions, with particular emphasis on the design, development, and delivery of training programs; evaluate training and development programs; facilitate work group discussions and group processes; translate training and development theory into practice; and critically evaluate research in training and development.

### Admission Requirements

An applicant must hold a baccalaureate degree in any field from a regionally accredited, college-level institution. Admission decisions are based primarily on an applicant's junior/senior cumulative grade-point average and career-goal statement. Additional information pertaining to any postbaccalaureate course work and professional experience are considered. The best-qualified applicants will be accepted up to the number of spaces available for new students.

Applicants with low grade-point averages may be required to take the Graduate Record Examinations (GRE) or take 9 credits of course work recommended by a program faculty member and maintain a GPA of B or higher in order to be reconsidered.

Students are required to submit the following:

- A completed application with the application fee
- Two copies of official transcripts from all colleges/universities attended
- A brief career-goal statement

### International Students

All applicants whose first language is not English or who have not received a baccalaureate degree from an institution in which the language of instruction is English must take the Test of English as a Foreign Language (TOEFL; [www.toefl.org](http://www.toefl.org)).

The test must be passed with a score of 550 (paper-based test) or 213 (computer-based test) or higher.

All students with international credentials must submit transcripts to Educational Credential Evaluators, Inc. (ECE) for a "Course by Course" academic evaluation of transcripts and degree. An ECE application can be obtained at [www.ece.org](http://www.ece.org).

### Application Deadlines

Candidates may enter the program at the beginning of fall or spring semester, or the summer session. Application deadline dates for U.S. students and international students are posted on the Training and Development program website. (<http://www.hbg.psu.edu/hbg/programs/gradprog/trdev.html>)

Please note: Each graduate program reserves the right to set earlier deadlines than those noted above.

### Degree Requirements

Students may enter the Training and Development program from a variety of backgrounds and enroll in courses to help them develop competencies in training and development. Coursework includes both required and elective courses in training and development as well as electives from outside the program. Students select one of two areas of professional practice, training or human resource development, as a focus for their electives in the training and development program. Courses are scheduled to accommodate part- and full-time students.

There are two options in the program: the Paper option requires the completion of a master's paper (TRDEV 587) and a total of 36 credits (excluding an internship if one is needed); the Non-Paper option does not require a master's paper, but does require Research Designs Applied to Training (TRDEV 588) and an extra elective in Training and Development for a total of 39 credits (excluding an internship if one is needed). For both the Paper and Non-Paper options, at least half of the total credits must be earned in 500-level courses.

Both options require successful completion of Instructional Methods in Training and Development (TRDEV 418), Foundations in Training and Development (TRDEV 460), Performance Analysis (TRDEV 465), Systematic Instructional Design (TRDEV 518), Technology in Training (TRDEV 531), and Educational Research Design (EDUC 586).

### Prescribed (Required) Courses:

- TRDEV 418: Instructional Methods in Training & Development (3 credits)
- TRDEV 460: Foundations in Training & Development (3 credits)
- TRDEV 465: Performance Analysis (3 credits)
- TRDEV 518: Systematic Instructional Design (3 credits)
- TRDEV 531: Technology in Training (3 credits)
- EDUC 586: Educational Research and Design (3 credits)

### Additional Courses

**A.** From Training and Development courses, select three courses for the Paper option or four courses for the Non-Paper option:

TRDEV 421: Presentation Skills for New Trainers (3 credits)  
 TRDEV 432: Video Production for Training (3 credits)  
 TRDEV 470: HRD Tools and Techniques (3 credits)  
 TRDEV 475: Career and Succession Management (3 credits)  
 TRDEV 505: Project Management (3 credits)  
 TRDEV 507: Program Evaluation (3 credits)  
 TRDEV 520: Learning Styles and Theories for Trainers (3 credits)  
 TRDEV 532: Web-Based Training (3 credits)  
 TRDEV 533: Distance Learning in Training (3 credits)  
 TRDEV 565: Implementing Training and HRD Programs ( \_ credits)  
 TRDEV 583: Issues in Training & Development (3 credits)  
 TRDEV 596: Individual Studies (1-3 credits)  
 TRDEV 597: Special Topics (3 credits)

**B.** Select two three-credit courses at the 400/500 level from programs outside Training and Development. The two courses should assist you in preparing for professional roles and responsibilities in training and development. The following courses are highly recommended:

BE SC 408: Group Facilitation and Leadership Skills (3 credits)  
 BE SC 468: Industrial Psychology (3 credits)  
 P ADM 510 or MNGMT 510: Organizational Behavior (3 credits)

### Required Experience:

One of the following:

- A.** Holds or has held a position in training and development successfully for six months or more. Submit request for waiver for approval.
- B.** TRDEV 595 Internship (3 credits which are not counted in the 36 credit or 39 credit requirement)

### Capstone Requirement:

Choose one of the following options:

- A.** TRDEV 588: Research Designs Applied to Training (3 credits - plus one additional 3-credit elective)
- B.** TRDEV 587: Master's Paper (3 credits)

### Transfer Credits and Course Substitutions

A maximum of 10 credits of high-quality graduate work done at a regionally accredited institution may be applied toward the requirements for the master's degree in Training and Development. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser and the Graduate School. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript. Credits earned toward a previously completed postbaccalaureate professional degree program (law, medicine, etc.) are not transferable. However, up to 10 credits can be transferred from a professional degree program if the degree has not been conferred.

A maximum of 15 credits earned as a special nondegree student at Penn State University may be applied to the Training and Development program, with departmental approval. The credits must have been earned within five years preceding entry into the program.

### Grade-point Average and Time Limit

A 3.00 (out of 4.00) minimum grade-point average is required to graduate from the program. All course work must be completed within eight years.

### Financial Aid

There are a limited number of scholarships, fellowships, and research grants available, as well as graduate assistantships. Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact the Financial Aid Office at 717-948-6307.

### Courses

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not be used to meet graduate degree requirements. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[TRAINING AND DEVELOPMENT \(TRDEV\) course list](#)

[EDUCATION \(EDUC\) course list](#)

Last Revised by the Department: Fall Semester 2005

Blue Sheet Item #: 33-07-121

Review Date: 06/14/05

Faculty updated: 1/3/13

## Master of Professional Studies in Turfgrass Management

ANDREW S. MCNITT, *In Charge of Master of Professional Studies in Turfgrass Management Graduate Program*  
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814-863-1368, asm4@psu.edu

### The Graduate Faculty

- David R. Huff, Ph.D. (California, Davis) Professor of Turfgrass Breeding, Department of Crop and Soil Sciences
- Andrew S. McNitt, Ph.D. (Penn State) Assistant Professor of Soil Science, Department of Crop and Soil Sciences
- Maxim J. Schlossberg, Ph.D. (Georgia) Associate Professor of Turfgrass Nutrition and Soil Fertility, Department of Crop and Soil Sciences
- J. Turgeon, Ph.D. (Michigan State) Professor of Turfgrass Management, Department of Crop and Soil Sciences
- Wakar Uddin, Ph.D. (Georgia) Associate Professor of Plant Pathology, Department of Plant Pathology

The Master of Professional Studies in Turfgrass Management (MPS-TM) is a 30-credit terminal master's degree program that emphasizes a systems approach to turfgrass management. The program balances theory and practice. Courses taught in MPS-TM use Web-based lessons, quizzes, exams, and team projects and exercises to provide a balance between individualized study and interactive learning. Individuals who currently work as managers of turfgrass facilities, including golf courses and professional sports complexes, would benefit from this program. The MPS-TM program requires the completion of four core courses in which students learn to apply scientific concepts to fundamental problems encountered in the management of complex turfgrass ecosystems. Additionally, a capstone individual studies in turfgrass management course is a project that integrates theory and practice in addressing real problems encountered in turfgrass facility management.

### Degree Requirements

The professional master's degree requires 30 credits including a final integrative project. All students complete the required MPS-TM core program of turfgrass courses. The MPS-TM turfgrass courses consist of TURF 850 (Turfgrass Physiology), AGRO 851 (Applied Plant Population Biology), TURF 852 (Turfgrass Health Management), TURF/PPATH 853 (Turfgrass Science Literature), and AGRO 596 (Individual Studies in Agronomy). An integrative project is required in which the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques, and interpretation skills learned in the program to a real problem faced in turfgrass facility management. In consultation with their advisor, students also take an additional 15 credits of elective coursework to focus on their particular interest within turfgrass facility management. A total of 18 credits must be 500-level or higher, with at least 6 credits of 500-level coursework; this Graduate School requirement is met through the required courses, the project, and at least one 500-level elective course.

### List of required courses in proposed program\*

AGRO 596 (3) Individual Studies in Agronomy. Used by students to work with an advisor on their capstone project.

AGRO 851 Applied Plant Population Biology (3). Lectures and exercises designed to develop student competency in plant selection to promote ecological diversity and genetically superior plants.

TURF 850 Turfgrass Physiology (3). Lectures, reading assignments, and exercises designed to develop student competency in plant physiology as it relates to turfgrass management strategies.

TURF 852 Turfgrass Health Management (3). Lectures and exercises designed to develop student competency in solving turfgrass pest problems, as well as disease resistance in turfgrasses.

TURF/PPATH 853 (3). Interpreting Turfgrass Science Literature (3). Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results.

\*See Appendix B for elective courses

### Admissions Requirements

Applicants must submit a letter of professional introduction in which they describe their professional experiences and education, delineate their career goals, and discuss how the MPS-TM program will enable them to meet their objectives. Applicants must also provide three letters of reference and recommendation. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Scores from Graduate Record Examination (GRE), or from a comparable substitute examination accepted by a graduate program are required for admission; however, exceptions may be considered on a case-by-case basis. The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin* [http://www.psu.edu/bulletins/whitebook/\\$gradregs.htm](http://www.psu.edu/bulletins/whitebook/$gradregs.htm).

### Transfer Credits

If students have successfully completed courses from another institution that are equivalent to the elective turfgrass courses (TURF 425, 434, 435, and 436) with grades of B or better, these can be applied toward satisfying the MPS-TM degree requirements. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School, must be equivalent to "B" quality (grades of B- are not transferable) on Penn State's grading system, and must appear on an official graduate transcript.

### Student Aid

Students in this program may receive financial assistance from their workplace or bear the cost of the degree personally. Other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin* [http://www.psu.edu/bulletins/whitebook/\\$gradregs.htm](http://www.psu.edu/bulletins/whitebook/$gradregs.htm). The forms of financial aid noted in the bulletin available to residential graduate students are not available to students studying via the World Campus, e.g., assistantships, fellowships. The other common form of financial aid is loans.

### Typical Schedule

Flexibility is a key principle of the design of this program. Each course will be offered once each academic year. Sequencing of courses is determined by the semester the student begins the program. Students and their advisor will develop a plan of study upon completion of the second course taken in the program or the end of the first year, whichever occurs sooner. Many students may take three or four courses per year while others may only take one or two. Because of this, the time to degree will average three years and one semester. The typical schedule for offering the required MPS-TM courses is shown in Table 1.

Table 1. MPS-TM REQUIREMENTS (30 credits)

### REQUIRED COURSES (12 credits)



**FALL SEMESTER**

**AGRO 851 (3) Applied Plant Population  
Biology  
TURF 850 (3) Turfgrass Physiology**

**SPRING SEMESTER**

**TURF 852 (3) Turfgrass Health Management  
TURF/PPATH 853 (3) Turfgrass Science Literature**

**INTEGRATIVE PROJECT (3 credits)**

**AGRO 596 (3) Individual Studies**

**ELECTIVES (15 credits)**

**See list of approved elective courses available through Penn State. All electives listed are offered online. Must include at least one 500-level (3 credit) course.**

**Elements of Residency**

We propose several strategies to meet the elements of residency in MPS-TM. We describe these strategies and then indicate how each contributes to various elements of residency. Table 2 provides a summary of the program strategies that contribute to each element of residency. These elements will be phased into the program over the first five years the program is in existence. The elements will be evaluated for their effectiveness and modifications made, as necessary, to ensure a quality educational experience. This section is organized by the strategies we plan to use to meet the elements of residency.

**Strategy A—Seminars and discussions:** CSS offers departmental seminars during Fall and Spring Semesters. Topics that are relevant to MPS-TM students will be made available for students to view using appropriate technology. We then would offer chat-room time and threaded discussion opportunities for the students to interact with each other and with the presenter and/or a faculty facilitator. Faculty and graduate students in the program will be invited to participate in the discussions. We will explore the use of real-time teleconferencing for students to join the seminars, but the geographical (time zone) distribution of our students may make this difficult. Strategy A contributes to residency elements 1, 2, 4 and 7. Strategy A provides opportunity for interaction among students and faculty outside of direct instruction (1); offers students a chance to interact with each other on the topic (2); provides broader exposure to and socialization to the field and to related fields (crop science, soil science, horticulture, plant pathology, entomology) (4); and it increases student identification with Penn State (7) by giving students the opportunity to discuss topics with faculty and graduate students in the other two graduate programs in the department (i.e., Agronomy, Soil Science). It also will increase student awareness of the department and the breadth of its substantive expertise. We expect that at least one seminar per semester will be made available in this way and we expect all students currently enrolled in the program to take part in one of these seminar/discussion opportunities each academic year. Strategy A will be phased in during year 1 of the new program.

**Strategy B—Student seminar or discussion of their capstone project in the program:** An important part of socialization and sharing of information is student-led seminars and discussions. Each student in the program will be required to offer a seminar and/or to lead a discussion about their capstone project. This is the integrative experience in the program and will be a required element for completion of the program. As part of this, the student will post the presentation and the full project report prior to the seminar/discussion. The student will work with their faculty advisor and the MPS-TM program coordinator to develop the content of the seminar and/or discussion questions. The faculty advisor and the MPS-TM program coordinator will provide support to the student during the seminar and/or discussion. This will give other students an opportunity to become familiar with the requirements of the integrative experience as well as allowing for sharing of the experiences of the student completing the program. We will evaluate the feasibility of video conferencing for those students interested in giving a formal seminar, and recording the presentation for distribution to students and others unable to participate in real-time. Alternatives to video conferencing include a threaded discussion format based on the written document, and/or specific times for students and faculty to visit a chat room for a guided discussion led by the student. Strategy B contributes to residency elements 1, 2, 4, 6 and 7. Strategy B offers an opportunity for interaction between students and faculty outside the course context (1); encourages interaction among students with student led discussions (2); provides students an opportunity to explore substantive or socialization issues in the field (4); allows students to contribute their own insights, knowledge and expertise and to share those with other students and faculty in the program, the department, college and university (6); and increases identification with Penn State through participation in university-sponsored discussions (7). This strategy will be phased in as the first cohorts of students in MPS-TM complete their programs.

**Strategy C: Informal discussions.** An online 'coffee room' will be set up as a space for informal discussions among students and faculty. Topics may be proposed by students and faculty. A threaded discussion format will be used, although the 'coffee room' also will be available for chat rooms for a particular meeting or discussion group. Participation will be voluntary and we expect different students and faculty to take part depending on the topics. Strategy C fulfills residency elements 1, 2, 4, 6 and 7. Informal student interaction with faculty is encouraged (1), as is interaction among students (2). The topics are likely to include issues of socialization in the field and practical application of course content and so will contribute to residency element (4). The discussions and interactions will allow students to contribute their expertise and experiences, shaping faculty knowledge of applications in the field and providing ideas for applied research. Thus, these discussions will enable students to contribute to the program, college and university (6). Participation will increase identification with Penn State (7). Strategy C will be phased in during year 1 of the program.

**Strategy D: Students as experts.** The CSS department has an established undergraduate major in Turfgrass Science (TS) that has important conceptual and practice overlap with MPS-TM. We plan to provide opportunities for students in MPS-TM to participate as experts in the field or as video conference presenters on certain topics in the undergraduate classes. Again, the practical, real world experiences of MPS-TM students will be invaluable in helping the undergraduates to understand how the information from classes translates into application. This interaction also will provide undergraduate students opportunities to interact with professionals in the field about the nature of their careers, the kinds of tasks they do on a daily basis, and the relevance of program/course content. Strategy D contributes to residency elements 1, 2, 4, 6 and 7. In developing the undergraduate course presentation, MPS-TM students will work with the faculty member in the course to develop content and instructional strategies thus providing socialization and experience with instruction (1, 4); if a panel is used then MPS-TM students on the panel will need to interact to organize the presentation (2). MPS-TM students would make a clear and strong contribution to the program, college, and university by participating as experts, panel members in undergraduate courses related to their coursework and professional experiences (6). Such participation will increase the identification with Penn State (7). Students will be encouraged to participate in one such activity during their program.

**Strategy E: Students as mentors.** MPS-TM students will be asked to serve as mentors in two capacities. First, 'senior students' will be asked to serve as mentors to new students in the MPS-TM program. This will include providing advice, responding to questions that new students in the program might have, and helping new students to navigate the somewhat less-structured world of online courses (where there is no formal class meeting time). Since many students are already practitioners, these mentoring relationships should help to build networks among students on which they can draw in their professional careers, not just in the program context. Second, MPS-TM students will be asked if they would be interested in volunteering to mentor one or two undergraduate students in the TS program. This provides MPS-TM students with experience in mentoring and providing leadership to those with less knowledge and experience, and it enhances the experiences of the undergraduate students to have a practitioner to whom they can turn with substantive/career-related questions. Strategy E contributes to residency elements 2, 4, 5, 6 and 7. This strategy encourages interaction among students (2), provides a socialization/professionalization experience guided by faculty (4), it provides a student perspective on the program and courses in terms of advising (5), allows students in MPS-TM to make invaluable contributions to the program, college and university through involvement in undergraduate education (6), and increases student involvement in and identification with Penn State and its programs (7). Strategy E will be phased in during years 2 and 3 of the MPS-TM program and the Turfgrass Science undergraduate program, as feasible.

**Strategy F: Annual Turfgrass Management Institute.** One element often missing from online programs is face-to-face interaction. We propose to offer an Annual Institute for one week during the fall Penn State Golf Turf Conference to bring faculty and students together at University Park. The Institute would include substantive topics or short courses that would describe recent developments in different areas of turfgrass science and management, and would provide opportunities for informal discussions and socializing among students and faculty. Because of the costs involved, this will not be a required element, but we will strongly encourage students to participate at least once during their program. In addition, we would plan to invite new students to participate in the Institute prior to taking their first course. We also would invite alumni to attend and to participate in organizing/presenting some of the sessions. Student and alumni mentors could then meet those they are mentoring. Opportunities for advising sessions on coursework and an introduction to the program would be included for students new to the program. Times also would be available for students to set up meetings with their academic advisors to discuss their integrative experience. Some sessions in the Institute may be made available to those unable to attend in person. The Annual Institute

contributes to all of the elements of residency. The institute provides opportunities for face-to-face interaction among faculty and students (1); among students (2); will increase access to information and instructional resources of the program, department and University (3); offer opportunities for socialization to the field (4); provide face-to-face academic and program advising (5); enable students to contribute by helping to organize sessions and use their expertise (6); and a visit to University Park is generally always a good way to increase identification with Penn State (7). We view the Institute as an important element of the program, and will work to develop funding mechanisms to assist students and alumni in covering the costs of travel to and living expenses while visiting Penn State. We expect to offer the first institute during the second fall following the approval of the MPS-TM program.

Strategy G: Academic advising and support services. Academic advising is provided initially by the Graduate Program Coordinator who is a tenure-line faculty member in the program. Students will be encouraged to identify a permanent faculty advisor as soon as possible in the program and will work through a proposed schedule of courses and a tentative timeline within the first year. This process will be facilitated by the Graduate Program Coordinator. Advising is conducted by email and phone. Once a faculty advisor is identified, the student can seek advice from the faculty advisor, the Graduate Program Coordinator, or from other faculty and students in the program. Advising also will be available through an online advising 'coffee room,' the Annual Institute, and the use of senior students in MPS-TM as mentors/peer advisors. Materials providing specific information on program requirements, the unique aspects and responsibilities of participating in an online program, identifying a faculty advisor and committee, and the integrative experience are being developed and will be available on the program web site. Support for MPS-TM will be provided by a staff assistant in CSS and through initial contact with World Campus personnel/advisors. Students will apply for admission directly to the MPS-TM program in the academic department. Strategy G meets residency elements 1, 3, 4 and 5.

Strategy H: MPS TM program web site. We view the MPS-TM program web site as an essential element in creating a 'home and identity' for the MPS-TM program. The web site will contain the typical elements of an educational program with information on application guidelines, course offerings, requirements for the degree, information on faculty in the program, and links to broader Penn State resources. We also propose to develop elements of the web site that will provide opportunities for interaction (formal and informal), program and course review and evaluation, professional networking, and building program identity. Interaction linked through the web site would be the opportunities to participate in organized chat rooms or threaded discussions related to the departmental or student seminars or discussion (Strategies A and B) informal discussion chat-rooms and threaded discussions (Strategy C), and the 'coffee room' (Strategy C, E and F). The 'coffee room' also can be used for course review and evaluation where access would be restricted to students in a particular course and the faculty peer evaluator of the course. One page on the web site would include links to professional organizations, nationally and within states, that provide training and conferences for practitioners and researchers in topics related to community and economic development. We plan to identify these through searches, but also by the organizations in which our students and alumni participate. This site also will include a link to a discussion area about insights obtained from student/faculty/alumni participation in particular conferences. Another element would be a restricted access site that includes information on former and current students in MPS-TM. This would include information on current positions, locations, and areas of expertise of the students and alumni; lists of the capstone projects completed by the students with links to electronic copies, and a map showing locations of current and former students. We see this information as building identity with the program and Penn State and encouraging continued participation in the program by alumni. This alumni/student/faculty space would include access to chat rooms, threaded discussions, and coffee rooms on organized topics and informal discussion topics introduced by members. The web site contributes to all elements of residency. It offers opportunities for interaction among faculty and students (1), interaction among students and among students and alumni (2), provides access to information and instructional resources (3), increases exposure to substantive issues in the field and to professional networks and experiences (4), provides access to advising information and support services (5), offers a means for students and alums to stay connected with the program and contribute substantively both formally and informally (6), and creates a location and reason for continuing active participation in and identification with the Penn State community. We plan to develop a new website for the MPS-TM program and to phase in various elements within the first three years of the program.

Ultimately, we would like to employ all of the above strategies to increase participation and interaction available to alumni of the MPS-TM program. The alumni of this program are practitioners in the field or work in related areas and can provide an invaluable resource to current graduate and future undergraduate students, the program, and Penn State. We would hope to use the 'friends of Penn State' accounts to provide access to the web sites and associated activities. Recent efforts by the Penn State Alumni Association and University Libraries to offer some restricted access to library resources to members of the Alumni Association also will increase the benefits to alumni of retaining their contact and interaction with the program and with Penn State. The special interaction elements related to community and economic development offered to alumni and students should increase the attractiveness to alumni of staying involved.

Another element would be a virtual coffee room for informal discussions with and among students. We will maintain alumni and former student lists. As we develop the program website, we will consider an electronic newsletter for alums and a special alums page on the web site.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-099

Review Date: 01/12/2010

## Wildlife and Fisheries Science (W F S)

[Program Home Page](#)

MICHAEL G. MESSINA, *Director of the School of Forest Resources and Professor of Forest Resources*  
121 Forest Resources Building  
814-863-7093

### Degrees Conferred:

Ph.D., M.S.

### The Graduate Faculty

- Victoria Braithwaite-Read, D.Phil. (Oxford) Professor of Fisheries and Biology
- Margaret C. Brittingham, Ph.D. (Wisconsin) Professor of Wildlife Resources
- Hunter Carrick, Ph.D. (Michigan) Associate Professor of Aquatic Biology
- Duane R. Diefenbach, Ph.D. (Georgia) Adjunct Professor of Wildlife Ecology; Leader--Wildlife, PaCFWRU
- C. Paola Ferreri, Ph.D. (Michigan State) Associate Professor of Fisheries Management
- Matt Marshall, Ph.D. (Georgia) Adjunct Assistant Professor of Wildlife Conservation
- Susan E. Parks, Ph.D. (MIT & Woods Hole Oceanographic Inst) Assistant Professor of Acoustics and Ecology
- Gary J. San Julian, Ph.D. (Colorado State) Professor of Wildlife Resources
- Charles Schaadt, Ph.D. (McGill) Assistant Professor of Wildlife Technology
- Jay R. Stauffer, Jr., Ph.D. (Virginia Tech) Distinguished Professor of Ichthyology
- Walter M. Tzilkowski, Ph.D. (Massachusetts) Associate Professor of Wildlife Science
- Tyler Wagner, Ph.D. (Michigan State) Adjunct Assistant Professor of Fisheries Ecology; Assistant Unit Leader, PACFWRU
- Richard H. Yahner, Ph.D. (Ohio) Professor of Wildlife Conservation

Programs are designed to give students an understanding of the biology and management of terrestrial or aquatic wildlife species and their environments, and include training in fish and wildlife ecology, nutrition, physiology, behavior, and pathology of wildlife species; study of successional stages, land use, and management of various habitats and their impact on fish and wildlife populations; population dynamics and manipulation of animal numbers; and studies of recreational, aesthetic, and socioeconomic values of fish and wildlife. Most programs of study are strengthened by including appropriate courses offered by related departments.

### Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. A student may be admitted provisionally without GRE scores. Requirements listed here are in addition to general Graduate School requirements stated in the [GENERAL INFORMATION](#) section of the *Graduate Bulletin*.

Application materials should be submitted before February by those who want to begin in summer or fall. For admission, an applicant should have at least a 2.75 grade-point average, a 3.00 junior/senior average, and courses that are basic to the individual's field of specialization. Ordinarily these include 12 credits in communication, 12 credits in social sciences and humanities, 10 credits in quantification including calculus and statistics, 8 credits in chemistry and/or physics, 8 credits in biological sciences, and 18 credits in fish, wildlife, forestry, or related courses. Three reference reports (forms supplied on request), and a brief statement describing the applicant's academic goals, career interests, and special qualifications are required. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

Admission to the Ph.D. program in Wildlife and Fisheries Science requires a master's degree in wildlife and fisheries science or a closely related field, or a bachelor's degree with a minimum grade-point average of 3.30 and demonstrated research ability.

### Master's Degree Requirements

**M.S.:** In addition to Graduate School requirements, 6 credits of statistics and 2 credits of colloquium are required.

### Doctoral Degree Requirements

Doctoral students would normally emphasize either wildlife or fisheries in their course selection. Course work shall include at least 15 graduate credits beyond those required for an M.S. in Wildlife and Fisheries Science. At least 9 of these credits must include courses at the 500 level with a Wildlife and Fisheries Science designation.

An international communications or cultural requirement is required for the Ph.D. degree. This requirement may be satisfied by demonstrating competence in one foreign language equivalent to passing two or three college-level courses. It also may be met by two courses in one or two contemporary foreign cultures. With approval of the doctoral committee, a student may petition the Graduate Faculty of the school for waiver of the international communications or culture requirement.

Students must pass the candidacy examination during their first year of residence and a comprehensive examination which is given after all course requirements have been completed. The final examination is oral; all doctoral students are required to present a public seminar on their dissertation prior to the final examination.

### Watershed Stewardship Option

The Graduate Option in Watershed Stewardship is intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program within Wildlife and Fisheries Science. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at water resources problems encountered in Pennsylvania communities, especially nonpoint source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2). One credit of FOR 591 would count as a colloquium course toward degree requirements, but at least 1 additional credit of FOR 590 is required. Breadth courses will consist of three graduate credits of course work from each of four subject matter areas: (1) water resources science, (2) social science, public policy and economics, (3) humanities, and (4) communications and design. In the watershed stewardship practicum courses students work in teams with community, government and business leaders to analyze and understand natural resources problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A representative pattern of scheduling for the Graduate Option in Watershed Stewardship in addition to a student's other degree requirements might be:

#### First Year:

##### Fall Semester

Breadth electives--6 credits  
FOR 591A or LARCH 510.2,  
Watershed Stewardship  
Issues Colloquium--1 credit

##### Spring Semester

Breadth electives--6 credits  
FOR 591B or LARCH 510.2,  
Watershed Colloquium--1 credit

**Second Year:***Fall Semester*

FOR 570 or LARCH 540.2,  
3 credits  
Keystone Project

*Spring Semester*

FOR 571 or LARCH 550.2,  
5 credits  
Keystone Project

A list of acceptable breadth courses from each discipline is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other equivalent (400- or 500-level) degree requirements with concurrence of their adviser and graduate committee. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.S. or Ph.D. degree programs within Wildlife and Fisheries Sciences may apply to participate in the Graduate Option in Watershed Stewardship.

**Other Relevant Information**

Each entering student receives individual guidance from an adviser, and later from his or her committee, in designing a program of studies and research based on his or her own interests. The student is responsible for conforming to all requirements summarized in the "Graduate Studies Handbook" of the School of Forest Resources, and for completing the degree program within a reasonable time, i.e., two years for a master's degree and three years for a Ph.D.

**Student Aid**

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the [STUDENT AID](#) section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

*Forest Resources: Jesse Rossiter Rapp Memorial Scholarship*

Available to graduate students in the School of Forest Resources who are not holding assistantships as graduate students. Apply to the School of Forest Resources' Scholarships, Loans, and Awards Committee.

*Roger M. Latham Memorial Award*

Awarded to outstanding graduate students specializing in wildlife or fisheries after at least one semester in residence.

**Courses**

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**[WILDLIFE AND FISHERIES SCIENCE \(W F S\) course list](#)**

See also Forest Resources.

**Joint Degree Programs between The Pennsylvania State University Dickinson School of Law (J.D.) and the School of Forest Resources (M.S., Ph.D.)**

**Joint Degree Program.** The Pennsylvania State University Dickinson School of Law (DSL) and the School of Forest Resources (SFR) will offer coordinated programs of studies leading to the degrees of Juris Doctor (J.D.) and a Master of Science (M.S.), or a Doctor of Philosophy (Ph.D.) in Wildlife and Fisheries Science. The SFR programs are interdisciplinary.

**Admissions.** In order to be admitted to the program, students may a) first be admitted and enrolled in either SFR or DSL, and be subsequently admitted to the other program, or b) be admitted to the joint degree program prior to commencing studies at Pennsylvania State University. Credits earned in the SFR program before admission to DSL cannot, however, be credited to the J.D. degree. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates. Applications for transfer into the joint degree program from another law school or forestry/natural resources program at another University will be considered on a case-by-case basis.

**Admission Requirements**

**Dickinson School of Law (DSL).** A bachelor's or equivalent degree from an accredited college is a prerequisite for admission. However, there is no standard prescribed undergraduate curriculum. An applicant should have acquired significant oral, and written communications skills before entering law school. The following are required of applicants: a completed application form for DSL; taking of the Law School Admissions Test (LSAT); completion of an LSDAS report; a one-page personal statement; employment record since high school; and two recommendations.

**School of Forest Resources:** A Bachelor's or equivalent degree from a regionally accredited college is a prerequisite for admission to a master's degree program, with a cumulative grade point average of 2.75 and junior-senior average of 3.0, based on a maximum 4.0 system. The following are also required of applicants to the joint degree program: taking of the Graduate Record Examination (GRE) or the LSAT; an official undergraduate transcript or transcripts; a personal statement; employment record since high school; and three recommendations. There is no prescribed undergraduate curriculum, and, because of the diversity of programs in the School, professional preparation may vary considerably. As a guide, SFR suggests having 8 credit hours in chemistry and/or physics; 12 in calculus, statistics, and/or computer science; 8 in biology, botany, and/or zoology; 12 in writing and speaking; 12 in economics, social sciences, and/or humanities; and 18 in forest science, wildlife and fisheries science, and/or wood products. Completed applications showing that a candidate is qualified for admission will be forwarded to potential faculty advisers in SFR, and admission of otherwise qualified candidates will depend upon the willingness of a faculty member to act as an adviser. Applicants are advised to contact potential advisers before applying and should contact the SFR liaison (the Goddard Chair), as well as the SFR Assistant Director of Graduate Studies, to identify potential advisers.

Admission to the Ph.D. program requires evidence of research ability, e.g., a master's degree thesis, paper, or equivalent publication and a grade point average of 3.3 or higher in graduate studies work, exclusive of thesis and special problem courses. Baccalaureate degree students graduating from an honors program with a required thesis, or who have authored a refereed publication, may be considered for admittance without a master's degree.

**Residency:** For master's programs, 5 semesters' residence is required at the Law School and 3 semesters' residence at the SFR at University Park, although additional time may be required to complete the M.S. thesis requirements. For Ph.D. programs, the same minimum number of semesters will be required, as well as the additional time as required to complete additional course work and a dissertation. In addition, Ph.D. candidates must arrange the sequence of semesters such that they are in residence at University Park as a full time student for at least two semesters in a single 12-month period. Although a student will normally take all courses at the campus where the student is in residence, a student may take up to one course (three credit hours) per semester at the campus where the student is not in residence. A Ph.D. joint degree student in residence at DSL will be considered to be "registered" at University Park for the purpose of satisfying any requirement of continuous registration and/or benchmarking in the Ph.D. program.

**Liaisons:** The respective liaisons for DSL and SFR shall be as follows: The Department and Faculty liaison for DSL shall be the Associate Dean for Academic Affairs and the student adviser will be the Director of the Agricultural Law Center or such other faculty member(s) as may be designated by the Dean. The liaison for SFR for the Joint Degree Program and the student contact for inquiries regarding the Joint Degree Program shall be the then current holder of the Maurice K. Goddard Chair in Forestry and Environmental Resources Conservation, or the Director of SFR when there is no current appointee to the Goddard Chair.

**Interprogram Transfer of Credits**

**J.D.** A maximum of 12 credits for SFR course work may be transferred for credit toward the J.D. degree at DSL. Students must obtain a grade satisfactory to

DSL for the course work to be credited toward the J.D. degree. What courses may qualify for credit shall be determined by the DSL liaison. Because of the interdisciplinary nature of many SFR degrees, courses from other Departments and Colleges are credited towards an SFR degree with the approval of the SFR committee (e.g. courses in Economics, Agricultural Economics, Agricultural and Extension, Agronomy, Entomology, Geosciences, Landscape Architecture, Leisure Studies, Meteorology, Plant Pathology, Soil Science, EPC) and credits of these courses will be treated as SFR courses (i.e. may be credited to the DSL program with DSL approval, subject to the 12-credit limit).

**SFR Degrees:** The SFR programs are interdisciplinary programs and typically credits from other Departments and Colleges may be credited. What courses may be credited will be determined by the student's SFR committee. Normally, a maximum of 12 credits of DSL course work will be counted for credit toward the minimum requirements for an SFR Master's degree, subject to approval by the student's SFR committee.

**Sequence.** The sequence of courses will be determined by the students and their advisers. Generally, however, students will complete the first year of the DSL program before beginning the SFR program. Thereafter, students may concurrently enroll in courses in the DSL and SFR programs, provided that they abide by the requirements of each program. The ordinary expectation will be that students will spend entire semesters at one location or the other.

**Recommended Program of Study and Advising.** All students in the program will have two advisers, one from DSL and one from SFR (the committee chair). Periodic interaction between the two advisers will be encouraged. A program of study will be developed for each student taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year, but some are offered every two or three years. Advisers will have available a list of projected relevant offerings in order to work with the student on an individualized program of study. The standard committee structure will apply to the SFR programs.

**Tuition.** Students will be charged the applicable DSL tuition to cover the J.D. program and the applicable SFR tuition to cover the SFR degree program. The DSL tuition will be paid for the semesters that the student is in residence at DSL and the SFR tuition will be paid for the semesters that the student is in residence at University Park. A student may take up to one course (3 credit hours) per semester at the campus where the student is not residence without, any change in tuition, but must pay additional tuition to the nonresidential campus if he or she wishes to take additional course work at that campus during that semester.\*

**Financial Aid and Assistantships.** Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Generally, SFR assistantships and financial aid will not apply to time spent at DSL.

**Fulfillment of Degree Requirements and Graduation.** A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree, provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count toward meeting the requirements of the other program must be completed before award of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the interprogram transfer of credits. With respect to SFR's requirement for a thesis or paper, work done while at DSL under the supervision of a DSL faculty member may be appropriate for incorporation into the thesis or paper with the approval of the SFR committee (in such cases, the committee should consider whether credits afforded such work will be subject to the 12-credit maximum for interprogram transfers described in paragraph 6(b) and the DSL faculty member should be a member of the committee).

\*After taking comprehensive examinations, a Ph.D. student must pay tuition for all courses taken at any campus where the Ph.D. student is not registered.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-081

Review Date: 02/21/2012

Last updated by Publications: 10/27/11

## Workforce Education and Development (WF ED)

[Program Home Page](#)

KYLE PECK, *Director of Graduate Studies*  
314 Keller Building  
814-863-2596

### Degrees Conferred:

Ph.D., M.S., M.Ed.

### The Graduate Faculty

- Rose Baker, Ph.D. (Penn State) Assistant Professor of Education
- Robert W. Clark, Ph.D. (Penn State) Associate Professor of Education
- Wesley E. Donahue, Ph.D. (Penn State) Associate Professor of Management Development
- Edgar I. Farmer, D.Ed. (Penn State) Professor of Education
- Kenneth C. Gray, Ed.D. (Virginia Tech) Professor Emeritus of Education
- Judith A. Kolb, Ph.D. (U of Denver) Associate Professor of Education
- David L. Passmore, Ph.D. (Minnesota) Professor of Education
- Cynthia Pellock, Ph.D. (Penn State) Associate Professor of Education
- William J. Rothwell, Ph.D. (Illinois) Professor of Education
- Mark Threeton, Ph.D. (Penn State) Assistant Professor of Education
- Richard A. Walter, Ph.D. (Penn State) Associate Professor of Education

The general focus of the program is preparation for entry into professional positions within the broadly conceived field of workforce education and development, including human resource development in industry, secondary and postsecondary technical education, and employability programs for special populations. Emphases within the program include: training and development/human resources, leadership/administration, school-to-work, and postsecondary technical and community college leadership.

### Admission Requirements

Admission to graduate programs in Workforce Education and Development (WF ED) is based on the faculty's evaluation of a candidate's prior undergraduate and graduate work, relevant prior work experience including military service, and career goals. A minimum undergraduate GPA of 2.50 is required for admission to the master's degree program. A GPA of 3.00 in prior graduate course work is required for admission to the doctoral program.

### Degree Requirements

#### Master's Degrees Requirements

M.Ed. and M.S. degrees are offered in Workforce Education and Development, both of which require a minimum of 30 credits beyond the baccalaureate degree. M.S. candidates must complete a master's thesis or paper. Candidates for the M.Ed. degree must complete a written comprehensive examination.

#### Doctoral Degrees Requirements

The Ph.D. degree is offered in Workforce Education and Development. Two or more years of prior full-time work experience that is relevant to WF ED is an important consideration in evaluating applications for the doctoral program. Students are admitted only for the fall semester. Beginning students are not formally granted candidate status for a doctoral degree until successfully completing the candidacy exam given in the spring semester. Please see WF ED Web site for further details.

### Student Aid

A limited number of graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

### Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[WORKFORCE EDUCATION AND DEVELOPMENT \(WF ED\) course list](#)

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-109

Review Date: 01/10/2012

Faculty updated: 3/1/13

## Women's Studies (WMNST)

[Program Home Page](#)

CAROLYN SACHS, *Head, Department of Women's Studies*  
LORI GINZBERG, *Graduate Officer*

133 Willard Building  
814-863-4025; fax: 814-863-3578

### Degrees Conferred

Students electing this program through participating departments will earn a degree with a dual title at both the Ph.D. and M.A./M.S. levels, i.e., Ph.D. in (graduate program name) and Women's Studies, or M.A./M.S. in (graduate program name) and Women's Studies.

The following graduate programs offer dual degrees in Women's Studies: Adult Education, Curriculum and Instruction, English, French, Geography, History, Philosophy, Political Science, Psychology, and Rural Sociology.

### The Graduate Faculty

Women's Studies-affiliated faculty include individuals with budgeted appointments in Women's Studies and individuals with courtesy joint appointments. The following faculty members have budgeted and courtesy joint appointments in Women's Studies:

- Micaela Amato, M.F.A. (Colorado) Professor of Art and Women's Studies
- Lee Ann Banaszak, Ph.D. (Washington U) Associate Professor of Political Science and Women's Studies
- Wenda Bauchspies, Ph.D. (Rensselaer) Assistant Professor of Science, Technology, and Society, and Women's Studies
- Robin Becker, Ph.D. (Boston) Associate Professor of English and Women's Studies
- John P. Christman, Ph.D. (Illinois) Associate Professor of Philosophy and Women's Studies
- Christine Clark-Evans, Ph.D. (Bryn Mawr) Associate Professor of French, Women's Studies and African and African American Studies
- Deborah Clarke, Ph.D. (Yale) Associate Professor of English and Women's Studies
- Mary De Jong, Ph.D. (S. Carolina) Associate Professor of English and Women's Studies
- Lorraine Dowler, Ph.D. (Syracuse) Associate Professor of Geography and Women's Studies
- Robert Drago, Ph.D. (UMass) Professor of Labor Studies and Industrial Relations and Women's Studies
- Yvonne Gaudelius, Ph.D. (Penn State) Associate Professor of Art Education and Women's Studies
- Lori Ginzberg, Ph.D. (Yale) Associate Professor of History and Women's Studies
- Cheryl Glenn, Ph.D. (Ohio) Associate Professor of English and Women's Studies
- Marnina Gonick, Ph.D. (Toronto) Assistant Professor of Curriculum and Instruction, and Women's Studies
- Amy Greenberg, Ph.D. (Harvard) Associate Professor of History and Women's Studies
- Irene Harvey, Ph.D. (York) Associate Professor of Philosophy and Women's Studies
- Lisa Hogan, Ph.D. (Indiana) Senior Lecturer in Communication Arts and Sciences, and Women's Studies
- Charlotte Holmes, M.F.A. (Columbia) Associate Professor of English and Women's Studies
- Kathryn E. Hood, Ph.D. (Temple) Associate Professor of Human Development and Women's Studies
- Patricia Johnson, Ph.D. (Michigan) Associate Professor of Anthropology and Women's Studies
- Jane Juffer, Ph.D. (Illinois, Urbana-Champaign) Assistant Professor of English and Women's Studies
- Julie Kasdorf, Ph.D. (NYU) Associate Professor of English and Women's Studies
- Claire Katz, Ph.D. (Memphis) Associate Professor of Philosophy, Jewish Studies, and Women's Studies
- Karen Keifer-Boyd, Ph.D. (Oregon) Associate Professor of Art Education and Women's Studies
- Patricia Koch, Ph.D. (Penn State) Associate Professor of Biobehavioral Health, Health Education, and Women's Studies
- Joan Landes, Ph.D. (NYU) Ferree Professor of Early Modern History and Women's Studies
- Margaret Lyday, Ph.D. (Catholic U of America) Associate Professor of English and Women's Studies
- Janet Lyon, Ph.D. (Virginia) Associate Professor of English and Women's Studies
- Christiane Makward, Ph.D. Docteur es Lettres (Sorbonne) Professor of French and Women's Studies
- Phyllis Mansfield, Ph.D. (Penn State) Professor of Women's Studies
- Sophia McClennen, Ph.D. (Duke) Associate Professor of Comparative Literature, Spanish, and Women's Studies
- Sallie McCorkle, M.F.A. (Rutgers) Associate Professor of Art and Women's Studies
- Sally McMurry, Ph.D. (Cornell) Professor of American History and Women's Studies
- Benedicte Monicat, Ph.D. (Maryland) Associate Professor of French and Women's Studies
- Cecelia Novero, Ph.D. (Chicago) Assistant Professor of German, Comparative Literature, and Women's Studies
- Stacy Rogers, Ph.D. (Ohio State) Associate Professor of Sociology, Crime, Law, and Justice, and Women's Studies
- Carolyn Sachs, Ph.D. (Kentucky) Professor of Rural Sociology and Women's Studies
- David Shapiro, Ph.D. (Princeton) Professor of Economics, Demography, and Women's Studies
- Stephanie Shields, Ph.D. (Penn State) Professor of Psychology and Women's Studies
- Sandra Spanier, Ph.D. (Penn State) Associate Professor of English and Women's Studies
- Stephanie Springgay, Ph.D. (U of British Columbia) Assistant Professor of Art Education and Women's Studies
- Susan Squier, Ph.D. (Stanford) Julia Gregg Brill Professor of English and Women's Studies
- Shannon Sullivan, Ph.D. Assistant Professor of Philosophy and Women's Studies
- Nancy Tuana, Ph.D. (California) DuPont/Class of 1949 Professor in Ethics; Professor of Philosophy and Women's Studies; Director, Rock Ethics Institute; Interim Head, Department of Philosophy
- Cassandra Veney, Ph.D. (Missouri) Assistant Professor of Women's Studies, and African and African American Studies
- Theresa K. Vescio, Ph.D. (Kansas) Assistant Professor of Psychology and Women's Studies
- Aaronette M. White, Ph.D. (Washington U) Assistant Professor of Women's Studies, and African and African American Studies
- Linda Woodbridge, Ph.D. (UCLA) Professor of English and Women's Studies
- Linda Wray, Ph.D. (Southern California) Assistant Professor of Biobehavioral Health and Women's Studies
- Melissa Wright, Ph.D. (Johns Hopkins) Assistant Professor of Geography and Women's Studies

Dual-title degrees grounded both in Women's Studies and a given discipline will acknowledge and foster scholarly work across disciplines. A dual-title degree program will increase the intellectual rigor and breadth of graduate work through immersion of candidates in Women's Studies and their discipline. The dual-title degree will also provide a context in which students can learn to synthesize knowledge within and across disciplinary boundaries. In addition, a dual-title degree program provides students with an opportunity for increased work within a pedagogical framework that also encourages an interdisciplinary approach to teaching.

The primary advantages of dual-title degrees include the intellectual and academic advantages of interdisciplinary, strengthening the reputation of individual programs/departments through innovative degree programs, increased recruitment of quality graduate students, and improved placement of doctoral graduates.

The dual-title degree programs do not duplicate other degree programs in the University.

### Admission Requirements

In addition to the admission requirements set forth by the Graduate School and the cooperating department, students will be admitted to graduate study in Women's Studies by an admissions committee of Women's Studies-affiliated faculty. The Women's Studies program will follow the timetable and admission requirements of the cooperating department. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background should be considered for study. It is required that prospective students seeking admission to a dual-title degree program will write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and feminist research.

### Degree Requirements

The dual-title degree will have requirements above those for the graduate minor, which currently requires 9 credit hours for the M.A./M.S. and 15 credit hours for the Ph.D. The requirements for the dual-title degree include increased course work, additional components to the comprehensive exams at the doctoral level, and the completion of women's studies related theses at both the master's and doctoral level. Degree requirements for dual-title degrees in Political Science, French, History, English, Education, Geography, Curriculum and Instruction, and Philosophy will be added to the Women's Studies Graduate Handbook.

### Master's Degree

9 required credits (WMNST 501, WMNST 502, WMNST 507)

3 additional credits of Women's Studies course work

Thesis on a Women's Studies-related topic, or another 3 additional credits of Women's Studies course work and a master's essay will be approved by the student's committee

### Ph.D. Degree

9 required credits (WMNST 501, WMNST 502, WMNST 507)

9 additional credits of Women's Studies course work (at least 6 of these should be at the 500 level)

Comprehensive examination in Women's Studies and the disciplinary field

Dissertation on a Women's Studies-related topic will be approved by the student's committee

### Foreign Language and English Competency Requirements

The student will fulfill the language requirement specified by the cooperating department through which the student is admitted to the dual-title degree program.

### Candidacy

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the cooperating department. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in Women's Studies.

### Committee Composition

For a dual-title M.A./M.S., the recommended student's committee will include at least one Women's Studies-affiliated faculty member.

For a dual-title Ph.D., 2 out of 4 members of the committee will be Women's Studies-affiliated faculty members.

### Comprehensive Exams

The Women's Studies affiliated faculty members on the student's committee are responsible for administering a comprehensive examination in Women's Studies that constitutes a portion of the student's comprehensive exams. The women's studies portion of the exam will focus on the following areas: feminist theory, feminist methodology, global feminism, and feminist studies in the student's discipline.

### Dissertation

A dissertation on a women's studies topic is required of students in the dual-title degree program. The women's studies-related topic of the dissertation will be approved by the student's committee.

### Women's Studies Minor

An interdisciplinary dual-degree graduate minor is available, administered by the Women's Studies program. Each student's major and minor is planned by the student and the Women's Studies graduate adviser in consultation with the student's graduate adviser in his or her major field.

**Master's Minor Requirements:** Master's-level dual-title degree students are required to take 9 credits of course work in Women's Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 3 additional credits in Women's Studies, chosen in consultation with the Women's Studies graduate adviser.

**Doctoral Minor Requirements:** Doctoral-level dual-title degree students are required to take 9 credits of course work in Women's Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 9 additional credits of Women's Studies course work (at least 6 of which should be at the 500 level), chosen in consultation with the Women's Studies graduate adviser.

9 credits required credits of Women's Studies courses for master's level  
15 credits required credits of Women's Studies courses for doctoral level

The above credits are in addition to the requirements for the student's major. Six credits consist of required courses in feminist theory (3) and feminist methodology (3). The remaining credits may include a combination of WMNST 400- and 500-level courses, as well as special topics courses (numbered 497 and 597) and independent/individual studies (496 and 596).

Prescribed courses (6 credits): WMNST 507 Feminist Theory; WMNST 501 Feminist Perspectives on Research and Teaching

Additional courses (a minimum of 3 credits at the 500 level)

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the [STUDENT AID](#) section of the Graduate Bulletin.

Last Revised by the Department: Fall Semester 2001

Blue Sheet Item #: 29-07-048

Review Date: 9/2/03

3/28/08 (moved minor description into program description, per Graduate School)

Last updated by Publications: 7/26/12



## Applied Youth, Family and Community Education (AYFCE)

[Program Home Page](#)

RAMA RADHAKRISHNA, *Interim Head of the Department*  
114 Ferguson Building  
814-865-1688

### Degree Conferred:

M.Ed.

### The Graduate Faculty

- Connie D. Baggett, Ph.D. (Penn State) Associate Professor of Agricultural and Extension Education
- Blannie E. Bowen, Ph.D. (Ohio State) Professor of Agricultural and Extension Education
- Cathy F. Bowen, Ph.D. (Ohio State) Professor of Agricultural and Extension Education
- Mark A. Brennan, Ph.D. (Penn State) Associate Professor of Agricultural and Extension Education
- Thomas H. Bruening, Ph.D. (Iowa State) Associate Professor of Agricultural and Extension Education
- Marilyn Corbin, Ph.D. (Kansas State) Professor of Agricultural and Extension Education
- John C. Ewing, Ph.D. (Ohio State) Assistant Professor of Agricultural and Extension Education
- Daniel D. Foster, Ph.D. (Ohio State) Assistant Professor of Agricultural and Extension Education
- Tracy S. Hoover, Ph.D. (Penn State) Professor of Agricultural and Extension Education
- Patreese D. Ingram, Ed.D. (Western Michigan) Professor of Agricultural and Extension Education
- Matthew S. Kaplan, Ph.D. (CUNY) Professor of Agricultural and Extension Education
- Claudia C. Mincemoyer, Ph.D. (Penn State) Professor of Agricultural and Extension Education
- Daniel F. Perkins, Ph.D. (Michigan State) Professor of Agricultural and Extension Education
- Rama B. Radhakrishna, Ph.D. (Penn State) Professor and Interim Head of Agricultural and Extension Education
- Jan F. Scholl, Ph.D. (Iowa State) Associate Professor of Agricultural and Extension Education
- Nicole S. Webster, Ph.D. (Michigan State) Associate Professor of Agricultural and Extension Education
- Edgar P. Yoder, Ph.D. (Ohio State) Professor of Agricultural and Extension Education

The curriculum prepares students to assume leadership roles in education and human service organizations whose goals are to support and enhance the well-being of youth and families within community settings. Through this graduate program, students will: (1) design, implement, and evaluate educational programs for youth and families; (2) interpret relevant research in youth and family education; and (3) apply research and problem-solving strategies to increase professional effectiveness.

### Admission Requirements

Applicants whose junior/senior grade-point average is below 3.00 on a 4.00 scale for their baccalaureate degree are required to submit Graduate Record Examinations (GRE) scores. The program is tailored to students with baccalaureate degrees in family and consumer science, youth development, or other disciplines closely related to the human sciences.

### Degree Requirements

For the M.Ed., a minimum of 30 credits is required, including a 3-credit professional paper or thesis. The paper or thesis is defended in a one-hour oral examination. The graduate program is organized around the following themes: youth and family education, community-based education, and research. Students have the flexibility to focus their programs in areas of professional interest within youth and family education.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[APPLIED YOUTH, FAMILY AND COMMUNITY EDUCATION \(AYFCE\) course list](#)

Last Revised by the Department: Summer Session 2010

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## Graduate Minors

A graduate minor may be taken in one of the approved graduate degree programs offered at Penn State. However, some formal graduate minors have been approved by the Graduate Council, such as the minors listed on this page. A minor at the graduate level must represent curriculum and study that reflect graduate-level concepts and scholarship, with a preponderance of courses at the 500 level.

A student seeking a minor must have the approval of the student's major program of study, the minor program, and the Graduate School. A student may not pursue more than three minors at one time. If a student pursues more than one minor, each minor must have a separate group of courses to support it (i.e., none of the courses may be used concurrently).

A doctoral minor consists of no fewer than 15 graduate credits of integrated or articulated work in one field related to, but different from, that of the major with a preponderance of courses at the 500 level; however, at a minimum, 6 credits must be at the 500 level. Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishing the doctoral committee and prior to scheduling the comprehensive examination. For more information regarding minors, please see the following web pages.

---For doctoral students:

[http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm)

---For Ph.D. candidates:

[http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm?section=degreeReq2](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq2)

For D.Ed. candidates:

[http://bulletins.psu.edu/bulletins/whitebook/degree\\_requirements.cfm?section=degreeReq3](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq3)

A master's minor consists of no fewer than 6 credits of integrated or articulated work in one field related to, but different from, that of the major; however, at a minimum, 3 credits must be at the 500 level. Official requests to add a master's minor to a student's academic record must be submitted to Graduate Enrollment Services at least one semester prior to the semester the student intends to graduate.

Updated: 12/14/11

## Bioinformatics

The interdisciplinary graduate minor in Bioinformatics is administered by the Engineering Division at Penn State Great Valley and requires 15 graduate credits. The minor offers an opportunity for graduate students in all Penn State colleges and majors to pursue a focused set of graduate courses and gain core competency and experience in informatics, statistics, and ethics as they relate to the field of biotechnology.

Students complete a 9-credit core curriculum of SYSEN 509 Biostatistics, SWENG 552 Bioinformatics, and S T S 589 Ethics and Values in Science and Technology. Students then build upon the core by selecting 6 credits of electives focusing on database design concepts, data mining, and genetic algorithms.

Nine of the 15 credits in this minor may be applied toward the student's major program of graduate study. Students seeking admission to the Bioinformatics minor without appropriate prerequisite courses may be required to complete preparatory courses that are not applicable to either their major or minor program of study.

Additional information and application materials maybe found at [www.gv.psu.edu/bioinformatics](http://www.gv.psu.edu/bioinformatics).

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## Computational Science

The Department of Aerospace Engineering administers this interdisciplinary minor. Each student's program is planned by the student and a designated computational science adviser, in consultation with the graduate adviser in the student's major field.

The minor offers an opportunity for students in all colleges and majors to pursue a focused set of courses that emphasize computational science. The minor requires 9 credits in computational science courses for a master's degree and 15 credits for a doctoral minor. All students must take at least one of these: AERSP 424, CMPSC 450, NUC E 530, or CSE 557 *and* at least one of these: MATH 523, MATH/CSE 550, STAT 500, or STAT/IST 557. The additional credits will be chosen from a list of approved courses on the CSCI Web site ([www.csci.psu.edu](http://www.csci.psu.edu)). In addition, for the Masters Minor and Ph.D. Minor the students can use at most 6 and 9 credits, respectively, from (or cross-listed with) their home department.

More information can be found on the CSCI Web site: <http://www.csci.psu.edu>.

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## Gerontology

The interdisciplinary graduate minor in Gerontology is administered by a committee of faculty appointed by the Gerontology Center Advisory Board. The committee members represent diverse programs within the University. Students admitted to the minor will develop a course of study that includes both prescribed course work and additional course work suited to the student's interests. The minor course of study will be developed jointly by the student, the student's academic adviser, and one member of the graduate minor gerontology committee. Contact the Gerontology Center (S-105 Henderson) for information regarding the committee membership.

The minor requires a minimum of 10 credits of the master's level and 15 credits at the doctoral level, 10 of which are prescribed. The prescribed courses are: BIOL 409 Biology of Aging (3); HD FS/PSYCH 445 Development throughout Adulthood (3); HD FS 590 Gerontology Colloquium (1); and SOC 435/HD FS 434 or SOC 535 (3). Doctoral students must select a minimum of 5 additional credits from among the following courses: ADTED 460, 505, CN ED 415, EDPSY 527, HD FS 446, 447, 579, H P A 442, KINES 481, 482, NURS 464, 500, SOC 535, and gerontology-related special topics courses (SUBJ 497, 597) or independent studies (SUBJ 496, 596).

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## Latin American Studies

The Latin American Studies graduate minor is administered by the Latin American Studies committee. The minor offers students the ability to study the region of Latin America from an interdisciplinary perspective and is open to students from across the University. It is housed in three departments: History; Comparative Literature; and Spanish, Italian and Portuguese. Graduate students from across the University are encouraged to participate. Students who are admitted to the minor will develop courses of study suited to their special interests. The minor for each student will be planned jointly by the student, the student's doctoral adviser, and an adviser designated by the Latin American Studies committee. Any change in the plan must be approved by both advisers. A minimum of 15 credits must be completed, with a minimum of 6 credits at the 500-level. Per graduate school regulations for the minor, a representative of the minor will participate on the student's doctoral committee.

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## **Latina and Latino Studies**

The Latina and Latino Studies graduate minor is an interdisciplinary minor that will be administered by a faculty committee appointed by the dean of Liberal Arts and made up of faculty in English, Comparative Literature, Spanish, and other appropriate disciplines. Graduate students from across the university are encouraged to participate. Students who are admitted to the minor will develop courses of study suited to their special interests. The minor for each student will be planned jointly by the student, the student's doctoral adviser, and an adviser designated by the Latina and Latino Studies committee. Any change in the plan must be approved by both advisers.

A minimum of 15 credits must be completed. Per graduate school regulations for the minor, a representative of the minor will participate on the student's doctoral committee. This representative may be a member of the Latina and Latino Studies committee or any other faculty member approved by that committee.

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## Literary Theory, Criticism, and Aesthetics

This is an interdisciplinary doctoral minor that is administered by two designated advisers, one from the Department of Comparative Literature and one from the Department of Philosophy. Students who are admitted to the minor will develop courses of study suited to their special interests. The minor for each student will be planned jointly by the student and the two advisers, in consultation with the student's doctoral adviser in his or her major field. Any change in the plan must be approved by all of the advisers. A minimum of 15 credits must be selected from among the following courses (including at least 3 credits each in comparative literature and philosophy, chosen from the asterisked courses): ART H 410, CMLIT 502\*, 503\*, 580, ENGL 581, 582, 583, FR 571, GER 591, PHIL 413, 414\*, 516\*, 581, 582, SPAN 587, SPCOM 503, 505, 507, or THEA 503, 504. Note 1: 3 credits of SUBJ 596 in one of the nine subject areas indicated may be substituted for one of the non-asterisked 3-credit courses. Note 2: A student majoring in one of the nine subject areas may not include any courses in that field as part of the minor. Appropriate courses may be substituted.

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## **Linguistics**

The doctoral minor provides interested students with an opportunity to complete a program of scientific study focused on the nature, structure, and use of human language. The minor is designed to cover the foundations of the discipline of linguistics by reviewing fundamental core areas such as phonology and syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and discourse analysis.

The minor requires a minimum of 15 credits, 6 of which must be at the 500 level. Nine credits are prescribed in syntax (LING 400), phonology (LING 404), and a general introduction to linguistics (LING 401), although a linguistics course at the 500 level may be substituted for LING 401 with the approval of the director of the program in Linguistics.

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## Medieval Studies

The graduate minor in Medieval Studies offers graduate students in the humanities an interdisciplinary field of study in an important era in European development. The minor provides students with a broader historical and cultural background for their major discipline. Graduate status is required for admission to the minor.

The graduate minor in Medieval Studies requires 9 credits of course work (of which 3 credits are at the 500 level) for a master's candidate and 15 credits of course work (of which 6 credits are at the 500 level) for a doctoral candidate; the courses will be selected in consultation with an adviser for the minor, who will normally be a member of the Liberal Arts Medieval Studies Committee; and with the chair of the student's graduate committee. The courses for the minor will be chosen from at least two of the following areas outside the students' area of specialization: arts; history; literature and language; medieval studies; philosophy and religious studies; and other areas as available. The sequence of the courses will be determined by the student's major department.

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## Religious Studies

This is a graduate minor administered by the Religious Studies program leading to a minor at the master's or doctoral level. Each student's course of study would be planned jointly by the student and an adviser selected from the Religious Studies faculty, in consultation with the student's adviser in his or her major field.

The minor requires a minimum of 9 credits of Religious Studies courses for a master's degree and 15 credits for a doctorate. These credits are in addition to the requirements for a student's major. Three credits consist of a required course, Research in Religious Studies (RL ST/HIST 565). Students would select among 500-level Religious Studies course to fulfill the remaining requirements. These include: RL ST 532, 536, 539, 596, RL ST/HIST 510, 560, 561, 562, 563, 564.

With the consent of a student's adviser, the student may elect to take a 500-level course in a field closely related to Religious Studies that may help to satisfy the minor's requirements. This may not be in the student's major field.

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## **Science, Technology, and Society**

This interdisciplinary graduate minor is administered by the Science, Technology, and Society Program. Each student's program will be planned by the student and designated S T S graduate adviser, in consultation with the graduate adviser in the student's major field.

The goal of the graduate minor in Science, Technology, and Society is to complement graduate and professional students' major programs through study of the interactions among science, technology, and society. More specific objectives are to promote scholarship in the humanities and social sciences concerning the social and ethical dimensions of science and technology; to inform those training in the scientific and technical professions about the social and ethical dimensions of their professional practice; and to develop research and rhetorical skills used in shaping public discourses about, and public policies regulating, science and technology.

The minor requires 9 credits in S T S courses for a master's and 15 credits for a doctoral minor. Six credits consist of S T S 589 Ethics and Values in Science and Technology and S T S 591 Research and Writing in S T S. The remaining credits may include 400- and 500-level, special topics (S T S 497 and 597), and independent study (S T S 496 and 596) courses.

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## Second Language Acquisition

This interdepartmental doctoral minor draws upon the opportunities that various departments offer to study the processes of language acquisition and pedagogy, and to conduct research in these fields. Developments in the theories of language acquisition, the practices in language instruction, and the technical innovations provide a wide range of resources for secondary specializations in second language acquisition theory. The minor provides an official credential for doctoral students who complete an organized program of study.

The minor requires a minimum of 15 credits at the 400, 500, or 600 levels (beyond credits used for degree requirements in the student's field of study), consisting of one or two methodology courses totaling 3 credits and 12 additional credits selected from an interdepartmental list of eligible courses, with approval both by the student's doctoral committee in his or her major field, and by the person in charge of the minor. A maximum of 6 credits may be taken at the 400 level, and no more than 3 credits of 602 may count toward the minor. Courses in at least two departments must be included. Further, students must complete at least two semesters' experience in supervised teaching of either a foreign language or ESL, or alternative equivalent practicum if approved by the doctoral committee and the person in charge of the Minor.

In general, students whose major field of study in the Ph.D. is a concentration in foreign language acquisition or ESL are not eligible for this minor, as their field of specialization already includes this area. However, students in English as a Second Language may do the minor with a focus on foreign language acquisition or a student with a specialty area in forced language acquisition may complete the minor with a specialty area in English as a Second Language.

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## Social Thought

The purpose of the Social Thought minor is to enable graduate students in a variety of fields to study theories of society across conventional disciplinary boundaries. The minor enables qualified students to enrich their own chosen fields of study with readings and discoveries from other, contiguous fields. The minor requires at least 15 credits of courses with social thought content. These are courses taught by STP Affiliated Faculty or those approved by the STP Advisory Committee. Those 15 credits must include the following: at least 9 credits of courses from outside the student's major discipline and SOCTH 501 -- Introduction to Social Thought. In addition, at least one member of the student's dissertation committee must be an STP Affiliated Faculty and preferably be from outside the student's major discipline.

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## Women's Studies

This interdisciplinary dual degree graduate minor is administered by the Women's Studies program. Each student's major and minor is planned by the student and the Women's Studies graduate adviser in consultation with the student's graduate adviser in his or her major field.

**MASTER'S REQUIREMENTS:** Master's-level dual-title degree students are required to take 9 credits of course work in Women's Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 3 additional credits in Women's Studies, chosen in consultation with the Women's Studies graduate adviser.

**DOCTORAL REQUIREMENTS:** Doctoral-level dual-title degree students are required to take 9 credits of course work in Women's Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 9 additional credits of Women's Studies course work (at least 6 of which should be at the 500 level), chosen in consultation with the Women's Studies graduate adviser.

The minor requires a minimum of 9 credits of Women's Studies courses for a master's degree and 15 credits for a doctorate. These credits are in addition to the requirements for the student's major. Six credits consist of required course in feminist theory (3) and feminist methodology (3). The remaining credits may include a combination of WMNST 400- and 500-level courses, as well as special topics courses (numbered 497 and 597) and independent/individual studies (496 and 596).

Prescribed courses (6 credits): WMNST 507 Feminist Theory; WMNST 501 Feminist Perspectives on Research and Teaching. Additional courses (a minimum of 3 credits at the 500 level).

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## **Postbaccalaureate and Graduate Credit Certificate Programs**

Postbaccalaureate and graduate credit certificate programs are innovations that reflect emerging academic areas, and may be supplements or enhancements to existing degree programs. These credit certificate programs are designed to foster development of an area of specialty or competency within a discipline and flexibility is essential to accommodate the parameters of the discipline as well as the educational needs of the students. The programs consist of a sequence, pattern, or group of courses developed, supervised, and evaluated by the faculty members of the academic unit offering the program.



## Addiction Studies

### Postbaccalaureate Credit Certificate Program

Dr. Richard Hazler  
331 Cedar Building  
University Park, PA 16802  
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Fax: 814-863-7750  
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The postbaccalaureate certificate in Addiction Studies has emerged in response to the growing need among counselors, educators, nurses, clergy, other helping professionals, and individuals working directly in chemical dependency treatment and prevention settings. It is designed to enhance an individual's understanding of clients or students who are experiencing addiction, who may be at risk to experience addiction, or who are affected by somebody else's addiction. Students may opt for either the treatment track or the prevention track. All students must take four 3-credit core courses (12 credits total), as well as one additional 3-credit course for the Prevention track or two additional 3-credit courses for the Treatment track.

### Admission Requirements

All applicants must have a baccalaureate degree from a regionally accredited undergraduate institution whose credit conditions are substantially equivalent to Penn State. Students whose baccalaureate degree is not in a field substantially similar to counseling (e.g., psychology, rehabilitation services, human services, human development and family studies) and/or without substantive work experience in either the addictions field or the field of counseling must take CN ED 403 as a prerequisite prior to being admitted to the certificate program.

### PRESCRIBED COURSES

#### COUNSELOR EDUCATION (CN ED)

- 401. Foundations of Chemical Dependency Counseling (3)
- 416. Interpersonal Relationships and Alcohol and Other Drugs Dependency (3)
- 420. Chemical Dependency: Youth at Risk (3)
- 840. Trends and Issues in Addiction Counseling (3)

#### ADDITIONAL COURSES -- TREATMENT TRACK

#### COUNSELOR EDUCATION (CN ED)

- 541. Counseling Addicted Clients (3)
- 542. Dual Diagnosis (3)

#### ADDITIONAL COURSES -- PREVENTION TRACK

#### COUNSELOR EDUCATION (CN ED)

- 843. Prevention (3)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

- [COUNSELOR EDUCATION \(CN ED\) course list](#)

Effective Date: Summer Session 2009  
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Last Revised by the Department: Summer Session 2009

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## Adult Gerontology Acute Care Nurse Practitioner

### Graduate Credit Certificate Program

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University Park, PA 16802  
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The purpose of the Adult Gerontology Acute Care Nurse Practitioner certificate is to prepare individuals with a Master's degree in Nursing seeking additional certification as an Adult Gerontology Acute Care Nurse Practitioner. The curriculum includes the didactic and clinical courses required for application of the NP role and required for certification. The program of study is variable and may require a total of 31 credits. Up to 9 credits may be waived based on evaluation of transcripts and prior course completion.

### Admission Requirements:

Applicants are required to have a Master's degree in nursing from a NLNAC- or CCNE-accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations and official transcripts from all undergraduate and graduate programs. Applicants are required to have two years of experience as an RN in an acute care/hospital setting.

### Required Courses

#### NURSING (NURS)

- 860. Adult Gerontology Acute Care Nurse Practitioner Role I (3)
- 861. Adult Gerontology Acute Care Nurse Practitioner Role II (3)
- 862. Adult Gerontology Acute Care Nurse Practitioner Practicum I (4)
- 863. Adult Gerontology Acute Care Nurse Practitioner Practicum II (4)
- 864. Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (6)
- 865. Pharmacology for Acute Care Nurse Practitioners (1)
- 866. Health Assessment of the Adult Gerontology Population in Acute Care (1)

### Additional Coursework\*

- 502. Advanced Health Assessment of Adult Populations (3)
- 503. Pathophysiology (3)
- 504. Pharmacologic Therapy (3)

\*Any or all of these courses may be waived based on the certificate program chair's evaluation of transcripts and prior courses completed.

Effective Semester: Fall 2012

Expiration Semester: Summer 2017

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## Agricultural Biosecurity and Food Defense

### Graduate Credit Certificate Program

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This 12-credit graduate certificate program is designed to provide students with broad training in the field of agricultural biosecurity. Courses cover animal and plant health, and food defense aspects of agricultural biosecurity and food defense. Content is both theoretical and applied but with an emphasis on practical application of knowledge gained. A distance education format is used to accommodate the needs of professionals already active in this area.

The certificate program is an attractive option for those who desire advanced graduate training but do not require the full Master's degree program. It is also ideal for students who wish to move into the degree program once all admissions requirements are fulfilled (e.g., GRE); however, successful completion of a certificate program neither implies nor guarantees admission to a graduate degree program at Penn State.

### ADMISSION REQUIREMENTS

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution, and must have a 3.0 or higher undergraduate grade point average. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

### COURSES

#### AGRICULTURAL BIOSECURITY AND FOOD DEFENSE (AGBIO)

- 520. Agricultural Biosecurity (3)
- 521. Food Defense (3)
- 801. Veterinary Infectious Disease Diagnostic and Surveillance Systems (3)
- 802. Plant Protection (3)

Effective Date: Fall Semester 2012  
Expiration Date: Fall Semester 2017

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-148

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## Applied Behavior Analysis

### Graduate Credit Certificate Program

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This program is intended for those who seek advanced knowledge in the field of applied behavior analysis. The 18-credit curriculum is specifically designed to prepare students to sit for the BCBA certification examination sponsored by the Behavior Analyst Certification Board. After completing the program, students will be able to:

1. Describe the basic principles of behavior and how those principles relate to community/classroom situations with clients.
2. Develop procedures to determine the purpose of aberrant behavior for an individual, determine if targeted behaviors warrant intervention, and monitor the effects of interventions.
3. Develop interventions based on the purpose of aberrant behavior.
4. Develop instructional programs to teach new behaviors that are functional in school and community settings.

#### ADMISSION REQUIREMENTS:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

#### PRESCRIBED COURSES

##### SPECIAL EDUCATION (SPLED)

- 503A. Applied Behavior Analysis for Special Education: Basic Principles I (4)
- 503B. Applied Behavior Analysis for Special Education: Basic Principles II (4)
- 503C. Applied Behavior Analysis for Special Education: Extended Applications I (4)
- 503D. Applied Behavior Analysis for Special Education: Extended Applications II (3)
- 511. Ethical Considerations for Special Education Populations (3)

Effective: Fall Semester 2012  
Expiration: Spring Semester 2017

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## Applied Statistics

### Graduate Credit Certificate Program

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The graduate certificate in Applied Statistics helps quantitative professionals in a variety of fields become knowledgeable and skillful in applied statistics. The certificate was designed specifically for researchers working with statistical data who wish to advance their careers, and for those who seek career changes. The certificate is offered through Penn State's World Campus. Students earn the certificate by completing 12 credits of instructor-led online course work. Two 3-credit courses are required, and the remaining 6 credits are selected from a list of electives. Students who successfully complete the certificate earn 12 academic credits and receive the graduate certificate in Applied Statistics. Students subsequently admitted to the Department of Statistic's professional Master of Applied Statistics degree program may count up to 15 credits of certificate courses toward the M.A.S. degree.

### Admission Requirements

An applicant must have received, from a regionally accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. Applicants from countries in which English is not the primary language must earn TOEFL scores of at least 550 for the paper test or 213 for the computer-based test.

### Admission Procedures

Students interested in applying for admission to the Graduate Certificate in Applied Statistics program should go to the World Campus web site: [http://www.worldcampus.psu.edu/AppliedStatisticsCertificate\\_Admissions.shtml](http://www.worldcampus.psu.edu/AppliedStatisticsCertificate_Admissions.shtml)

### PRESCRIBED COURSES

#### STATISTICS (STAT)

- 500. Applied Statistics (3)
- 501. Regression Methods (3)

#### ELECTIVES

Choose at least 6 credits from:

#### STATISTICS (STAT)

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 480. \*Introduction to SAS (1)
- 481. Intermediate SAS for Data Management (1)
- 482. \*Advanced Topics in SAS (1)
- 483. \*Statistical Analysis Systems Programming (3)
- 502. Analysis of Variance and Design of Experiments (3)
- 503. Design of Experiments (3)
- 504. Analysis of Discrete Data (3)
- 505. Applied Multivariate Statistical Analysis (3)
- 506. Sampling Theory and Methods (3)
- 507. Epidemiologic Research Methods (3)
- 509. Design and Analysis of Clinical Trials (3)
- 510. Applied Time Series Analysis (3)

\* Note: credits cannot be taken for both 483 and 480-482.

#### GEOGRAPHY (GEOG)

- 483. Problem-Solving with GIS (3)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

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Expiration Date: Fall Semester 2016

Last Revised by the Department: Fall Semester 2011

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## **Educating Individuals with Autism**

### **Postbaccalaureate Credit Certificate Program**

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The focus of this postbaccalaureate certificate program is to provide comprehensive, evidence-based information on creating effective educational programming for individuals with autism spectrum disorders. After completing the 12-credit program, students will be able to assess individuals with autism spectrum disorders to effectively provide instruction; develop strategies to enhance social, behavioral, communication, and academic gains; strengthen professional skills to work with families; and develop professional competencies to work with other educators and personnel in related disciplines.

For admission into this program, applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

#### Required Courses:

- SPLED 461 Autism: Issues and Concerns (3)
- SPLED 462 Autism and Applied Behavior Analysis (3)
- SPLED 463 Communication and Social Competence (3)
- SPLED 464 Assessment and Curriculum (3)

Effective Semester: Fall Semester 2012

Expiration Semester: Summer Session 2017

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-01-081

Review Date: 08/14/2012

## Children's Literature

### Graduate Credit Certificate Program

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The goal of the program is to provide students with an in-depth background in the theories and genres of literature for children and youth while also considering pedagogical (broadly construed) and cultural implications. Students are required to take LL ED 502, Studies in Literature for Children, as their initial course in the program as a foundation to the various orientations to the study of children's literature. Students may then choose a minimum of four additional courses in areas such as picture books, fantasy literature, myth and folklore, cultural and social issues, and research approaches for a total of 15 credits. The program does not lead to any initial teacher certification, but may assist students with recertification. Students should check with their specific state departments of education for regulations regarding recertification.

#### Admission Requirements:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

#### PRESCRIBED COURSE:

LANGUAGE AND LITERACY EDUCATION (LL ED)

502. Studies in Literature for Children (3)

#### ADDITIONAL COURSES:

Select four courses from the following:

- 462. The Art of the Picture Book (3)
- 465. Fantasy Literature for Children (3)
- 561. Cultural Pluralism in Children's and Adolescent Literature (3)
- 563. Myths and Folklore in Children's Literature (3)
- 568. Doing Research in Children's Literature (3)

Effective: Fall Semester 2012  
Expiration: Spring Semester 2017

Blue Sheet Item #: 41-02-066

Review Date: 10/02/2012

## Heritage and Museum Practice

### Graduate Credit Certificate Program

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This 15-credit graduate certificate program offered at Penn State Harrisburg provides students with knowledge of practices in the heritage and museum sector, which includes historical and heritage societies, art galleries, archives and record management programs, educational institutions, cultural and governmental agencies, preservation and cultural resource management groups, and media production companies. A goal of the program is to enable students to conceptualize, deliver, and manage effective heritage and museum projects. The Heritage and Museum Practice certificate is awarded for successful completion of 9 credits of prescribed courses plus 6 credits of electives from an approved list of courses. Students must earn a grade of B or above in each course that counts toward the certificate program.

#### Admission Requirements:

An applicant must hold either a baccalaureate degree from a regionally accredited U.S. institution or a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

A candidate in the certificate program may also become a candidate in the Master of Arts in American Studies, Master of Arts in Humanities, or Master of Arts in Public Administration degree programs if the candidate is admitted to one of these graduate degree programs; however, successful completion of the certificate program neither implies nor guarantees admission to any graduate degree program at Penn State. Students enrolled in any of these degree programs may apply credits earned toward the certificate as elective credits with program approval. Up to 15 credits of coursework taken in nondegree status can count towards a graduate degree.

#### GPA REQUIREMENT

Applicants are expected to have 2.75 GPA or above in the last two years of undergraduate work in American Studies, history, art, architecture, anthropology, folklore, management, communications, or fields related to museum and heritage practice.

#### PRESCRIBED COURSES (9 credits)

##### AMERICAN STUDIES (AM ST)

480. MUSEUM STUDIES (3)  
481. HISTORIC PRESERVATION (3) or 482. PUBLIC HERITAGE (3)  
550. SEMINAR IN PUBLIC HERITAGE (3)

#### ADDITIONAL COURSES (6 credits)

In addition to the 9 credits of prescribed coursework, students must select 6 credits from the following list of 500-level elective courses.

##### AMERICAN STUDIES (AM ST)

530. TOPICS IN FOLKLORE (3)  
531. MATERIAL CULTURE AND FOLKLIFE (3)  
575. MUSEUM INTERNSHIP (3)  
551. SEMINAR IN LOCAL AND REGIONAL STUDIES (3)  
570. TOPICS IN AMERICAN ART (1 - 6 per semester)  
592. FIELD EXPERIENCE IN AMERICAN STUDIES (3)

##### PUBLIC ADMINISTRATION (P ADM)

500. PUBLIC ORGANIZATION AND MANAGEMENT (3)  
505. HUMAN RESOURCES IN THE PUBLIC AND NONPROFIT SECTORS (3)  
516. STRATEGIC PLANNING (3)  
517. NONPROFIT ORGANIZATIONS: HISTORY AND EVOLUTION (3)  
518. NONPROFIT ORGANIZATIONS: MANAGEMENT AND LEADERSHIP (3)  
519. NONPROFIT ORGANIZATIONS: RESOURCE DEVELOPMENT AND MANAGEMENT (3)

**Effective Semester:** Spring 2013

**Expiration Semester:** Fall 2017

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-06-199

Review Date: 04/09/2013



## Clinical Research

### Graduate Credit Certificate Program

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In the current medical climate, there is a growing need for academic clinicians and health care professionals who are trained in clinical research. Unfortunately, there are few programs that offer the didactic preparation for the unique requirements of a clinical researcher.

The primary goal of this program is to provide a formal, structured program that will prepare certificate candidates to pursue a successful career in clinical research. The curriculum includes courses in biostatistics, epidemiology, clinical trials, decision and cost-effectiveness analysis, outcomes measurement, quality management, health care economics and policy, scientific communication, and SAS statistical analysis computing. The 15 credit hour program offers courses on weekday evenings, enabling the student to continue clinical or employment activities. Certificate candidates will be able to complete the 15 credit hour requirement in 2 semesters.

### Admission Requirements

The successful applicant must have completed a medical, nursing, or baccalaureate degree from a regionally accredited institution. Fellows and junior faculty members with current appointments at the Penn State College of Medicine, as well as nursing graduates and public health personnel, are target candidates for the certificate program.

### COURSES

#### Core (6 prescribed credits)

#### PUBLIC HEALTH SCIENCES (PHS)

- 520. Principles of Biostatistics (3)
- 550. Principles of Epidemiology (3)

In addition to the 6 credits of required core coursework, students must select an additional 9 credits from the following list of electives:

#### PUBLIC HEALTH SCIENCES (PHS)

- 500. Research Ethics (1)
- 511. Methods in Translational Research (1)
- 518. Scientific Communications (1)
- 519. Patient Oriented Research (1)
- 535. Quality of Care Measurement (3)
- 536. Health Survey Research Methods (3)
- 551. Advanced Epidemiological Methods (3)
- 580. Clinical Trials Design Analysis (3)
- 581. Clinical Trials Case Studies (1)
- 801. Data Management (1)

- [PUBLIC HEALTH SCIENCES \(PHS\) course list](#)

Effective Date: Spring Semester 2010  
Expiration Date: Summer Session 2015

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-185

Review Date: 01/10/2012

## Community and Economic Development

### Graduate Credit Certificate Program

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The Graduate Certificate program in Community and Economic Development helps students prepare to confront the multidimensional challenges faced by community development practitioners. The main objective of the certificate program is to educate professionals who will assume leadership roles in helping establish and maintain viable communities. Recipients of the certificate will become deeply involved in assisting localities with a variety of issues, including: developing new organizations and new industries; growth management; protecting the environment; revitalizing downtown areas; enhancing the local quality of life; assisting educational, social, health, and human service systems; and developing vital infrastructure—in short, working with communities to help them shape their own futures.

The certificate program teaches the theory, skills, and tools that allow practitioners to address the important issues in community and economic development. The certificate program emphasizes topical problems, drawing from the experiences of both students and the faculty. Students in Community and Economic Development gain a broad understanding of the dynamics of communities and their social, economic, and political systems. With this training, graduates have a wide range of career opportunities in an expanding job market. Some work for local or regional governments, industrial development authorities and chambers of commerce, major corporations, nongovernmental organizations, or consulting firms. Others may work for development authorities, housing authorities, planning commissions, or environmental planning and development agencies.

### Program Requirements

The Graduate Certificate in Community and Economic Development (CEDEV Certificate) requires 15 credits, consisting of five 3-credit courses. The CEDEV Graduate Certificate is designed to build a basic level of knowledge and skills required for practitioners to address the important issues in community and economic development. Admission to the certificate requires applicants to provide evidence of completion of a baccalaureate degree from a regionally accredited institution.

The certificate program is designed primarily for professionals in the field who wish to expand their existing knowledge and for those who wish to learn about community and economic development, including those working in or interested in dealing with the variety of development issues in America's towns, boroughs, small cities and rural areas. All courses are delivered online through the Penn State World Campus.

The five required courses introduce students to the field and cover the topics of principles of community and economic development, leadership, community structure, capacity and processes, local economic development, planning, population, land use and municipal finance, and the methods and techniques of effective community and economic development. Courses in the certificate program are required courses in the master's degree program in Community and Economic Development and can be transferred into the master's program for qualified applicants.

### Admission Requirements

Students with a 3.00 average (on a 4.00 scale) for the most recent two years of college/university education, or with an advanced degree, and with appropriate course or experiential backgrounds will be considered for admission. To complete an application for the graduate certificate in Community and Economic Development, please visit:

<http://www.worldcampus.psu.edu/degrees-and-certificates/community-and-economic-development-certificate/apply>

## COURSES

### COMMUNITY AND ECONOMIC DEVELOPMENT (CEDEV)

- 430. Principles of Economic Development Planning (3)
- 452. Rural Organization (3)
- 500. Principles of Community and Economic Development and Leadership (3)
- 509. Population, Land Use and Municipal Finance (3)
- 575. Methods and Techniques for Community and Economic Development (3)

Program is jointly offered by Penn State's World Campus and the Department of Agricultural Economics and Rural Sociology, College of Agricultural Science.

- [COMMUNITY AND ECONOMIC DEVELOPMENT \(CEDEV\) course list](#)

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-186

Review Date: 01/10/2012

## Computer and Network Security

### Postbaccalaureate Credit Certificate Program

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The goal of this certificate program is to prepare security analysts and researchers to develop and apply advanced security needs of enterprise and personal environments. To be awarded the Certificate in Computer and Network Security, students must successfully complete 12 credits of course work including CSE 543, and three of the following courses: CMPSC 443, CSE 544, CSE 545, or CSE 546.

### Admission Requirements

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. The successful applicant will possess a baccalaureate degree in computer science, computer engineering, or a closely aligned field and is generally expected to have a minimum GPA of 3.0. International students must satisfy the Graduate School's English language requirement. Professional experience will be taken into consideration for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

GRE scores are not required for nondegree graduate students. Individuals who wish to apply to the graduate degree program in Computer Science & Engineering must submit a graduate-degree application for admission, along with all of the required supporting documentation, including GRE scores; successful completion of the certificate program neither implies nor guarantees admission to a graduate degree program at Penn State.

### COMPUTER SCIENCE (CMPSC)

- 443. Introduction to Computer & Network Security (3)

### COMPUTER SCIENCE AND ENGINEERING (CSE)

- 543. Computer & Network Security (3)
- 544. System Security (3)
- 545. Network Security (3)
- 546. Cryptography (3)

To be awarded the Certificate in Computer and Network Security, students must successfully complete CSE 543, and three (3) of the following courses: CMPSC 443, CSE 544, CSE 545, or CSE 546. All courses must be completed with an average GPA of 3.0; students may not earn a grade of less than B- in any single course.

Effective Date: Summer Session 2009  
Expiration Date: Summer Session 2013

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-072

Review Date: 06/12/2012

## Corporate Finance

### Graduate Credit Certificate Program

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The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in corporate finance.

The program is designed to provide preparation for individuals who work or aspire to work in the corporate finance field as financial analysts, credit managers, investor relations officers, treasurers, controllers, or in related positions in the treasury department or controller's office of an organization, investment banking firms, and commercial lending, or in the area of mergers and acquisitions.

The curriculum focuses on a set of knowledge and skills in financial analysis and reporting, financial modeling and valuation, and capital structure. Course work emphasizes the development of competencies in building pro forma financial statements, company valuation, advanced capital budgeting based on a real options approach, and understanding of 10K reports, as well as mergers and acquisitions, internal control and planning, and decision making under uncertainty. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master's degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master's degree program, as well as for professionals who already hold a master's degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants should submit an online nondegree application, available at <http://www.gradsch.psu.edu/portal/gateway.html>, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current résumé, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With program adviser approval, all four courses in the certificate program may be applied to the master's degree program in Finance or the Master of Business Administration program at Great Valley. Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email [gvadmiss@psu.edu](mailto:gvadmiss@psu.edu)) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

### Curriculum

The graduate certificate program in corporate finance requires a total of four courses (12 graduate credits). Three of the courses are required (ACCTG 512, BUSAD 526, and FIN 531), and the fourth course is an elective selected from a list of three courses (ACCTG 524 or BUSAD 528 or FIN 532). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate. All courses are 3 graduate credits.

#### Prescribed Courses (9 credits)

##### Accounting (ACCTG)

512. Financial Accounting Theory and Reporting Problems (3 credits)

##### Business Administration (BUSAD)

526. Current Issues in Corporate Finance (3 credits)

##### Finance (FIN)

531. Financial Management (3 credits)

**Elective Courses** (Choose 1 from the following 3 courses) (3 credits)

##### Accounting (ACCTG)

524. Managerial Accounting (3 credits)

##### Business Administration (BUSAD)

528. Mergers and Acquisitions (3 credits)

##### Finance (FIN)

532. Financial Decision Processes (3 credits)

- [ACCTG course list](#)
- [BUSAD course list](#)

[• FIN course list](#)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011

Expiration Date: Summer Session 2016

Last reviewed by the Department: Summer Session 2011

Blue Sheet Item #: 40-03-101

Review Date: 11/08/2011

## Data Mining

### Graduate Credit Certificate Program

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The Graduate Certificate Program in Data Mining (DM) empowers professionals with knowledge and skills regarding the discovery and the synthesis of information and knowledge for supporting decision makings. Students will learn the foundations of information sciences, databases, knowledge management and data mining from 3 required courses (9 credits). Through 2 additional elective courses (6 credits), students can learn the theory and the practice on topics ranging from network security, information retrieval, advanced data mining, to intelligent agents. The graduate certificate program provides an excellent advanced education opportunity not only for those professionals from corporations, military, and other government agencies who desire career advancement but also for those who may be interested in a professional master program. Up to 15 credits of coursework taken in non-degree status can count towards a graduate degree (e.g., MPS in Information Sciences).

#### Admission Requirements:

Both students of a graduate degree program (e.g., Master of Professional Studies) and non-degree graduate students can be awarded the graduate certificate after they complete the course requirement of the program.

Applicants for non-degree graduate students must have received, from an accredited institution, a baccalaureate degree equivalent to those required by Penn State. International students must hold the equivalent of an American four-year baccalaureate degree. GRE scores are not required for non-degree graduate students.

A bachelor's degree in a related area (e.g., engineering and science), while not required, is helpful in the successful completion of the certificate. It is expected that students will have a basic level of competency in computer language and information technology (related work experience can be used to demonstrate such competency).

International students must satisfy the Graduate School's English language requirement.

LIST OF COURSES INCLUDED IN THE CERTIFICATE PROGRAM:

#### Required Courses (9 credits):

IST 562. Theoretical Foundations of Information Sciences (3 cr.)  
IST 552. Data and Knowledge Management (3 cr.)  
IST/STAT 557. Data Mining I (3 cr.)

#### Elective Courses (6 credits)

Choose two courses from the following courses or other courses approved by the College of Information Sciences and Technology:

IST 516. Web and Internet Information Retrieval (3 cr.)  
IST 554. Network Management and Security (3 cr.)  
IST 555. Intelligent Agents and Distributed Decision Making (3 cr.)

[INFORMATION SCIENCES AND TECHNOLOGY \(IST\) course list](#)

EFFECTIVE DATE: Spring Semester 2010  
EXPIRATION DATE: Spring Semester 2014

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item#: 37-07-069

Review Date: 6/16/09

## Dietetic Internship

### Postbaccalaureate Credit Certificate Program

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Penn State's Dietetic Internship Program is a postbaccalaureate, general, supervised practice program. Students who have completed a baccalaureate degree and hold a valid Verification Statement from a Didactic Program in Dietetics (DPD) may submit an application for consideration. The internship program is structured according to the Accreditation Council for Education in Nutrition and Dietetics (ACEND) 2012 Eligibility Requirements and Accreditation Standards. Students are required to complete 15 graduate-level credits earning a grade of "B" or better. Upon completion of the program, students are eligible to take the Registration Examination for Dietitians administered by the Commission on Dietetic Registration.

### PRESCRIBED COURSES

#### NUTRITION (NUTR)

- 595A. Application of Community Nutrition -- Internship (3)
- 595B. Application of Food Service Management -- Internship (3)
- 595C. Application of Basic Clinical Nutrition -- Internship (1)
- 595D. Application of Advanced Clinical Nutrition -- Internship (4)
- 595E. Introduction to Nutrition Research -- Internship (1)
- 595F. Professional Portfolio -- Internship (1)

Effective Date: Fall Semester 2012  
Expiration Date: Summer Session 2017

Blue Sheet Item #: 41-02-067

Review Date: 10/02/2012

## Distance Education

### Postbaccalaureate Credit Certificate Program

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The certificate in Distance Education is a postbaccalaureate program designed for educators and trainers who want to expand their knowledge and build competencies in the field of distance education. The certificate program consists of 12 credits of course work in Adult Education (ADTED) of which 6 credits must be at the 500 level. The goal of the program is to assist the students in learning the latest trends, issues, and applications within the field of distance education while experiencing them firsthand as a student.

### Admission Requirements

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants must submit the following materials:

- A one-page resume
- A statement describing professional goals, experiences, and responsibilities (2 page maximum)
- One letter of recommendation
- Official transcripts from all undergraduate and graduate programs previously attended

#### List of Courses Included in the Certificate:

ADTED 460: Introduction to Adult Education  
ADTED 470: Introduction to Distance Education  
ADTED 531: Course Design and Development in Distance Education  
ADTED 532: Research and Evaluation in Distance Education

Effective Date: Spring Semester 2012

Expiration Date: Fall Semester 2016

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-073

Review Date: 06/12/2012



## Enterprise Architecture

### Graduate Credit Certificate Program

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The certificate in Enterprise Architecture (EA) is designed to provide an introduction to EA and increase the knowledge of professionals seeking advanced leadership roles within an organization. EA strives to align the enterprise information systems and technology with business strategy and goals to enable the most effective use of technology to both support and grow an organization. All candidates are required to complete nine (9) credits.

The certificate program is an attractive option not only for those who desire advanced education and do not wish a full Master's Degree program, but also for students who might wish to take a certificate to determine if they are interested in a complete graduate degree program in Enterprise Architecture. Up to 15 credits of Penn State coursework taken in non-degree status can count towards a graduate degree in EA, but completion of the coursework neither implies nor guarantees admission to a graduate degree program at Penn State.

To be awarded the certificate, students must successfully complete 9 credits of graduate course work including EA 871, EA 872 and one of the following courses: EA 873, MANGT 510.

### Admission Requirements

For admission to The Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

For admission to the certificate, a 2.75 GPA, either overall or from the last 60 credits, is needed. A 3.0 GPA must be obtained in order to successfully complete the certificate. GRE scores are not required. Individuals who wish to apply to the master of professional studies degree program in Enterprise Architecture must submit a separate application for degree admission, along with all of the required supporting documentation.

#### Required Courses (6 credits)

EA 871 Enterprise Architecture Foundations I (3)  
EA 872 Enterprise Architecture Foundations II (3)

#### Elective Courses (Select 3 credits)

EA 873 Enterprise Modeling (3)  
MANGT 510 Project Management (3)

Effective Date: Fall Semester 2012  
Expiration Date: Fall Semester 2013

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-076

Review Date: 06/12/2012

## Educational Technology Integration

### Postbaccalaureate Credit Certificate Program

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This 15-credit certificate program prepares educators and instructional design professionals who want to advance their skills in the design, development, and implementation of technology-based learning experiences. The 6-credit core prepares professionals in the use of instructional design principles to select and use appropriate educational technologies to meet learning goals. The remaining 9 credits of study can be used to develop integration skills with additional technologies or to acquire skills that prepare candidates to address issues that are encountered by technology integration leaders.

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (post secondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

**Core Courses** (required courses for all candidates, 6 credits)

EDTEC 440: Educational Technology Integration (3 credits)  
INSYS 415: Systematic Instructional Development (3 credits).

**Candidates must complete three additional courses from the following list.** (9 credits)

EDTEC 448: Using the Internet in the Classroom (3 credits).  
EDTEC 449: Using Video in the Classroom (3 credits).  
EDTEC 461: Designing Computer Networks for Education (3 credits).  
EDTEC 462: Coordinating Technology Use in Education (3 credits).

Effective Semester: Spring Semester 2012  
Expiration Semester: Fall Semester 2016

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-074

Review Date: 06/12/2012

## English as a Second Language (ESL) Program Specialist and Leadership

### Postbaccalaureate Credit Certificate Program

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The primary goal of the ESL Specialist and Leadership Certificate Program, a U.S. Department of Education, Office of English Language Acquisition (OELA), National Professional Development grant-funded program, is to prepare mainstream PreK-12 teachers to work effectively with English Language Learners (ELLs), their families, and communities. The curriculum includes: (1) legal, historical, and socio-cultural background and history of ELLs in the U.S.; (2) linguistics; (3) language acquisition; (4) ESL curricular, instructional, and assessment strategies and best practices; and (5) ESL instructional leadership, action research, and advocacy with ELL populations. The curriculum focuses on helping PreK-12 teachers do the following: (1) become ESL instructional leaders by learning, understanding, and incorporating curricular, instructional, and assessment strategies specifically tailored for ELLs; (2) learn to develop and implement ESL action research projects within their own classrooms; and (3) develop cultural competence, engage in active outreach, and become advocates for ELLs. Candidates are required to take all five courses (15 credits) in sequence.

An additional 1-credit field experience internship is required by the Pennsylvania Department of Education (PDE) to apply for the PDE ESL Program Specialist Certificate. Students who wish to apply for the PDE certificate must take the 1-credit internship along with the final course in the postbaccalaureate credit certificate program.

#### ADMISSION REQUIREMENTS

An entering candidate must hold either (1) a baccalaureate degree in education or a similar field from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree in education or a similar field that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. S/he must possess proof of valid teaching/instructional certification from the Pennsylvania Department of Education (PDE) or, in case of those transferring from other states, be in the process of obtaining certification as a highly qualified teacher. When applying for admission online applicants must submit a formal transcript with their previous higher education coursework, as well as proof of teacher certification. At a minimum, a GPA of 3.0 is expected at the baccalaureate level.

#### List of Courses Included in the Certificate:

EDUC 466: Foundations of Teaching English as a Second Language  
EDUC 467: English Language Structure for English as a Second Language  
EDUC 468: Language Acquisition for English as a Second Language  
EDUC 469: Teaching Methods and Assessment of English as a Second Language  
EDUC 475: ESL Leadership, Research and Advocacy

Effective Date: Summer Session 2012  
Expiration Date: Spring Semester 2017

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-075

Review Date: 06/12/2012

## Family Literacy

### Postbaccalaureate Credit Certificate Program

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The certificate in Family Literacy, based on a multidisciplinary approach to literacy instruction involving both adult educators and early childhood education and family literacy specialists, is intended for location-bound students who work in a variety of literacy-related settings, both formal and informal. These settings include public schools and preschools (teachers, teaching assistants, reading specialists), organizations such as Head Start and grant-funded family literacy programs. The goal of the certificate is to build the capacity of the field to provide high-quality, research-based instruction and program development in family literacy. The certificate consists of a 12-credit program delivered online through the World Campus. The program objectives include strengthening program effectiveness through developing an understanding of staff roles and responsibilities as part of a collaborative family literacy team and supporting a learner-centered approach to delivering program services.

### Admission Requirements

Students must have a baccalaureate degree to enroll.

### PRESCRIBED COURSES

#### ADULT EDUCATION (ADTED)

- 456. Introduction to Family Literacy (3)
- 457. Adult Literacy (3)
- 458. Early Literacy Development (3)
- 459. Interactive Literacy: Parents and Children (3)
- [ADULT EDUCATION \(ADTED\) course list](#)

Effective Date: Fall Semester 2010  
Expiration Date: Summer Session 2015

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-189

Review Date: 01/10/2012

## Family Nurse Practitioner

### Graduate Credit Certificate Program

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The purpose of the Family Nurse Practitioner certificate is to prepare individuals with a Master's degree in Nursing seeking additional certification as a Family Nurse Practitioner. The curriculum includes the didactic and clinical courses required for application of the NP role and required for certification. The program of study is variable and may require a total of 33 credits. Some credits may be waived based on evaluation of transcripts and prior course completion.

### Admission Requirements:

Applicants are required to have a Master's degree in nursing from a NLNAC or CCNE accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations and official transcripts from all undergraduate and graduate programs.

### List of Courses Included in the Certificate:

NURS 502(3), NURS 502A(1), NURS 503(3), NURS 504(3), NURS 870(3), NURS 871(3), NURS 872(3), NURS 873(4), NURS 874(6), NURS 875(2), NURS 876(2)

Effective Semester: Spring 2012  
Expiration Semester: Spring 2016

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-190

Review Date: 01/10/2012

## Financial Risk Management

### Graduate Credit Certificate Program

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The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in financial risk management.

Financial risk management involves identifying and quantifying risk exposure and controlling the risk exposure. This certificate program is designed to help prepare individuals to manage financial risk, including credit risk, market risk, interest rate risk, currency risk, and inflation risks using financial derivative instruments such as forwards, futures, swaps, and options. Course work emphasizes the development of competencies in the valuation of financial derivatives, fixed income securities, and quantitative methods in finance. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

The program is ideal for individuals who wish to develop and expand their analytical, technical, evaluative, and communication skills and expertise in this particular area of finance. Individuals working or aspiring to work as financial risk managers and in related positions focusing on the area of derivatives and managing risk in organizations, including insurance companies, commercial and retail banks, asset management firms, and regulatory agencies, will find the program particularly valuable.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master's degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master's degree program, as well as for professionals who already hold a master's degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants should submit an online nondegree application, available at <http://www.gradsch.psu.edu/portal/gateway.html>, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current résumé, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With adviser approval, all four courses in the certificate program may be applied to the master's degree program in Finance or the Master of Business Administration program at Great Valley. Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email [gvadmiss@psu.edu](mailto:gvadmiss@psu.edu)) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

### Curriculum

The graduate certificate in financial risk management requires a total of four courses (12 graduate credits). Three of the courses are required (FIN 531, FIN 513, and BUSAD 525), and the fourth course is an elective selected from a list of two (BUSAD 527 or FIN 505). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate. All courses are 3 graduate credits.

#### Prescribed Courses (9 credits)

##### Business Administration (BUSAD)

525. Quantitative Methods in Finance (3 credits)

##### Finance (FIN)

513. Speculative Markets (3 credits)  
531. Financial Management (3 credits)

**Elective Course:** Choose one course from the following two (3 credits)

##### Business Administration (BUSAD)

527. Fixed Income Securities (3 credits)

##### Finance (FIN)

505. Multinational Managerial Finance (3 credits)

- [BUSAD course list](#)
- [FIN course list](#)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011

Expiration Date: Summer Session 2016

Last reviewed by the Department: Summer Session 2011

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Review Date: 11/08/2011

## Financial Modeling

### Graduate Credit Certificate Program

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The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in financial modeling.

Financial models are an integral part of nearly all major business decisions. This certificate program is designed to help students enhance their ability to analyze business problems and create reliable financial models. The curriculum focuses on the application of corporate finance theory and principles to valuation and financial decision making and assists students in developing proficiency in financial model building and in advanced capital budgeting analysis based on a real options approach. Course work emphasizes the development of competencies in Monte Carlo simulation, econometrics, and decision analysis under uncertainty. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

The program assists in preparing individuals to work in positions as financial analysts, financial managers, budget heads, risk analysts, business planners, financial controllers, financial advisers, and corporate strategists.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master's degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master's degree program, as well as for professionals who already hold a master's degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants should submit an online nondegree application, available at <http://www.gradsch.psu.edu/portal/gateway.html>, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current résumé, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With program adviser approval, all four courses in the certificate program may be applied to the master's degree program in Finance or the Master of Business Administration program at Great Valley. Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email [gvmadmiss@psu.edu](mailto:gvmadmiss@psu.edu)) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

### Curriculum

The graduate certificate program in financial modeling includes a total of four required courses (FIN 531, BUSAD 526, FIN 532, and BUSAD 525) for a total of 12 graduate credits. Students must complete each course with a grade of B or better to receive a graduate certificate. All courses are 3 credits.

#### Prescribed Courses (12 credits)

##### Business Administration (BUSAD)

- 525. Quantitative Methods in Finance (3 credits)
- 526. Current Issues in Corporate Finance (3 credits)

##### Finance (FIN)

- 531. Financial Management (3 credits)
- 532. Financial Decision Processes (3 credits)

- [BUSAD course list](#)
- [FIN course list](#)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011

Expiration Date: Summer Session 2016

Last reviewed by the Department: Summer Session 2011

Blue Sheet Item #: 40-03-102

Review Date: 11/08/2011



## Geographic Information Systems

### Postbaccalaureate Credit Certificate Program

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The Postbaccalaureate Certificate Program in Geographic Information Systems (GIS) helps professionals in a variety of fields become knowledgeable and skillful users of geographic information systems. The program was designed specifically for experienced GIS practitioners who lack formal education in geography and GIS and wish to advance their careers, and for those who seek to make career changes. The program is offered through Penn State's World Campus. Students earn the certificate by completing four instructor-led online courses -- three required and one elective. Students who successfully complete the program earn 11 academic credits (2 credits for the first course, 3 credits each for the rest). Students subsequently admitted to the Department of Geography's Master of GIS degree program may count up to 15 credits of certificate program courses toward the MGIS degree.

### Admission Requirements

Applicants must have received, from a regionally accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. Applicants from countries in which English is not the primary language must earn TOEFL scores of at least 550 for the paper test or 213 for the computer-based test.

### PRESCRIBED COURSES

#### GEOGRAPHY (GEOG)

- 482. The Nature of Geographic Information (2)
- 483. Problem-Solving with GIS (3)
- 484. GIS Database Development (3)

### ELECTIVES

Choose at least 3 credits from:

#### GEOGRAPHY (GEOG)

- 485. GIS Programming and Customization (3)
- 486. Cartography and Visualization (3)
- 487. Environmental Applications of GIS (3)
- 488. Acquiring and Integrating Geospatial Data (3)

Graduate courses carry numbers from 500 to 599 - 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [GEOGRAPHY \(GEOG\) course list](#)

Effective Date: Summer Session 2011  
Expiration Date: Spring Semester 2016

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-191

Review Date: 01/10/2012

## Geospatial Intelligence

### Graduate Credit Certificate Program

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The Geospatial Intelligence certificate promotes sound theory, methodologies, techniques, ethics, and best practices in the professional application of geospatial intelligence. The program is for working geospatial intelligence professionals with more than two years of experience who are only able to participate part-time and at a distance, while maintaining full-time professional responsibilities. The curriculum integrates the geospatial information science and intelligence disciplines in a synergistic manner. All courses are instructor-led and online. Students devote approximately eight to twelve hours per week to each course. Although assignments are due weekly, students are free to study at their convenience. The program is well suited for the geospatial intelligence professional serving outside the continental US. All candidates are required to take the 3-credit foundations course, 6-credits of geospatial information science and technology courses, a 3-credit course in a geospatial intelligence area of the student's interest, and a minimum of 1-credit of capstone work. Half of the credits must be at the 500- level or above.

### Admission Requirements:

An applicant for the graduate certificate must have received, from a regionally accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. An entering student must have worked, anticipates working, or completed in a satisfactory manner course work in an area related to national security, law enforcement, or business. The student must be admitted to the: (1) Penn State's Graduate School, (2) World Campus, and (3) Department of Geography. To apply, the student completes a single online application that provides the necessary information to each organization. In addition to completing the online application, transcripts must be submitted to the program by surface mail. The Geospatial Intelligence Program Admissions Committee reviews and ranks applications as they are received.

### Prescribed Courses

GEOGRAPHY (GEOG)

- 483. Problem Solving with GIS (3)
- 882. Geographic Foundations of Geospatial Intelligence (3)

or

- 883. Remote Sensing for the Geospatial Intelligence Professional (3)
- 884. Geographic Information Systems for the Geospatial Intelligence Professional (3)

594A. Seminar in Geospatial Intelligence

### Electives

GEOGRAPHY (GEOG)

Choose at least 3 credits from:

- 485. GIS Programming and Customization (3)
- 486. Cartography and Visualization (3)
- 489. GIS Application Development (3)
- 585. Open Web Mapping (3)
- 863. GIS Mashups for Geospatial Professionals (3)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[GEOGRAPHY \(GEOG\) course list](#)

Effective Date: Spring Semester 2012  
Expiration Date: Spring Semester 2016

Last Revised by the Department: Fall Semester 2011

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Review Date: 01/10/2012

## Geriatric Nursing Education

### Graduate Credit Certificate Program

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In conjunction with the Hartford Center of Geriatric Nursing Excellence, the Penn State School of Nursing offers a Geriatric Nursing Education Graduate Certificate program. The primary goal of the program is to prepare individuals with a current Master's degree in Nursing or a related health discipline to teach geriatric content at both the Associate and Baccalaureate degree levels. The curriculum includes 6 credits (two 3 credit courses) of didactic content in gerontology and 6 credits (two 3 credit courses) of didactic content in education. All four courses will be delivered using distance technology, and are currently available through the World Campus.

The Geriatric Nursing Education certificate program consists of four graduate-level courses (12 credits).

#### Admission Requirements

Applicants must hold a Master's degree in nursing or a related health discipline from a U.S. regionally accredited institution, or a Master's degree that is equivalent to a U.S. Master's degree from an officially recognized degree-granting international institution. The credit conditions for the Masters degree must be substantially equivalent to those required by Penn State's Master's degree programs in nursing or related health disciplines. Copies of all undergraduate and graduate degree transcripts must accompany the application.

Prior to an applicant's admission, transcripts are evaluated by the Director of the Hartford Center in collaboration with the admissions committee to ascertain the applicant's potential for successful completion of the core nursing courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education prior to making an offer of admission to this certificate program.

#### PRESCRIBED COURSES

##### NURSING (NURS)

- 522. Comprehensive Assessment of the Older Adult (3)
- 523. Interventions for Common Health Problems of the Older Adult (3)

##### ADULT EDUCATION (ADTED)

- 460. Introduction to Adult Education (3) AND
- 506. Program Planning in Adult Education (3) OR
- 507. Research and Evaluation in Adult Education (3)

OR

##### NURSING (NURS)

- 840. Nursing Education Theories and Strategies (3) AND
- 841. Assessment and Evaluation in Nursing Education (3) OR
- 842. Curriculum and Program Development in Nursing Education (3)

To be awarded the Graduate Certificate in Geriatric Nursing Education, students must successfully complete

NURS 522, NURS 523, ADTED 460, and ADTED 506 or ADTED 507

- OR -

NURS 522, NURS 523, NURS 840 and NURS 841 or NURS 842

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2013  
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Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-06-198

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## Health Sector Management

### Graduate Credit Certificate Program

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The School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) Graduate Certificate program in Health Sector Management.

The program is designed to provide preparation for individuals who work or aspire to work in the health sector as administrators, managers, physicians, nurses, pharmaceutical representatives and scientists, and other health sector professionals. The program is designed to respond to the needs of professionals in health care provider organizations, third-party payors, biopharmaceutical organizations, and other organizations whose business is focused on the health sector including information technology, medical devices, benefits management, clinical research organizations, and consulting firms.

The curriculum emphasizes development of the knowledge, skills, and abilities necessary to understand and influence the dynamics of the health sector's business environment. The curriculum's broad focus considers business issues from the vantage points of multiple stakeholders to prepare students with a comprehensive understanding of the health sector. The program is designed to help students build a distinctive competence in health sector management that is relevant not only to managers and professionals employed by payor and provider organizations but also for those employed by biopharmaceutical, medical device, information technology, and other organizations that comprise the health sector. Required course work emphasizes the key dimensions of policy, financing, and organization in the health sector; critical analysis of current issues that health sector organizations face; as well as legal and ethical dimensions of decision making in the health sector. The cost, quality, access paradigm serves as an over-arching framework for study of current issues in the health sector including commercialization of biopharmaceuticals, information technology (IT) solutions, marketing, regulation, and quality improvement. Content is grounded in research and best demonstrated practice and is both theoretical and applied, with an emphasis on practical application of knowledge gained.

This certificate program is attractive to individuals who desire advanced education in health sector management but who do not wish to pursue a master's degree at this time, as well as those interested in pursuing specialized knowledge of health sector management concurrent with a graduate degree program. With program approval, the courses in this graduate certificate program may be applied to the Master of Business Administration program at Great Valley or, in the case of two courses in the certificate program (BUSAD 530 and BUSAD 534), to the Master of Leadership Development (MLD) program. This graduate certificate program also is valuable for individuals who already hold a master's degree and wish to update or expand their knowledge and skills.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average. Applicants holding a master's degree or doctoral degree should have attained at least a cumulative grade point average of 3.0 (B) in previous graduate work. Professional experience will be taken into consideration for admission.

Applicants should submit an online nondegree certificate application, available at <http://www.gradsch.psu.edu/portal/gateway.html> and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current resume, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With adviser approval, all four courses in the certificate may be applied to the Great Valley MBA, and two courses (BUSAD 530 and BUSAD 534) may be applied to the Great Valley Master of Leadership Development program.

- Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email [gvalmiss@psu.edu](mailto:gvalmiss@psu.edu)) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to a master's degree program and enrolls on a degree basis, certificate courses completed with a grade of B or better will be "transferred" into the program. Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.
- Students who are already enrolled at Penn State in a master's degree program must make a new, separate online application to the certificate program. Certificate program courses will only apply to their master's program with adviser approval. Courses applied to the student's master's degree program must be completed with a grade of "B" or better.

### International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission.

### Curriculum

The graduate certificate program in health sector management requires a total of four 3-credit courses (12 graduate credits) as outlined below. One course is required (BUSAD 530), and three courses are electives selected from a list of four courses (BUSAD 534, 578, 835; H P A 836). Students completing each of the four 3-credit courses with a grade of B or better will be eligible to receive a graduate certificate.

#### Required Course (3 credits)

##### Business Administration (BUSAD)

530. Biotechnology and Health Industry Overview

#### Elective Courses (9 credits) (Choose 3 from the following 4 courses):

##### Business Administration (BUSAD)

534. Ethical Dimensions of Management in the Biotechnology and Health Industries  
578. Managing Business Processes  
835. Commercialization of Biopharmaceuticals

##### Health Policy and Administration (H P A)

836. Health Law

- [BUSAD course list](#)
- [H P A course list](#)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Spring Semester 2012

Expiration Date: Fall Semester 2016

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-139

Review Date: 02/21/2012

## Human Resources and Employment Relations (HRER)

### Graduate Credit Certificate Program

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The program is designed for professionals who desire further education in the specialized field of Human Resources and Employment Relations (HRER) without completing a full master's degree. Many professionals and recent graduates believe they need further education beyond their bachelor's degree for personal and professional development and to compete effectively in the labor market for HRER practitioners. The certificate program provides flexibility for working professionals and advanced knowledge in the rapidly changing field of HRER in many areas, including: dispute management and resolution, workplace diversity, work and family, trends in human resources, and technology and the workplace. Upon successful completion of the certificate program, students may opt to apply for the master's degree in HRER.

Students must complete 9 credits.

### Admission Requirements:

Admission to the program does not assume former knowledge of the field of HRER. An applicant must have received a valid bachelor's degree from a regionally accredited institution and have two years of full-time professional work experience. The following documentation must be submitted for evaluation prior to admission:

- A valid transcript demonstrating graduation from a baccalaureate degree program
- A one-page statement of purpose, focusing on educational and professional objectives
- A resume

### List of Courses Included in the Certificate:

#### HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)

504. Seminar in Employment Relations (3)

505. Seminar in Human Resources (3)

Select One Elective from the Course List below:

500. Topics in Comparative Industrial Relations (3)

501. Labor and Employment Law (3)

502. Organizations in the Workplace (3)

512. Research Methods in Human Resources and Employment Relations I (3)

513. Research Methods in Human Resources and Employment Relations II (3)

516. Labor Market Analysis (3)

536. Diversity in the Workplace (3)

Effective Semester: Summer 2010

Expiration Semester: Summer 2015

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-195

Review Date: 01/10/2012

## Homeland Security and Defense

### Graduate Credit Certificate Program

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School of Public Affairs  
Middletown, PA 17057  
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This 12-credit graduate certificate program is designed to provide students interested in the subject with a certificate to demonstrate knowledge of the Homeland Security and Defense system. Students will learn about the major legislation shaping homeland security policy, the interaction of key actors needed for successful homeland security and defense, and applications to the Commonwealth of Pennsylvania.

The certificate program is an attractive option for those who desire advanced education but do not wish a full Master's Degree program. It is also an attractive option for students who might wish to take a certificate to determine if they are interested in a complete degree program. For students in the i-MPS in Homeland Security, this would provide an additional credential. Finally, this certificate features classes that could serve as electives for current students at Penn State.

The curriculum consists of four required courses: P ADM 401 (Foundations of Homeland Security), P ADM 404 (Homeland Security and Defense in Practice), P ADM 802 (Collaboration and Integration: Multifaceted Approaches to Homeland Security), P ADM 803 (Strategic Planning and Organizational Imperatives in Homeland Defense and Security).

### Admission Requirements

Applicants must present a baccalaureate degree from an accredited institution and must have a 3.0 or higher undergraduate grade point average.

### PRESCRIBED COURSES:

12 credits

### PUBLIC ADMINISTRATION (P ADM)

- 401. Introduction to Homeland Security (3)
- 404. Homeland Security and Defense in Practice (3)
- 802. Multifaceted Approaches to Homeland Security (3)
- 803. Strategic Planning and Organizational Imperatives in Homeland Defense and Security (3)

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Effective Date:** Fall Semester 2010

**Expiration Date:** Summer Session 2015

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-05-161

Review Date: 02/23/2010

## Human Factors Engineering and Ergonomics

### Graduate Credit Certificate Program

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Harold and Inge Marcus  
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Individuals involved in the design and development of products for human use will find the program content immediately applicable to their job. With an emphasis on the application of user engineering design principles, the tools and methods to assess and enhance quality and productivity for both consumers and employees are provided. Applications include medical devices, consumer products, military systems, software design and the workplace. The program is comprised of three courses from the Penn State curriculum. These courses provide students with both a breadth and depth in their exposure to user engineering tools and principles.

### Admission Requirements

An applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Graduates in engineering, physical sciences, and mathematics who present a 3.0 grade-point average will be considered for admission. International students must satisfy the Graduate School's English language requirement. Professional experience will be taken into consideration for admission. Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests.

GRE scores are not required for nondegree graduate students. Individuals who wish to apply to the graduate degree program in Industrial Engineering must submit an application for admission, along with all of the required supporting documentation, including GRE scores. Completion of a graduate credit certificate at Penn State does not imply or guarantee admission to a graduate degree program.

### PRESCRIBED COURSES (9 credits)

#### INDUSTRIAL ENGINEERING (I E)

- 479. Human Centered Product Design and Innovation (3)
- 553. Engineering of Human Work (3)
- 558. Engineering of Cognitive Work (3)

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

- [INDUSTRIAL ENGINEERING \(I E\) course list](#)

Effective Date: Spring Semester 2012  
Expiration Date: Fall Semester 2016

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-077

Review Date: 06/12/2012



## Information Systems Security

### Postbaccalaureate Credit Certificate Program

Lead Certificate Chair:

Michael McNeese  
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814-865-6170

This postbaccalaureate certificate program is designed to provide students or professionals with both a breadth and depth of training in information security. The certificate will enable those completing the program to market to academic institutions, government, and technology-based businesses.

Student will be exposed to principles, models, tools, and applications in information security that specifically focus on network security, security and risk management, digital forensics, crisis and disaster management, and web security and privacy. A distance education format is used to accommodate the needs of professionals already active in this area.

The certificate program is an attractive option not only for those who desire advanced education but do not wish a full Master's Degree program, but also for students who might wish to take a certificate to determine if they are interested in a complete post-baccalaureate degree program in Information Sciences and Technology (IST). Up to 15 credits of coursework taken in non-degree status can count towards a graduate degree in IST.

To be awarded the Certificate, students must successfully complete 15 credits of graduate course work including IST 554, IST 515, and three of the following courses: IST 451, IST 454, IST 456, or IN SC 561.

### Admission Requirements

An applicant must have received, from an accredited institution, a baccalaureate degree equivalent to those required by Penn State. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the certificate. It is expected that students will have a basic level of competency in computer language and information technology (related work experience can be used to demonstrate such competency). International students must satisfy the Graduate School's English language requirement.

GRE scores are not required for nondegree graduate students. Individuals who wish to apply to the graduate degree program in Information Sciences and Technology must submit an application for admission, along with all of the required supporting documentation, including GRE scores.

### Required Courses (6 credits)

IST 515. Information Security and Assurance (3 cr.)  
IST 554. Network Management and Security (3 cr.)

**Elective Courses** (Select 9 credits from the following courses or other courses as approved by the College)

IST 451. Network Security (3 cr.)  
IST 454. Computer and Cyber Forensics (3 cr.)  
IST 456. Security and Risk Management (3 cr.)  
IST 564. Crisis, Disaster, and Risk Management (3 cr.)  
IN SC 561. Web Security and Privacy (3 cr.)

[INFORMATION SCIENCES AND TECHNOLOGY \(IST\) course list](#)

Effective Date: Summer Session 2009  
Expiration Date: Spring Semester 2014

Last Revised by the Department: Spring Semester 2009

Blue Sheet Item #: 37-07-070

Review Date: 5/28/09

Updated by Publications: 1/11/12

## Institutional Research

### Postbaccalaureate Credit Certificate Program

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The primary goal of the program is to improve the skills of institutional researchers on college and university campuses. The curriculum includes research design, assessment and evaluation, and the integration of strategic planning with institutional finance. All candidates are required to take 18 credits of coursework (21 credits if Intro Statistics is needed).

### Admission Requirements

An applicant must have received, from an accredited institution, a baccalaureate degree earned under resident and credit conditions substantially equivalent to those required by Penn State. Students are expected to have knowledge of introductory statistics. Students without a background in statistics will enroll in a statistics course online before commencing their coursework in the certificate program.

### PRESCRIBED COURSES

#### HIGHER EDUCATION (HI ED)

- 801. Foundations and Fundamentals of Institutional Research (3)
- 830. Designing Institutional Research Studies (3)

#### ELECTIVES (select four)

#### HIGHER EDUCATION (HI ED)

- 810. Planning and Resource Management Studies (3)
- 820. Studying Students and Student Affairs Programs (3)
- 840. Assessing Student Outcomes and Evaluating Academic Programs (3)
- 850. Analyzing Faculty Workload, Performance, and Compensation (3)
- 860. Conducting Enrollment Management Studies (3)

#### STATISTICS (STAT)

- 500. Applied Statistics. Multivariate Analysis, Correlation, Regression (3)

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

- [HIGHER EDUCATION \(HI ED\) course list](#)
- [STATISTICS \(STAT\) course list](#)

Effective Date: Spring Semester 2009  
Expiration Date: Spring Semester 2013

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-05-162

Review Date: 02/23/2010

## Investment Management

### Graduate Credit Certificate Program

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The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in investment management.

The curriculum focuses on essential knowledge and skills in investment management related to financial markets; security valuation; portfolio theory and practices, including portfolio valuation and optimum portfolio allocation; fixed income markets and equity markets; and risk and return. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

The program is designed to help prepare students for positions in investment management including portfolio manager, investment adviser, and mutual fund manager, wealth manager, financial planner, private banking adviser, and mutual fund analyst. Individuals working or aspiring to work in the areas of specialized commodity funds, hedge funds, investment advice, performance evaluation, quantitative analysis in the money management sector, mutual funds, and pension funds will find this program valuable.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master's degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master's degree program, as well as for professionals who already hold a master's degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants should submit an online nondegree application, available at <http://www.gradsch.psu.edu/portal/gateway.html>, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current résumé, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With adviser approval, all four courses in the certificate program may be applied to the master's degree program in Finance or the Master of Business Administration program at Great Valley. Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email [gvadmiss@psu.edu](mailto:gvadmiss@psu.edu)) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

### Curriculum

The graduate certificate program in investment management requires a total of four courses (12 graduate credits). Three of the courses are required (FIN 531, FIN 506, and BUSAD 585), and the fourth course is an elective selected from a list of two courses (BUSAD 527 or FIN 508). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate. All courses are 3 credits.

#### Prescribed Courses (9 credits)

##### Business Administration (BUSAD)

585. Research in Security Valuation (3 credits)

##### Finance (FIN)

506. Portfolio Theory and Policy (3 credits)

531. Financial Management (3 credits)

**Elective Course:** Choose one course from the following two (3 credits)

##### Business Administration (BUSAD)

527. Fixed Income Securities (3 credits)

##### Finance (FIN)

508. Analysis of Financial Markets (3 credits)

- [BUSAD course list](#)
- [FIN course list](#)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011

Expiration Date: Summer Session 2016

Last reviewed: Summer Session 2011

Blue Sheet Item #: 40-03-104

Review Date: 11/08/2011

## Leadership in Elementary Science Teaching

### Graduate Credit Certificate Program

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The School of Graduate Professional Studies at Penn State Great Valley offers a four course (12-credit) Post-Baccalaureate Certificate program in Leadership in Elementary Science Teaching which is designed for teachers who wish to improve their knowledge concerning the nature of science, science content, and science teaching.

Certificate program courses have been selected from the master of education program in Curriculum and Instruction emphasizing Science Education and are regularly offered at Penn State Great Valley. All science content courses in the program are designed to comply with Pennsylvania State Standards and were developed in collaboration with scientists at Penn State. They are designed to help teachers grasp essential science concepts and principles (related to physical, life, and environmental science) and to become more comfortable in teaching science. Science teaching courses promote better understanding of the nature, content, and process of science and the basic principles of science teaching, science process skills, inquiry, and assessment. Course participants develop both knowledge and leadership skills in enhancing the quality of student learning experiences. The research course is designed to help participants learn how to read, interpret, and conduct research. Through discussion, classroom activities, and hands-on projects, course participants can learn the process of qualitative and quantitative methods of inquiry and apply this knowledge to enhance the teaching and learning of science teaching in schools.

Four 3-credit courses are required (for total of 12 credits). Students complete one required Science Content course (3 credits), and one required Research course (3 credits) which may be selected from a choice of two. Students also select two Science Teaching courses (6 credits) from a selection of Science Education (SCIED) course offerings based on their backgrounds and interests. All course content in the certificate program provides a balanced mix of theory, research, and practical application in the topics. Students who complete the program with at least a 3.0 (B) average receive the Post-Baccalaureate Certificate in Leadership in Elementary Science Teaching.

### Admission Requirements:

Individuals wishing to enroll in this post-baccalaureate certificate program must have a requisite combination of education and classroom teaching experience. They must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. They also should hold a minimum of an Instructional I Certification. Individuals who do not hold the Instructional I Certification should contact an adviser about enrollment options.

Applicants should complete and submit the online nondegree application and application fee and will enroll on a nondegree basis. For more information about how to apply on a nondegree basis, refer to <http://grsdsch.psu.edu/prospective/apply.html>. The program may be started in the fall, spring, or summer semesters.

The courses in this post-baccalaureate certificate program are applicable to the master's degree program in Curriculum and Instruction offered through the School.

Students who wish to have the certificate courses applied to the master's degree program in Curriculum and Instruction must be formally admitted to the master's degree program. Note that admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (610-648-3242) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, the certificate program courses completed with a grade of "B" or better will be "transferred" into the program.

Penn State's Graduate School permits up to 15 credits of course work taken on a nondegree basis to be applied to a graduate degree. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### Required Courses (12 Credits):

#### A. Science Content Course: Required (3 credits)

#### SCIENCE EDUCATION (SCIED)

457. Environmental Science Education

#### B. Research Course: Required (3 credits) - Choose one of the following two:

#### CURRICULUM AND INSTRUCTION (C I)

501. Teacher as Inquirer  
 400. Introduction to Research Literature

#### C. Two Science Teaching Courses (6 credits). Choose two of the following three or from other departmental offerings of 500-level graduate science education teaching courses:

#### SCIENCE EDUCATION (SCIED)

410. Using Technology to Enhance Science Teaching (3 credits)  
 551. History, Philosophy, and Sociology of Science and Science Teaching (3 credits)  
 559. Analysis of Instruction in Elementary Science Education (3 credits)

[SCIENCE EDUCATION \(SCIED\) course list](#)  
[CURRICULUM AND INSTRUCTION \(C I\) course list](#)

EFFECTIVE DATE: Summer Session 2009  
 EXPIRATION DATE: Spring Semester 2014

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item#: 37-07-071

Review Date: 6/16/09

## Literacy Strategies Across Content and Cultures

### Graduate Certificate Program

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The School of Graduate Professional Studies offers a three-course (9-credit) Graduate Certificate program in *Literacy Strategies Across Content and Cultures*. This program is designed for K-12 teachers of all disciplines and focuses on strategies for encouraging effective reading, writing, speaking, and thinking while teaching new concepts and linking prior knowledge. Attention is given to how culture and gender inform and influence learning and how to use these differences to enhance the learning experience.

In each content area, teachers will develop specific approaches to helping K-12 students learn to read better, write expressively, speak effectively, and think critically within and across content areas. The courses that comprise this certificate program have been selected from the graduate program in Curriculum and Instruction with an emphasis in Literacy and are regularly offered at Penn State Great Valley. Course content provides a balanced mix of theory, research and practical application in the topics. Students who complete the program with at least a 3.0 (B) average receive the Graduate Certificate in Literacy Strategies Across Content and Cultures.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must have a requisite combination of education and classroom teaching experience. They must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. They also should hold an Instructional I Certification. Individuals who do not hold the Instructional I Certification should contact an adviser about enrollment options.

Applicants should submit an online nondegree application and fee and, upon approval, will enroll in course work on a nondegree basis. For more information about how to apply on a nondegree basis, refer to <http://gradsch.psu.edu/prospective/apply.html>. The program may be started in the fall, spring, or summer semesters.

With adviser approval, all three courses in the certificate program may be applied to the master's degree program offered through the School of Curriculum and Instruction.

Certificate program students who wish to have the certificate courses applied to the master's degree program in C I must formally be admitted to the master's degree program. Note that admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (610-648-3242) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a "B" or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### Required Courses (6 credits)

#### LANGUAGE AND LITERACY EDUCATION (LL ED)

501. Teaching Writing in Elementary and Secondary Schools (3 cr.)  
541. Adolescent and Children's Literature Related to Ethnic and Social Issues (3 cr.)

### Elective Course: Choose one course from the following two (3 credits)

#### LANGUAGE AND LITERACY EDUCATION (LL ED)

450. Content Area Reading (3 cr.)  
500. The Reading and Writing Classroom (3 cr.)

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirement when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

#### [LANGUAGE AND LITERACY EDUCATION \(LL ED\) course list](#)

Effective Date: Summer Session 2009  
Expiration Date: Spring Semester 2014

Last Revised by the Department: Spring Semester 2009

Blue Sheet Item #: 37-07-072

Review Date: 5/28/09

## Long-Term Care Administration and Policy

### Graduate Credit Certificate Program

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The Health Administration program at Penn State Harrisburg offers a Long-Term Care Administration and Policy graduate credit certificate program. This certificate program is designed for working long-term care administrators, professionals, and policy makers in for-profit, not-for-profit, and public organizations who need more knowledge and skills in long-term care administration and policy, as well as in long-term care systems and their relationship to and integration with health-care systems. Persons completing the program will receive a transcript notation attesting to their accomplishment.

The Long-Term Care Administration and Policy graduate credit certificate program consists of four Health Administration (H ADM) graduate-level courses (12 credits).

### Admission Requirements

Applicants for the certificate program must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Additionally, applicants must have at least three years of professional experience.

All prospective graduate credit certificate students must apply using the Graduate School's certificate application. Copies of all undergraduate and graduate degree transcripts must accompany the application.

Applicants admitted into the certificate program must have a master's degree or a 3.0 grade-point average in the last two years of undergraduate work. This requirement may be waived in exceptional circumstances. All courses must be taken for a letter grade. A 3.0 grade-point average in the certificate program courses is needed for the awarding of the certificate, and only grades of C or better will be counted toward the certificate.

If an applicant to the certificate program already holds a graduate degree in health care administration or a related field and has taken graduate courses that duplicate the content of courses in the certificate program, he or she may substitute other H ADM courses for those redundant courses with the prior approval of the person in charge.

### PRESCRIBED COURSES

#### HEALTH ADMINISTRATION (H ADM)

- 542. Health Politics and Policy (3)
- 543. Long-Term Care Administration and Policy (3)
- 545. Health Financial Management (3)

### ELECTIVE COURSES (select one)

#### HEALTH ADMINISTRATION (H ADM)

- 539. Health Systems Organization (3)
- 551. Health Care Law (3)
- 552. Health Delivery Systems: Managed Care (3)

Effective Date: Summer Session 2012  
Expiration Date: Spring Semester 2017

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-149

Review Date: 1/15/2013

## Adult Education in the Health and Medical Professions

### Graduate Credit Certificate Program

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The primary goal of the Graduate Certificate in Adult Education in the Health and Medical Professions is to assist medical/health professionals in increasing their knowledge and competence in educating adult learners in medical education/health science settings.

The objectives are to promote: awareness of how learning theory informs practice; effective methods for teaching adults; development of a reflective practice; understanding of program/instructional design

Candidates are required to take **12 graduate credits, including the 9-credit core of three required classes and one other advisor-approved 3-credit graduate course** related to the candidate's specific area of interest. The required classes, in which assignments will relate to health/medical education issues, are:

ADTED 460: Introduction to Adult Education  
ADTED 501: Foundations of Medical Education  
ADTED 505: Teaching of Adults

The 3-credit graduate elective will be related to the candidate's specific interest in medical/health education.

### ADMISSION REQUIREMENTS

U.S. applicants must have a baccalaureate degree from a regionally accredited institution. International applicants must have a tertiary (post secondary) degree that is deemed comparable to a four-year U.S. bachelor's degree. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Additionally, all international applicants must meet the Graduate School's English proficiency requirements.

Applicants must submit the following materials:

- \* A one-page resume
- \* A statement describing professional goals, experience, and responsibilities (2 pages maximum)
- \* One letter of recommendation
- \* Official transcripts for all undergraduate and graduate programs previously attended.

### LIST OF COURSES INCLUDED IN THE CERTIFICATE

The three required classes include the following and assumes that the candidate would relate a part of their papers or assignments to the areas of health or medical education :

ADTED 460: Introduction to Adult Education  
ADTED 501: Foundations of Medical Education  
ADTED 505: Teaching of Adults

The 3-credit graduate elective will be related to the candidate's particular interest related to health or medical education, and could include other graduate courses in the Adult Education Program or another related area.

Effective Date: Summer Session 2010  
Expiration Date: Spring Semester 2015

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-197

Review Date: 01/10/2012



## Nonprofit Administration

### Graduate Credit Certificate Program

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The graduate credit certificate program in Nonprofit Administration is offered by the graduate program in Public Administration at Penn State Harrisburg. The certificate is designed for administrators and professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

- Management of nonprofit organizations and leadership
- In-depth understanding of nonprofit organizations' evolution, current operation, and future direction
- Understanding of finance, taxation, and competition that affect an organization's future
- Working in the nonprofit sector

### Admission Requirements

1. An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.
2. Applicants must have a GPA of 3.0 in the last two years of undergraduate work.
3. Applicant must have at least two years of managerial or administrative experience in the nonprofit sector.

Participants will apply to the program by completing the online Graduate School certificate application, including payment of the application fee, and will earn the certificate upon successful completion of the three required courses and one elective course (12 credits). All courses must be taken for a letter grade with at least a 3.0 average maintained; no grades below a C will be counted toward the certificate.

If a student who is already enrolled in a graduate degree program wishes to enroll in this graduate credit certificate program as well, he/she must do so by completing the online certificate application and paying the application fee.

Students who are already enrolled in the Public Administration degree program at Penn State Harrisburg must complete a "Notice of Intent" form as well in order to enroll in the certificate program. These students can choose elective courses for their MPA degree program in accordance with the requirements of the certificate program in order to earn the certificate in Nonprofit Administration.

The certificate program consists of four graduate courses (12 credits). All courses must be at the 500 level. Students are required to take three required courses and one elective course of their choice.

### PRESCRIBED COURSES

#### PUBLIC ADMINISTRATION (P ADM)

- 517. Nonprofit Organizations: History and Evolution (3)
- 518. Nonprofit Organizations: Management and Leadership (3)
- 519. Nonprofit Organizations: Resource Development and Management (3)

#### Elective Courses: (choose one)

Students are required to take one elective 3-credit course. Students are free to choose any 3-credit course at the 500 level that is relevant to their interest. Following is the suggested list of courses from which students can choose.

#### PUBLIC ADMINISTRATION (P ADM)

- 510. Organization
- 514. Public Organization and Managerial Consultation
- 516. Strategic Planning
- 522. Government Financial Management
- 523. Governmental and Nonprofit Accounting
- 550. Program Planning and Evaluation

Effective Date: Summer Session 2012  
 Expiration Date: Spring Semester 2017

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-150

Review Date: 01/15/2013

## Policy Analysis and Evaluation

### Graduate Credit Certificate Program

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The primary goal of the program is to prepare policy analysts and policy/program evaluation specialists who work for governments and not-for-profit organizations for professional analytical tasks. The 12-credit curriculum is designed to educate students in multiple aspects of the policy analysis and evaluation profession: general concepts in the policy analytic literature, decision making, planning, program evaluation, and issues in a public policy area of the student's choice. The credits earned for the certificate may be applied toward a Master of Public Administration (MPA) degree in Public Administration at Penn State Harrisburg. However, successful completion of the certificate neither implies nor guarantees admission to a graduate degree program at Penn State. To successfully complete the certificate program a student must maintain 3.0 cumulative grade-point average; no course with a grade of lower than a C will count toward the certificate.

### Admission Requirements

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Students who are already enrolled in the MPA program at Penn State Harrisburg and wish to enroll in the certificate program must complete the online Graduate School certificate application and pay the application fee just as any other certificate applicant would. They should also complete the Notice of Intent form and submit it to the program administration.

### Prerequisite

#### PUBLIC ADMINISTRATION (P ADM)

- 503. Research Methods (3)

### Prescribed Courses

#### PUBLIC ADMINISTRATION (P ADM)

- 507. Introduction to Public Policy Analysis (3)
- 535. Policy Analysis and Planning (3)
- 550. Policy and Program Evaluation (3)

### Elective Course

One graduate-level 3-credit course in a substantive public policy area of student's choice (e.g., health care, criminal justice, economic development, transportation, national security, welfare, education, environmental policy). Students must consult with and obtain the consent of the program coordinator when selecting this elective course.

Effective Date: Summer Session 2012  
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Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-151

Review Date: 01/15/2013

## Project Management

### Graduate Credit Certificate Program

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 Sam and Irene Black School of Business  
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Delivering complex projects on time and under budget is a daily challenge for most corporations. More organizations now use project-based methods to accomplish such tasks, resulting in increased demand for project managers. The online Graduate Certificate in Project Management is an interdisciplinary, 12-credit program that uses problem-based learning to provide a strong foundation in project management theory and practice. The program is offered by the AACSB Accredited Sam and Irene Black School of Business and Penn State is a Project Management Institute (PMI)® Registered Education Provider (R.E.P), making this certificate a well-respected credential. In addition to being an excellent stand-alone credential, all of the courses in the Graduate Certificate in Project Management can be applied toward the Master of Project Management degree program also offered through Penn State's World Campus. Approval to apply nondegree graduate credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. A maximum of 15 credits earned as a nondegree student may be applied to a degree program.

### Admission Requirements

Only candidates who demonstrate high promise of success for graduate work are admitted to the program. All applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions that are deemed substantially equivalent to those currently required by Penn State. Admission decisions are based on undergraduate grade-point average, Graduate Management Admission Test (GMAT) scores, and a personal essay.

Applicants must achieve a minimum GMAT score of 450. When this score is added to the applicant's undergraduate grade-point average, multiplied by 200, the total must be at least 1,050 in order to meet minimum requirements for admission to the MPM program. Either the applicant's cumulative undergraduate grade-point average or the junior/senior grade-point average can be used for this calculation. Applicants must also demonstrate proficiency in writing by obtaining at least a 4.0 on the analytical writing assessment portion of the GMAT, or by earning a grade of B or higher in a college English composition course. The MPM program emphasizes application of course concepts to actual project management opportunities and problems. Therefore, students who currently are, or previously were, employed as project managers or project team members will derive the greatest benefit from the program. All applicants must provide evidence of sufficient current or previous work experience that will enable them to successfully complete course assignments requiring the application of course concepts to real project management situations. This evidence may be provided in either the form of three letters of recommendation from individuals who know the applicant in a professional capacity or through nomination to participate in the program by an appropriate official within the applicant's employing organization. Those who write letters of recommendation or submit nominations on behalf of the candidate will be asked to attest to the nominee's suitability for the program of study considering factors such as the applicant's length of employment, level and areas of work responsibility, personal qualities, career goals, maturity of purpose, and program requirements to apply course concepts to work-related issues. Applicants are encouraged to consult with the program chair concerning the suitability of their work experiences in relationship to program requirements.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

All students must be computer literate and have ready and reliable access to a computer and the Internet to successfully complete the MPM program. They must know how to use word processing software, log on to an Internet provider, and use e-mail. Additionally, MPM students will use Microsoft Office in their coursework that will require they have a working knowledge of Microsoft Office programs such as Word, Excel, Power Point, and Access. Access to fax facilities may be needed as an additional form of communication between student and instructor or between students.

### COURSES

Students complete MANGT 510, Project Management (3), in their first semester of study and three additional courses from the following list for a total of 12 credits:

#### MANAGEMENT (MANGT)

- 515. Cost and Value Management (3)
- 520. Planning and Resource Management (3)
- 525. Commercial and Procurement (3)
- 531. Organizations (3)
- 535. Interpersonal and Group Behavior (3)
- 540. Strategy: Corporate, Business and Project (3)

MANGT 515 through 540 may be taken either concurrently or subsequently with MANGT 510.

- [MANAGEMENT \(MANGT\) course list](#)

Effective Date: Fall Semester 2012  
 Expiration Date: Spring Semester 2016

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## Public Budgeting and Financial Management

### Graduate Credit Certificate Program

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The certificate program in Public Budgeting and Financial Management is offered by the graduate program in Public Administration at Penn State Harrisburg. The purpose of this certificate is to provide administrators and professionals in government and not-for-profit organizations an opportunity to acquire knowledge and skills in the following areas:

- fiscal and governmental aspects of budgeting and financial management
- development of organizational budgets
- governmental and not-for-profit accounting

Participants earn a certificate in Public Budgeting and Financial Management from Penn State Harrisburg upon successful completion of the three required courses (9 credits); all courses must be taken for a letter grade with at least a 3.0 average maintained, and no course with a grade of lower than C will count toward the certificate.

### Admission Requirements

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

An applicant must also have at least two years of managerial or administrative experience in a governmental or not-for-profit organization.

Participants will apply for the program by submitting a completed Graduate School certificate application and application fee.

### PRESCRIBED COURSES

#### PUBLIC ADMINISTRATION (P ADM)

- 502. Governmental Fiscal Decision-Making (3)
- 522. Government Financial Management (3)
- 523. Governmental and Not-for-Profit Accounting (3)

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

- [PUBLIC ADMINISTRATION \(P ADM\) course list](#)

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## Public Health

### Graduate Credit Certificate Program

Roger T. Anderson, Ph.D., Professor, Public Health Sciences; Chief, Division of Health Services Research; Director, Penn State Master of Public Health (MPH) Program

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 Department of Public Health Sciences  
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The purpose of the graduate certificate in Public Health is to provide students with foundational graduate-level coursework in public health. The five-course, 15-credit curriculum can be completed in two semesters. All coursework will be at the 500-level or above. Certificate coursework may be transferable to the Penn State Master of Public Health (MPH) graduate degree program should a student wish to continue public health training at the graduate level. Upon completion of the Public Health certificate, students will be able to:

1. Demonstrate their knowledge in the five core areas of public health, which include biostatistics, environmental health sciences, epidemiology, health services administration, and social and behavioral sciences.
2. Apply their knowledge and skills to solving public health problems.

### Admission Requirements:

Applicants must meet the following admissions standards:

- An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.
- The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.
- International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Applicants must submit the following items with their application for admission to the Public Health certificate program:

- One official transcript from each institution of higher education attended.
- Resume/CV
- Statement of Purpose or Rationale for seeking a Graduate Certificate in Public Health
- Two letters of recommendation

Admission decisions are made by a faculty committee and are based on the quality of the applicant's professional and academic accomplishments. Upon approval, certificate program students will enroll in coursework on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

All five courses in the certificate program may be applied to the Penn State Master of Public Health (MPH) degree program. Students must earn a grade of B or better for a course to be applied to the MPH degree program. Certificate program students who wish to have the certificate courses applied to the Penn State MPH degree program must formally apply and be admitted to the Penn State MPH degree program. Admission into the Penn State MPH degree program is a separate step and is not guaranteed. Students who are interested in the Penn State MPH degree program should contact the program at 717-531-1502 or mphprogram@phs.psu.edu, or visit www.mphprogram.psu.edu. Once a certificate program student is admitted to the Penn State MPH degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

List of Courses Included in the Certificate:

#### PUBLIC HEALTH (PHS)

- 504. Behavioral Health Intervention Strategies (3) or BB H 504: Behavioral Health Intervention Strategies (3)
- 520. Principles of Biostatistics (3)
- 542. Environmental Health Sciences (3)
- 550. Principles of Epidemiology (3)
- 571. Health Services Organization and Delivery (3) or H P A 520. Introduction to U.S. Health Services Organizations and Delivery (3)

Effective Semester: Fall 2012

Expiration Semester: Summer 2017

Last Revised by the Department: Summer Semester 2012

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## Public Health Preparedness: Disaster and Bioterrorism

### Graduate Credit Certificate Program

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This graduate certificate program is designed to provide non-science students with broad training in the field of public health preparedness. A distance education format is used to accommodate the needs of professionals already active in this area.

The certificate program is an attractive option for those who desire advanced graduate training but do not require the full Master Degree program. It is also ideal for students who wish to move into the degree program once all admissions requirements are fulfilled (e.g., GRE).

The curriculum consists of Public Health Preparedness for Disaster and Bioterrorism Emergencies I and II (PHP 410 and PHP 510; 6 credits), Public Health Evaluation of Disasters and Bioterrorism (PHP 527; 3 credits), and Critical Infrastructure Protection of Health Care Delivery systems (PHP 530; 3 credits).

### ADMISSION REQUIREMENTS

All applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. All applicants are expected to have a 3.0 or higher undergraduate grade point average. Applicants whose native language is not English must provide evidence of proficiency in English with a minimum TOEFL score of 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Three letters of recommendation are required. Special backgrounds, abilities, and interests related to homeland security are desirable.

### COURSES

#### PUBLIC HEALTH (PHP)

PHP 410. Public Health Preparedness for Disaster and Bioterrorism Emergencies I (3)  
PHP 510. Public Health Preparedness for Disaster and Bioterrorism Emergencies II (3)  
PHP 527. Public Health Evaluation of Disasters and Bioterrorism (3)  
PHP 530. Critical Infrastructure Protection of Health Care Delivery Systems (3)

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Expiration Date: Summer Session 2016

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 40-02-063

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## Public Sector Human Resources Management

### Graduate Credit Certificate Program

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The graduate credit certificate program in Public Sector Human Resources Management is offered by the Public Administration program at Penn State Harrisburg.

The certificate is designed for administrators and other professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

- personnel/human resource management
- labor relations
- problem solving
- planning
- management of organizational change and development

The certificate program in Public Sector Human Resources Management requires taking four courses (12 credits) -- two required and two elective courses.

### Admission Requirements

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. A Graduate School certificate application must be completed and submitted with copies of all undergraduate degree transcripts.

Successful applicants typically have a 3.0 grade-point average in the last two years of undergraduate work.

Applicants who have graduate degrees in public administration or a related field, and who have taken graduate courses that duplicate the content of courses in the certificate program, may substitute other P ADM courses for those courses with the prior approval of the person in charge. Graduate transcripts, course syllabus, and course projects/term papers will be needed for this evaluation process. Some certificate courses may be used toward completion of the master's degrees in Public Administration and in Health Administration but completion of a certificate neither implies nor guarantees acceptance into a graduate degree program at Penn State.

### PRESCRIBED COURSES

#### PUBLIC ADMINISTRATION (P ADM)

- \*505. Personnel Management: Public and Nonprofit Sectors (3)
- 510. Organizational Behavior (3)

\*Note: MNGMT 505 may be substituted for these courses.

#### ELECTIVE COURSES (select two)

#### PUBLIC ADMINISTRATION (P ADM)

- 511. Organizational Change and Development (3)
- 512. Issues in Human Resources (3)
- 514. Public Organization and Managerial Consultation (3)
- 515. Labor Management Relations (3)
- 516. Strategic Planning (3)

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

- [PUBLIC ADMINISTRATION \(P ADM\) course list](#)

Effective Date: Summer Session 2012  
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## Supply Chain Management

### Graduate Credit Certificate Program

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The primary goal of the program is to prepare supply chain professionals to manage value-creating supply chain networks that modern business enterprises employ to acquire, produce, and deliver goods and services on a global scale. Students learn how to analyze and manage core business processes including sourcing and procuring raw materials, supplies and components and planning and fulfilling customer demand. All candidates are required to complete with a passing grade the three prescribed 800-level, 4-credit courses to earn the certificate.

### Admission Requirements

The curriculum is designed for working supply chain management professionals. Accordingly, successful applicants will normally have, before the start of their first semester, at least two years' post baccalaureate work experience in supply chain management or a closely allied field.

An applicant must have received, from a regionally accredited institution, a baccalaureate degree under residence with credit conditions substantially equivalent to those required by Penn State. Additionally, the applicant's baccalaureate degree should be in business, engineering, economics, information sciences, or a related field and the applicant should have completed a college-level course in microeconomic principles.

To assure a smooth transition into the curriculum prospective students should have Microsoft Office Excel skills, knowledge of business statistics, and an understanding of basic accounting and microeconomic terms and principles.

### Required Courses

#### SUPPLY CHAIN MANAGEMENT (SCM)

- 800. Supply Chain Management (4)
- 810. Transportation and Distribution (4)
- 820. Strategic Procurement (4)

[SUPPLY CHAIN MANAGEMENT \(SCM\) course list](#)

Effective Date: Summer Session 2011  
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Blue Sheet Item #: 40-04-200

Review Date: 01/10/2012



## Sustainable Management Practices

### Graduate Credit Certificate Program

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The School of Graduate Professional Studies at Penn State Great Valley offers a four course (12-credit) Graduate Certificate program in Sustainable Management Practices. The primary goal of this certificate program is to prepare individuals to design, implement, and evaluate new or existing sustainable practices in their organizations. Sustainability in this context refers to the operational policies and practices that seek to maximize not only the economic, but also the social (employees, community) and environmental (physical) outcomes of an organization.

Twenty-first century organizations interested in competitive advantage and long-term survival must implement sustainable management practices into their firms' core operations. The courses required in this certificate program will ground students in the complex social, economic, political, technological, cultural, and demographic trends that influence organizational stakeholders. Students will be introduced to decision models that account for the interconnected nature of all organizational systems, and learn to build mutually beneficial alliances and partnerships with all relevant stakeholders.

The curriculum is designed to address concepts relevant to issues of sustainable management (products/services/organizations) and organizational sector (public, non-profit, private). The certificate program will develop students' critical capacities for reflection and action based upon a systems thinking framework, with respect to the social, environmental, and organizational sustainability challenges facing business leaders. Curriculum highlights pertinent research and practices from the fields of accounting, finance, economics, marketing, and operations to introduce students to value creation strategies inherent in sustainable tools and techniques. Course content is designed to provide a balanced mix of theory, research, and practical application in the topics.

This certificate program is attractive to individuals who desire advanced education in sustainable management practices but who do not wish to pursue a master's degree at this time, as well as those interested in pursuing specialized knowledge of sustainable management practices concurrent with a graduate degree program. With program approval, the courses in the certificate program may be applied to the Master of Business Administration degree program. This graduate certificate program also is valuable for individuals who already hold a master's degree and wish to update or expand their knowledge and skills.

### Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international and are expected to have achieved a 3.0 (B) or higher undergraduate grade point average. Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 (B) in previous graduate work. Professional experience will be taken into consideration for admission.

Applicants should submit an online nondegree certificate application, available at <http://www.gradsch.psu.edu/portal/gateway.html>, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current resume, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With adviser approval, all four courses in the certificate program may be applied to the Master of Business Administration degree program at Penn State Great Valley.

- Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email [gvadmiss@psu.edu](mailto:gvadmiss@psu.edu)) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to a master's degree program and enrolls on a degree basis, certificate courses completed with a grade of B or better will be "transferred" into the program. Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.
- Students who are already enrolled at Penn State in a master's degree program must make a new, separate online application to the certificate program. Certificate program courses will only apply to their master's program with adviser approval. Courses applied to the student's master's degree program must be completed with a grade of "B" or better.

### International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

### Curriculum

The graduate certificate program in sustainable management practices requires a total of four 3-credit courses (12 graduate credits). One of the courses is required (BUSAD 802), and three courses are electives selected from a list of five courses (BUSAD 582, BUSAD 809, BUSAD 824, BUSAD 879, and SYSEN 507). Students completing each of the four 3-credit courses with a grade of B or better will be eligible to receive a graduate certificate.

#### Prescribed Course (3 credits)

##### Business Administration (BUSAD)

802. Cornerstones of Sustainability (3 credits)

#### Elective Courses (9 credits) (Choose 3 from the following 5 courses)

##### Business Administration (BUSAD)

582. Social Entrepreneurship and Community Leadership (3 credits)

809. Triple Bottom Line Accounting (3 credits)

824. Finance and Investment for Sustainable Growth (3 credits)

879. Sustainable Products and Service Development (3 credits)

##### Systems Engineering (SYSEN)

507. Systems Thinking (3 credits)

- [BUSAD course list](#)
- [SYSEN course list](#)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Spring Semester 2012

Expiration Date: Fall Semester 2016

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Blue Sheet Item #: 40-05-140

Review Date: 02/21/2012

## Teaching Writing and Literacy

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This program is designed to afford educators deep study in all aspects of teaching writing and literacy. The certificate will contain 12 core credits plus a 3-credit concentration for a total of 15 credits. A grade of C or higher must be earned in each course to be counted toward the certificate.

### Admission Requirements:

An applicant must hold either (1) a baccalaureate degree in Education from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree in Education that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

### PRESCRIBED COURSES

#### EDUCATION (EDUC)

- 425. Literacy Assessment (3)
- 452. Teaching Writing (3)
- 463. The Internet and K-12 Education (3)
- 477. Teaching Struggling Readers and Writers (3)

Select one 3-credit elective concentration from the following list.

- 432. Children's Literature in Teaching Writing (3)
- 464. Technology and the Learning Process (3)
- 465. Serving Culturally and Linguistically Diverse Learners (3)

Effective Semester: Fall 2011  
Expiration Semester: Summer 2016

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-06-201

Review Date: 04/09/2013

## Teaching English to Speakers of Other Languages (TESOL)

### Graduate Credit Certificate Program

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The Graduate Certificate in Teaching English to Speakers of Other Languages (TESOL) is designed for candidates holding a baccalaureate degree with little or no previous experience teaching adult English language learners either in the US or abroad. Candidates are required to take four 3-credit graduate level courses that contain integrated practical field experiences that enable candidates to gain essential knowledge, skills, and dispositions for teaching adult English language learners in diverse contexts throughout the world.

### Admission Requirements

Candidates must have received either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution with a minimum GPA of 3.0 on a 4.0 scale.

International candidates must have a minimum TOEFL score of 600 (paper-based), 250 (computer-based), or 100 (internet-based) with a 23 on the oral section.

### List of Courses Included in the Certificate:

APPLIED LINGUISTICS (APLNG)

802 FOCUS ON ENGLISH: TEACHING FORM, MEANING & USE (3)  
804 FOCUS ON LEARNERS: IDENTITY, COMMUNITY & LANGUAGE LEARNING (3)  
806 FOCUS ON CLASSROOMS: PLANNING & SUPPORTING LANGUAGE LEARNING (3)  
808 FOCUS ON INSTRUCTION: TEACHING & ASSESSING LANGUAGE LEARNING (3)

Capstone experience: Professional e-portfolio that draws upon aspects of course work that demonstrate achievement of all program goals and can be used when applying for teaching positions around the world.

Effective Semester: Fall 2010  
Expiration Semester: Fall 2016

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-201

Review Date: 01/10/2012

## Workplace Learning and Performance Improvement Design

### Graduate Credit Certificate Program

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The School of Graduate Professional Studies at Penn State Great Valley offers a four course (12 credit) Graduate Certificate program in Workplace Learning and Performance Improvement Design. The primary goal of this certificate program is to provide professionals with the knowledge and skills needed to successfully create learning and performance improvement initiatives/interventions in their organizations.

The courses in the program have been selected from the graduate program in Instructional Systems and focus on essential knowledge, critical thinking skills, and effective problem-solving strategies as they relate to the design, development, implementation, and evaluation of learning and performance improvement solutions in corporate, educational, and nonprofit organizations. These courses are taught at the graduate level, and content provides a balanced mix of theory, research, and practical application in the topics. Students who complete the program with at least a 3.0 (B) average receive the Graduate Certificate in Workplace Learning and Performance Improvement.

### Admission Requirements:

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants should complete and submit the online nondegree application and application fee and will enroll on a nondegree basis. For more information about how to apply on a nondegree basis, refer to <http://gradsch.psu.edu/prospective/apply.html>. The program may be started in the fall, spring, or summer semesters.

The courses in this graduate certificate program are applicable to the master's degree program in Instructional Systems offered through the School.

Certificate Program students who wish to have the certificate courses applied to the master's degree program in Instructional Systems must be formally admitted to the master's degree program. Note that admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (610-648-3242) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, the certificate program courses completed with a grade of "B" or better will be "transferred" into the program.

Penn State's Graduate School permits up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

### Required Courses (12 Credits)

#### INSTRUCTIONAL SYSTEMS (INSYS)

415. Systematic Instructional Design (3 credits)  
521. Instructional Systems Analysis (3 credits)  
551. Performance Technology (3 credits)  
553. Managing and Consulting for Instructional Development (3 credits)

[INSTRUCTIONAL SYSTEMS \(INSYS\) course list](#)

EFFECTIVE DATE: Summer Session 2009  
EXPIRATION DATE: Spring Semester 2014

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item#: 37-07-075

Review Date: 6/16/09

## Writing Instruction Specialist

### Postbaccalaureate Credit Certificate Program

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This Writing Instruction Specialist Certificate is a 15-credit program designed to serve the continuing educational and professional development needs of educators and other professionals in writing and writing instruction. The program is grounded in ongoing changes in theory and instructional practices in writing, and changes in the requirements for continued education and professional development of teachers. Completion of the program will prepare professionals to provide specialized assistance in composition and to serve as a resource on writing pedagogy. Students must earn a B or higher in each course that counts toward the certificate program.

### Admission Requirements

An applicant must hold either (1) a baccalaureate degree or a Master of Arts degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

To be considered for admission into the certificate program, applicants must have a master's degree or a 3.0 grade-point average in the last two years of undergraduate work. This requirement may be waived in exceptional circumstances.

### PRESCRIBED COURSES

#### ENGLISH (ENGL)

- 409. Composition Theory and Practice for Teachers (3 credits)
- 507. English Composition Studies (3 credits)
- 553. Literacy Studies (3 credits)
- 584. Studies in Rhetoric (3 credits)

#### EDUCATION (EDUC)

- 452. Teaching Writing (3 credits)
- [EDUCATION \(EDUC\) course list](#)
- [ENGLISH \(ENGL\) course list](#)

Effective Date: Spring Semester 2013  
Expiration Date: Fall Semester 2017

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-05-184

Review Date: 02/19/2013

## Providing Services to Youth At Risk

### Postbaccalaureate Credit Certificate Program

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#### Description of the Certificate Program Including Purpose, Objectives, and Total Number of Credits Required:

The purpose of this program is to provide a current knowledge and skills base to those working with children and adolescents experiencing family problems, addiction, depression, sexuality, suicide, and numerous other concerns. The plan of study is composed of 15 credits to be completed within three years (four required 3-credit courses and one 3-credit elective). Applicants with a master's degree or higher in counseling, psychology, social work, marriage and family, or a clearly related degree that will qualify them to perform professional counseling duties can use this professional development certificate to strengthen their professional credentials. Applicants holding a baccalaureate degree from a regionally accredited undergraduate institution as their highest degree may use this certificate to support them in their work setting (e.g., teaching, college student affairs, human resources, personnel work), but it will not qualify them to perform professional counseling duties.

#### Admission Requirements:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants seeking admission into the Providing Services to Youth At Risk Certificate Program must complete the Graduate School Certificate Application (indicate "certificate" in the Graduate Degree Sought Area) and pay the application fee. This certificate is not a formal part of a graduate degree program at Penn State and does not presume admission to such a program. The web-based Graduate School Certificate Application is available at: <http://www.gradsch.psu.edu/prospective/apply.html>.

**PRESCRIBED COURSES:** 12 credits

#### COUNSELOR EDUCATION (CN ED)

- 422. Foundations of Addictions Counseling (3)
- 430. Couples and Family Counseling (3)
- 431. Counseling and Teaching Youth at Risk (3)
- 432. Ethical, Legal, and Professional Issues in Counseling (3)

**ELECTIVE COURSES:** 3 credits

Three (3) elective credits that emphasize work with youth at risk are required. Courses must be selected in consultation with a program adviser.

**Effective Date:** Summer Session 2012

**Expiration Date:** Spring Semester 2017

Last Revised by the Department: Fall Semester 2012

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